

Global Event Control Server®



Version 3.11
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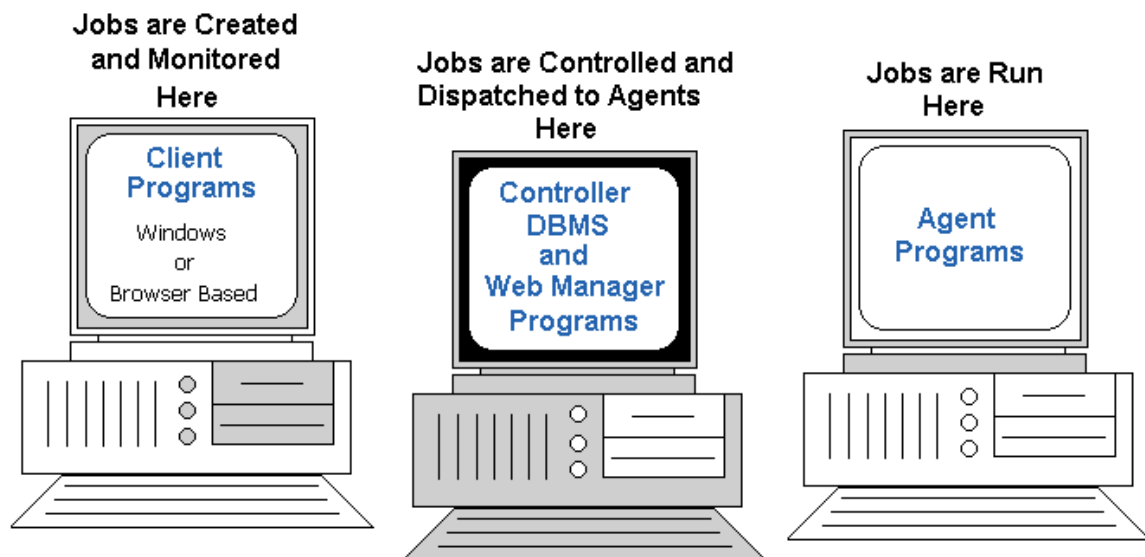
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Introduction

The Global Event Control Server®

The Global Event Control Server® (GECS) is a set of integrated tools for creating a sophisticated computer automation, job scheduling and batch processing system. GECS lets you apply mainframe concepts of 24 hour job scheduling and automated batch processing to your client / server systems.

GECS uses several components to create, monitor, control and run jobs; Client programs, Controller, DBMS, Web Manager and Agent programs.



Client Programs

The Client programs are run on users' workstations. They provide a single point of control for monitoring and managing job streams and the GECS system. There are two types of GECS Client programs. There are Browser Based Client programs and Windows Client programs. When the GECS Web Manager program is running, the Browser Based Client programs can be run from most computers running a browser. The Web Manager program has an integrated web server and no additional web server is needed. The Windows Client programs can be run on Windows Workstations or Servers that have network access to the computer running the GECS DBMS program or data files.

DBMS, Controller and Web Manager Programs

The DBMS, Controller and Web Manager programs run on a Windows NT/2000/XP/2003 Server or Workstation. They are all usually run on the same machine. The DBMS allows access to the GECS data. The Controller dispatches jobs to available Agents. The Web Manager is an interface between an internet browser and the GECS DBMS.

Agent Programs

GECS Agent software must run on every computer on which jobs will run. The GECS Controller dispatches jobs to available GECS Agents. The Agents answer status requests from the Controller and DBMS programs. There are Agents available for computers running:

- Windows NT v4.0 or higher (Server or Workstation)
- NetWare 4.11 or 5.0

- SCO UnixWare v2.1 or v7.0
- Linux (Red Hat Linux v5.1, Caldera OpenLinux 1.2 or SuSE Linux 6.1) for Intel
- HP-UX v10.x
- Solaris 2.6 for Sparc and Solaris 2.6 for Intel
- AIX
- Tru64 Unix (Digital Unix)
- (Silicon Graphics) SGI IRIX.

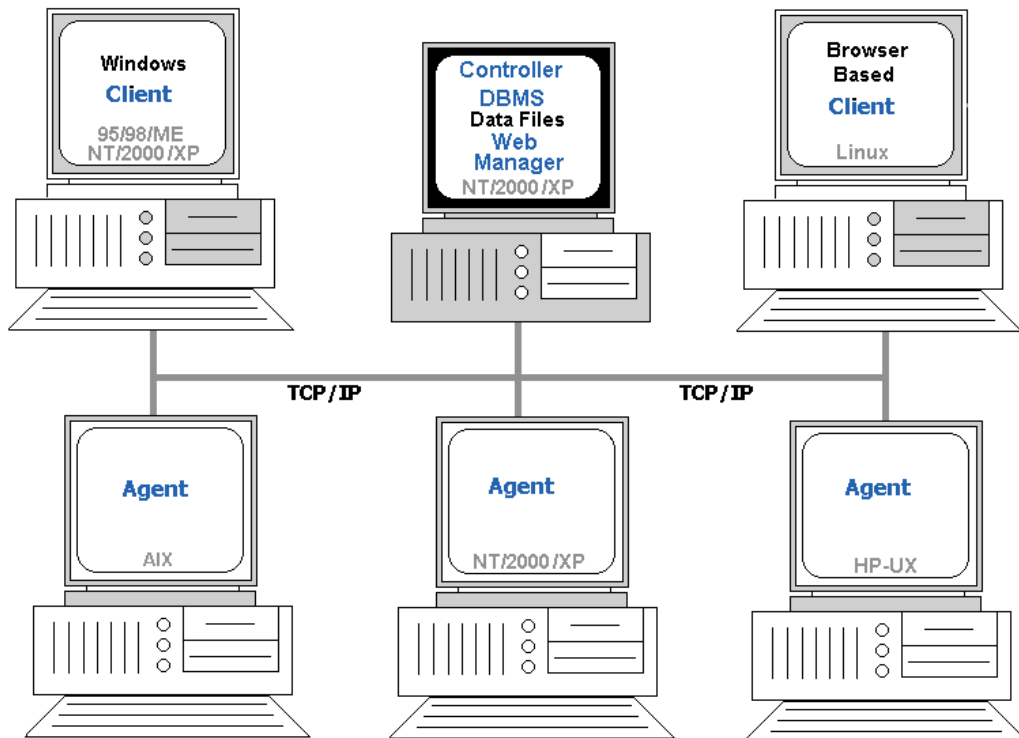
Architecture

GECS Client programs can run on any computer running an internet browser or Windows 95/98/ME/NT/2000/XP/2003 PC (where the GECS Client programs are configured). Client programs allow users to enter data into and monitor the GECS system. The Windows Client programs can be installed locally on each client machine or can be accessed over a network from a shared drive. Client computers must be able to access the DBMS or Web Manager via TCP/IP.

The GECS system uses one DBMS and one Controller to control all Agents and to dispatch jobs to computers running the Agent software on Windows NT/2000/XP/2003, NetWare, SCO UnixWare, Linux, HP-UX, Solaris, AIX, Tru64 Unix or SGI IRIX. The DBMS and Controller programs must always be running to control and dispatch jobs to Agents. When using browser clients, the Web Manager program must be running.

The Agent programs accept jobs from the Controller and answer status requests from the Controller and DBMS via TCP/IP or drive sharing.

Regardless of operating system, each computer running either the Agent, Controller, DBMS, Web Manager or Windows client software must have a TCP/IP protocol stack loaded.



Supported operating systems can be mixed in any fashion. For example, you may have a Linux Agent, an HP-UX Agent, a Windows Agent and use any machine with an internet browser to monitor the system.

In addition to the Client, Controller, DBMS, Web Manager and Agent software programs, a variety of maintenance and testing programs are installed.

As a test, you must be able to 'ping' each computer which will run GECS Agent software from the computer which will be the GECS DBMS and Controller. Use PING.EXE which comes with Windows.

You will need to know the IP address or name of each computer that will be running the Agent software. This might be in the form of

Your GECS license determines the type and number of machines that can run the Agent programs at one time. There is no limit on the number of PCs that can run the Client programs at one time. You can only run one Controller, one DBMS and one Web Manager.

The different operating system platforms supported by GECS Agents can run different types of programs as jobs. This is referred to as the command line type. The operating system, GECS Agents and the types of command lines they can run can be summarized by:

Windows Agent

- BAT or CMD Batch Files
- DOS Programs
- OS/2 Text Programs
- Windows 3.1/95/98/ME/NT/2000/XP/2003 Programs

AIX Agent

- AIX Programs

HP-UX Agent

- HP-UX Programs

Linux Agent

- Linux Programs

NetWare Agent

- NetWare NLMs

SCO UnixWare Agent

- SCO UnixWare Programs

Solaris Agent

- Solaris Programs

Tru64 Unix Agent

- Tru64 Unix (Digital Unix) Programs

SGI IRIX Unix Agent

- SGI IRIX Unix Programs

There are limitations on some of the program types depending on the way the Agents are being run (hidden, as a service or daemon).

In addition to the different operating system platforms supported by GECS, the Windows clients, DBMS and the Controller can interface with NetWare networks, Microsoft networks (workgroups and networks) and LAN Server (LAN Manager &) networks. When networking features are enabled, they can automatically recognize network user names as GECS user names and they can send network messages for Event notification using the standard messaging capabilities built into these networks.

The GECS DBMS can also interface with MS Mail or MS Exchange using , cc:Mail using VIM or MAPI, Lotus Notes Mail, Internet Mail (SMTP/POP3) or MHS mail systems. GECS will send messages via these mail systems to indicate special Events such as the completion of jobs or to notify the system manager of problems. Jobs can also be mailed to GECS via most of these mail systems.

It is important that you pay attention to software versions with GECS. All GECS programs in use must be of the same version. Do not mix programs of different versions.

Getting Started

System Requirements

Client Programs

GECS Windows Client programs will run on any Intel based hardware environment that is supported by Windows 95/98/ME/NT/2000/XP/2003. Minimum hardware requirements; Pentium 200 with 32 megabytes of RAM.

Browser based Client programs should run on most computers running a browser.

DBMS, Controller and Web Manager

The GECS DBMS, Controller and Web Manager programs will run on any Intel based hardware environment that is supported by Windows NT version 4.0 or higher. Though GECS will operate on the minimum hardware required to run Windows NT/2000/XP/2003, typically that will produce slow operation. The following are recommended minimum hardware requirements; 1 Gigahertz Pentium or above with 128 megabytes of RAM. For systems with large numbers of jobs, faster CPU with more memory will be essential.

GECS Agents

GECS Agent programs and supported operating systems are listed below.

Windows Agent	- Windows NT version 4.0 or higher with minimum hardware requirements Pentium 200 with 32 megabytes of RAM.
AIX Agent	- AIX version 4.3 or higher
Linux Agent	- Red Hat Linux version 5.1 - Caldera OpenLinux version 1.2 - SuSE Linux 6.1
HP-UX Agent	- HP-UX version 10.x
NetWare Agent	- NetWare version 4.11 or 5.0
SCO UnixWare Agent	- SCO UnixWare version 2.1 or version 7.0
Solaris Agent	- Solaris version 2.6 for Sparc - Solaris version 2.6 for Intel
Tru64 Unix Agent	- Tru64 Unix (Digital Unix) version 5.0 or higher
SGI IRIX Unix Agent	- (Silicon Graphics) SGI IRIX Unix

Hardware Recommendations

Frequently the question is asked, "How much hardware power does GECS need?". GECS will run on very limited hardware power, though as the power is increased GECS can take advantage of it. Sometimes this occurs automatically, other times through system configuration. The jobs you intend to run, the operating system you're using and your desired level of performance will determine the hardware power required.

On its own, GECS puts very little drain on the system. Your previous experience with the jobs you intend to automate should indicate the amount of power and the number of Agents that are required. Due to the nature of GECS, you can always add more PCs as Agents to improve performance and job throughput.

It will take GECS just as long to run your jobs as it would if you were to run the jobs manually. GECS simply does it on schedule, with fewer mistakes and less wasted time.

GECS Documentation

The GECS online manual (GECSMAN.PDF) is shipped on the Global ECS Windows CD ROM. It can be viewed using the Adobe Acrobat Reader. The Adobe Acrobat Reader (ACROREAD.EXE) can be installed separately from the Global ECS Windows CD ROM. Installation information is described later in this chapter.

The GECS Client programs also contain separate help files that can be displayed when using the Client programs.

Microsoft Network

To run GECS on a Microsoft network, all computers running GECS client and Controller/DBMS programs must be able to login to the network running the Microsoft Network. From the Workstation Setup program, set the “Use .. networking for security and messaging ” field to “Microsoft” to configure Microsoft networking features.

NetWare Network

To run GECS on a NetWare network, all computers running Windows client program or the Controller/DBMS program must be able to login to the network running Advanced NetWare 2.15 or above. When used with NetWare version 4 or 5, Bindery emulation is required. Each PC that will access the GECS data must have the NetWare Client software (from Novell) installed. The NetWare Client for Windows software puts a number of DLLs in the \WINNT subdirectory that GECS needs in order to work with NetWare. Set the “Use .. networking for security and messaging” field to “NetWare” in the Workstation Setup program to configure NetWare networking features.

LAN Server Network

To run GECS on a LAN Server network, all computers running the Windows Client programs or the Controller/DBMS program must be able to login to the network running LAN Manager 1.0 or above or LAN Server 1.0 or above. Set the “Use .. networking for security and messaging” field to “Manager” in the Workstation Setup program to configure LAN Server or Lan Manager networking features.

No Network

Any computer running Windows Client programs or the Controller/DBMS program can be run with no network. Set the “Use .. networking for security and messaging” field to “No” in the Workstation Setup program when not using network features.

If you choose “No” networking, you will be prompted to login to every Windows client program (.e. a Login window will appear prompting you for a GECS User Name and Password). If you do not wish to login each time you open a Windows client program, choose one of the networking options mentioned above.

TCP/IP

A Transmission Control Protocol/Internet Protocol (TCP/IP) stack must be running in any machine that will be running GECS programs.

Mail

In order for GECS to send and receive mail, a copy of the MHS, NetWare Global Messaging or NetWare Messaging must be installed and configured on the file server. You must create a mail user for GECS that will interface with the mail system.

cc:Mail (VIM)

In order for GECS to send and receive cc:Mail (VIM) messages, cc:Mail must be installed and configured on a file server. The PC that will be running the GECS Controller/DBMS software must have the cc:Mail Workstation software installed on the local hard drive. VIM32.DLL and the other 32 bit cc:Mail DLLs must be in a subdirectory in your search path. You must create a mail user for GECS that will interface with the mail system. Versions 8 and higher of cc:Mail use MAPI. If you are using version 8 or higher, refer to the MS Mail/Exchange (MAPI) sections for setup information.

Lotus Notes Mail

In order for GECS to send and receive Lotus Notes Mail messages, Lotus Notes must be installed and configured on a Notes Server. The PC that will be running the GECS Controller/DBMS software must have Lotus Notes Workstation software installed and configured on the local hard drive. VIM32.DLL and the other 32 bit Notes DLLs must be in a subdirectory in your search path (i.e. c:\notes). You must create a mail user for GECS that will interface with the mail system.

MS Mail (MAPI)

In order for GECS to send and receive MS Mail () messages, the MS Mail client software must be installed and configured on each Workstation that will be running the Controller/DBMS software. MAPI32.DLL must be in a subdirectory in your search path. You must create a mail user for GECS that will interface with the mail system. Note that other mail systems such as Groupwise and cc:Mail version 8 or higher also use MAPI. When using these mail systems with GECS, choose the Microsoft mail system option.

Internet Mail (SMTP / POP3)

In order for GECS to send and receive Internet Mail messages, WSOCK32.DLL must be in a subdirectory in your search path. You must have an email address for GECS that will interface with internet mail.

SNMP Traps

In order for your GECS DBMS to send SNMP trap messages when certain GECS Events occur, you must install the SNMP service on the Windows computer that will be running your DBMS program. You then configure the appropriate Event Definitions. See the Events chapter of this manual for more details.

Audio WAV files

GECS Events can be configured to play WAV files when an Event occurs. Use the Event Definitions to specify the fully qualified path and WAV file name to be played when the specified Event occurs.

Help Files and Tutorial

A Help file (GECSHELP.HLP), including a tutorial, can be accessed from the GECS Windows Client programs from any 'Help' pull down menu or by pressing the <F1> key while your cursor is positioned on a data field within the GECS Windows Client programs.

GECS HTML help is available via the GECS browser based clients by clicking the "Help" option(s).

What's Different from Standard ECS

Global ECS is very similar to, but incompatible with ECS. DO NOT mix Global ECS with any versions of ECS.

Global contains many programs that closely resemble programs included with ECS version 5.1. One major difference between using Global ECS and standard ECS is that you use the GECS Administrator program to setup Agents and a Controller and DBMS rather than setting up Job Servers with Server Edit. With Global ECS, the Job Server has been cut in half. Part of the Job Server functionality is performed by the Agent and part by the Controller and DBMS. You must set up each Agent, Controller and DBMS using the Administrator program.

Another major difference is the method by which GECS components communicate. The Controller, DBMS, Agents and Client monitoring programs use TCP/IP to communicate with one another.

Additionally, when you set up Agents, there are two new required fields: IP Address and IP Port which tell GECS how to communicate with the Agent. You must enter the IP Addresses of the computers that will run the Agent program. The IP Port of the computer must also be specified. An Agent can ONLY be serviced by one Controller. A single GECS Controller will control all Agents. As far as the other fields go in the Agent, Controller and DBMS programs, you need to think of the fields from the perspective of either the Agent, the Controller or the DBMS. For example, the Pulse Rate field is entered for a Controller. How often should the Controller pulse? On the other hand, the Operating System field is entered for the Agent. What operating system is the Agent running on?

Jobs are entered the same. When selecting which job server should run the job, you should select the Agent that should run the job, not the Controller. When you look at the Completed Jobs, you will see the Agent that ran the job, not the Controller. When entering information about Agents running on Unix or jobs that should run on Unix, be sure to specify the right command line type and operating system.

The GECS Administrator is updated in version 3.10. It allows you to manage your entire GECS installation from one utility. The utilities that it replaces (e.g. Job Edit, Batch Manager) are no longer available.

GECS does not utilize Btrieve. A database manager program has been added to the system.

Agent programs can run on a variety of new operating systems.

A new Web Manager program makes it possible for users to access the GECS system remotely using a browser from most computers.

What's Different from GECS 3.0x

The major differences from GECS v3.0x have been broken down into several categories below.

Events: Sentry has been eliminated. Its functionality has been incorporated into Administrator through the use of Views, Events and the DBMS. Sentry Events have been replaced with GECS System Events. New GECS Events make it easy for users to choose which Events they care about and what actions or notifications they would like generated when the particular Event occurs. Ability to send SNMP Trap numbers and messages when a particular Event occurs. Jobs can depend on the occurrence of Events. User can create and define your own Events. Ability to activate jobs based on specified Events occurring. Ability to customize notifications, using Event Definitions you can customize the messages sent when specific Events occur. Ability to play specified WAV files when specified Events occur.

Job Views: Sentry lists have been replaced with new customizable views. New Job Views to allow customized filtering of jobs displayed in lists. Users can add and share an unlimited number of separate job views. Ability to display jobs within specified windows of time. Ability to sort job lists by job number, date/time or job status. Ability to display job's schedule time, start time or finish time in views. More responsive list population. New Batch Summary views allow jobs to be displayed at the batch or job level. Customizable background and foreground color in Job views. Lists can be sorted ascending or descending by clicking column headers. Delete and Insert buttons can be used in lists and multiple items can be selected in lists.

Event Views: New Event views to allow customized filtering of Events displayed in lists. Users can add and share an unlimited number of separate Event views. Users can be alerted to special Events. User Event indicator button at the bottom right corner of the Administrator program. Customizable background and foreground color in Event views. Lists can be sorted ascending or descending by clicking column headers. Delete and Insert buttons can be used in lists and multiple items can be selected in lists.

Job Changes: Job record now contains the new Minimum Good Return Code field. Job record now contains the new Never Late field. Job record now contains the new Job Notes field contains an ASCII text file that can be edited and used for notes or documentation relative to the job. Job record now contains the new Generate Event on success and on failure fields. Job status of Waiting Approval has been renamed to On Hold. New Capture Output field. New login as submitting user fields.

Controller Error File: No more controller error logs (CONTROL.ERR). It has been replaced by Events.

Log File: No more log file. Log information is now maintained with jobs and by Events. Jobs run only once, repeating jobs create a new instance for each time scheduled to run. New Job statistics information in the job record contains completed job information.

Security: Optional Enhanced 128 bit Data Encryption for communications when the optional Certificate Management for added security is enabled. New Security Profiles.

SNMP: The DBMS can now generate SNMP traps for Events that occur. The new GECSMIB.DLL can be used with Microsoft's SNMP service to monitor GECS from network management software programs.

Standard Out and Standard Error: Agents can now capture Standard Out and Standard Error. This information can be saved to a file and displayed in the Job Detail screens.

Other:

- Ability to send Internet Mail attachment(s).
- DBMS data backup option adds the ability click a button to quickly backup GECS data or run a command line utility to backup GECS data.
- New Command Line Utilities GECSCHNG, GECSEVNT, GECSBKUP, GECSCERT, GECSSIZE and GECSEDEL.
- Enhanced Web Client programs.
- SDK Updates.
- New Substitution Variables - @BATCH for batch name, and MANY MORE ...
- Allowing the use of formatting strings in substitution variables such as (%m).
- You can no longer simulate a job. This has been replaced with the ability to change the job's return code or skip and reschedule the job.
- The DBMS handles loading WRK files not the Controller and the DBMS now sends and receives all email. The DBMS now handles most system maintenance tasks such as purging old Jobs.
- Job detail now has the new This Jobs History toolbar button and Events toolbar button
- Job detail can display Standard Out in the Job Detail Output tab.
- Ability to ping Agents, Controller, or DBMS from the Administrator program.
- All lists can display a record count by right clicking on the column header. Left clicking column headers in Jobs, Events and Event Definition lists sorts data ascending or descending. Multiple items in lists can be selected. Delete and Insert Keys work in lists.
- For faster performance, Client machines can be configured to bypass the DBMS and access the GECS data files directly. For direct data access, specify the data path using the Client Programs page of the Workstation setup program.

Installing GECS

IMPORTANT: If you're upgrading an existing installation of ECS or GECS, see page 2-19 thru 2-22 of this manual. Do not follow the express installation directions when upgrading.

All GECS programs are shipped on the Global ECS Windows CD ROM or can be downloaded from our web site.

Agent software for Unix systems are shipped on either a CD ROM or can be downloaded from the Global ECS web site. This media contains the Agent program (GECSAGNT) along with command line utility programs. For details on installing Agents see the Agents chapter of the GECS manual.

When installing from the Global ECS CD ROM, your installation options are as follows: Complete Installation, Install Agent Only or Install Client Programs Only.

GECS Express Installation

Evaluators and first time GECS users should follow the installation directions below.

These instructions are for the Express Installation. They will quickly install and configure all components of the GECS System on one computer.

IMPORTANT: If you're upgrading an existing version, see page 2-19 thru 2-22 of this manual.

1. Determine which Windows Workstation or Server will be your primary GECS computer. This computer will run the Controller, DBMS, Web Manager, one Agent and store the GECS data files. This computer must have a TCP/IP protocol stack loaded.
2. Go to the primary GECS computer and login as Administrator or an administrator equivalent user.
3. **Insert the Global ECS Windows CD ROM.** If the installation program does not automatically start, click the Start button, select Run and enter: D:\SETUP.EXE (Where D: is your CD ROM drive).



4. The default settings on this screen are fine. Click the “**OK**” button to continue.
5. Once the files have been copied, choose “**Express**” from the Global ECS Setup screen and click the “**Next**” button.
6. Enter your **Company Name** and **License Number**, then click the “**Next**” button. Your license number is in the format of: XXXXX-XXXXXXXXXX.
7. Finally, click the “**Configure**” button to complete the configuration.

On your Windows desktop you should see a shortcut folder for your Global ECS icons. Express configuration automatically starts your GECS Controller, DBMS and Web Manager, as services under the system account. One Windows Agent is created and configured to run on the desktop. You can now begin creating, scheduling and running jobs on this machine.

Install Agent Only

The Install Agent Only installation option will install the GECS Agent for Windows. To set up additional Agents on other operating systems see the Agents chapter of the GECS manual.

Install Client Programs Only

Browser based Client programs do not require configuration or installation. Users can access the GECS system via a web browser as long as the GECS Web Manager program is running. See the Web Manager chapter of the GECS manual for details on the GECS Web Manager and browser Client programs.

GECS Windows Client programs can be installed locally on users computers or installed on a sharable drive and run over your network. Installing Client programs locally offers the best performance. To install the GECS Windows Client programs, see the “Configuring GECS Client Computers” section of this chapter.

Creating and Scheduling Test Jobs

Suppose you have three jobs that need to run every morning at 6am. You can use GECS Batches to create a Batch containing your three jobs.

For testing purposes, all three Batch jobs will automate the same task.

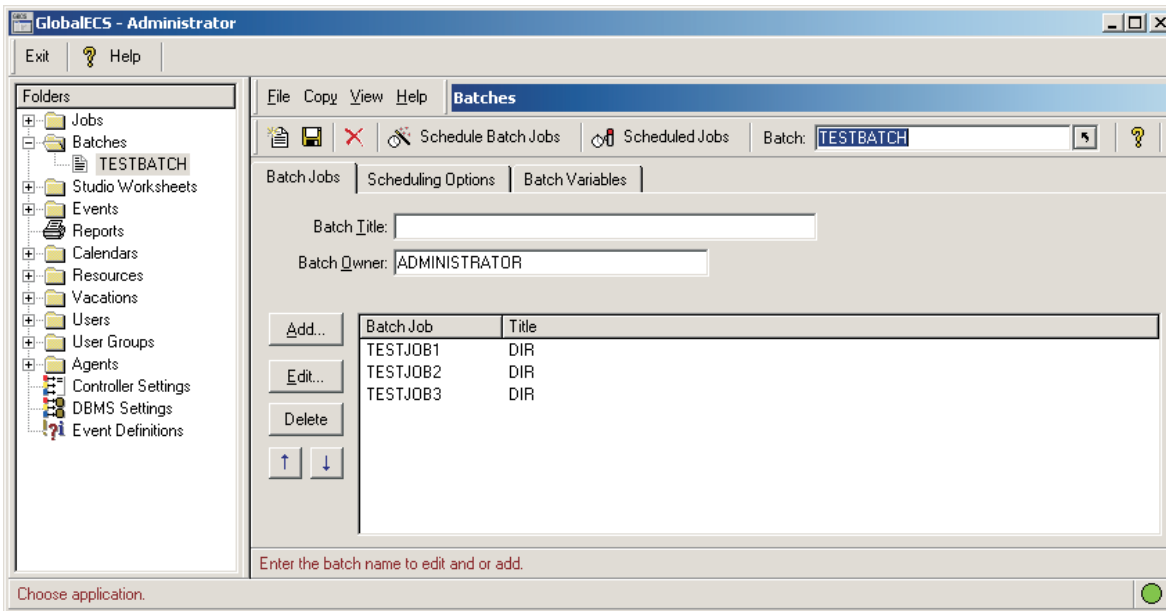
DIR

(DIR will temporarily display a directory listing).

1. To create a new Batch, start the Global ECS Administrator. Right click on the **Batches** folder from the list on the left of the screen. Then select **New**.
2. Type the name of the test Batch you wish to create

TESTBATCH

then click the **Add** button.



3. To create the first job for your Batch, click the **Add...** button on the Batch Jobs tab.
4. Type the name of the test job you wish to create

TESTJOB1

then click the **Create** button.

5. On the **Command Line** field enter: **DIR**
6. Set the **Command Line Type** to **NT Console**.
7. Ensure the **Job Status** field is set to **Pending**.

The screenshot shows a window titled "Batch Job: TESTBATCH.TESTJOB1". The "Command" tab is active. The "Command Line" field contains the text "DIR". The "Command Line Type" dropdown is set to "NT Console". The "Job Status" dropdown is set to "Pending". The "Next Run Time" is "18:02:54". The "Job Title" and "Start In Directory" fields are empty. There are four checkboxes: "Enable Command Line Substitution" (checked), "Show Activity" (checked), "Mark job as complete once started" (unchecked), and "Keep When Complete" (checked). The "Execute" dropdown is set to "Normal". Below these are four "Keystrokes" fields and a "Comments" field, all empty. A "Notes" field is at the bottom, also empty. A red text prompt at the bottom of the window reads "Enter the command to execute."

8. Save the job by clicking on the **File** pull down menu and selecting **Save**.
9. To create two more jobs, for your Batch, you can copy the first job by clicking on the **Copy** pull down menu and selecting **Copy Batch Job**. **Copy As: TESTJOB2** then from the **File** pull down menu select **Copy Batch Job**. Next **Copy As: TESTJOB3** and again from the **File** pull down menu select **Copy Batch Job**. Then from the **File** pull down menu select **Exit**. You can use the blue arrow buttons to reorder the display of the batch jobs.
10. To set up your jobs to repeat every day at 6am, click on the **Scheduling Options** tab. Set the **Beginning On** date to **today's date** at **06:00:00**. Set the **Scheduling Model** field to **Dynamic**. Set the **Schedule Type** field to **Day of the Week Schedule**. Enter check marks next to **Monday, Tuesday, Wednesday, Thursday** and **Friday**.
11. Save the Batch by clicking on the **File** pull down menu and selecting **Save**.
12. To schedule the Batch for execution, click on the **File** pull down menu and select **Schedule Batch Jobs**.
13. Continue by clicking **Next**. Then to complete the process click **Finish**.

Your test jobs are now scheduled for execution. Once your Agent is started, and if the current time of day is after 6am, these jobs will run immediately. Otherwise, they will wait until 6am to run.

14. Start your GECS Agent by double clicking on the **Agent** icon from your Global ECS folder.

Checking the Status of your Jobs

Use the GECS Administrator program to check the status of your jobs. From the Jobs folder look at the “Batch Summary” View. You will see a list of your jobs. These lists are moveable, sizable and configurable.

The information displayed in the lists can be sorted ascending or descending by clicking on the column headers of the lists. You can also right click on list column headers to display a record count or print the list.

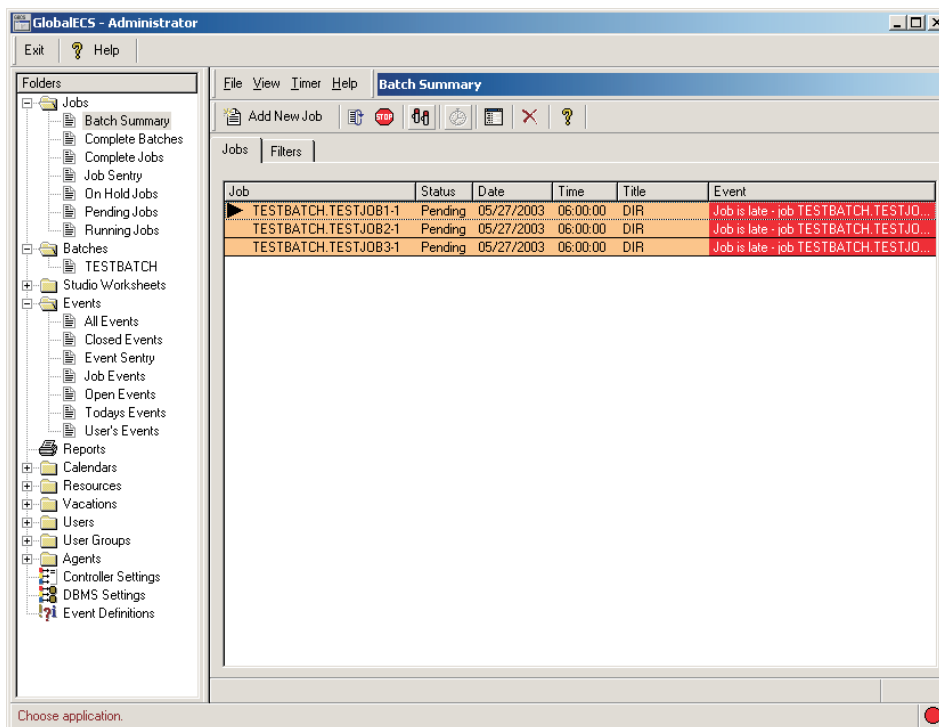
You can select multiple items in lists by highlighting the items or by clicking the shift key and using the up and down arrow keys. An arrow will denote which items are selected.

You can update Job Views or add your own. Right click on the View name (such as Batch Summary) and select View Properties to update the filtering that can be applied to the view of jobs. You can double click on a job from the list to view the Job Detail screens. By default, GECS ships with the views displayed in the screen below.

1. On the left side of the GECS Administrator, double click on the **Jobs** folder then click on the “**Batch Summary**” view.

2. Click on the File pull down menu and select **Refresh** to update the screen.

After the jobs run, their status will be set to complete and a new instance of each job will be created for tomorrow at 6am. Right click on one of the Pending Jobs scheduled to run tomorrow then select ‘why this job can’t run’. The reason should be future start time. Experiment with some of the other options.



Viewing GECS Events

The Administrator program will display Event views by double clicking on the Events folder. You can use the default 'All Events' view to display a list of All Events.

The last column on the right side of the Events list displays the status of each Event. The status is either open or closed. Next to the status will be a green or red dot. This color indicates whether this Event is included in your 'Users Events' view. A red dot means that the Event exists in your 'Users Events' view. A green dot means that the Event is not included in your 'Users Event' view.

Click on the Event indicator dot on the bottom right corner of the Administrator program to jump to the 'User's Events' view.

You can view all Events associated with each job from the job detail screen via the 'This Jobs Events' toolbar button.

The Event lists are moveable, sizable and configurable. You may wish to filter the Events displayed in these list or create you own views and customize them. To customize your views, right click on the view name and select View Properties.

The information displayed in the lists can be sorted ascending or descending by clicking on the column headers of the lists. You can also right click on list column headers to display a record count or print the list.

You can select multiple items in lists by highlighting the items or by clicking the shift key and using the up and down arrow keys. An arrow will denote which items are selected.

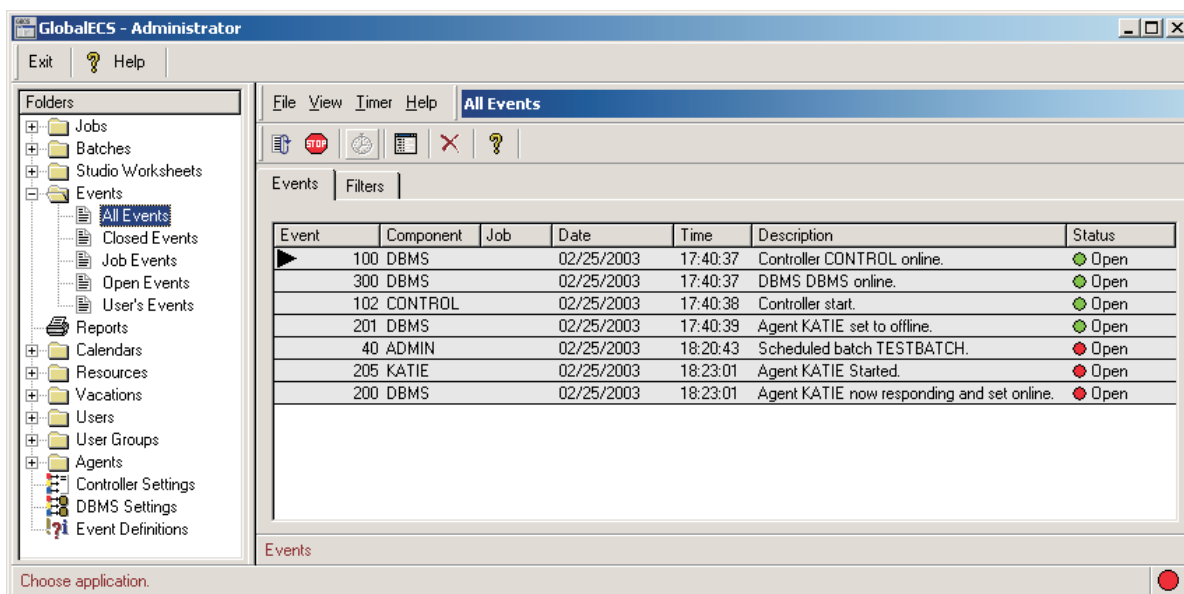
By double clicking on an Event from this list you can display the Event Edit information. Right clicking on an Event from the list will give you additional options such as:

Close Event - Update the status of the Event from open to closed.

Delete Event - Delete the Event from the GECS system.

Remove My Name - Remove this Event from my 'User's Events' View list (in other Views that may still display this Event, this will also change the color of the status dot from red to green).

View Event Detail - Display the Event Edit information screen.



1. From the GECS Administrator, double click on the **Events** folder then click on the default view **All Events**.
2. You should see a list of Event records. Double click on an Event to display the Event Edit screen.
3. When you are finished viewing you can close the Event record.

By default, one GECS user, one Controller, one DBMS and one Agent were installed on this computer during the GECS “Express” Installation. These records were created using default settings. If you wish to make changes to these records or create additional users or Agents follow the instructions below.

Setting Up GECS User Records

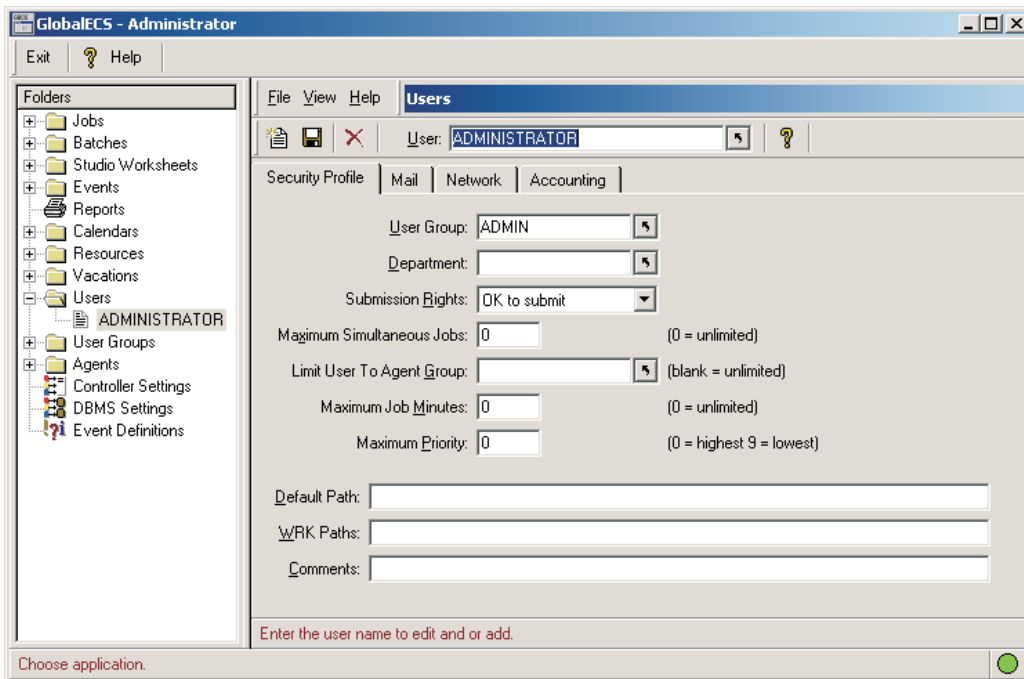
Double click on the Users folder then click on the user record. Review the user created by the Workstation Setup program. Notice that this user was assigned to the ADMIN Security Profile. This ensures that this user has access to all GECS components.

1. To add an additional user, click on the **File** pull down menu and select **New User**. Enter the user name then click the **Add** button.
2. Select a Security Profile from the Security Profile Lookup. This field is used to set a profile for GECS security access into the GECS Client program modules.

Each GECS User record is assigned a GECS Security Profile. The Security Profile will allow access to whichever GECS Client programs the Security Profile record has defined. By default an ADMIN and OPERATOR Security Profiles are defined.

You can create as many GECS Security Profiles as necessary. The ADMIN default Security Profile can be modified but cannot be deleted. The OPERATOR default Security Profile can be modified and/or deleted.

3. Save the record by pressing the F10 key or click the **File** pull down menu and select **Save**.
4. Set up records for additional GECS users, as needed.



Review or Create Agent Records

Review the Agent record created by the Workstation Setup program by opening the GECS Administrator icon and double clicking on the Agents folder on the left side of the screen.

1. Click on the Name of your Agent under the Agents folder.
2. Review your Agent information. You can press the F1 key for online help.
3. Set up records for additional Agents, as needed. To add a new Agent record, click on the **File** pull down menu and select **New**. Enter the GECS name of your Agent (i.e, NTAGENT or HPAGENT) then click the **Add** button.
4. Enter the **IP Address** or IP Name of this Agent. (DNS server will resolve names). On the Agent tab, most of the default settings can be used.

IP Address: IP name or address of Agent

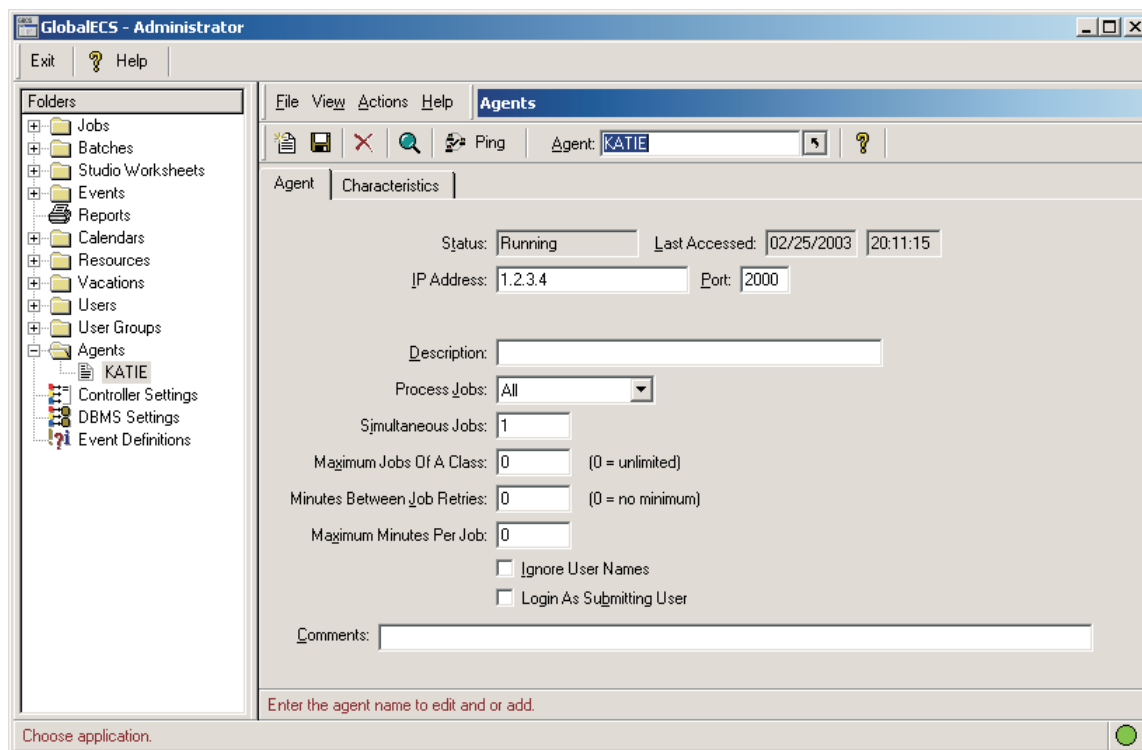
Port: Port number used when starting Agent (2000)

5. On the Characteristics page set the following fields:

Operating System: choose the operating system that applies

Job Types: choose applicable job type(s)

6. Save the record by pressing the F10 key or click the **File** pull down menu and select '**Save**'.
7. Set up records for additional Agents, as needed. For details on installing the Agent software, see Agents chapter of the GECS manual.



Controller and DBMS Settings

Review the Controller and DBMS Settings created by the Workstation Setup program by opening the GECS Administrator and clicking on the Controller Settings and DBMS Settings options on the left side of the screen. You can press the **F1** key for online help. All default settings are fine for now.

Event Definitions

Review the default Event Definitions by opening the GECS Administrator and clicking on the Event Definitions option on the left side of the screen. Each Event is numbered and contains parameters to allow for special notifications. These notifications include: email, SNMP, network message, Windows event logging, job activation, audible wav file, and color highlighting in the GECS Administrator Events lists.

Use the Event Definitions folder to update Event parameters. GECS system Events are numbered from zero to 500 and cannot be deleted. User definable Events can be numbered starting from 1000. You can press the **F1** key for online help. Default settings are fine for now.

Configuring GECS Client Computers

Once you have installed all components of the GECS system, you can configure additional computers to run the GECS windows Client programs from remote Windows computers. Remember to set up appropriate GECS Users. Clients must have appropriate security profiles established or they will not be allowed into the GECS components. These computers must have a TCP/IP protocol stack loaded.

1. To configure remote client computers, insert the Global ECS CD ROM and “**Install Client Programs Only**” into the default directory on each target machine then click the “**OK**” button.
2. After the new files are installed, click the “**Finish**” button to begin setting up this Client computer. You will need to enter information about your GECS system components into the following screen.

3. Enter IP Address or IP name of the computer that is running your DBMS.
4. If this Client computer can directly access the GECS data files, check the “Enable Data Path” field. Enable this option if you wish to allow your GECS Client programs to access the GECS data files directly for faster performance. When this field is enabled you must also specify the path to use for client access to the data files. Because using this direct data access method is performed by the operating system and network drivers, the GECS data encryption is NOT available even if a certificate is installed.

When this field is not enabled, your client programs will use TCP/IP to request data from your GECS DBMS. Using this method you can install optional certificates to enable a very strong 128 bit data encryption algorithm.

5. When you are finished, click the “**Configure**” button then click the “**OK**” button.

GECS Documentation & Installation

When you install the GECS Client software for Windows the GECS documentation is automatically installed. The GECS documentation file is named GECSMAN.PDF. An icon for this document is created in your GECS folder along with other GECS icons. Adobe Acrobat Reader software should be used to view the GECS documentation file. If you get an error message trying to open this file you probably need to install the Adobe Reader.

The Adobe Acrobat Reader must be installed separately. You can use \Acrobat\SETUP.EXE from your Global ECS Windows CD Rom or install from your own Acrobat CD.

Once the Adobe Reader and GECS documentation files have been installed, you can view the GECS documentation by double clicking on the Online Manual icon in your Global ECS desktop folder.

Refer to the documentation and/or help supplied with the reader for information about the readers features and how to use the viewer for searching the documentation.

Upgrading from ECS 5.1

1. If using Job Dependencies, allow all Job streams to finish before upgrading and/or Remove Scheduled Batch Jobs from the Jobs queue. Log records are no longer used for verifying Job Dependencies. A new method is used. Therefore, if you upgrade in the middle of a job stream, your remaining jobs may run out of sequence.
2. Make a note of each User's security access into the Client programs. This information will need to be reassigned using Security Profiles after upgrading.
3. Stop all ECS programs.
4. Go to a computer that can run ECS 5.1 and that will run your new GECS Controller and DBMS programs. This computer must have a TCP/IP protocol stack loaded. Login as Administrator or an administrator equivalent user.
5. The ECS.INI file MUST exist in the local C:\WINNT directory before you continue.
6. Backup your ECS data. (ECS 5.x data files have no extension, i.e. JOBS., USERS., etc.).
7. **Insert the Global ECS Windows CD ROM.** If the installation program does not automatically start, click the Start button, select Run and enter:

D:\SETUP.EXE (Where D: is your CD ROM drive).

Or download the programs from our web site at www.globalecs.com

8. A message will display prompting you to upgrade. Click "Yes" to upgrade. Program Files will be copied into the default GECS directory.
9. GECS Workstation Configuration screen will appear. To configure this computer to run the new GECS 3.x DBMS program, use the default settings. Click the "Next" button..
10. Configure the computer to run the new GECS 3.x Controller program. The default settings should be used. Click the "Next" button.
11. You should configure this computer to run the new GECS 3.x Web Manager program. The default settings should be fine. Click the "Next" button.
12. To install an Agent to run on this computer, you may either leave the default settings or make modifications to reflect a name used by an ECS 5.1 Job Server. (ECS Job Server names should become GECS Agent

names. It is important to keep your job server names if you have jobs required to run on specific job servers because now they will need to run on specific Agents). Then click the “**Next**” button.

13. Click the button to create icons for Client programs on this computer then verify the type of networking (for security and messaging) then click the “**Next**” button.

14. There is a new option to Enable SNMP messaging for Event notifications.

15. There is also a new option to allow your GECS Client programs to access the GECS data files directly. To get faster performance, check the Enable data path field. When this field is enabled you must also specify the path to use for client access to the data files. (Note that because using the direct data access method is performed by the operating system and network drivers, the GECS data encryption is NOT available even if a certificate is installed). Click the “**Next**” button to create icons for Client programs on this computer

16. Verify the desktop folder name you would like for your GECS 3.x icons, then click the “**Next**” button.

17. Enter your **Company Name** and **License Number** then click the “**Next**” button. Your license number is printed on the label attached to your Global ECS Windows CD ROM case in the format of:
XXXXX-XXXXXXXXX

18. Click the “**Configure**” button to complete the configuration.

19. On your Windows desktop you should see a shortcut folder for your Global ECS icons. This configuration automatically starts your GECS Controller, your DBMS and Web Manager, as services under the system account. One Windows Agent is created and configured to run on the desktop. These are all the components you need for your GECS system.

20. After converting your data, review your GECS 3.x Agent and Controller and DBMS records. Next, review and modify all jobs and Batch jobs to include your new Agents and resources. Jobs that were previously setup to run on specified job servers should now be modified to run on specified Agents. Jobs requiring job server resources should be modified to require Agent resources.

21. All upgraded User records are converted to Administrative (ADMIN) Security Profiles giving them access to all GECS components. Modify your User records as needed to associate each User with the appropriate Security Profile.

22. If your Job Server and or Sentry was set up to send email you now need to configure your DBMS Settings to reflect email. The DBMS will now send email and the Event Definitions will tell it on which Events to send it. Next, review all Jobs and Batch Jobs and verify their schedule information.

23. You can use the new Job and Event Views to customize your lists to display the same type of information you were used to seeing in the old GECS Sentry program.

24. Look through the Event Definitions module to configure job completion, job failure and other Events that you wish to be notified of.

Upgrading ECS 5.1 Job Servers to GECS 3.11 Agents

- 1.** Go to a Windows computer that runs an ECS 5.1 Job Server. Make note of the Job Server name. This computer must have a TCP/IP protocol stack loaded. Login as Administrator or an administrator equivalent user.
- 2.** Stop the Job Server program.
- 3.** Install GECS 3.11 Agent software on this computer. Insert the Global ECS Windows CD ROM (or insert a GECS Windows Agent diskette or download the Agent software from our web site). (See the Agents chapter of the GECS manual for instructions on Agent Installation). If the installation program does not automatically start, click the Start button, select Run and enter: D:\SETUP.EXE (Where D: is your CD ROM drive).

4. Click the “**Install Agent Only**” option. Then click the “**OK**” button.
5. After the new files are installed, click the “**Finish**” button to begin setting up this Agent.
6. Enter the Name of your Agent (this should be your Job Server name).
7. Click the “**Configure**” button to complete the configuration then click “**OK**”.
8. Once you have verified Agent names and Agent parameters you can start your Agent.

Upgrading ECS 5.1 Clients to GECS 3.11 Clients

1. Go to a Windows computer. This computer must have a TCP/IP protocol stack loaded. Login as Administrator or an administrator equivalent user.
2. Stop any ECS programs.
3. Insert the Global ECS Windows CD ROM or download the GECS software from our web site. If the installation program does not automatically start, click the Start button, select Run and enter:

D:\SETUP.EXE (Where D: is your CD ROM drive).
4. Click the “**Install Client Programs Only**” option. Then click the “**OK**” button.
5. After the new files are installed, click the “**Finish**” button to begin setting up this Client computer.
6. Enter the IP Address of the DBMS for your GECS system.
7. Set the ‘Enable Data Path’ option if you wish to allow your GECS Client programs to access the GECS data files directly for faster performance. When this field is enabled you must also specify the path to use for client access to the data files. Note that when using direct data access method, the GECS data encryption is NOT available even if a certificate is installed.
8. Click the “**Configure**” button to complete the configuration then click the “**OK**” button.

20. Click the “**Configure**” button to complete the configuration.
21. On your Windows desktop you should see a shortcut folder for your Global ECS icons. This configuration automatically starts any GECS components that were configured to run as services.
22. All upgraded User records are converted to Administrative (ADMIN) Security Profiles giving them access to all GECS components. Modify your User records as needed to associate each User with the appropriate Security Profile.
23. Review your GECS Agent, Controller and DBMS records. If your Controller and or Sentry was set up to send email you now need to configure your DBMS Settings to reflect email. The DBMS will now send email and the Event Definitions will tell it on which Events to send it. Next, review all Jobs and Batch Jobs and verify their schedule information.
24. You can use the new Job and Event Views to customize your lists to display the same type of information you were used to seeing in the old GECS Sentry program.
25. Look through the Event Definitions module to configure job completion, job failure and other Events that you wish to be notified of.

Upgrading Agents from GECS 2.0 or Later

1. Go to your Agent computer. Make note of the Agent name.
2. Stop the Agent program.
3. Uninstall the GECS 2.0x Agent Software.
4. Once all GECS 2.0x programs are removed, you can install GECS 3.11 Agent software from the Global ECS Windows CD ROM (Agent Subdirectory), from Agent diskettes or you can download the Agent software from our web site. (See the GECS Agents chapter of the GECS manual for instructions on Agent Installation).

Upgrading Clients from GECS 2.0 or Later

1. Go to a Windows computer where GECS 2.0x has been installed. This computer must have a TCP/IP protocol stack loaded. Login as Administrator or an administrator equivalent user.
2. Stop any GECS 2.0x programs.
3. Uninstall the GECS 2.0x software.
4. See the instructions for Configuring GECS Client Computers section of this chapter to install new GECS 3.11 clients.

Updating your GECS License Number

Your GECS license number can be updated after the programs are installed. You will receive a new license number whenever your license is changed. Changing an evaluation license to a full license, upgrading to Unix operating systems or changing the maximum number of Agents that are allowed to run at one time will require that you receive a new license number. When you receive a new license number, it must be installed in order to become effective. You will find your license number on the label attached to the printed license agreement.

When updating, you should stop all of your GECS components and exit all client and utility programs. From the DBMS machine, open the Workstation Setup program, enter the new license number including the dash in the license number field, then click on the Configure button. To verify your update, start the Administrator Client program, open one of the modules, then click on the Help pull down menu and select Help About. Your new license information should be displayed in the About box.

Read Me File

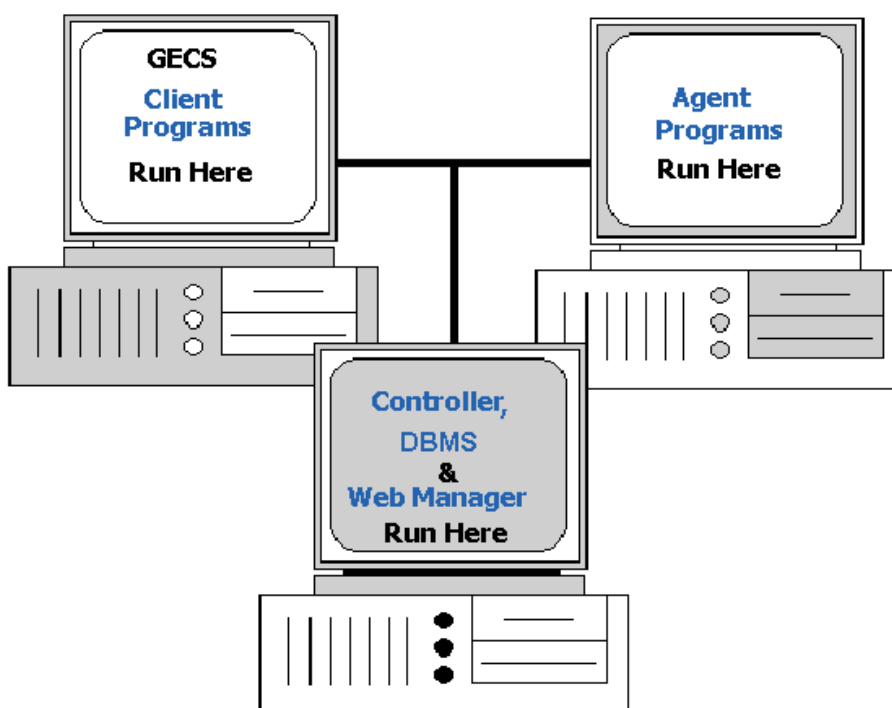
The READ.ME file contains late breaking news for each new GECS version which may not be included in this manual.

User Guide

GECS System Overview

The Global Event Control Server® (GECS) provides a framework where jobs are set up and run in a controlled fashion. GECS DBMS, Controller, Web Manager and Windows Client software must run on a Windows machine. Browser based Clients can be run from most any computer running a browser. GECS Agent software is available for Windows, NetWare NLMs, SCO UnixWare, Linux, HP-UX, Solaris, AIX, Tru64 Unix and SGI IRIX. A single operating system or a combination of operating systems can be used.

GECS is made up of a series of software programs and data files. The software programs fall into five categories; the Client programs, DBMS, Controller, Web Manager and the Agent programs. A typical system configuration is:



GECS can be run on a single PC or across a network using TCP/IP. The Client programs are typically run on desktop workstations. The DBMS, Controller and Web Manager are run on a Windows NT 4 or higher workstation or server machine. The Agent programs are run on the machines where the jobs are run. The Client programs are stored on a shared drive of a file server, usually on the DBMS/Web Manager/Controller machine, that all the client workstations can access.

The GECS Workstation Setup “Express” installation option automatically installs every GECS component onto one computer. This is the recommended setup for GECS evaluators or first time GECS users.

Overview of Terminology

To fully understand the Global Event Control Server® there are several terms that need to be explained.

Client Programs

There are two types of Client programs. There are windows and browser based Client programs. These programs yield a user friendly interface to access GECS data files.

The windows based client program is the GECS Administrator. It can be installed or configured using the GECS Workstation Setup program. Once installed, it will appear as an icon in a Global ECS folder on your Windows desktop.

The browser based Client programs do not require configuration or installation. While the GECS Web Manager program is running, the browser based web clients can be used from most any computer running a browser.

DBMS Program and Data Files

The client and Controller programs access the GECS data files via the DBMS. The DBMS program (GECSDBMS.EXE) can be run as a service or on the desktop and is designed to run continuously. The DBMS is usually run on the same machine as the Controller and Web Manager where the data files are stored. The data contained in these files is the heart of GECS. You can easily identify data files because they have .DAT and .IDX extensions. For example: JOBS.DAT, JOBS.IDX, USERS.DAT, USERS.IDX, etc. This data can be queried for reporting or accessed with third party programs using ODBC drivers supplied with the GECS SDK, which can be purchased separately.

GECS Controller Program

A Windows Workstation or file server can be used to run the GECS Controller program (GECSPROC.EXE). The Controller can be run as a service or on the desktop and is designed to run continuously. The Controller will dispatch jobs users submit to available Agents. The Controller is usually run on the same machine as the DBMS and Web Manager.

Agent Programs

A computer running a copy of the GECS Agent software will actually run the jobs users submit. The Agent program (GECSSAGNT) can be run as a service or on the desktop on Windows or in a terminal session or as a daemon on Unix versions. Agents must be running to launch jobs and answer job status requests from GECS.

Web Manager Program

The Web Manager program, by default, runs on the DBMS/Controller computer. It allows users to access the GECS system using a browser from any computer without having to install or configure the sometimes complex

GECS windows Client programs. The Web Manager interfaces with the DBMS allowing users access via an http site.

GECS Users

Any valid network user (if using networking features) who has been set up in the GECS User data file is a GECS User. GECS users must be given rights to run the various components of the GECS system by being assigned a GECS Security Profile. Only GECS users are allowed to schedule jobs and they are the only users allowed to run the Client programs. If a person has not been added to the User file, they will be unable to use GECS. If you are using GECS on a stand-alone PC (using “No” networking), GECS users will be prompted for their user name and password each time they start a GECS client program.

GECS Security Profiles

GECS Security Profiles are used to assign security profiles to GECS Users. By default an ADMIN and OPERATOR Security Profiles are defined. Once a Security Profile has been created and defined, Users can be assigned to the specified Security Profile thus giving them access to the specified GECS Client program components. You can create as many GECS Security Profiles as necessary.

Jobs

The easiest way to think about a job is as a command line. GECS executes these command lines. Jobs can be executable programs, batch files or scripts. Although you can build a single job that runs a batch file that runs multiple executables, GECS will be better able to control your job flow if you create separate jobs for each executable with dependencies that sequence the jobs. When jobs are created, criteria such as the time to run and the name of the user that is submitting the job are combined with the command line to create a scheduled job. Jobs can be added in many ways in GECS. Client programs offer the most direct way of adding jobs to the GECS data files. GECS Batches can be used to create job streams. Jobs can also be added by using text files called WRK files. GECS will read these temporary files and convert them into real scheduled jobs. An Agent will then launch the job or jobs.

Batches and Batch Jobs

GECS Batches allow you to define a batch of processes in an off-line environment and schedule or remove them as a whole unit. When a Batch is scheduled, job records are created and added to the GECS jobs file. When the Batch is removed, these job records are deleted from the GECS jobs file. When Batches are defined, one Batch job is defined for each scheduled job that should be created.

Batch Variables

Special Batch variables can be defined for each Batch. These variables are used in defining the Batch and Batch jobs. At the time the Batch is scheduled, the user is prompted for the values that the variables should be changed to. This allows Batches to be defined that are regularly scheduled, but with dates, times, accounting period numbers or other information that changes.

WRK Files

WRK (pronounced 'work') files are created and used as one method of scheduling jobs. They are simple ASCII text files. GECS can be configured to look for these files and convert them to scheduled jobs. GECS can add jobs based on information in WRK files. You can create your own programs to schedule jobs to GECS by using WRK files. The definition of WRK files is included later in this manual.

Completed Jobs

GECS keeps a record of the jobs run by your Agents. This record is referred to as the job history or job statistics. GECS can update the job records to reflect when an Agent executes a job. The completed job information displays when a job started, finished, what Agent ran it and other information about the job. When GECS is configured to automatically trim completed jobs, you can enable a GECS.INI setting to keep failed completed jobs on file.

Events

Events are things which may require special notice. Each GECS Event is numbered and contains parameters (detail definitions) to allow for special notifications. GECS keeps track of special Events such as when a batch is scheduled or removed, when a job is dispatched ignoring dependencies, when a job is skipped and rescheduled or when a WRK file is converted into a real job, Controller started, Controller stopped, GECS tried to convert an invalid WRK file to a real job, and many more. Given the unattended nature of GECS, the logging mechanism is designed to keep GECS running whenever possible, even after encountering Events. Some Events represents things to which you should pay attention. Besides recording the Event, GECS they can be sent as notifications including: email, SNMP, network message, Windows event logging, job activation, audible wav file, and color highlighting in the administrator Events lists.

Vacation Periods

Vacation periods represent periods of time when you don't want jobs to run. Vacation periods are based on job classes. Each job can be assigned a class when it is scheduled. If you don't want a particular class of job to run on Sundays for example, you could create a Vacation period for Sunday and have the vacation period repeat once a week. In this case, jobs of the class specified won't run on Sunday even if they are scheduled to run. When you create the vacation period, you can specify what should happen when a job encounters a conflict with the vacation period. You can have the conflicting jobs wait until the vacation period ends or you can have the jobs react as if they had run, even though they hadn't. In this case, conflicting jobs will reschedule themselves just as if they had run.

Vacation periods define times when jobs can't run, even if scheduled.

Calendars

GECS allows you to define a virtually unlimited number of calendars. Each calendar is named. Each calendar actually contains two calendars, one listing non-business days and the other listing defined months. Each job can be assigned a calendar to be used in scheduling.

Business Days & Non-Business Days

GECS allows you to define the days that are Business Days and those that are Non-Business Days. Once these are defined, you can schedule jobs to run based on the calendar you've established. For example, you can schedule a job to run on the last business day of each week, the 2nd to the last business day of each month or the first non-business day of each week. Business Days and Non-Business Days are different from Vacation Periods, even though the two can be used to accomplish the same thing. Vacation periods determine when jobs shouldn't run. Business Days and Non-Business Days determine how jobs are rescheduled after they run.

User Defined Months

Many businesses operate on a calendar that is different from the traditional calendar. For example, retail operations frequently use a calendar where each month is 4 weeks long and there are 13 months in each year. The User Defined Months feature lets you establish a calendar of your own for use in job scheduling. For example, you might want a job to run on the 5th day of each retail month. To define your User Defined Months, identify the date that is the first day of each month. The months can vary in length. Each month continues up to the date that is identified as the next starting date.

Resources

Resources represent hardware, software or other things (hardware or software, physical or logical) that are needed by jobs. Resources are limited in quantity either because only certain GECS Agents have them or there is a limited quantity of them on the system. Consequently, resources are either assigned to specific Agents or they are system wide resources. Resources are best described by using the following examples:

Example 1 - Agent Resource:

Only the GECS Agent named AGENTNT has a CD ROM player and you don't want more than one job to access it at a time. You would create a resource named CDROM assigned to AGENTNT and indicate it is allowed a maximum of 1 job. You would then setup the jobs that require the resource named CDROM. Should you later add a CD ROM player to AGENTHP, you could simply add that resource to the system with maximum jobs equal 1 and the jobs would then be able to run on either Agent, but never more than one at a time on each Agent.

Example 2 - System Resource:

You don't want your jobs to ever use more than 5 database server connections. You would create a system resource named DBCON and indicate it is allowed a maximum of 5 simultaneous jobs. Since this is a system resource, it consequently wouldn't have an Agent name associated with it. Your Controller would then check to see if there were already 5 jobs using this resource before dispatching any job that require the resource DBCON.

Work Sheets

Work sheets are used to graphically represent one or more job streams. The Studio program allows you to create, change, delete and save work sheets.

GECS Licensing

The GECS System requires a valid license number to operate. This license number will allow one GECS Controller to run and a limited number of GECS Agents. For more information, review your license agreement or contact your sales representative. This license number is important and you should make backup copies and store it in a safe, but accessible place. GECS will not operate if a license number has not been installed.

Supported Operating Systems

The GECS Controller and Client programs are available for Windows NT/2000/XP/2003. The GECS Agent software is available for Windows NT/2000/XP/2003, NetWare NLMs, SCO UnixWare, Linux, HP-UX, Solaris, AIX, Tru64 Unix and SGI IRIX.

Windows Client Program Interface

The GECS Windows Client programs have a common and easy to use interface. Most functions can be performed in several ways. You can use the pull down menus, toolbar buttons, field lookups and function keys, as well as access on line application help.

Pull Down Menus

Pull down menus can be accessed by either clicking on the menu item with your mouse or by simultaneously pressing the Alt key and the underlined letter of the menu item.

Toolbar Buttons

Most of the GECS Client programs contain various toolbar buttons. A small balloon help box will appear for each button on the toolbar after the mouse has set on the button for several seconds.

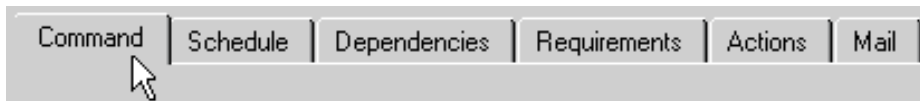


Field Lookups

Some fields in the GECS Client programs contain lookup lists from which you can choose valid values. Lookup fields are denoted by a lookup button. This button displays a small arrow. To display a lookup list press the lookup button.

Tabs

Many of the GECS Client programs contain tabs to allow you navigate through various screens. When you use your mouse to click on a tab the screen associated with that tab will be displayed.



Function Keys

A list of available function keys can be found in the GECS on line application help file.

Application Help

On line application help is available for the GECS Client programs from the help pull down menu, by clicking on the help toolbar button or by pressing the <F1> function key.

Printing Lists

Most lists in GECS can be printed by simply right clicking on the column header of the list and selecting print.

Record Count

You can get a record count of most lists in GECS by simply right clicking on the column header of the list.

Column Sort

You can sort ascending or descending Jobs, Events and Event Definitions lists by left clicking on the column header.

GECS System Setup

The Getting Started chapter of this manual provides instructions for setting up a simple GECS installation. More complex set up information can be found in the Technical Reference or Task Automation chapters.

GECS Users

After running Workstation Setup for the first time a GECS user is created and automatically given rights to all modules in the GECS system. Additional people who wish to use GECS must be added and given security authorization to the system. Use the Users and Security Profiles modules from the GECS Administrator program to create users for your GECS system.

When using GECS with Microsoft, NetWare or LAN Manager networking, your GECS user names should be the same as your network names. When you choose “No” networking from Workstation Setup, user names can be anything you want. The Add Users utility can also be used to load users from a comma separated file. Information regarding GECS utilities are described in the GECS Command Line Utilities section of this manual.

GECS DBMS

The GECS DBMS must be running before any GECS programs can be started. If you attempt to start programs without first starting the GECS DBMS you may get the following errors: “(3)Timeout connecting to host ...” and “Unable to communicate with the Database Server, this program will be closed”.

GECS Express installation forces the DBMS to be run as a service. When run as a service it is automatically started when the computer is turned on.

GECS Web Manager

The GECS Web Manager must be running before users can access the GECS system using the browser based programs. The GECS Workstation Setup program configures the Web Manager program. The GECS “Complete” “Express” installation option automatically configures and starts the Web Manager program as a service.

GECS Controller

The Workstation Setup program allows you to automatically create your Controller record. Your Controller can be updated using the GECS Client programs. The Controller program should be running continuously to dispatch jobs to Agents.

GECS Express installation forces the Controller program to be run as a service. When run as a service it is automatically started when the Controller computer is turned on.

GECS Agents

The GECS Administrator program allows you to create your GECS Agent records. To run multiple Agents, you must define an Agent record for each computer that will be running the Agent software. Each Agent is identified with a unique name, IP Address and port number. The Agent record contains fields that allow you to define the types of jobs that can be run by the Agents, the number of jobs it can run simultaneously, hardware of that computer, and many other characteristics of how the Agent should behave.

Automating Tasks using GECS Jobs

The GECS Client programs offer the most direct way of adding jobs to the GECS data files. You can use the GECS Windows Administrator program or browser based clients to create jobs. (See also WRK files). You must enter a unique job name or number, information such as the command line for the job, how it should behave, what it depends on, how it should repeat, required hardware and or software and the name of the Agent(s) or Agent group where the job should run. Much of the information in the job screens are only needed for more complex configurations. The default settings can usually be used.

GECS Naming & Numbering Schemes

Most of the Client programs in GECS allow you to assign names or numbers to the items you are adding. These include things like job name, Agent name, user name or Batch names. Most of these selections allow you to use any alphanumeric name you want. Vacation numbers are one of the few keys that must contain only numeric characters. As you enter names and numbers, the Client programs will frequently turn lowercase letters to uppercase and they will prevent you from including characters that aren't allowed. GECS maintains most of its data in alphabetic order. You can 'next & prev' through the records in alphabetic order. This is accomplished by having the number left justified before it is stored. For example, Agents would appear in the following order:

```
1
10
1A
2
20
2A
APPLE
BAKER
CHARLIE
```

In situations like the vacation number, where only numeric characters are allowed, the records are stored in numeric order so they would be sorted as:

```
1
2
10
20
```

Even though the job numbers are alphanumeric, they are sorted differently than the other alphanumeric fields. This field would be sorted as:

```
1
2
10
20
1A
10A
2A
20A
APPLE
BAKER
CHARLIE
```

The logic behind this sorting scheme is as follows:

- a) If the numbers contain ONLY numeric characters they are sorted in numeric order. This is accomplished by storing the number right justified.
- b) If the numbers contain ANY alphabetic characters they are sorted in alphabetic order. This is accomplished by storing the number left justified.

This allows you to use all numeric numbers and have them come out in numeric order or to use numbers that contain alphabetic characters and have them sorted in alphabetic order. Keep in mind that this sequencing only applies to the order the numbers appear in when you ‘next & prev’ through the data on screen or the order it appears on reports.

Another unique feature of job numbers and Batch job numbers is in how leading zeros are handled.

- a) If the number is all numeric, leading zeros are removed.
- b) If the number contains alphabetic characters, the leading zeros are left on the number.

For example:

<u>Entered As</u>	<u>Stored As</u>
1	1
01	1
1A	1A
01A	01A

Keep in mind that the numbers ‘1’ and ‘01’ are the same and ‘1A’ and ‘01A’ are not the same. You can always use the lookup windows to find the record you want, whether you know the number or not. For best results, you should decide to use numbers that are all numeric or to use numbers that all contain at least one alphabetic character.

GECS can automatically generate job numbers on the entry screens for new jobs or Batch job entries. GECS determines the highest all numeric value on file, adds one to the number and uses that as the default job.

Task Automation

Automating Tasks

Tasks are entered into the GECS system as jobs. At minimal, a job must have a name, a command line containing the task to automate and a next run date and time. Additionally, jobs can be defined to:

- run at predetermined dates and times using “next run date and time”
- run once, a fixed number of times or indefinitely using “job scheduling”
- type predefined keys to your Windows applications using “key stuffing”
- run in a specified sequence using “job dependencies”
- run based on other jobs’ success or failure using “operation on return code”
- run based on the occurrence of Events using “Event Dependencies”
- run only during specified time periods using “valid times”
- run based on the presence or absence of single or multiple files using “trigger files”
- run based on file contents changing or file size changing using “command line utilities”
- run based on the availability of predefined resources using “Agent or system resources”
- generate Events on job success or job failure
- run special command files before and after “NT Console” jobs using “precmd.txt and postcmd.txt files”
- retry on failure using “retry on return code and times to retry”
- terminate a job if it takes too long to run using “maximum minutes”
- notify users of job completion or job failure using “Events”, and much more.

Create a new job by first defining a job name or number for your task. You can then specify the task by populating the command line field. This chapter describes these and many other job parameters that can be used with GECS.

Job Creation

Once users are defined in the GECS system, there are several ways they can create and add jobs to be run on defined Agents. GECS users can add jobs using:

- 1) Browser Based GECS Client Programs (Jobs or Batches/Batch Jobs)
- 2) Windows Based GECS Administrator Client Program (Jobs, Batches/Batch Jobs or Studio Worksheets)
- 3) WRK Files (ASCII text files)
- 4) Customized Job Entry Programs (created using the GECS SDK)

The browser based Client programs only require an internet browser. There is no need to have any GECS programs installed or configured. Users can simply access the GECS system via http accessing the Web Manager program. (See the Web Manager chapter). To use the Windows based Administrator client program, users must install or configure it to run on their computer. ASCII text files called WRK files can be emailed to GECS or placed in a specified directory where GECS is configured to check. When using wrk files, no GECS programs are required. The WRK files use number or letter equivalent job parameters. WRK files can be created using most any text editor.

(See the end of this chapter). Customized job entry programs can be created by using the GECS SDK. The GECS SDK must be installed and job entry programs must be written. (Contact GECS Sales for details).

Batch Jobs

When using GECS Batches it is very important to fully understand the concept of batches, batch jobs and scheduled jobs. Batches can be created to define a batch of related processes in an off-line environment. Batches are like templates. Each Batch can contain one or more Batch jobs. Batch jobs do not become real jobs until they are scheduled. Once a Batch is scheduled then real jobs are created using the information in the Batch jobs. The result is new job records that the GECS system will launch and the remaining untouched Batch and Batch job templates.

Therefore, you should create a Batch using the Batches folder. You add related Batch job records to the Batch. When you are finished and ready to run these Batch jobs, you Schedule the Batch which creates real jobs available to be run by your Agents.

Studio Worksheets

Studio Worksheets can be used to create, edit or delete job records. Worksheets can be automatically created during the process of Scheduling a Batch. They can be viewed as a graphical display of your job streams showing lines and arrows depicting job dependencies.

Worksheets do not display real time information about your jobs.

Job Views

GECS Job records can be displayed in customizable lists. You can use the View Properties to update the filtering that can be applied to your view of jobs. You can double click on a job from the list to view the Job Detail screens. Creating your own views can help you organize your jobs into manageable entities. Views give you flexibility by allowing filtering on the items displayed in the lists. For more information on Job Views, see the Client Programs chapter of this manual.

Job Name

Each GECS job must be assigned a unique name or number which may consist of three parts:

BATCHNAME . JOBNAME - Instance

The format is:

XXXXXXXXXXXXXXXXXXXX . XXXXXXXXX - nnnnnnnnnn

The first section is optional and allows for an alphanumeric Batch name up to 20 characters in length. Batch names are forced to uppercase and only letters or numbers are allowed. This section is used when jobs are created using the Batches option.

The second section is required and allows for an alphanumeric job name up to 10 characters (valid characters are 0-9 and A-Z). When using Batches to create jobs, this section is derived from the Batch Job name.

The third section allows for a numeric instance of the job which can be up to 10 digits. This section is used when jobs are scheduled to repeat.

You should try to devise a naming or numbering scheme that best suits your company's needs. Examples of job names and numbers include:

1
TESTJOB1
BATCH1 . BKUP1
BATCH2 . UPDATE-1
BATCH2 . UPDATE-2

Command Line

Every GECS job must have a command line defined. The command line contains the actual task you wish to automate. In general, any task that can be run by hand at the machine where a GECS Agent is running can be automated by GECS.

With the Windows Agent, your command line can be an executable program, macro, batch file, etc. It can also include caption text, GECS substitution variables, command line parameters and environment variables.

With the NetWare NLM Agent, your command line can be any System Console command such as 'MODULES' or 'LOAD XYZ.NLM'.

With the Linux/Unix Agents, your command line must be the name of the executable program to be run such as 'cp' or 'ls'. To run shell scripts, enter the shell name and script for the command line such as 'sh xyz.sh'.

Remember that any paths specified in the command line field must be relative to the Agent.

The Windows Client Command Line field allows you to "Edit" a file or "Browse" for a command line by clicking on the command line lookup button. This feature is only relevant to Windows commands.

Limits on the length of the GECS command line is determined in part by the operating system that the GECS Agents are running on and in part by the "Command Line Type" defined for the job. Therefore, the number of characters allowed on the command line varies. Most command lines can hold up to 120 characters.

Executable Programs and Shell Scripts

To automate running a program or shell script, enter the fully qualified path and program or shell script name as follows:

```
C:\APPS\notepad.exe  
SH /APPS/Nightly.sh
```

Shell scripts or executables must be preceded by 'SH' or other shell name.

Long File Names on Windows Agents

Jobs run on Windows Agents that have command lines with long file names should be enclosed in double quotes. For example:

```
"C:\Program File\Microsoft Office\Excel.exe" f:\excel\test.xls
```

Batch and Command Files

Use appropriate file extensions when applicable. For example, when automating batch files use .bat or .cmd, such as:

```
C:\UTILS\TEST1.BAT  
C:\UTILS\TEST1.CMD
```

You can specify the command interpreter used to run your .bat or .cmd job using the GECS job "Command Line Type" field. You can choose a "Command Line Type" of DOS for the COMMAND.COM interpreter or choose Windows NT/2000/XP/2003 or NT Console for the CMD.EXE interpreter.

Input / Output Redirection - Piping

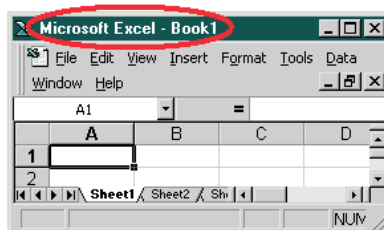
On Unix Agents, any I/O redirection or piping must be done within a shell script. It should not be put directly on the command line.

Caption Text

When a Windows program you need to automate requires you to type keys, GECS will automate the typing using "Keystroke Stuffing". See the Keystroke(s) fields. In addition to that, GECS can stuff keys to application windows based on their "caption text" (the text that appears in the title bar of the window). When entering the command line for the job, put the desired caption text between curly braces ({}) after the command such as:

```
C:\Excel\Excel.exe {Microsoft Excel}
```

This will force the keys to go to this window. Note that the entire caption need not be included. GECS will attempt to match just as much of the caption text as is specified in the curly braces. The caption text must be entered exactly as displayed. The comparison IS case sensitive ('A' does not equal 'a'). The caption text is circled on the window below.



An additional side of this feature is that you can specify just the window caption as the command line:

```
{Microsoft Excel}
```

GECS will not attempt to start any new program. It will simply look for an already running program with the specified caption text and will send the specified keys to that application. When all the keys have been sent to the task, the job is logged as complete with a return code of zero.

Substitution Variables

Command lines can contain special GECS substitution variables. A complete list of these variables can be found later in this chapter and in the on line application help. These variables can be entered on the command line as follows:

```
TEST2.BAT @DATEL @TIME @USER
```

Substitution on these variables occurs just before the job is launched. In the example above @DATEL will be substituted for the current date, @TIME will be substituted for the current system time and @USER will be substituted for the name of the user that submitted the job.

Command Line Parameters

Command line parameters can also be included in the Command Line field. They should be entered just as they would appear when you run the task by hand. For example:

```
dir /od
```

The example above would launch the directory command and display the list ordered by date.

Environment Variables

Optionally, you can substitute environment variables on your command line. The usage is %ENV%, where ENV is the environment variable name.

```
%SystemRoot%\system32\progrname.exe
```

Where the variable %SystemRoot% may be substituted with a predefined value such as c:\winnt.

These environment variables are the Agent environmental variables before “logging in as submitting user” on all GECS platforms.

Command Line Type

The GECS job parameter called the “Command Line Type” determines the way your “Command Lines” get executed by your Agents. The different platforms supported by GECS can run different types of programs as jobs. Your options are:

- DOS
- Windows
- OS/2
- Windows NT/2000/XP/2003

- NLM
- Windows 95/98/ME
- NT Console
- UnixWare
- Linux
- AIX
- HPUX
- Solaris
- OS/400
- Tru64 Unix
- IRIX

Windows Agents will run Windows NT/2000/XP/2003, Windows 95/98/ME, Windows, DOS, OS/2 and NT Console command line types. NetWare, SCO Unix Ware, Linux, HP-UX, Solaris, AIX, OS/400, Tru64 and IRIX Unix Agents will run their own command line type.

If you choose a command line type that is unsuitable for your command line you may get several errors when your Agent executes your job. For example:

```
Command Line Type: Windows
Command Line: DIR
```

You may get the following error:

```
Failed to launch task dir, WinExec returned 2
```

Or, your job might run returning an inaccurate return code. This is because DIR is not a valid Windows command. To avoid these errors, always ensure your command line type is compatible with the command line you are trying to run.

A more appropriate solution to the above example would be:

```
Command Line Type: NT Console
Command Line: DIR
```

Windows Agent Precmd.txt & Postcmd.txt

Windows Agents have the capability of defining a list of commands to be executed before and after every DOS, OS/2 and NT Console “command line type” job. These commands will be executed for EVERY job defined with a “command line type” of DOS, OS/2 or NT Console. The Windows Agent software looks for two ASCII text files PRECMD.TXT and POSTCMD.TXT in the Agent’s GECS directory. If these files exist, their contents will be executed similar to the way a batch file is executed. The lines in the PRECMD.TXT file are executed just before the job’s command line and the lines in the POSTCMD.TXT file are executed after the job’s command line. When these files don’t exist, the jobs execute just as they always have. Each line in PRECMD.TXT and POSTCMD.TXT is limited to 128 characters in length for DOS, 255 for NT Console command line type jobs.

Windows Agent - CMD.EXE vs. COMMAND.COM

When using Windows Agents, your “Command Line Type” also determines the type of interpreter that your Windows Agent opens to run certain jobs.

If you choose a command line type of “Windows NT/2000/XP/2003” or “NT Console”, your Agent will launch a copy of 32-bit CMD.EXE to run your job. If you choose a command line type of “DOS”, your Agent will launch a copy of 16-bit COMMAND.COM to run your job.

Determining if a Program is for Windows NT/2000/XP/2003, Windows 95/98/ME or Windows 3.1

One method is to create an icon for the program under Windows NT/2000/XP/2003. After the program name is entered, notice the questions about running the program in a separate address space. If this question is “grayed out”, the program is a Windows NT/2000/XP/2003 or Windows 95/98/ME program. If you can set this question, it’s a Windows 3.1 program.

Yet another method is to select the Start or File/Run option under Windows NT/2000/XP/2003 and enter the program name, noticing the questions about running the program in its own address space. If this question is “grayed out”, the program is a Windows NT/2000/XP/2003 or Windows 95/98/ME program. If you can set this question, it’s a Windows 3.1 program.

It’s important to note that even some of the programs that come with Windows NT/2000/XP/2003 are actually Windows 3.1 programs.

Capture Output

The “Capture output” field is used to enable standard output to be created and displayed on the Completed job record’s Output tab. Agents capture standard output. When Jobs complete, the DBMS requests the output from the Agents then saves the file to the GECS data directory. This feature only works when your Agents are configured to run on the desktop. The Agents cannot be run as a service or daemon when using the Capture Output feature. The output files are named BATCHNAME.JOBNAME-INSTANCE.OUT.

Next Run Time

The “Next Run Time” field is used to set the date and time your job should run next. Every GECS job must have a next run time defined. If this time is in the past, the job should run immediately.

Jobs containing dependencies or resource requirements may not always run on time according to their next run time. Sometimes, jobs are forced to wait. When a job’s next run time is in the past the job is considered to be in a “backlogged” state. This means the job is scheduled to run but for some reason it can not. A list of reasons why a job cannot run can be viewed. Reasons why a job cannot run may include:

- predecessor job had an invalid return code - the job this job depends on failed
- unable to find any required file - a required trigger file for this job is not yet available
- predecessor job hasn’t run - the job this job depends on is late and has not started yet
- event dependency - a required Event has not yet occurred
- resource unavailable - a required resource for this job is not yet available

Jobs setup to run in a specified sequence using job dependencies may all contain the same next run time. However, as long as they have defined job dependencies they will always run in order.

A new job with a new next run time is automatically created for those setup to repeat. Repeating jobs are created with new instance numbers.

Batch jobs use either the next run time specified in each Batch job screen or use the next run time specified for the Batch as a whole on the Scheduling Options tab. A Batch job's next run time gets overridden if a time is entered for the Batch as a whole.

Job Status

The “Job Status” field displays the status of your job. Status options are:

- Pending
- Started
- On Hold
- Complete

Jobs ready to be run should be marked 'Pending'. While they are being executed, they are marked as 'Started'. GECS users with User record security set to 'Approval Required', must save jobs with a status of 'On Hold'. These jobs must be manually approved by a user with authority 'OK to Submit Jobs'. When your Controller is set up not to delete completed jobs, they are marked 'Completed'. Only jobs marked 'Pending' will be executed.

WRK files can be used to launch a completed job by changing a job's status from complete to pending. See the WRK files section of this chapter for details.

Job Title

The “Job Title” field can be used to enter a title or short description for your job. The title entered here appears in various GECS screens. Job titles are optional and can be up to 30 characters in length.

Start In Directory

Use the “Start In Directory” field if you need to change to a drive and directory other than where your program file is located. Agents will change to this specified drive and directory before executing your jobs' command line. Often this directory will contain DLL files which may be required by a program you are automating from your command line.

Environment variables and special GECS substitution variables can be used in the start in directory field. See the command line field environment variable section for details on syntax.

From a Windows machine, you can display the start in directory for GECS programs by right clicking on the shortcut icon, clicking properties then clicking on the shortcut tab.

GECS checks the start in directory when a jobs requires “minimum disk space” to run.

Enable Command Line Substitution

GECS can 'alter' job command lines, keystroke(s) fields, trigger files and start in directory before they are executed if you include special GECS "Substitution Variables" in them.

If you want GECS to check for substitution variables, check mark (set to yes) the "Enable Command Line Substitution" field. Enabling this field will have no impact on command lines or other areas that do not contain any substitution variables.

Do not check mark (set to no) this field if your command line or other areas contain characters that match GECS substitution variables though you do not want them substituted with special GECS substitution values.

Substitution Variables in Jobs

The Global Event Control Server® can manipulate job command lines, keystroke(s) fields, trigger files and start in directory before jobs are executed using special GECS substitution variables. This is useful for passing parameters to the programs being run. For example, if you want to execute a program called SAMPLE.EXE and pass it the name of the user that submitted the job, you could enter the command:

```
SAMPLE.EXE USER=@USER
```

The @USER will be changed/substituted before the command is executed to the name of the user that submitted the job. For example, if the job was submitted by a GECS user called FRED, the command would be changed to:

```
SAMPLE.EXE USER=FRED
```

Special GECS Substitution Variables:

Variable	Format	Description
@AGENT	text	Agent name.
@ANAME	text	Agent's user name the Agent is running as.
@BATCH	text	Batch name.
@BEGCDEFMO	mm/dd/yy	Beginning date of current defined month.
@BEGCDEFMOL	mm/dd/yyyy	Beginning date of current defined month.
@BEGLMO	mm/dd/yy	The beginning date of the last month.
@BEGLMOL	mm/dd/yyyy	The beginning date of the last month.
@BEGMO	mm/dd/yy	The beginning date of the current month.
@BEGMOL	mm/dd/yyyy	The beginning date of the current month.
@BEGPDEFMO	mm/dd/yy	Beginning date of previous defined month.
@BEGPDEFMOL	mm/dd/yyyy	Beginning date of previous defined month.
@BEGNMO	mm/dd/yy	The beginning date of the next month.
@BEGNMOL	mm/dd/yyyy	The beginning date of the next month.

@BEGNDEFMO	mm/dd/yy	Beginning date of next defined month.
@BEGNDEFMOL	mm/dd/yyyy	Beginning date of next defined month.
@CMDLINE	text	The command line from the job record.
@DA	dd	Two digit day.
@DATE	mm/dd/yy	The current system date.
@DATEL	mm/dd/yyyy	Current date formatted as mm/dd/yyyy.
@DAY	dd	Today's day of the month.
@ENDCDEFMO	mm/dd/yy	Ending date of current defined month.
@ENDCDEFMOL	mm/dd/yyyy	Ending date of current defined month.
@ENDLMO	mm/dd/yy	The ending date of the last month.
@ENDLMOL	mm/dd/yyyy	The ending date of the last month.
@ENDMO	mm/dd/yy	The ending date of the current month.
@ENDMOL	mm/dd/yyyy	The ending date of the current month.
@ENDNDEFMO	mm/dd/yy	Ending date of next defined month.
@ENDNDEFMOL	mm/dd/yyyy	Ending date of next defined month.
@ENDNMO	mm/dd/yy	The ending date of the next month.
@ENDNMOL	mm/dd/yyyy	The ending date of the next month.
@ENDPDEFMO	mm/dd/yy	Ending date of previous defined month.
@ENDPDEFMOL	mm/dd/yyyy	Ending date of previous defined month.
@ESTMINUTES	n	Estimated minutes.
@FILE	text	The name of the file that was found for jobs that depend on the existence of a file. For jobs that depend on multiple files, this variable will be the name of one of the files found.
@HR	nn	Two digit hour in 24 hour format.
@JOBCOM	text	The job comments from the job record.
@JOBNUM	text	The job number from the job record.
@JOBTITLE	text	The job's title field.
@LASTMO	mm	Last month's month.
@MAXMIN	nn	Job's maximum run time minutes.
@MI	nn	Two digit minute.
@MO	mm	Two digit month.
@MONTH	mm	Today's month.
@MTIME	hh:mm:ss	Current time formatted as hh:mm:ss in 24 hour (military) format.
@NEXTDAY	dd	Tomorrow's day of the month.
@NEXTFRI	mm/dd/yy	Next Friday's date.
@NEXTFRIL	mm/dd/yyyy	Next Friday's date.
@NEXTMO	mm	Next month's month.

@NEXTMON	mm/dd/yy	Next Monday's date.
@NEXTMONL	mm/dd/yyyy	Next Monday's date.
@NEXTSAT	mm/dd/yy	Next Saturday's date.
@NEXTSATL	mm/dd/yyyy	Next Saturday's date.
@NEXTSUN	mm/dd/yy	Next Sunday's date.
@NEXTSUNL	mm/dd/yyyy	Next Sunday's date.
@NEXTTHU	mm/dd/yy	Next Thursday's date.
@NEXTTHUL	mm/dd/yyyy	Next Thursday's date.
@NEXTTUE	mm/dd/yy	Next Tuesday's date.
@NEXTTUEL	mm/dd/yyyy	Next Tuesday's date.
@NEXTWED	mm/dd/yy	Next Wednesday's date.
@NEXTWEDL	mm/dd/yyyy	Next Wednesday's date.
@NOWDATE	mm/dd/yy	Current system date.
@NOWDATEL	mm/dd/yyyy	Current system date.
@PATH	text	The subdirectory to change to from the Start In Directory.
@PREVDAY	dd	Yesterday's day of the month.
@PREVFRI	mm/dd/yy	The previous Friday's date.
@PREVFRIL	mm/dd/yyyy	The previous Friday's date.
@PREVMO	mm	The previous month's month.
@PREVMON	mm/dd/yy	The previous Monday's date.
@PREVMONL	mm/dd/yyyy	The previous Monday's date.
@PREVSAT	mm/dd/yy	The previous Saturday's date.
@PREVSATL	mm/dd/yyyy	The previous Saturday's date.
@PREVSUN	mm/dd/yy	The previous Sunday's date.
@PREVSUNL	mm/dd/yyyy	The previous Sunday's date.
@PREVTHU	mm/dd/yy	The previous Thursday's date.
@PREVTHUL	mm/dd/yyyy	The previous Thursday's date.
@PREVTUE	mm/dd/yy	The previous Tuesday's date.
@PREVTUEL	mm/dd/yyyy	The previous Tuesday's date.
@PREVWED	mm/dd/yy	The previous Wednesday's date.
@PREVWEDL	mm/dd/yyyy	The previous Wednesday's date.
@PRIOR	nn	Job's priority.
@SCHBEGLMO	mm/dd/yy	Beginning date of the month before the month the job is scheduled in.
@SCHBEGLMOL	mm/dd/yyyy	Beginning date of the month before the month the job is scheduled in.
@SCHBEGMO	mm/dd/yy	Beginning date of the month the job is scheduled in.
@SCHBEGMOL	mm/dd/yyyy	Beginning date of the month the job is scheduled in.

Task Automation

@SCHBEGNMO	mm/dd/yy	Beginning date of the month after the month the job is scheduled in.
@SCHBEGNMOL	mm/dd/yyyy	Beginning date of the month after the month the job is scheduled in.
@SCHDATE	mm/dd/yy	Job's scheduled date.
@SCHDATEL	mm/dd/yyyy	Job's scheduled date.
@SCHDAY	dd	Job's scheduled day.
@SCHENDLMO	mm/dd/yy	Ending date of the month before the month the job is scheduled in.
@SCHENDLMOL	mm/dd/yyyy	Ending date of the month before the month the job is scheduled in.
@SCHENDMO	mm/dd/yy	Ending date of the month the job is scheduled in.
@SCHENDMOL	mm/dd/yyyy	Ending date of the month the job is scheduled in.
@SCHENDNMO	mm/dd/yy	Ending date of the month after the month the job is scheduled in.
@SCHENDNMOL	mm/dd/yyyy	Ending date of the month after the month the job is scheduled in.
@SCHMONTH	mm	Job's scheduled date month.
@SCHNBDD	dd	The next business day's day relative to the job's scheduled time.
@SCHNBDM	mm	The next business day's month relative to the job's scheduled time.
@SCHNBDY	yy	The next business day's year relative to the job's scheduled time.
@SCHNBDYL	yyyy	The next business day's year relative to the job's scheduled time.
@SCHPBDD	dd	The previous business day's day relative to the job's scheduled time.
@SCHPBDM	mm	The previous business day's month relative to the job's scheduled time.
@SCHPBDY	yy	The previous business day's year relative to the job's scheduled time.
@SCHPBDYL	yyyy	The previous business day's year relative to the job's scheduled time.
@SCHPDD	dd	The previous day's day relative to the job's scheduled time.
@SCHPDM	mm	The previous day's month relative to the job's scheduled time.
@SCHPDY	yy	The previous day's year relative to the job's scheduled time.
@SCHPDYL	yyyy	The previous day's year relative to the job's scheduled time.
@SCHTIME	hh:mm:ss	Job's scheduled time in 24 hr format (military time).
@SCHYEAR	yy	Job's scheduled date two digit year.

@SCHYEARL	yyyy	Job's scheduled date four digit year.
@SE	nn	Two digit second.
@SERVER	text	Same as @AGENT (Depricated).
@SNAME	text	The Controller's network user name.
@SUPPLIES	text	Supplies required for this job from the Supplies field.
@TIME	hh:mm AM	The current system time.
@TOMO	mm/dd/yy	Tomorrow's date.
@TOMOL	mm/dd/yyyy	Tomorrow's date.
@USER	text	The user that submitted the job.
@YEAR	yy	Today's year.
@YEARL	yyyy	Today's year.
@YEST	mm/dd/yy	Yesterday's date.
@YESTL	mm/dd/yyyy	Yesterday's date.
@YR	yy	Two digit year.

Variables displayed in **bold** type can also be used to define environment variables in the GECS.INI file that Windows Agents can set prior to job execution. @ANAME, Agent's user name (text) is also included. See the Technical Reference chapter of this manual for information on the GECS.INI file.

Remember that you must check mark the "Enable Command Line Substitution" field for your job if you want GECS to check for and change substitution values for your job's command line.

Substitution Variable Date Math

You can add and subtract days or months from any substitution variable that returns a date either in the format 'mm/dd/yy' or 'mm/dd/yyyy' by adding a plus or minus sign and a number to the end of the substitution variable. For example:

@DATE+3

would be substituted as '08/04/97' if the current system date was 08/01/97. Optionally, you can include the letter 'D' after the number to indicate days. To add or subtract months, include the letter 'M' after the number to indicate months. For example:

@SCHDATEL+2M

would be substituted as '09/03/1997' if the job's scheduled date is 07/03/1997.

Note that if you are adding or subtracting months from a date near the end of a month, you may not get the expected date due to months having variable numbers of days. For example, if you add 3 months to 01/31/97 you will end up with 04/28/97 as follows:

```
01/31/97 plus 1 month = 02/28/97
02/28/97 plus 1 month = 03/28/97
03/28/97 plus 1 month = 04/28/97
```

Due to this situation, it is not recommended to add and subtract months from the last several days of the month. In most cases other substitution variable combinations can be used to achieve the desired date.

Note that no space is allowed between the substitution variable and the plus or minus sign.

Substitution Variable Formatting

By default, substitution variables are formatted in standard U.S. format (i.e. mm/dd/yy or mm/dd/yyyy).

Default formatting:

```
@DATE 12/31/02
@DATEL 12/31/2002
@TIME 11:59:59 PM
@MTIME 23:59:59
```

Other formatting options are available by including the following entry in your local GECS.INI file.

```
[FORMAT]
DATES=n
```

where 'n' is a number 0 through 4 as follows:

'n'	Format	Example
0	mm/dd/yyyy	12/31/1999
1	dd-mm-yyyy	31-12-1999
2	ddMMMyyyy	31DEC1999
3	mm-dd-yyyy	12-31-1999
4	dd/mm/yyyy	31/12/1999

Note that the substitution variable format is system wide and applies to all date substitution variables. If this section is missing or invalid in a GECS.INI file, the system defaults to the 'mm/dd/yyyy' format.

You can use

```
[FORMAT]
DateFormatShort=string
DateFormatLong=string
TimeFormat=string
```

to override the default formatting or the formatting specified by 'Date=n'. The 'string' is a formatting string that can contain one or more of the following special fields:

- %b abbreviated month uppercase (JAN)
- %c abbreviated month capitalized (Jan)
- %B month (January)
- %m month (2 character)
- %d day (2 character)
- %l month (1 or 2 character)
- %2 day (1 or 2 character)
- %n day with suffix (1st, 2nd)
- %y year (2 character)
- %Y year (4 character)
- %A day of week (Monday)
- %a day of week (Mon)
- %H hour in 24 hour format
- %I hour in 12 hour format
- %M minute

%S second
 %T hundredths of seconds
 %p AM or PM

For example:

```
[FORMAT]
DateFormatShort=%m.%d.%y
DateFormatLong=%B %n, %Y
TimeFormat=%H:%M
```

would cause the following output:

```
@DATE 12.31.02
@DATEL December 31st, 2002
@TIME 23:59
```

Note that 'TimeFormat' overrides the default formatting of @TIME and @SCHTIME, but not @MTIME. @MTIME uses "%H:%M:%S" regardless of what 'TimeFormat' is set to.

Lastly, you can use formatting strings with the substitution variable to override any other formatting specified by including the formatting string in parenthesis immediately after the substitution variable and before any date math.

For example:

```
@DATE(%m) 12
@DATEL(%1.%2.%y) 12.31.02
@TIME(%I o'clock) 11 o'clock
@DATE(%d)+1d 1
```

No spaces are allowed between the substitution variable and the parenthesis. Empty parenthesis will use the default formatting.

Marking Jobs Complete Once Started

GECS can mark jobs complete when they actually complete or when they are started. This can be used when you want to 'load' a program at the beginning of a job stream, execute one or more jobs that 'use' the loaded program and then 'unload' the program. You would want to flag the job that 'loads' the program as "Mark Complete Once Started". This would allow the job(s) that 'use' the loaded program to be dependent on the 'loading' job. For example, you might need to load a database server, print a report and then unload the database server program.

Job	Command Line	Depends On	Mark Complete Once Started
1	LOAD DB.NLM	(none)	Yes
2	REPORTER.EXE	1	No
3	UNLOAD DB.NLM	2	No

The example shows the loading and unloading of NLMs, but might involve the loading and unloading of programs on Windows as well. The 'unload' portion might execute a command to unload the program or it might simply 'stuff' keys to the originally loaded program to cause it to quit using caption text.

When this feature is enabled, your Agent will execute your command line and GECS will immediately log a successful, '0' return code.

Never Late

The “Never Late” flag is used for jobs that do not really rely on time as much as the presence or absence of such things as Trigger Files, Job Dependencies or Events. Therefore, if you do not want your job to be considered late when the job’s Next Run time is in the past, enable the Never Late field. This will keep any special notification on late jobs from telling you about this particular job.

Show Activity

The “Show Activity” enables you to filter this job from displaying in your lists. When this field is set to no, this job will not show up in your jobs listings.

Keep When Complete

The “Keep When Complete” field is used to override your Controller fields “Delete Jobs On Completion” and “Days of Completed Jobs to Keep”. This flag allows you to delete most jobs on completion or that have completed in the past, while having certain jobs remain on file after completion allowing them to be easily “activated”.

See also the delete only successful jobs on completion GECS.INI file entry. By setting this entry, [Controller] DeleteOnlySuccessfulJobs=1, failed jobs will be left on file.

Execute

The “Execute” field is used to indicate how your job should be started. The different Agent operating systems are only capable of particular job start modes.

- Normal - Use the applications default presentation.
- Hidden - Run the application invisible.
- Minimized - Display the application as an icon.
- Maximized - Display the application full screen.

Note that, when the “Execute” job parameter field is set to minimized or hidden, keystuffing will not operate.

Programs That Require User Input

The Global Event Control Server® is designed specifically to execute jobs without user input. When using in-house developed programs, this shouldn’t present any problem. When using commercial applications or products developed by others, this can present a problem. The GECS Windows Agent contains a “keyboard stuffing”

program that can feed most standard keystrokes to the programs being run as if you had typed them directly on the keyboard.

In some unique situations, you might need more power or sophistication than is included in the keyboard stuffing program included with GECS.

Sending Keystrokes to Programs

The job entry fields “Keystrokes 1-4” are used for key stuffing. Key stuffing is simply GECS feeding keystrokes to programs being run just as if someone was typing them directly on the keyboard.

The Windows Agent will send keys to most Windows NT/2000/XP/2003, Windows 95/98/ME or Windows 3.1 programs. It will send keys to most DOS programs. Special commands can be stuffed to wait for a period of time or to wait for a task to complete whether Windows NT/2000/XP/2003, Windows 95/98/ME, Windows 3.1 or DOS programs are being run.

GECS for NetWare NLMs will send keys to most NLMs. Special commands can be stuffed to wait a period of time before continuing the keys.

Unix Agents cannot send keys for key stuffing.

Windows Agent Keystroke Stuffing

GECS uses a special technique to send keys to DOS command line type jobs. It uses a completely different scheme for sending keys to Windows command line type jobs which is substantially more powerful. Yet with certain programs GECS is unable to determine which window in the program should receive the keys. The typical problem is that temporary message boxes may get the keys intended for the main program window. The ‘W n’ key stuffing command causes GECS to wait ‘n’ seconds before sending the next key to the Windows program. This may help you get around the problem of keys going to the wrong window.

The ‘W n’ command can also help with the delays associated with printing. For example, if you know a report will take about 2 minutes to print, you can put the delay of W 120 in the keys to allow the report to finish printing before any other keys are sent to the program. Note that the ‘W n’ command can only be used with Windows command line type jobs. If you are running a DOS command line type job, you should use the ‘@WT n’ command as described under the DOS keystroke stuffing section.

You will note that at the end of the list of “stuffable” keys there are several that are only available to Windows programs. These keys cannot be used by jobs automating DOS programs, when the command line type set to DOS, even though, they are being run by a Windows Agent.

An additional feature of the Windows key stuffing mechanism is its ability to send keys to a window by specifying its caption text. The ‘caption text’ is the text that appears on the title bar / on the top line of the window (in the caption). Caption text is described later in this chapter.

DOS Keystroke Stuffing Programs

KSLOAD.COM is a TSR that is automatically loaded when keystrokes to execute are specified. The program KS.EXE is then executed to actually “stuff” the keys. Your program is then run. After the program runs, KSLOAD.COM is called again to unload the TSR from memory. The TSR is slightly larger than 1K and is only loaded before jobs that specify keystrokes. DO NOT load KSLOAD.COM before starting the program.

Should the KS.EXE program encounter a problem, the job will stop and a return code of 255 will be recorded as the job's return code.

KS.EXE KSLOAD.COM

There are two programs used for sending keys to DOS programs. These programs are used by your Windows Agent to send keys to the DOS "command line type" jobs they run. KSLOAD is a small TSR (less than 3K in size) that is loaded the first time it's run and unloads the second time it's run. The KS program actually sends the keys to the programs. For example, you might create a batch file that contains the lines:

```
KSLOAD
KS 'Hello World'
yourprog.exe
KSLOAD
```

The lines in this batch file would send keys to your program. These programs 'hook' the keyboard BIOS. They will not work with programs that talk directly with the keyboard hardware. Though you can use these programs in your own batch files, it is better to define the keys to be sent to your jobs using the Client program Keystrokes fields and allow GECS to automatically call these programs to send keys to the programs in your jobs.

To test your keystroke stuffing, you can use the KSLOAD.COM and KS.EXE programs directly from a batch file such as:

```
KSLOAD
KS 'keys' ENTER
yourprog
KSLOAD
```

The first line loads the TSR. The second line "stuffs" the keystrokes. The third line executes your program. Your program will accept the "stuffed" keys as if you had typed them. The last line unloads the TSR. When KSLOAD is executed, it loads only if it can't find itself in memory. If it finds itself in memory, it unloads itself. No command line options are required to specify loading or unloading.

By including the wait keyword, @WT n in the keys to be stuffed, the program can wait while reports or other processing completes before sending the remaining keys. For example:

```
'112233' ENTER @WT 300 ENTER ESC F10
```

would send several keys, wait 5 minutes (300 seconds) and then send the remaining keys. Note that the @WT n command must be outside any quotation marks to be effective.

Details of Keyboard Stuffing

The job entry screen contains four fields where "Keystrokes" to be executed are entered. Keystrokes can be entered 4 ways:

1) Normal typeable characters are entered in single quotes like:

```
'abc'
```

You can include a single quote in a quoted string as long as it is the first character of the string. For example, to stuff the characters:

I haven't seen it.

you would enter:

'I haven' ``t seen it.'

The phrase is cut into two pieces. The first single quoted string is 'I haven' and there is nothing special about it. The second string is ``t seen it'. Note that the double single quotes at the beginning of the string is interpreted as a single quote.

2) The special, non-typeable keystrokes such as the F10, Enter, Alt+F or Esc keys are entered using special words outside the single quoted strings like:

`abc' ENTER F10 A_F ESC' Joe' ENTER

The complete listing of special GECS keywords:

<u>GECS Keyword</u>	<u>Keystroke</u>
BACKSPACE	Backspace
BS	Backspace
C_BACKSPACE	Ctrl & Backspace
C_BS	Ctrl & Backspace
ENTER	Enter
CR	Enter
C_ENTER	Ctrl & Enter
SPACE	Space Bar
ESC	Esc
TABLEFT	Shift & Tab
TABRIGHT	Tab
TAB	Tab
LEFT	Left Arrow
RIGHT	Right Arrow
C_LEFT	Ctrl & Left Arrow
C_RIGHT	Ctrl & Right Arrow
DOWN	Down Arrow
UP	Up Arrow
PAGEDOWN	PgDn
PAGEUP	PgUp
C_PAGEDOWN	Ctrl & PgDn
C_PAGEUP	Ctrl & PgUp
HOME	Home
END	End
C_HOME	Ctrl & Home
C_END	Ctrl & End

INS	Ins
DEL	Del
F1-F10	Function Keys
A_F1-A_F10	Alt & Function Keys
S_F1-S_F10	Shift & Function Keys
C_F1-C_F10	Ctrl & Function Keys
A_1-A_0	Alt & Top Row Number Keys
A_-	Alt -
A_=	Alt =
A_A-A_Z	Alt & Alphabetic Keys
C_@	Ctrl @
C_A-C_Z	Ctrl & Alphabetic Keys
C_[Ctrl [
C_/	Ctrl /
C_]	Ctrl]
C_^	Ctrl ^

Windows Command Line Type Only Keys:

A_SPACE	Alt Space
F11,F12	Function Keys
A_F11, A_F12	Alt & Function Keys
S_F11, S_F12	Shift & Function Keys
C_F11, C_F12	Ctrl & Function Keys
W n	Wait 'n' seconds before sending the next key
SUSPEND	Wait until the current foreground window changes. This keyword only works when the Agent is running one job at a time.

DOS Command Line Type Only Keys :

@WT n	Wait 'n' seconds before sending the next key
@WC row col char	Wait until char appears at row and col on the screen
@WS 'string'	Wait until string appears somewhere on the screen

NLM Command Line Type Only Keys :

@WT n	Wait 'n' seconds before sending the next key
-------	--

3) Keystrokes can be entered with their ASCII codes numerically “outside” the single quoted strings like:

`'abc' 13 13 27 'Joe' 13`

When more than one number is entered in a row, they must be separated by at least one space. Spaces outside the single quoted strings are ignored and simply act as separators.

To enter the non-typeable keys numerically, you need to know the “scan code” for the key. The scan codes are entered in the most significant byte of a two byte number. For example, the key Alt Z is not a typeable key and has a scan code of 44. To calculate the number to use multiply the scan code number times 256. For example:

$$44 * 256 = 11264$$

Use this number to “stuff” the Alt Z keystroke:

```
`abc' 11264 ENTER
```

Note that the method shown in section B of using the A_Z keyword would be much simpler in this situation.

4) All of the special GECS substitution variables can be used in the keystrokes to stuff. For example:

```
`@SCHDATE' CR' @SCHTIME' CR
```

would be translated to something like

```
`08/01/97' CR' 08:00:00' CR
```

These 4 methods can be combined into a single set of keystrokes such as:

```
`abc' ENTER ESC 45 `xyz' @YR F1
```

5) Environment variables can be used in the keystrokes to stuff. For example:

```
`%ENV%' CR CR
```

DOS Command Line Type Jobs Keystroke Length

DOS command line type jobs keystrokes are passed on the command line to a program called KS.EXE. Because DOS limits the command line length to 128 characters, the total keystroke string is limited to 125 characters for DOS (128 - 3 for the “KS ”).

Key Stuffing Based On Caption Text

GECS can stuff keys to windows based on their caption text (the text that appears in the center of the top line of a window header) sometimes called the ‘title bar’. When entering the command line for the job, put the desired caption text in curly braces ({}) after the command such as:

```
C:\EXCEL\EXCEL.EXE {Microsoft Excel}
```

Note that the entire caption need not be included. GECS will attempt to match just as much of the caption text as is specified in the curly braces. The caption text must be entered exactly as shown. The comparison IS case sensitive ('A' does not equal 'a').

This helps solve a problem associated with certain Windows programs. GECS knows the window handle of the window associated with the program it launches. If this initial program launches another program and then goes away, GECS is unable to find the program it launched to send keys to. By specifying the caption text of the second window (it may be the first one you can see), GECS will be able to figure out which window to send the keys to.

Another benefit of this feature is that you can specify just the window caption as the command line:

```
{Microsoft Excel}
```

and GECS will not attempt to start any new program. It will simply look for an already running program with the specified caption text and will send the specified keys to that application.

Key Stuffing Using SUSPEND

SUSPEND is used to help simplify key stuffing with GECS on Windows Agents.

When the SUSPEND command is encountered, the Agent takes a snapshot of the windows that are active for the job. The Agent then waits until the active window goes away or the window focus changes from the snapshot before it continues sending keystrokes. This will solve the problem of not knowing how long a process will take and how long to wait before continuing key stuffing. For example, the command line:

```
C:\EXCEL\EXCEL.EXE TEST.XLS
```

and the keystrokes of:

```
A_F 'P' ENTER SUSPEND A_F 'X'
```

This would cause Excel to start and load TEST.XLS. The keys to print the spreadsheet (A_F 'P' ENTER) would then be stuffed and the Agent would then take a snapshot of the windows. Once the 'Printing' dialog box goes away, the Agent would send the keys to exit Excel (A_F 'X'). This keyword only works when the Agent is running one job at a time.

Key Stuffing on Windows Agents

The ability of GECS Windows Agents to send keystrokes to programs depends on the type of program being run and the mode the GECS Agent is running in as shown below:

Job Command Line Type	Running From A Desktop Icon	Windows Running As A Service
Windows NT/2000/XP/2003	Keys	No Keys
Windows 95/98/ME	Keys	No Keys
Windows 3.x	Keys	No Keys
DOS	Keys	Keys
OS/2	No Keys	No Keys
NT Console	Keys	No Keys

Known Keystroke Stuffing Problems With Windows

The Windows operating system provides no guaranteed method of sending keystrokes to applications. In most cases, the keys sent by GECS to the jobs will get to the job without any problem. It is conceivable that from time to time programs will not properly get the keystrokes you've told GECS to send. The following is a list of the things you can do to reduce the likelihood of this occurring and/or to work around them:

- Add RAM to the machine or use a machine with a faster processor or hard drive.
- Reduce the number of "Simultaneous Jobs" to 1.
- Update the GECS.INI configuration file.

Also note that keys will not stuff if the Windows "Lock Workstation" feature is enabled.

Special DOS Key Stuffing Commands

There are two special commands for DOS command line type key stuffing routines used for Windows Agents to help deal with programs that take an unknown amount of time. The @WC and @WS commands cause waits to occur much like the @WT command, except that they wait until something happens on the screen. The @WC command waits until a particular character appears on the screen at a particular location. Its syntax is:

```
@WC row col char
```

where 'row' and 'col' are the location of the character on the screen (1-25 and 1-80 respectively) and 'char' is the character to look for at that location (case matters). For example:

```
CR CR @WC 1 1 A F10
```

would cause the Enter key to be pressed twice, the program would wait until the letter 'A' appeared in the upper left corner of the screen and then the F10 key would be pressed.

The @WS command waits until a particular string appears somewhere on the screen. Its syntax is:

```
@WS 'string'
```

'string' is the word or phrase to look for. The word or phrase MUST be enclosed in single quotes ('), the phrase must match exactly (case matters) and the phrase must be found on a single line. For example:

```
CR CR @WS 'Good Morning' F10
```

would cause the ENTER key to be pressed twice, the program would wait until the phrase Good Morning appeared somewhere on the screen and then the F10 key would be pressed.

These commands ONLY work when the video adapter is in 80x25 Color mode. They will not work when the video adapter is in Mono or Graphics modes or when resolutions other than 80x25 are used.

Job Return Code Overview

Return codes can be a terrific way to monitor program execution, determine job success or failure and manage job dependencies.

GECS does not generate return codes. It simply captures return codes produced by the programs or jobs your Agents execute. By default, GECS recognizes '0' as success and '255' as a failure. Any other number is a result of the program or application your GECS Agent ran. Job success or job failure can be defined for each job using the Maximum good return code and Minimum good return code fields.

- Every well behaved EXE or COM program generates a return code when it finishes.
- Some programs don't appear to generate a return code, though in reality they do. They just always return '0'.
- Internal commands such as COPY or DIR do not tend to generate return codes on most operating systems.
- Return codes generally work best when used with programs you develop yourself, rather than with off the shelf programs you purchase.
- Most Unix programs return significant error codes on failure.

A specific scheme has been established to help make it easier to send return codes back from jobs for recording by GECS. GECS can capture the actual program return code, the value of an environmental variable or the contents of a disk file as the return code for a job, depending on the GECS operating system platform and command line type.

GECS first checks for a value sent from your program or executable. If this value exists, then GECS will record this value as the job's return code.

Next when the job “Command Line Type” is set to DOS, GECS looks for an environmental variable EL. If one exists, GECS will override the value from the program, executable or shell script and record the environmental value of EL as the Job’s return code.

Because many programs return meaningless return codes, GECS can use an ASCII text file named *jobnum.EL*, found in the GECS Agent directory, for capturing meaningful return codes.

jobnum.EL is the name of your GECS job with a .EL extension added. Instance numbers must be omitted from the job name before adding the .EL. For example, BATCH.JOB-1 would be:

BATCH . JOB . EL

GECS checks for a value in the *jobnum.EL*. If a value exists, GECS will override the value from the program, executable or environmental value and record the value of *jobnum.EL* as the job’s return code. GECS automatically deletes the *jobnum.EL* file after it is read.

Valid GECS Return Code Range

Valid return codes are determined in part by the operating system, in part by the GECS command line type and the scheme used to capture return codes.

Command Line Type	Valid Return Code Range	Valid Range Using jobnum.EL
Windows NT/2000/XP/2003	+/- 2 billion	+/- 2 billion
Windows 95/98/ME	+/- 2 billion	+/- 2 billion
Windows 3.1	0-255	+/- 2 billion
DOS	0-255	N/A
NT Console	0-255	+/- 2 billion
OS/2	0-255	N/A
NLM	N/A	N/A
UnixWare	0-255	0-255
Linux	0-255	0-255
AIX	0-255	0-255
HPUX	0-255	0-255
Solaris	0-255	0-255
Tru64 Unix	0-255	0-255
IRIX	0-255	0-255

Capturing Return Codes from Executables

GECS ships with a program to demonstrate how it deals with return codes from executables. The program is called `gecsret`. A version of `gecsret` is shipped with every Agent.

GECSRET

This utility can be used to test your job streams with various job return codes. (Other variations of this utility include: `DOSRET`, `OS2RET`, `WINRET` and `WINRET32`) Your “command line” should be as follows:

`c:\gecs\gecsret retval`

where *retval* is the return code you’d like the program to return. This program simply returns the specified value as its return code. For example, create a GECS job named “TEST” and specify the following job parameters:

Command Line: **`c:\gecs\gecsret 8`**

Command Line Type: choose the appropriate operating system

Where `c:\gecs` is your Agent directory and 8 is the value you would like the program to return.

When you have finished, save your job and exit. After your job has run, ensure your job returned 8 by viewing your completed job statistics return code for this job.

Capturing Return Codes within a Windows Batch or CMD file

It is recommended that you run the commands you need to automate directly from the GECS job command line when you can, rather than trying to launch several commands within a batch or CMD file. This way GECS can better control your job stream and manage return codes. However, when it is necessary to use batch files or when dealing with software you purchase you can test return codes by using a batch file similar to this one. `TESTBAT.BAT`:

```
@ECHO OFF
theprog.exe
IF ERRORLEVEL 255 goto 255
IF ERRORLEVEL 254 goto 254
IF ERRORLEVEL 253 goto 253
"
copy for all numbers
"
IF ERRORLEVEL 2 goto 2
IF ERRORLEVEL 1 goto 1
IF ERRORLEVEL 0 goto 0
:255
set el=255
goto d
:254
set el=254
goto d
"
copy for all numbers
"
:1
set el=1
goto d
:0
set el=0
goto d
:d
WINRET32.EXE -j:C:\GECS\jobnum.EL %EL%
ECHO %EL%
```

NTFS file system is required on the Agent PC if job names greater than eight characters are used.

For a test you could substitute “.exe” with “C:\GECS\GECSRET 1” and “C:\GECS” with your GECS Agent directory. Your GECS job name could be CODETEST with:

```
Command Line: c:\gecs\TESTBAT.BAT @JOBNUM
Command Line Type: DOS
```

Because, in this example, you substitute WINRET32 *retval* with “1”, this job should return 1.

Note that you cannot use ECHO in your batch file to capture return codes if you are using long job names with DOS command line type jobs. Instead, you must use the following command in your batch files to set the return code.

```
WINRET32 -J:jobnum.EL retval
```

Capturing Return Codes from Windows Environment Variables

To retrieve meaningful return codes from DOS batch files (BAT), set an environmental variable named “EL” to a number in your batch file with a line similar to:

```
SET EL=n
```

GECS will record the value of EL as the job return code in the completed job statistics for that job.

For example, you create a job named VALUEEL with the following job parameters:

```
Command Line: c:\gecs\ELTEST.BAT
Command Line Type: DOS
```

The batch file ELTEST.BAT contains the following lines:

```
SET EL=42
ECHO %EL%
PAUSE
```

This job named VALUEEL should capture the value of EL which is “42” and return 42 as the return code. You can check your completed job statistics to verify.

Capturing Windows Return Codes using the jobnum.EL file

The special ASCII text *jobnum.EL* file makes it very easy to setup return codes for jobs that normally would not return meaningful values. For example:

If you have a job named “BATCH.123-1” that executes a Windows NT/2000/XP/2003 batch file (CMD) with the following job parameters:

```
Command Line: c:\gecs\123TEST.CMD
Command Line Type: Windows NT/2000/XP/2003 (not NT Console or
DOS)
```

you might include in the 123TEST.CMD file the line:

```
ECHO 5 >BATCH.123.EL
```

When the job is complete and GECS finds the file named ‘BATCH.123.EL’ which contains the number 5, it will record a return code of 5, regardless of the value returned by the program, then automatically delete the BATCH.123.EL file.

Another example could be a job named “BATCH.456-1” with the following job parameters:

```
Command Line: c:\gecs\456TEST.CMD @JOBNUM
Command Line Type: Windows NT/2000/XP/2003
```

The 456TEST.CMD file might contain the following:

```
yourprog.EXE
ECHO 12 >%1.EL
```

GECS would use the @JOBNUM substitution variable from your command line and substitute its value in your CMD file thus replacing the “%1” with the name of your GECS job “BATCH.456”. You can then view your completed job record to verify that your job named “BATCH.456-1” records 12 as its return code.

Windows Return Codes and Command Line Types

The following describes the various command line types and how GECS handles program return codes.

Command Line Type	Return Codes
Windows NT/2000/XP/2003 Batch File (CMD)	Contents of <i>jobnum.EL</i> is captured.
Windows NT/2000/XP/2003 or Windows 95/98/ME executable	EXE return code or contents of <i>jobnum.EL</i> is captured.
Windows 3.x Executable	EXE return code (use LAUNCH16) or contents of <i>jobnum.EL</i> is captured.
DOS Executables	EXE return code is captured
DOS Batch File (BAT)	Value of the environmental variable EL is captured or contents of <i>jobnum.EL</i> is captured.
OS/2 Executable	EXE return code or contents of <i>jobnum.EL</i> is captured
NT Console Job	Value of the environmental variable EL is captured or contents of <i>jobnum.EL</i> is captured.

Windows 3.1 Command Line Type Jobs

As mentioned previously, GECS can capture and record return codes directly from 32-bit programs.

However, GECS does not capture return codes sent directly from 16-bit Windows 3.1 programs. They always record a return value of zero. To address this issue, you may use a special utility called LAUNCH16.EXE.

Using LAUNCH16.EXE to Capture Return Codes

The LAUNCH16 utility can be used to run and capture return codes from 16-bit Windows 3.1 applications run by GECS.

LAUNCH16 captures return codes by writing the *jobnum.EL* file to the specified GECS directory. As mentioned previously, GECS will look for the *jobnum.EL* file on job completion, read it, log the return value then delete the file.

The LAUNCH16 program requires the following command line parameters:

```
LAUNCH16 <GECS Agent directory> <job number> <command line>
```

- <GECS Agent directory> -The fully qualified path to your Windows Agent programs. LAUNCH16 writes the *jobnum.EL* file to the specified directory.
- <job number> -The job number of the job being executed. Pass this on the GECS command line using the @JOBNUM substitution value.
- <command line> -The 16-bit Windows command line you need to automate.

Running a 16-bit program from a GECS command line

For example, create job named **16PROG** with the command line type of **Windows NT/2000/XP/2003** and command line as:

```
C:\GECS\LAUNCH16.EXE C:\GECS @JOBNUM yourprog.exe
```

Where C:\GECS is your GECS Agent directory and *yourprog.exe* is the name of your 16-bit program. In this example you could use “C:\GECS\WINRET32.EXE 1”. When run as a GECS job, this command line would return 1.

Running a 16-bit program from a Windows NT/2000/XP/2003 CMD file

For example, a job named **16BCMD** with the command line type of **Windows NT/2000/XP/2003** and a command line as follows:

```
TEST16.CMD C:\GECS @JOBNUM
```

Contents of TEST16.CMD:

```
C:\GECS\Launch16.EXE %1 %2 yourprog.exe
```

Where *yourprog.exe* is the name of your 16-bit program you are automating. In this example you could use “C:\GECS\WINRET.EXE 33”. This GECS job would return 33.

DOS and NT Console Command Line Type Jobs

Your Windows Agents execute DOS command line type jobs and Windows NT Console command line type jobs quite differently from other types of jobs. These command line type jobs not only create and execute special temporary batch files before launching your command line, they also execute different batch files depending on the type of command line you have defined for the job. For instance, if your command line automates a DOS batch file versus if your command line automates a DOS program or executable. Each special temporary batch file is created in your GECS program directory and is assigned a random name such as “\$T000001.BAT”.

DOS and NT Console Command Line Type Jobs that Automate Batch Files

If your GECS job has a command line that automates a batch file GECS will create a special temporary batch file as described below:

1. It executes the lines for PRECMD.TXT
2. It changes to the start in directory defined for the job.
3. It executes the command line using a CALL statement:

```
CALL TEST.BAT
```

4. It changes back to the GECS drive and subdirectory:

```
C:
CD \gecssubdir
```

5. It executes a special program for capturing return codes:

```
WINRET32 -J:JOBNUM.EL retval
```

6. It executes the lines from POSTCMD.TXT.

DOS Command Line Type Jobs that Automate DOS Programs

The special temporary batch file that gets written for jobs that have command lines setup to run DOS programs or executables (not batch Files) can be described as follows:

1. It executes the lines from PRECMD.TXT.

2. It “stuffs” the keystrokes for the job:

```
KSLOAD  
KS keystrokes
```

3. It changes to the drive and subdirectory for the job:

```
F:  
CD \subdir
```

4. It executes the command line:

```
THEPROG.EXE
```

5. Sets EL to the ERRORLEVEL

6. It changes back to the GECS drive and subdirectory:

```
F:  
CD \gecssubdir
```

7. It unloads the keyboard “stuffer”:

```
KSLOAD
```

8. It executes a special program for capturing return codes:

```
WINRET32 -J:JOBNUM.EL retval
```

9. It executes the lines from POSTCMD.TXT.

Other Command Line Type Jobs

When programs are executed as Windows NT/2000/XP/2003, Windows 95/98/ME and Windows 3.1 command line type jobs, no special GECS batch file is written.

1. The Agent changes to the drive and subdirectory for the job.
2. The Agents directly launch the EXE file.
3. The Agent sends keystrokes to the launched program.
4. When the program ends, the Agent records the programs return code directly.

Defining Job Success and Failure

Each GECS job can define what it considers a success by setting the “Minimum Good Return Code” and failure by setting the “Maximum Good Return Code” from the Actions tab on a job entry screen.

Job Comments

The “Job Comments” field is an optional field that can be used to enter a miscellaneous comment about your job. Job comments can be up to 128 characters in length.

Job Notes

The “Job Notes” field is an optional field. It contains an ASCII text file can be edited and used for notes, comments or documentation relative to the job. The files are named:

```
BATCHNAME-JOBNAME.note
```

Instance numbers are excluded.

Job notes are not deleted when a job is deleted. Job Notes can be up to 4k in size. The notes must be stored in the GECS data directory because they must be accessible by the DBMS.

These job notes are automatically backed up with the GECS data is backed up.

Creating Jobs Using WRK Files

WRK (pronounced ‘work’) files are one of the most powerful features of GECS. WRK files are used to add jobs to the GECS system without using the GECS Client programs. This is the easiest way to interface with GECS from other programs. WRK files are also used to transfer jobs from a test environment to a production environment.

GECS can be configured to look for these files. When it finds one, it reads it, validates it and creates a GECS job based on it, just as if a user had manually created a job using the Client programs.

For example, if you want users to easily submit a job that prints a report, you could write a program or batch file that simply creates the appropriate WRK file. GECS finds it, adds it as a jobs and then dispatches it to an Agent. The user wouldn’t need to run the sometimes complex GECS Client programs. WRK files are simple to create. They are ASCII text files, the type created by programs like Notepad. Almost any language or 4GL tool can write an ASCII text file.

Every job parameter that you can enter in the Job record screens can be included in your WRK file. Press the F1 function key on each Job field to display online help which contains each equivalent WRK file parameter.

Conversely, existing GECS jobs can be dumped into WRK files. See the Job Export Utility in the GECS Command Line Utilities chapter of this manual for details.

As GECS adds the WRK files as jobs, it validates your entries. Information you have left out of your WRK file is set to the defaults. Some of the defaults can be defined by you from the defaults tab in the (Controller) record. For the others the defaults are simple blanks or zeros.

You can also submit .WRK files via supported mail systems. For details see the Submitting Jobs Via Mail section of this chapter.

File Format for WRK Files

The Global Event Control Server® can automatically add new jobs by looking for files that end in the extension WRK. If one of these files is found, GECS reads it and adds new jobs based on the information in the file. These files are standard ASCII text files, like those created by EDLIN, NOTEPAD or other word processors. Each line contains a command that describes the job to be added. The lines all have the format of:

```
X:YYYYY
```

where x tells the Global Event Control Server® what kind of data is on the line and yyyyy is the data for the line. The various types of commands that can be entered in a WRK file are described in detail later in this manual.

As an example, a WRK file that contains these two lines:

```
C:DIR F:\*.*
N:FRED
```

would cause the Global Event Control Server® to add a job submitted by user (N:) FRED and the command to execute (C:) is DIR F:*.*. All WRK files must contain a name line (N:name). Commands for multiple jobs can be put in a single WRK file if you wish. The commands for the different jobs are separated by beginning the line with the pound sign (#). Additionally, you can put comments in the WRK file as well. Any line that begins with a semicolon (;) is considered a comment line. For example:

```
; the first job
C:COPY F:\X F:\Y
N:FRED
#
; the second job
C:DEL F:\X
N:FRED
```

This WRK file would cause GECS to add two separate jobs to your jobs file. Remember that when commands are omitted, the Controller that adds the job using default values. WRK file values can be obtained from each field in the Job record by pressing the F1 key while your cursor is positioned on the field.

The following list is organized in numerical/alphabetical order by WRK file command:

Command	Values	Description
1:totaltimes	0-9999	number of times to execute
2:remaining	0-9999	remaining times to execute
2n:execafter	text	job 'name' to execute after in multi-job WRK file (20:-29:)
3:substcmd	0-1	substitute command line 0=No, 1=Yes
4:filespec	text	filespec to check for
4n:relationship	0-5	return code relationship (40:-49:) 0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
5:fileexist	0-6	0=no file exists, 1=if any file exists, 2= if any file can be opened sharably, 3=if any file can be opened exclusively, 4=if all the files exist, 5=if all files can be opened exclusively, 6=if all files can be opened sharably
5n:resource	text	required resource (50:-59:)
6n:timeafterjob	hh:mm:ss	time to wait after execafter job 'n' (2n:) finishes before executing this job (60:-69:)
7:jobnumber	text	add the job with this job number
8:class	text	the job class for use in figuring vacations

9:relaabso	0-3	0=relative repetition, 1=absolute repetition, 2=day of week repetition, 3=special
10:nth	0-366	number of variable units
11:daytype	0-11	0=reg,1=business,2=non-business,3=weeks,4=months, 5=sundays, 6=mondays, 7=tuesdays, 8=wednesdays, 9=thursdays, 10=fridays, 11=saturdays
12:begend	0-3	0=from beginning, 1=from end, 2=on or after beginning, 3=on or before end
13:period	0-5	0=week, 1=month, 2=defined month, 3=quarter, 4=half, 5=year
14:osver	0-99.99	the required minimum operating system version required
15:keystostuff	text	the keys to stuff into keyboard buffer
16:retryreturn	0-999999999999	retry job if the return code is = this number, 0=no retry
17:notifyretcode	0-255	minimum retcode to notify on
18:maxjobminutes	0-9999	maximum minutes for job to run
19:exectype	0-12	command line type 0=DOS, 1=Win31, 2=OS/2, 3=WinNT/2000/XP/2003, 4=NLM, 5=Win95/98/ME, 6=NT Console, 7=UnixWare, 8=Linux, 9=AIX, 10=HPUX, 11=Solaris, 12=OS/400, 13=Tru64, 14=IRIX
30:jobname	text	'name' of this job in multi-job WRK file
31:showactivity	0-1	show activity 0=No, 1=Yes
32:estjobminutes	0-9999	estimated minutes for job to run
33:keystostuff2	text	the keys to stuff into keyboard buffer
34:keystostuff3	text	the keys to stuff into keyboard buffer
35:keystostuff4	text	the keys to stuff into keyboard buffer
36:escalateminutes	0-9999	minutes before escalation of priority
37:failjob	text	job to activate on failure
38:maxminlate	0-9999	maximum minutes late before activating, 0=none
39:keepdone	0-1	keep job when done 0=no, 1=yes
70:latejob	text	job to activate if this job is late
71:lateskipmin	0-9999	skip job if this many minutes late, 0=none
72:launchmode	0-3	0=normal, 1=hidden, 2=minimized, 3=maximized
73:maxgoodreturn	0-255	return greater than this and activate latejob
74:message	text	execute message to prompt before job
75:sun	0-1	run on Sunday 0=no, 1=yes
76:mon	0-1	run on Monday 0=no, 1=yes
77:tue	0-1	run on Tuesday 0=no, 1=yes
78:wed	0-1	run on Wednesday 0=no, 1=yes
79:thu	0-1	run on Thursday 0=no, 1=yes
80:fri	0-1	run on Friday 0=no, 1=yes

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81:sat	0-1	run on Saturday 0=no, 1=yes
82:caltype	text	calendar type to use
83:escalpriority	0-9	amount to escalate late jobs priority by 0-9
84:oninvalid	0-1	on conflict with valid period 0=wait until end, 1=reschedule
85:juststart	0-1	mark complete once started 0=no, 1=yes
86:timestoretry	0-99	times to retry on failure
87:businessonly	0-2	0=all days ok, 1=business days only, 2=non-business days only
88:skiplate	hh:mm:ss	skip this job if it will finish after this time - 00:00:00 = don't skip
89:afterspecial	0-4	0=complete, 1=complete & warn, 2=relative, 3=absolute, 4=day of week
90:bval1	hh:mm:ss	beginning of valid time 1
91:bval2	hh:mm:ss	beginning of valid time 2
92:bval3	hh:mm:ss	beginning of valid time 3
93:bval4	hh:mm:ss	beginning of valid time 4
94:bval5	hh:mm:ss	beginning of valid time 5
95:eval1	hh:mm:ss	end of valid time 1
96:eval2	hh:mm:ss	end of valid time 2
97:eval3	hh:mm:ss	end of valid time 3
98:eval4	hh:mm:ss	end of valid time 4
99:eval5	hh:mm:ss	end of valid time 5
A:status	0-3	job status 0=pending, 1=started, 2=on hold, 3=completed, 4=pending as of next scheduled time after now
An:dephours	0-99	predecessor 'n' must have run in the last 'dephours' hours (A0:-A9:)
B:repeatbase	0-2	repeat base 0=from start time, 1=from end time, 2=from scheduled time
Bn:spdaten	mm/dd/yyyy	special schedule 'n' date (B0:-B9:)
C:cmdline	text	command line to execute
Cn:sptimen	hh:mm:ss	special schedule 'n' time (C0:-C9:)
D:date	mm/dd/yyyy	date to execute
E:priority	0-9	job priority
F:comment	text	comment to put on job
G:group	text	execute by Agent group
H:pathname	text	start in directory /path to change to/working directory
J:jobnumber	text	re-run job number - if used, the only other ones that can be used are D:, N: or T:

M0:filename	text	file attachments may be used when using mail features with GECS.
M5: - M9:mailto	text	mail to: user or group names on job completion. Include an asterisk * before group names.
N:username	text	user name
O:os	0-10	operating system required 0=Other, 1=Any, 2=WinNT/2000/XP/2003, 3=UnixWare, 4=NetWare, 5=Win95/98/ME, 6=Linux, 7=AIX, 8=HPUX, 9=Solaris, 10=OS/400, 11=Tru64 Unix, 12=IRIX
P8:supplies	text	supplies necessary
P9:premesg	text	message to send before job
P0:postmesg	text	message to send after job
Q1:depfilesize	0-99999999	minimum file size in bytes of trigger file
Q2:unscheduled	0-1	never late - is this an unscheduled job 0=no, 1=yes
Q3:createevent	0-1	create events for this job 0=don't, 1=create
Q4:loginuser	0-1	login as a specified user 0=no, 1=yes
Q5:loginname	text	login network user name
Q6:loginpswd	text	password
Rn:retval	0-255	max return code for execafter (R0:-R9:)
Sn:Agent	text	Agent name to execute (S0:-S9:)
T:time	hh:mm:ss	time to execute
U:repeatunit	0-9	units of repeat interval 0=seconds, 1=minutes, ..
V:repeatvalue	0-99999999	repeat value
W:diskspace	0-9999	minimum megs of disk required
Xn:execafter	text	job to execute after (X0:-X9:)
Y:title	text	job title
Zn:eventn	0-999999999	depends on event (Z1:-Z9:)

Note that some WRK file parameters are shown in the format Xn:, where 'n' is a number from 0 through 9 indicating that there are 10 possible values for the field.

#	end of job/beginning of next job
;	Comments

Adding Dependent Jobs Via WRK Files

Typically you need to know the job number that a job depends on in order to setup the job dependency. When jobs are added via WRK files, you may not know the number that will be assigned to the job. If you don't know a job's number, you can't make other jobs dependent on it.

The '2n:' and '30:' WRK file commands allow you to add dependent jobs via WRK files, as long as all the jobs involved in the dependency are added via a single WRK file with the '#' character as a separator between jobs. The '30:' command allows you to assign a logical name to each of the jobs in the WRK file. For example, the WRK file:

```
N:USER
C:DIR
30:Step1
#
N:USER
C:DIR
30:Step2
#
N:USER
C:DIR
30:Step3
#
N:USER
C:DIR
30:Step4
```

would define four separate jobs and would give each of them a name by using the '30:' command. This name by itself is useless unless it is used in conjunction with one or more '2n:' commands. For example, the WRK file:

```
N:USER
C:DIR
30:Step1
#
N:USER
C:DIR
30:Step2
;this job should run after the first one
20:Step1
#
N:USER
C:DIR
30:Step3
;this job should run after the first one
20:Step1
#
N:USER
C:DIR
30:Step4
;this job should run after the second & third ones
20:Step2
21:Step3
```

uses the '20:' command to define the dependencies between the jobs in the WRK file. The second job depends on the first job finishing. The third job also depends on the first job finishing. The fourth job won't run until both the second and third jobs have run.

Note that the names must be defined in the file with a '30:' command before they can be referenced with a '2n:' command or the WRK file will be rejected. Also note that case is unimportant in the names. Step1 is the same name as STEP1. Names can be up to 128 characters in length. You should view the '2n:' commands as equivalent to the 'Xn:' commands which are used to define dependencies when job numbers are known. You can use the '6n:' and 'Rn:' commands along with the '2n:' commands to indicate the return codes and delays for the dependencies just as they would be used with the 'Xn:' commands.

Submitting Jobs via Mail

WRK files can be sent to GECS via mail in one of two ways. Either the text of the message can contain the WRK file commands or the WRK file can be sent directly as an attached file. The following mail systems are supported:

- Microsoft Mail
- cc:Mail
- Internet Mail
- Novell MHS

Submitting jobs via Lotus Notes mail is not supported.

Submitting Jobs Via Microsoft Mail, cc:Mail, Internet Mail or MHS Mail

To submit WRK file commands as the text of the message, simply send a message to the email user you've defined for GECS as if it were another email user with the text of the message as the WRK file. For example,

```
C:command to execute
N:users_gecs_name
n:other options
```

Or For MHS Mail

```
From:users_mhs_name
To:GECS_mhs_name
C:command to execute
N:users_gecs_name
n:other options
```

To submit WRK files as attachments to a message, simply send a message to the email user you've defined for GECS as if it were another email user with no text in the message, but with an attachment of a WRK file. Press the Attach button to add the attachment to the message similar to:

```
From:users_mhs_name
To:GECS_mhs_name
Attachment:wrk_file_name
```

If an attachment is sent with the message, the message text is ignored. If there are no attachments, the message text is assumed to contain WRK file commands.

In order to preserve security, GECS checks to see that the sending email user name, defined in the "Mail User or Address" field, is the same as the mail user name defined for the user referenced in the WRK file N: parameter. For example, if the email message:

```
From:JohnDoe
To:GECS_1
C:DIR
N:JDOE
```

was sent to submit a job, it will only be accepted if the GECS user JDOE has an email name, defined in the "Mail User or Address" field, defined as JohnDoe. If the email name is different, the WRK file will be rejected.

When WRK files are received from email, they are written to disk as WRK files and are then added as jobs just as any WRK file might be added.

GECS will not send return receipt messages to the sending email user.

When Your GECS Job Won't Run...

Here are a few suggestions to try if you are having difficulty automating your command line in GECS.

1. Test Your Programs by Hand -

If you experience problems running a command line using GECS you should verify that you are able to run it by hand on the computer where your Agent is running. If you can not walk up to the Agent and launch the task, your GECS Agent will not be able to launch it either.

2. Display the "Why this job cannot run" List -

Click on the "Why this job cannot run" toolbar button from the job record

3. Test a different Job -

Test a different, simple job and ensure it will run. For instance, on Windows run a DOS Directory (DIR) ensure you can get any job to run.

4. Check your Command Line Type -

Ensure you have defined an appropriate "command line type" for the job "command line" you are trying to run.

5. View your Completed Job's Statistic -

Check your completed job record. Analyze the completed job detail record, specifically the return code, launch error and message fields. If using substitution, check to see if substitution has worked by viewing the command line or appropriate field.

6. Run your agent from a desktop icon

7. Do not "Login as Submitting User"

8. Populate the "Start In Directory"

Automating Programs

When defining jobs, you must accurately specify the "Command Line", "Command Line Type" and "Start In Directory". GECS will not properly run jobs if these job parameters are not correct. In order to properly define a job, you must know the following:

- What is the name of the executable, script or batch file?
- If you are going to run an executable, what type of executable is it? If you are going to run a script, how is it launched? If you are going to run a batch file, is it a Windows NT/2000/XP/2003 batch file (CMD) containing Windows NT/2000/XP/2003 commands and Windows NT/2000/XP/2003 and/or DOS programs or is it a DOS batch file (BAT) containing only DOS commands and executables?
- What is the drive and subdirectory where the executable, script or batch file is located?

Editing Text Files from GECS Job Entry Screens

The GECS client job entry programs allow direct access to ASCII text files to be edited. This is accomplished by either pressing the “<F8>” function key when your cursor is positioned on the “command line” field or by pressing the command line lookup button and selecting the “Edit” option. GECS accomplishes this under Windows by calling the Windows Notepad program.

Guide To Developing Job Programs

GECS can run most types of programs as jobs just as if they were run by hand and most of the programs you run as jobs will likely be off the shelf programs built by others. In situations where you are writing the programs that will be run as jobs, there are several things to keep in mind that will help you create programs that run optimally as jobs.

1. Pass parameters to the programs on the command line.

Though keystuffing works well with most programs, passing parameters to your programs on the command line is the most reliable method of sending runtime parameters to programs. The GECS substitution variables can all be used as command line arguments as well.

2. Limit or eliminate the user interface.

The CPU time spent producing a ‘pretty’ user interface will be wasted when the job is run unattended. The work your program needs to do will happen faster if time isn’t wasted updating a user interface.

3. Whenever possible write text applications that use redirectable standard I/O.

Though text applications are not as attractive or intuitive, their ability to take input from standard in and send their output to standard out can be useful for monitoring applications. The ‘printf’ and ‘scanf’ standard ‘C’ functions are both simple and functional for unattended operation. Sending status messages out to standard out which has been redirected to a file provides an easy method of logging the progress of your application.

4. Return meaningful return codes.

Many of GECS’s features become much more powerful when the programs being run as jobs return meaningful return codes. GECS can record return codes in the completed job statistics and make decisions based on their value. Job dependencies and processing of failures are two features that are more powerful when meaningful return codes are used. At a minimum, try to have your programs return 0 for success and non-zero for failure.

Windows NT/2000/XP/2003 Architecture

Windows NT/2000/XP/2003 runs most programs in their own protected address space. However, 16 bit Windows programs can be run either in their own address space or in a common address space shared with other 16 bit Windows programs. GECS Agents for Windows runs all jobs in their own address space. This architecture has several implications that are worth understanding:

All jobs are protected from other misbehaved jobs, even if they are DOS or 16 bit Windows programs.

16 bit Windows programs are protected from the unpredictable problems associated with the Windows On Windows (WOW) layer when shared with multiple 16 bit Windows applications.

Once started, 16 bit Windows programs run faster than if WOW is used.

GECS can safely terminate programs that run too long.

16 bit Windows programs running in their own address space consume more system resources than if WOW was used.

The time required to start 16 bit Windows programs is increased when run in their own address space.

16 bit Windows programs that are run as jobs cannot communicate with other 16 bit Windows programs that are running either in the shared WOW address space or in a separate address space using DDE. If the program that is launched by GECS starts the program it wants to communicate with as its “child”, both programs will be in the same address space and they can communicate using DDE.

GECS Agents for Windows will launch OS/2 1.x text programs, though key stuffing is not supported. Any OS/2 program that you can run by hand, can be run by GECS.

By default, DOS programs are launched using the DOS command interpreter in the format of :

```
command.com /E:1024
```

This can be changed by using an entry in the GECS.INI file. To change the launching command for DOS programs to:

```
command.com /E:1536
```

you would add the following lines to the GECS.INI file:

```
[Agent]  
SHELL=c:\winnt\system32\command.com /E:1536
```

You can also use this setting to indicate a different DOS command interpreter or the location of your command interpreter if it's not located in your search path.

Windows NT/2000/XP/2003 and Windows 95/98/ME jobs can automatically be terminated if the “maximum job minutes” is exceeded or if the GECS for Windows Agent is closed while jobs are still running.

Scheduling Jobs

Scheduling Concepts

GECS is designed with the concept that many jobs need to be run repeatedly according to some schedule. Jobs can be defined in GECS to run once, a fixed number of times or indefinitely.

Multiple Method Scheduling (MMS) allows for simple programming and management of tasks with a widely varying repetition schedule.

All jobs can be set up to repeat using a scheduling model called "Dynamic" scheduling. When jobs are created, the date and time that the job should run next is entered. When a recurring job completes the system automatically creates a new job with a new instance number based on rescheduling information entered for the job. For example:

"BATCH1" contains batch job "JOB1" which is scheduled to run at 7pm, daily Monday thru Friday forever.

Run BATCH1.JOB1 today at 7pm then reschedule BATCH1.JOB1 to run tomorrow at 7pm by creating BATCH1.JOB1-1. Then after it runs create job BATCH1.JOB1-2. After it runs create BATCH1.JOB1-3 and so on.

New job records are created only after the run of each job.

Batch jobs can be scheduled using a scheduling model called "Static" scheduling. Static scheduling is different from dynamic scheduling in that the next instance of the job is immediately created when the Batch is Scheduled. Like Dynamic scheduling, a separate job record is created for every instance of when the job should run next but, the instance is generated immediately. Likewise, each job created using static scheduling is set up to run only once and is marked complete when it finishes. For example:

"BATCH1" contains batch job "JOB1" which is scheduled to run at 7pm, weekly Monday thru Friday for the rest of the year.

Run BATCH1.JOB1-1 11/02/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-2 11/03/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-3 11/04/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-4 11/05/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-5 11/06/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-6 11/09/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-7 11/10/1998 at 7pm then mark it complete.

Run BATCH1.JOB1-8 11/11/1998 at 7pm then mark it complete...

All job records are created for static are created immediately when the Batch is scheduled. The advantage of using static scheduling is that it gives you the ability to alter a job stream on a particular day, with or without affecting other days.

In addition to the scheduling model, GECS supports several different methods of rescheduling; Relative, Absolute, Day Of The Week and Special. Given the power of these different methods, you may actually find there is more than one way to accomplish the same rescheduling.

Jobs That Repeat

Jobs can be set up to repeat in a variety ways. Jobs records can be setup to repeat by filling out scheduling information displayed on the Schedule tab. These jobs will use dynamic scheduling. Batch jobs can be set up to repeat by filling out scheduling information displayed on the Scheduling Options tab prior to scheduling your Batch

jobs. These Batch jobs can be set up to use either dynamic or static scheduling. The two fields described below can be used with both types of scheduling.

Reschedule on

The “Reschedule on” field is used to assign the type of day your job should run. You may choose to reschedule your job on “all days”, “business days” or “non-business days”. Business and non-business days must be defined using the Calendar module. See the Defining Calendars section of this chapter.

With Calendar

The “with calendar” field is used to assign a calendar for rescheduling to your job. A calendar is required when rescheduling your jobs on “Business Days”, “Non-Business Days” and or “Defined Months”. See the Defining Calendars section of this chapter for details.

Job Scheduling

GECS offers four different methods of rescheduling jobs:

- Relative
- Absolute
- Day of the Week
- Special

Relative Scheduling

Relative scheduling is used when you want your job to run some period of time after the last time it ran or was scheduled to run. It can be described with the sentence:

“Schedule the job to the date and time that is ‘n’ periods of time after the last time the job was scheduled, started or finished.” For example:

- 15 seconds after the last time it finished
- 1 day after the last time it was scheduled
- 1 month after the last time it was started

Note that when using Batches static scheduling, relative scheduling is different in that the repeat interval must be greater than or equal to a one day period. Because jobs are scheduled before they run, they are always scheduled relative to their scheduled time, not start or finish time.

Absolute Scheduling

Absolute scheduling is used when you want your job to run at a fixed point in time. It can be described with the sentence:

“Schedule the job to a date and time that is ‘n’ periods of time from the beginning or end of another period of time”

For example:

- 1 day after the beginning of the next week
- 3 business days on or after the end of the next month
- 5 non-business days after the beginning of the next quarter

When jobs are defined to reschedule using the absolute method, there are four choices for the offset within the next period.

1. after the beginning of
2. before the end of
3. on or after the beginning of
4. on or before the end of

The difference between ‘after the beginning’ and ‘on or after the beginning’ is whether the first day is counted, when it’s qualified. The difference between ‘before the end’ and ‘on or before the end’ is whether the last day is counted, if it’s qualified. The following jobs show the differences:

1. The job should reschedule to the date that is 1 Thursday after the beginning of the next month.
2. The job should reschedule to the date that is 1 Thursday on or after the beginning of the next month.
3. The job should reschedule to the date that is 1 Thursday before the end of the next month.
4. The job should reschedule to the date that is 1 Thursday on or before the end of the next month.

The jobs run on Jan 15, 1996 and Feb 1, 1996 and Feb 29, 1996 which are all Thursdays.

The jobs would be rescheduled to:

1. Feb 8, 1996 (Feb 1 is not after the first day of the next month)
2. Feb 1, 1996 (Feb 1 is on or after the first day of the month)
3. Feb 22, 1996 (Feb 29 is not before the last day of the month)
4. Feb 29, 1996 (Feb 29 is on or before the last day of the month)

On the other hand, if the same 4 jobs were setup for Wednesdays instead of Thursdays, they would reschedule to:

1. Feb 7, 1996
2. Feb 7, 1996
3. Feb 28, 1996
4. Feb 28, 1996

In most cases, you will find the ‘on or after’ or ‘on or before’ selections will tend to deliver the results you expect. Use the ‘after’ and ‘before’ selections when you specifically do not want the first or last day to be chosen.

Day Of The Week Scheduling

Day of the week scheduling is probably the simplest of the methods. Pick the days of the week the job should run and it gets rescheduled on the next day of the week it’s supposed to run. It can be described by the sentence:

“Schedule the job to the same time on the next valid day such that the new date and time are after the date and time it finished.” For example:

- every Monday
- every Monday, Wednesday and Friday
- every Saturday

Special Scheduling

Special scheduling allows you to enter up to 10 dates and times when the job should run. With this capability you can cause jobs to be rescheduled in a completely random fashion. As the Special times are ‘used up’ or if they fall in the past, they are cleared from the Special Schedule. Additionally, you can use Special scheduling for temporary changes to your regular schedule. Once the special dates and times have been ‘used up’, jobs can be configured to

revert to a regular schedule using relative, absolute or day of the week or they can be marked complete, with or without notification.

Checking Job Schedules

Job Schedule Lookups

To help you set up job schedules, the job record screens allow you to view the next 20 iterations of the schedule you've defined for a single job. From the job screen you may click on the File pull down menu and select 'This Jobs Schedule' or click on the toolbar button shortcut for this jobs schedule. This lookup is used for jobs scheduled to repeat using the dynamic scheduling model. Vacation periods do not show up when viewing job schedules.

Advanced Scheduling Features

GECS allows you to create very simple or very complex schedules. Job parameter information input from the various job entry screens along with information entered in GECS Calendars, Vacations, Resources, Agents and Events can work together to orchestrate a very wide range of schedules.

Defining Calendars

Defining Business Days and Defined Months Calendars

GECS allows you to create custom calendars defining "Business Days" and/or "Defined Months". These calendars are used for scheduling jobs. Jobs are assigned a calendar name to determine which business day and/or defined month the job should use for rescheduling.

Calendars can also be assigned "effective" and "expiration" dates. Batch jobs created using static scheduling use the effective and expiration dates to determine the range of jobs that should be created for a scheduled Batch.

Calendar features are typically used for complex rescheduling that doesn't fit the other built-in rescheduling methods GECS offers. You may not need to define custom calendars.

To define business days, you actually identify non-business days. When a non-business day is indicated, all other days, by default, are then considered business days. A defined month requires a start and end day to makeup the beginning and ending of the month.

Use the Calendars screens to define calendars or use the "Add Calendar" command line text utility to load a calendar from a comma separated file.

Job Scheduling Day Types

Regardless of the method of rescheduling defined for a job, you can indicate that a job should only be rescheduled for business days or non-business days. For example:

Reschedule the job to the time that is 23 hours after the last start time, but only on a business day.

or

Reschedule the job to the day that is 3 days after the beginning of the next quarter, but only on a business day.

or

Reschedule the job to the next Saturday, but only on a non-business day.

or

Reschedule the job to 02/02/98, but only on a business day.

When GECS encounters a conflict where the principle job scheduling rules generate a day that is contrary to the required type of day, they simply reschedule the job again until the resulting day is the correct type. When the rescheduling scheme is based on the job's finish time, the job's estimated minutes is added to the previously calculated start time for each rescheduling. Using the first example above, if Saturdays and Sundays are non-business days and the job starts on Friday at 23:00:00, the job would reschedule as follows:

```
22:00:00 Saturday Fails
21:00:00 Sunday Fails
20:00:00 Monday Success
```

As you can see, it is possible to define jobs that can't accurately reschedule. For example:

Reschedule the job to the day that is 2 business days after the beginning of the next month, but only on a non-business day.

This schedule would result in an infinite loop where GECS would be unable to derive a good next scheduled date, no matter how many times it tries. GECS will stop trying to reschedule a job, mark it complete and record an error when the following conditions have been met:

1. The derived date is at least 31 days after the last scheduled date, and
2. GECS has rescheduled the job at least 12 times.

Once BOTH of these requirements have been met, GECS will stop trying to reschedule the job and will mark the job complete and record an error.

Valid Time Periods

Regardless of the method of rescheduling defined for a job, you can indicate that a job should only be rescheduled for certain hours of the day. This is sometimes referred to as 'interval' scheduling or "Valid Times" your job can run. For example:

Reschedule the job to the time that is 23 hours after the last start time, but between 15:30:00 and 20:30:00 and on conflict reschedule.

or

Reschedule the job to the time that is 1 hour after the last finish time, but only between 8:00:00 and 17:00:00 or 23:00:00 and 05:00:00 and on conflict wait.

When GECS encounters a conflict where the principle job scheduling rules generate a time that is contrary to the valid times, they either:

1. Reschedule the job for the beginning of the first valid period after the invalid scheduled time (wait).
2. Reschedule the job again until the resulting time is in a valid period (reschedule).

Using the first example above, if the job starts on Friday at 23:00:00, the job would reschedule as follows:

```
22:00:00 Saturday Fails
21:00:00 Sunday Fails
20:00:00 Monday Success
```

As you can see, it is possible to define jobs that can't accurately reschedule. For example:

Reschedule the job to the time that is 1 day after the last scheduled time, but only between the hours of 08:00:00 and 09:00:00. The job is scheduled for 07:00:00 and ran at 08:10:00 and on conflict, reschedule.

Times to Execute

The “Times to Execute” field is an optional field that can be used to limit the number of times your job can run. If you enter a number of times to execute, you should also enter a number of “Remaining Times”. The number of remaining times field defaults to '0'. If this is not updated, your job will think it has 'X' number of times to execute and '0' times remaining to run. If this occurs, the job will not run at all.

Remaining Times

The “Remaining Times” field is an optional field that can be used in conjunction with the “Times To Execute” field. This field is decremented each time your job is executed. If you are entering a new job, these should be the same.

Job Class

The “Job Class” field can be used to accomplish two different objectives.

1. To limit the number of jobs of a given class that can be run at once.
2. To assign vacation periods to jobs of a given class.

When using the job class field to limit the number of jobs of a given class that can be run at once, you need to specify the “Maximum jobs of a Class” in the Agent record. This will limit the number of jobs that your Agent(s) will run of any given class.

For example, if you have your Agent set up with a maximum number of “Simultaneous Jobs” of 5, you might want to set the “Maximum Jobs of a Class” to 4. This would keep a single class of jobs from hogging the entire Agent. If you have jobs you never want to have running at the same time, you could set this number to 1 and schedule the jobs with the same class. Entering 0 will eliminate any class restrictions. You need to set up your Agent with a number of “Maximum Jobs of a Class”.

When using the job class field with vacation periods (periods of time your job shouldn't run even if scheduled), you need to use the vacations screens to create a vacation period. Your job's “job class” should then match your vacation class.

Vacation Periods

Vacation Periods are setup to indicate periods of time when jobs of a particular class should not run, even if they are scheduled for that time. Each vacation period is distinguished by number and the job class it applies to. You must enter how the job should behave when it encounters a conflict with the vacation period. The system can keep the job pending until the vacation period ends, or it can reschedule it as if it ran. You also need to setup how the vacation

period should repeat when it completes. For many situations, vacation periods may not be necessary. Note that vacation periods are not taken into account when viewing job schedules.

Trigger Files

Jobs can depend on the presence or absence of single or multiple files. These files are relative to the Agent machine. Use the Trigger File(s) field to tell the Agents to look for a filespec and only dispatch your job if the criteria specified in the Execute if field is true and optional Minimum File Size field is true. For example:

```
F:\GECS\TEST.DAT
```

If the Trigger File(s) field is left blank, GECS will not check for any files. Drive letters or UNC are acceptable. This field is limited to 128 characters. All files are relative to the Agent.

Multiple files may be specified, separated by semi-colons (much like the DOS PATH command). Special GECS substitution variables can also be used. For example:

```
F:\GECS\file1.txt;F:\GECS\file2.txt;F:\GECS\@MO@DA@YEARL
```

However, only one fully qualified file may be specified in the Trigger files field when using the Minimum File Size option. Minimum file size is not supported when using multiple files in the Trigger Files field.

If you want a job to run every day when a file appears, simply schedule the job to repeat daily, at a time earlier than when you expect the file to appear. The job will wait for the trigger file, run, and then reschedule for the next day.

When trigger file dependencies have not been met, the reasons Why This Job Cannot Run will temporarily display Unable to Find Any Required File. Keep in mind that GECS will check again for this file each time the GECS pulses.

The Agent must be running and the Agent machine must have sufficient rights to access files entered into this field. Insufficient security rights can cause trigger file dependencies to fail. Rights include: read, write create, erase modify and file scan.

Trigger File Command Line Utilities

The GECSSCHNG command line utility allows dependencies on files changing. The GECSSIZE command line utility will wait for a file size to change before returning. See your GECS online manual for more details.

File Dependency Caveats

Wildcards

Our file dependencies scheme is designed to handle fully qualified filenames WITHOUT wildcards. By accident, not by design, our file dependencies scheme will handle filenames with wildcards in a limited number of situations. Wildcards can be used ONLY with 'if no files exist' and with 'if any files exist'. You may receive unexpected results in any other situation.

Sharable/Exclusive

Sharability and exclusivity are concepts in the 'Microsoft file system' world. In general they have no parallel in the 'Unix file system' world. We have implemented them under Unix as follows:

Sharably If we can 'open(name, O_RDONLY)' the file, it can be accessed 'sharably'. If for some reason we can't 'open(name, O_RDONLY)' it, it cannot be accessed 'sharably'.

Exclusively For all the Unixes, except AIX, exclusivity is based on locks. If we can 'flock(fd, F_TEST, 0)' the entire file, it can be accessed 'exclusively'. If for some reason we can't 'flock(fd, F_TEST, 0)' the entire file, it cannot be

accessed 'exclusively'. For AIX, exclusivity is based on the 'non sharable' bit that can be set when files are opened. If we can 'open(name, O_RDONLY | O_NSHARE)' it, the file can be accessed 'exclusively'. If we can't 'open(name, O_RDONLY | O_NSHARE)' it, the file cannot be accessed 'exclusively'.

In general, it is not recommend that you use sharable or exclusive on Unix Agents unless you fully understand what they mean.

NLM

The NLM Agent doesn't support file dependencies at all.

Any vs. All

Understanding as described above that the scheme was designed for fully qualified file names, WITHOUT wildcards, the concepts of 'Any' and 'All' are implemented around the ability of the user to put multiple filenames on the 'file dependencies' line, for example:

```
filename1;filename2;filename3
```

If the desired condition, for example 'exists', is TRUE for either filename1, filename2 or filename3, then the condition 'any exists' would be true. If the desired condition, for example 'exists', is TRUE for filename1 and filename2 and filename3, then the condition 'all exists' would be true.

Execute

Use the "Execute" field to tell GECS whether or how to look for the filespec specified in the "Trigger File(s)" field. Indicate whether this job should only run:

- if no file exists
- if any file exists
- if any file can be opened sharable
- if any file can be opened exclusively
- if all the files exist
- if all files can be opened exclusively
- if all files can be opened sharable

This field is only valid if the 'Trigger File(s)' field is filled in, otherwise it is ignored.

The exclusive options work well when required files may not yet exist in their entirety. For example, files in the process of being copied or transferred. However, by design, wild card characters are not allowed as trigger files if any or all files can be opened exclusively.

Minimum File Size

Use the "Minimum File Size" field to specify the minimum file size in bytes required for this job to meet the trigger file(s) requirement specified.

This is an optional field and is only valid if the 'Trigger File(s)' field is populated, otherwise it is ignored.

File Contents Change Utility

The "GECSCCHNG" utility allows dependencies on file contents "changing". This program accepts a file name as an argument. When GECSCCHNG.EXE first starts, it records (in memory) the time/date stamp of the file that was passed on the command line. It then periodically checks the time stamp of the file. When the time stamp does not match the one in memory, that means the file has been edited/changed. At that point GECSCCHNG.EXE returns a zero to the OS and terminates. If the file passed on the command line cannot be found, GECSCCHNG.EXE returns a non-zero value and terminates. See the Command Line utility Chapter for more details. The syntax for use is:

`GECSCHNG filespec`

where *filespec* is the fully qualified path of the file to be watched. For example:

```
C:\GECs\GECSCHNG C:\TESTFIL.TXT
```

File Size Change Utility

The “GECSSIZE” utility allows dependencies on file size “changing”. This program accepts a file name as an argument. When GECSSIZE.EXE first starts, it records (in memory) the size of the file that was passed on the command line. It then periodically checks the size of the file. When the size does not match the one in memory, that means the file has been changed. At that point GECSSIZE.EXE returns a zero to the OS and terminates. If the file passed on the command line cannot be found, GECSSIZE.EXE returns a non-zero value and terminates. See the Command Line utility Chapter for more details. The syntax for use is:

`GECSSIZE filespec`

where *filespec* is the fully qualified path of the file to wait for a size change. For example:

```
C:\GECs\GECSSIZE C:\TESTFIL2.TXT
```

Job Dependencies

Job Dependencies force your jobs to run in sequence. When defining a job that needs to run after one or more other jobs, GECS allows you to use job dependencies. You can assign up to 10 job dependencies for each job. Each dependency may be set up to require successful completion of dependent jobs, a delay between dependent jobs and completion of dependent jobs within a specified amount of time. When scheduling dependent jobs that repeat, each job should be set up with the same repeat schedule.

Predecessor Job Parameters

When defining a job that needs to run after one or more other jobs, you can enter a variety of parameters in addition to the job numbers of the jobs that need to run first. The parameters are: Depends on Job, Operation on Return Code, Job Delay and Within Hours.

The “Depends on Job” fields indicate the job that must run before this job can run.

The “Operation on Return Code” fields indicate the value that the predecessor job must return, before this job can run. If the predecessor job returns 0 when it’s successful and non-zero when it encounters a problem, you would want to indicate that the predecessor job’s return code should be ‘= 0’.

The “Job Delay” fields are used to indicate the minimum amount of time that must have lapsed since the predecessor job finished. For example, if your job stream needs a minimum 30 minute wait between the jobs, you would enter ‘00:30:00’.

The “Within Hours” fields are used to indicate the maximum amount of time that may have lapsed since the predecessor job finished. For example, if the predecessor job runs every day and this job runs every Friday, you would want to put in a Within Hours value 8 hours to make sure that the predecessor job has run in the last 8 hours. This would insure that this job ran after the Friday occurrence of the predecessor job, and not before the Friday occurrence (after the Thursday occurrence).

Depends On Event

The Depends On Event field is used to keep a job from running until specified Events occur. Enter the number of the Event this job depends on. Up to 10 Events can be entered. This job will not run until each Event listed has occurred.

Resource Requirements

Resources represent hardware, software or other things (hardware or software, physical or logical) that are needed by jobs. Resources are limited in quantity either because only certain Agents have them or there is a limited quantity of them on the system. Consequently, resources are either assigned to specific Agents or they are system wide resources.

Each resource is defined with a unique name and optional Agent name. When you want to define a system resource, you simply leave the Agent name portion blank. You cannot have a system resource and Agent resource with the same name. Besides the resource and Agent names, you must indicate the maximum number of simultaneous jobs that should be allowed to use this resource. For resources that are assigned to Agents, this maximum is for that Agent. For system resources, this maximum is across all running Agents. The use of resources are typically only needed on complex multi-Agent installations and therefore, are not needed for all systems. For example: A system resource for limited database logins.

Job Requirements

Each GECS job can be setup to run on specified Agents or on Agents belonging to specified Agent groups. Use the Requirements tab from the job record to setup requirements for your jobs.

Execute By Agent

The execute by Agent fields are used to limit your job to only run on one of the Agents listed. You may specify up to 10 Agents. This job will run on the first available Agent.

Use Agent Group

This optional field is to be used in a multi-Agent environment. If your job should only be executed by Agents that belong to a particular Agent group, enter that group name in this field. For example: This group of Agents have special software configured.

Login as Specified User

Enable the login as specified user field if you would like your job to login as a specified user before running. When this field is enabled, you must specify the login user account name and password to be used. You must also edit the GECS user record and enter the appropriate user name and password. The login as specified user works when your Agent is configured to run as a service.

When a job is exported into a text file via the GECSDUMP utility, the login password is not exported.

Job Priority

In the event that two or more jobs are scheduled to begin at the exact same date and time, you may use job priorities to yield execution to higher priority jobs. Priority takes precedence over lateness. Priority is set using values 0-9; where '0' is the highest possible priority and '9' is the lowest. For example:

When jobs are scheduled to run at the exact same time, a job with priority = '0' will execute before a job with priority = '9'. Job priority can be set for each job by filling out a value in the job "Priority" field found on the job Actions tab. Priority can be escalated based on job lateness as well.

Maximum job priority can additionally be set for each GECS user. You can set "Maximum Priority" from the Profile tab in user record. If you enter '5' for a user's maximum priority, the user will only be allowed to add jobs with a priority of '5' through '9'.

Minimum Disk Space

Use this field to indicate the minimum disk space that must be available for this job to run. The disk space is checked, by the Agent, on the drive specified in the 'Start In Directory' field if one exists, otherwise the current drive is checked. Disk space is relative to the Agent. The minimum disk space field can be found on the Requirements tab in the Job record screens.

Things that keep jobs from running

There are a variety of things that may keep your jobs from running.

- Trigger File Dependencies
- Job Dependencies
- Resources Requirements
- Job Requirements
- Vacation Periods
- Minimum Disk Space Requirement
- Events

Resolve Scheduling Issues

When necessary, you can determine why a job won't run, run a job ignoring dependencies, skip and reschedule a job, rerun a job, change a completed job's return code and much more.

Events

Events

Events are things that can cause a job to run or things which may require special notice. Events can be generated by the GECS system or they can be user definable. Such as Job started, Job finished with bad return code or Agent set to offline. Each Event is numbered and contains parameters to allow for special notifications. These notifications include: email, SNMP, network message, Windows event logging, job activation, audible wav file, and color highlighting in the GECS Administrator's Events lists. Use the Event Definitions folder to update Event parameters.

Event Definition Details can be modified using the GECS Administrator client program to configure the special notifications mentioned above.

Depending on how you use the GECS system, many Events you will not care about and others you will want to know about if they occur.

Scroll through your list of Event Definitions and edit them where you deem necessary.

More examples of Events include things associated with the GECS system such as an Agent set to online, job completed successfully or a job finished with a problem. Events that are user definable may be associated with out side events or other systems. For example, you could create your own Event for a file transferred from your mainframe. This Event could cause one of your GECS jobs to run.

Jobs can depend on the occurrence of up to 10 specified Events. When configured, jobs will not run until each Event listed has occurred since the last time the job has run. Events can also be used to link GECS Batches together. Set the last job in the first Batch to generate an Event that the first job in the second Batch requires.

Specified Jobs can generate an Event on successful completion or failure.

When an Event occurs the following information may be provided about the Event.

Event Edit

Events associated with GECS jobs can be generated if a job is late, when a job starts, when a job finishes and many more. Job Events are defined in Event Definitions but can be turned off individual jobs using the "Should this job create Events" field from the Actions tab in the job record.

Generated By - Displays the name of the GECS component that generated this Event. The components can be any of the following: DBMS, Controller, Agent, Web Manager, Administrator client program or Other.

Priority - Displays the priority that was assigned to this particular Event in the Event Definition.

Component - Displays the specific name of the GECS component that generated this Event. For example, the Event may be Generated By an Agent but the specific name of the Agent is AGENT2.

Job Number - Displays the name of the GECS job associated with this Event, if one exists.

Began - Displays the date and time this Event was generated.

Ended - Displays the date and time this Event ended.

Message - Displays the alert message that was defined for this Event in the Event Definition.

Status - displays the status of this particular instance of this Event. The status is either open or closed. You can update the status when you have determined that this Event has been taken care of or is no longer an issue. The Status of an Event can be updated in the Event Definition to be Closed as soon as it occurs.

Closed By - This field should be populated with the name of the person who closed this instance of this Event. When an Event is Created Closed in the Event Definition, the Closed By name is SYSTEM.

Comment - This field can be used to enter any comments about this particular instance of this Event.

Event Follow up

Once an Event has occurred, you can follow up with the Event by updating the Event's "Status" from open to closed. GECS automatically logs the GECS user who closes the Event. You can also include optional comments with this follow up. By following up with Events that occur you can save the Event information while at the same time documenting that the Event has been taken care of by closing it. Closing Events also allows you more flexibility in filtering the Events you wish to display in your Event View lists.

Viewing Events in Lists

Use the GECS Administrator program to check the status of your GECS jobs and system by viewing your Events.

The Administrator program will display Event views by double clicking on the "**Events**" folder. You can use the default "**All Events**" view to display a list of All Events.

The last column on the right side of the Events list displays the status of each Event. The status is either open or closed. Next to the status will be a green or red dot. This color indicates whether this Event is included in your **User's Events** view. A red dot mean that the Event exists in your User's Events view. A green dot means that the Event is not included in your User's Event view.

You can view all Events associated with each job from the job detail screen via the "**This Job's Events**" toolbar button.

The Event lists are moveable, sizable and configurable. You may wish to filter the Events displayed in these list or create you own views and customize them. To customize your views, right click on the view name and select **View Properties**.

By double clicking on an Event from this list you can display the Event Edit information.

Right clicking on a job from the list will give you additional options such as:

Close Event - Update the status of the Event from open to closed.

Delete Event - Delete the Event from the GECS system.

Remove My Name - Remove this Event from my User's Event View list (in other Views that may still display this Event, this will also change the color of the status dot from red to green).

View Event Detail - Display the Event Edit information screen.

From the GECS Administrator, double click on the **Events** folder then click on the default view "**All Events**". You should see a list of Event records.

User's Events View and the Event Indicator

In the GECS Administrator Client Program there is a special Event View named 'User's Events'. Information displayed in this view controls the 'Event Indicator' button at the bottom right corner of the Administrator window. When Events are displayed in the 'User's Events' view, the 'Event Indicator' button is red. When Events do not exist in the 'User's Events' view the 'Event Indicator' button is green.

You can click on the Event Indicator button to quickly jump to the User's Events list. If you wish to be notified of various Events and have them included in your User's Events list, update the Event Definition and include your GECS User name in the 'Send Alerts to' field. This will cause the occurrence of this Event to display in your User's Events view. You can clear an Event from your view by either "Removing your Name" from the occurrence of the Event or Delete the Event. If you delete the Event it will obviously no longer show up in anyone's Events list.

Event Definitions

Events are defined in the GECS system using the Windows Administrator Client program using the Event Definitions module. Each Event is assigned a unique Event number. GECS system Events are numbered from zero to 500 and cannot be deleted. User definable Events can be numbered starting from 1000. Event Definition parameters are defined below.

Event Tab

Description - an optional field to enter a brief description of the Event.

Color - Fore/Back - You can modify the foreground and background colors of your Events that will be displayed in your GECS Events lists. This can help make special Events stand out in the lists.

Create Event - You can enable this field if you wish to have this GECS Event created and displayed in your GECS Events lists.

Create Closed - You can enable this field if you wish to have this GECS Event's status automatically closed when it is created.

Priority - You can use this field to set this Events Priority to be used for filtering in the lists displaying this GECS Event (0 = highest, 9 = lowest). Priority is commonly used to filter Users Events to display only high priority Events.

Activate Job - Use this optional field to activate a selected GECS job to be activated if this Event occurs.

WAV Filename - Use this optional field to enter a fully qualified wav filename to be played at your GECS DBMS machine when this Event occurs.

Alert Message - By default this field contains a short description of this GECS Event. This description is displayed in your Events list and is used when no Message is entered in the mail and network messages fields for this Event. You can use this optional field to enter a customized alert message to display if this GECS Event occurs.

Send Alerts To - Use this optional field to enter up to five GECS user or GECS user mail group names of people to be sent GECS Alerts if this GECS Event occurs. The GECS user or mail group must be defined in the GECS user record. GECS Mail groups are defined in the user record on the Mail tab. Examples of GECS user or mail groups include: *ADMIN, JAMES_SMITH, GINA and/or *OPERATIONS. Sending an Alert will cause this Event to be displayed in the specified Users Events folder. The * asterisk denotes GECS User 'Mail Group' names.

Mail Tab

Subject - Use this optional field to enter a customized subject for the email message to be sent to the specified people if this GECS Event occurs.

Message - Use this optional field to enter a customized email message or short description of this Event to be sent to the specified people if this GECS Event occurs. If you do not enter a message in this field, the Alert Message from the Event tab will be used.

Send Mail To - Use this optional field to enter the GECS User Name of up to five people to be sent notifications that this GECS Event has occurred. For GECS Job related Events, you can enter %USER% into these fields to use the names specified on the Jobs GECS Users or Groups to Notify fields. For example, %USER1%, %USER2%, %USER3%, %USER4% and/or %USER5%. This allows each Job to specify different users to be notified of the particular job related Event.

Network Tab

Network Message - Use this optional field to enter a customized network message or short description of this Event to be sent to the specified people if this GECS Event occurs. If you do not enter a message in this field, the Alert Message from the Event tab will be used.

Send Message To - Use this optional field to enter the Network User names of up to five people to be sent network messages if this GECS Event occurs.

Generate Windows Event Log - GECS can interface with the Windows Event Log. Enable this optional field if you would like to generate a Microsoft Windows Event Viewer Log for this GECS Event if it occurs. You can use the Windows Event Viewer to see the Events.

Windows Event Type - Use this optional field to select the Windows Event type you would like displayed in the Microsoft Windows Event Viewer for this Event when this GECS Event occurs. Your options are; Information, Warning or Error.

Windows Event Message - Use this optional field to enter a message that you would like to appear in the Microsoft Windows Event Viewer when this GECS Event occurs. If you do not enter a message in this field, the Alert Message from the Event tab will be used.

Generate SNMP - Enable this optional field if you want GECS to Generate an SNMP Trap when this GECS Event occurs.

Trap Number - Use this optional field to enter an SNMP Trap Number to use when this GECS Event occurs. This number will be an Enterprise Specific Trap number. Valid numbers are 0 to 4 billion.

SNMP Trap Message - Use this optional field to enter a SNMP Trap Message for this GECS Event number. If you do not enter a message in this field, the Alert Message from the Event tab will be used.

Adding User Event Definitions

You can add User Event Definitions from the Administrator program, Event Definitions module. User definable Events can be numbered starting from 1000.

Generating User Defined Events

Once you have defined an Event, GECS can generate your Event when you specify to generate it based on job success or job failure. Use the Events fields located on the Actions tab of the job record to have GECS automatically generate Events. Likewise, you can generate Events using the GECSEVNT command line utility. See the Command Line Utilities chapter of this manual for more details.

Event Definitions List

The Event Definitions List displays all defined GECS System and User Events. GECS System Events include:

- 0 No alert
- 1 OS error
- 2 TCP/IP error
- 3 Error changing window
- 4 Communications timeout
- 5 Invalid packet signature
- 6 Invalid packet name
- 7 Access denied
- 10 Added job from WRK file
- 11 No colon in wrk file line
- 12 No user name in wrk file
- 13 Invalid user name in wrk file
- 14 Bad mail username in wrk file
- 15 No command line in wrk file
- 16 Copied wrk file to BAD file
- 17 Can't copy wrk to BAD file
- 18 Error creating wrk file
- 20 Controller is licensed
- 21 Unable to read license info
- 22 License expired
- 23 Agent set offline for bad OS
- 30 MAPI logon error
- 31 MAPI send error
- 32 VIM error
- 40 Scheduled batch
- 41 Removed batch
- 50 Job late
- 51 Job start
- 54 Job complete
- 55 Job failed due to ctrl stop
- 56 Bad return code
- 57 Over run max job minutes
- 58 Overrun est job minutes
- 59 Under run max job minutes
- 60 Under run est job minutes
- 62 Manual skip and reschedule
- 63 Job terminated by user
- 64 Job terminated due to overrun
- 65 Job overrunning est. Minutes
- 66 Executed ignoring dependency
- 67 Activated due to failure
- 68 Activated due to lateness
- 69 Resched. due to vacation
- 70 Completed due to vac. Period
- 71 Deleted due to vac. Period
- 72 Resched due to invalid period
- 73 Complete due to inv. Period
- 74 Deleted due to invalid period
- 75 skipped due to late start
- 76 Resched due to late start
- 77 Skipped due to late finish

Events

78 Resched due to late finish
79 Pre job message
80 Post job message
81 No special schedule dates
82 Unable to reschedule job
83 Re-ran job
84 changed return code
85 Set job to terminate
86 Terminated by message
100 Controller online
101 Controller offline
102 Controller start
103 Controller stop
104 Controller reset
106 Controller paused by file
107 Controller halted by file
108 Controller exited by file
109 Controller unpaused
110 Received pause message
111 Received unpause message
112 received quit message
113 Received test message
114 Received minimize message
115 Received hide message
116 Received show message
117 Unable to substitute
118 Unable to reschedule vacation
120 Controller name too long
121 controller name undefined
200 Agent no online & responding
201 Agent set to offline
202 Agent not responding
203 Agent set to not process jobs
205 Agent start
300 DBMS online
301 DBMS offline
302 DBMS start
303 DBMS stopped
304 Database error
305 Data backup started
306 Databackup error
307 Data backup complete
308 SMTP error
309 Bad SMTP request
310 Bad SMTP authentication
400 Web Manager online
401 Web Manager offline
402 Web Manger started
403 Web Manager stopped

Setting Up Event Email Notifications

GECS logs into the mail system when a notification is required. Email systems must be installed and tested at the DBMS machine prior to setting up Global ECS. Vinzant recommends using a unique mail account for GECS.

GECS users can be created solely for notification. Up to five GECS users or GECS Mail Groups can be selected for each Event notification. Press the F1 key in any field for more information.

In order for GECS to interface with your mail system you must add a user to your mail system for GECS.

Notifying Users Via Microsoft Mail

GECS can interface with the MS Mail systems via MAPI. GECS uses the MAPI interface to access MS Mail and Exchange. Because the MAPI interface is used, GECS should be able to interface with any mail system that has a MAPI driver, though GECS has only been tested with the MAPI interface for MS Mail and Exchange. The MAPI driver must be installed before GECS can interface with the mail system. The MAPI interface is included as part of the mail system and consequently, the MS Mail client software must be installed on any computer that is acting as your DBMS. Microsoft mail will only work when your DBMS is running from a desktop icon. Microsoft mail will not work if your DBMS is running as a service.

To setup Microsoft MAPI mail systems: Exchange, Outlook, etc.

MS Profile names maintain the email friendly name, password and post office directory.

DBMS Settings:

1. Go to the DBMS Settings screen and set 'Mail System' to Microsoft Mail
2. Populate the 'Mail User Name' field with the desired Microsoft Profile Name using the exact Profile syntax (upper and lower case make a difference). To verify the MS Profile Name: Right click on Desktop MS Mail Icon. Select Properties. Click on "Show Profiles".
3. Leave the 'Password' field and 'Mail sub directory' fields blank then save the record (the password field will automatically be filled in with asterisks).

Event Definitions:

1. On the Event Definitions Mail Tab, enter a 'Subject' for this particular Events Mail 'message' then enter a message about this Event in the Message field.
2. Specify up to 5 GECS users or GECS User Mail Groups to be notified of this particular Event then save and exit the record.

GECS User Records:

1. For the desired GECS user, go to the user record and click on the Mail tab
2. Populate the "Mail User or Address" with the email account associated with this GECS User. Enter the name exactly as you would in the Mail system.
3. Enter an option GECS mail Group Name.

Notifying Users Via cc:Mail

GECS can interface with the cc:Mail mail system. GECS uses the VIM interface to access cc:Mail. The Windows VIM drivers are implemented as DLLs. These DLLs are provided by mail system vendor (IBM for cc:MAIL) and consequently a copy of the Windows cc:Mail must be installed on the computer that is acting as your DBMS. The 32 bit VIM drivers (VIM32.DLL) are required for Windows. cc:Mail version 8 and higher use MAPI, see the Microsoft mail section for details.

Notifying Users Via Lotus Notes Mail

GECS can interface with the Lotus Notes mail system. GECS uses a VIM interface to access Lotus Notes. The Windows VIM drivers are implemented as DLLs. These DLLs are provided by mail system vendor and consequently a copy of Lotus Notes Mail must be installed on the computer that is acting as your DBMS. The 32 bit VIM drivers (VIM32.DLL) are required for Windows. C:\Notes must be in the DBMS computer's search path.

Set up Instructions for Sending Lotus Notes Mail:

It is required that the GECS DBMS machine System Environment Path includes the local Lotus Notes programs directory. For example, "C:\NOTES".

DBMS Settings:

1. Go to the DBMS Settings screen and set Mail System to Notes Mail
2. Leave the Mail User Name field and Mail Subdirectory fields blank
3. Populate the password field and press the Enter key. Note: Asterisks will be displayed. Save the record.
4. Use the instructions given above in the setting up Microsoft mail section to configure the Event Definitions and GECS User records.

Submitting GECS Jobs via inbound Lotus Notes mail is not supported at this time.

Notifying Users Via Internet Mail

GECS can interface with Internet Mail (SMTP / POP3). A copy of TCP/IP sockets drivers must be installed on the computer that is acting as your DBMS.

To setup GECS for Internet Mail:

DBMS Settings:

1. Go to the DBMS Settings screen and set 'Mail System' to Internet Mail
2. Populate the 'Mail User Name' field with the Internet address to be used to send Event notification.
3. Populate the 'Password' field and press the Enter key. Note: Asterisks will be displayed.
4. Leave the 'Mail sub directory' field blank and save the record..
5. Use the instructions given above in the setting up Microsoft mail section to configure the Event Definitions and GECS User records.

Notifying Users Via MHS Mail

When GECS notifies users of Events, it sends an SMF-64 format message. The message is not locally delivered. It is written to the \MHS\MAIL\SND subdirectory. An MHS server is required to deliver the message to the user. GECS has been successfully tested with MHS 1.5 and NetWare Global Messaging.

For MHS installations, the mail user name MUST be 8 characters or less in length.

The message sent for Event notification is in the format:

```
SMF-64
From:Controller_mhs_name
To:users_mhs_name
Subject:GECS Notification
Job n Returned n - job_title
```

Mail Issues

Microsoft Mail Issues

A copy of the MS Mail client software must be installed on the computer that will act as your GECS DBMS.

When using MS Exchange as your email delivery system, profiles are used instead of directly using mail user names. To enable GECS to logon to MS Exchange, a profile created specifically for GECS MUST be used. MS Exchange profiles created on Windows are owned by the user who is currently logged in and may be viewed only by that user. Therefore, in order for GECS to access MS Exchange, profiles must be created so that the user account that you created for GECS has access to the profile.

To enable mail to work with MS Exchange, choose MS Mail from the Mail System list and in place of the Mail User Name and Password, enter the profile name created for GECS. Leave the Mail Subdirectory field blank.

Mail sent by GECS will use the Mail User Name entered in each GECS User record. These User record fields must contain your mail systems user names NOT profile names.

cc:Mail Issues

A copy of cc:Mail must be installed on the computer that will act as your DBMS. VIM32.DLL is used.

MHS Version Issues

The MHS capabilities built into GECS were originally designed to work with SMF v64. This is the SMF version implemented by NetWare MHS v1.5. With the introduction of NetWare Global MHS, Novell changed the SMF specification and labeled it SMF v71. On the front of every MHS message is the SMF version it was created under. GECS will read (receive) MHS messages created under any version of MHS (v64, v70, v71). When GECS creates (sends) messages, it must put an SMF version number (signature) on the front of the message. By default, it uses "SMF-64" as the signature. NetWare Global MHS will not send messages created with this signature. It generates an "Invalid Version" error. Other versions of MHS may also have problems with v64 signatures. If you are using a version of MHS that won't send v64 messages, you must create a file named **SMF.SIG** that contains the signature to be used by GECS on messages it sends. If this file exists in the Controller's default subdirectory (\GECS) the first six characters of this file will be used as the signature instead of "SMF-64". If you are using NetWare Global MHS or MHS that comes with NetWare 4.x, you need to create this file using a text editor with the first six characters being:

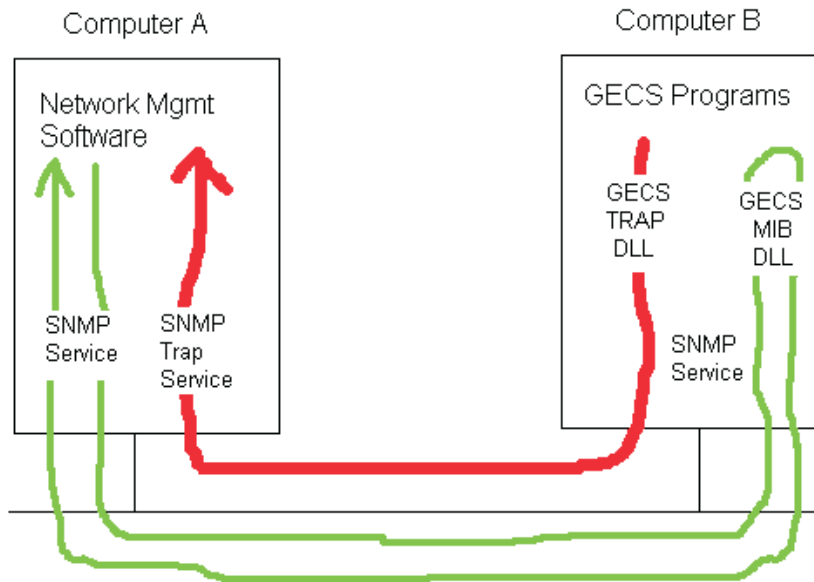
SMF-71

Once created, GECS will use the first six characters of this file as the signature on messages it sends.

Event SNMP Trap Messages

GECS can send SNMP Trap messages when specified Events occur.

Global ECS interfaces with the Simple Network Management Protocol (SNMP) Service on Windows NT/2000/XP/2003 in two ways. First, Global ECS can generate ‘traps’ when certain events occur. These traps are sent to your network management software by the SNMP service. You can also use SNMP from your network management software to query the Management Information Base (MIB) maintained by Global ECS to see what components are installed on the computer, what their name is and whether they are running at this time. This diagram shows how the various parts interact:



There are a large number of network management software programs available. We are not supporting any one in particular, though over time we will develop some familiarity with the most popular ones. This paper is not about how to configure ‘Computer A’ as shown in the diagram. We are concerned about how to configure ‘Computer B’.

Note that though it’s theoretically possible that Computer A and Computer B could be the same computer, I’ve experienced problems sending traps from GECS to OpenView when a single computer is used. I haven’t experienced these problems with Net-SNMP or WhatsUp when used with GECS on a single computer configuration. I believe it has something to do with the services installed by OpenView.

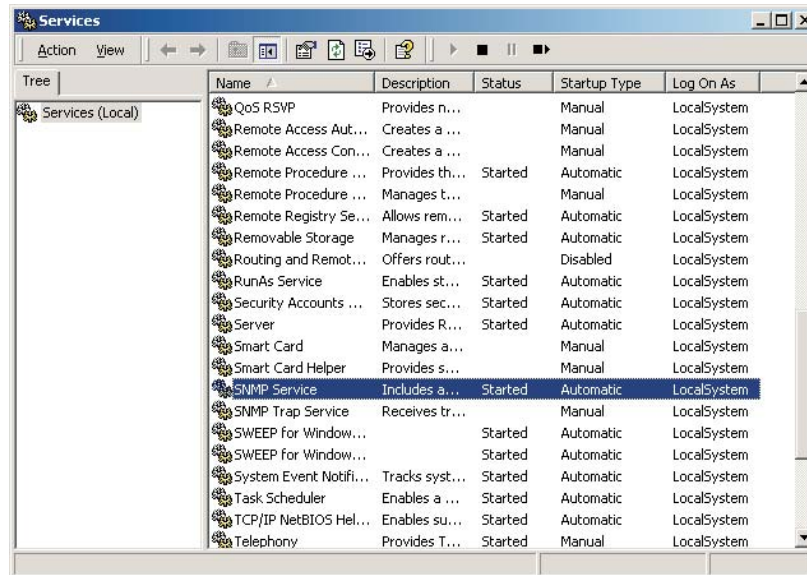
Configuring Computer B:

Step 1:

Install Global ECS. Do not indicate that you want to use SNMP at this time.

Step 2:

Check and see if the SNMP service is installed on the computer. It will show in the 'Services' screen similar to this if it is installed. If it is installed, skip to step 4.

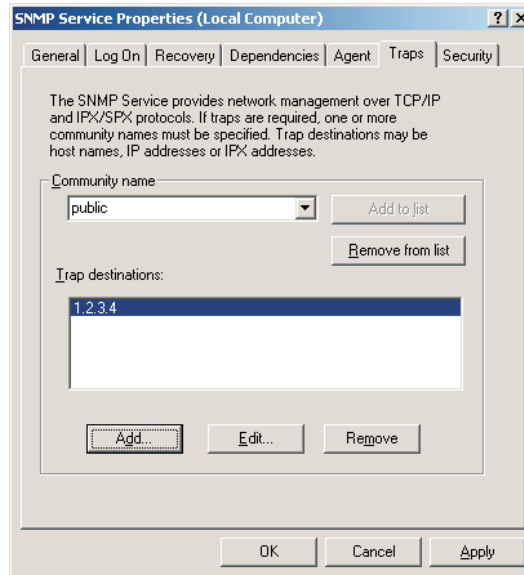


Step 3:

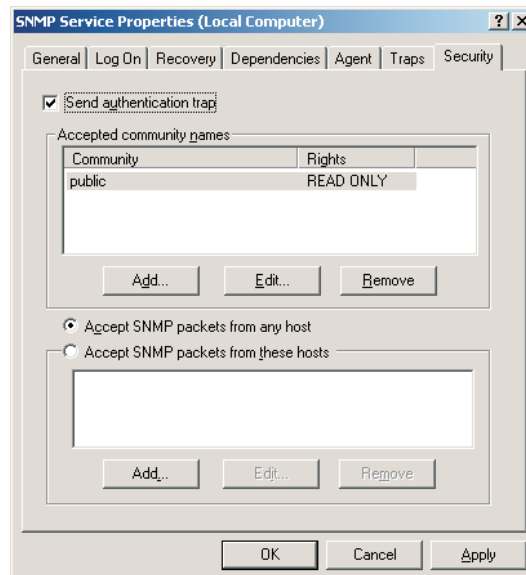
Install the SNMP service. This done slightly different on NT, 2000 and XP. On 2000 and XP, use Add Remove Programs, Add/Remove Windows Components and click on Management and Monitoring Tools. Click Details and check the checkbox next to 'Simple Network Management Protocol' and continue to install the service.

Step 4:

Configure the SNMP Service. This is done slightly different on NT, 2000 and XP. On 2000 and XP, double click on the SNMP Service line in the Services list. On NT it is done in Networking from Control Panel. The 'Traps' tab must be configured with the name of your Community and the IP address where traps should be sent. This is the IP address of the node or nodes that will be running your Network Management Software (Computer A in our diagram). The 'Community' name is like a password. The SNMP services will only communicate with computers with the same Community name.



You will also want to configure the Security tab with the access that should be allowed from others in your Community.



Step 5:

Run Workstation Setup. Check the Checkbox to indicate you want to interface with SNMP.

Step 6:

Run Administrator. Select Event Definitions and edit the events for which you want GECS to generate SNMP Traps. Enter the trap number and text to be sent. You may want to select different trap numbers based on how you use your network management software.

Step 7:

Test to see that GECS is sending traps properly.

Go to 'Computer A'.

Be sure the 'SNMP Trap Service' is stopped.

Create the C:\GECS\SNMP subdirectory.

```
MD \GECS
```

```
MD \GECS\SNMP
```

Change to the C:\GECS\SNMP subdirectory

```
CD \GECS\SNMP
```

Copy the C:\GECS\SNMP subdirectory from Computer B to Computer A.

```
COPY \\computerB\C$\GECS\SNMP\*.*
```

Start the SNMPTRAPD software using the supplied batch file:

```
GETTRAPS
```

Go back to 'Computer B'.

Run GECS Admin and edit the 'Controller Start' event (102) in Event Definitions.

Change to the 'Network' tab.

Check the box to send SNMP traps.

Enter a trap number (i.e. 11) and a description.

Save your entries.

Exit Admin.

Start your Controller (stop it first if it's already running).

Go back to computer A and you should see a message displayed in the SNMPTRAPD window.

Step 8:

Test to see that the GECS MIB can be queried properly.

Go to Computer A.

Change to the C:\GECS\SNMP subdirectory (created in Step 7 above).

```
CD \GECS\SNMP
```

Query the MIB by entering:

```
DISPMIBS ipname community
```

where ipname is the name or number of Computer B and community is the community name you use for SNMP. For example:

```
DISPMIBS 192.168.0.100 public
```

You will see information from the MIB similar to:

```
enterprises.vinzant.products.gecs.isGECSDBMSInstalled.0 = Yes(1)
enterprises.vinzant.products.gecs.GECSDBMSName.0 = "DBMS"
enterprises.vinzant.products.gecs.isGECSDBMSRunning.0 = No(0)
enterprises.vinzant.products.gecs.isGECSControllerInstalled.0 = No(0)
enterprises.vinzant.products.gecs.GECSControllerName.0 = "unknown"
enterprises.vinzant.products.gecs.isGECSControllerRunning.0 = No(0)
enterprises.vinzant.products.gecs.isGECSSWebMgrInstalled.0 = No(0)
enterprises.vinzant.products.gecs.GECSSWebMgrName.0 = "unknown"
enterprises.vinzant.products.gecs.isGECSSWebMgrRunning.0 = No(0)
enterprises.vinzant.products.gecs.isGECSSAgentInstalled.0 = Yes(1)
enterprises.vinzant.products.gecs.GECSSAgentName.0 = "CALVIN"
enterprises.vinzant.products.gecs.isGECSSAgentRunning.0 = No(0)
```

As shown, the 12 lines are actually 4 groups of 3 lines organized like this:

MIB Information	Meaning
isGECSDBMSInstalled.0 = Yes(1)	DBMS installed?
GECSDBMSName.0 = "DBMS"	DBMS name?
isGECSDBMSRunning.0 = No(0)	DBMS running?
isGECSControllerInstalled.0 = Yes(1)	Controller installed?
GECSControllerName.0 = "CONTROL"	Controller name?

isGECSControllerRunning.0 = No(0)	Controller running?
isGECSWebMgrInstalled.0 = Yes(1)	WebMgr installed?
GECSWebMgrName.0 = "WEBMGR"	WebMgr name?
isGECSWebMgrRunning.0 = No(0)	WebMgr running?
isGECSAgentInstalled.0 = Yes(1)	Agent installed?
GECSAgentName.0 = "CALVIN"	Agent name?
isGECSAgentRunning.0 = No(0)	Agent running?

Each group represents a particular GECS component. The first group corresponds to the DBMS, the second to the Controller, the third to the Web Manager and the fourth group to the agent. The first line of each group indicate whether the component is installed in this computer. A 0 indicates that it's not installed and a 1 indicates that it is installed. The second line of each group indicate the name of the component. The third line of each group indicate whether the component is running at this time. A 1 indicates that it's running and a 0 indicates that it's not running.

You can also use your network management software to see the Management Information Base (MIB) maintained by GECS.

The objectID to use for querying the MIB is:

1.3.6.1.4.1.10884.1.1

or

iso.org.dod.internet.private.enterprises.10884.1.1

or

iso.org.dod.internet.private.enterprises.vinzant.products.gecs

The 'private enterprise number' 10884 is registered to Vinzant, Inc.. The next number (1) corresponds to 'Products' and the next number (1) corresponds to 'GECS'. A MIB named C:\GECS\SNMP\GECS-MIB is included. You should be able to use this file with your network management software.

Step 9:

Install your Network Management Software if you haven't already on 'Computer A'.

Net-SNMP Utilities

Installation Tips:

GECS includes two programs, SNMPTRAPD.EXE and SNMPWALK.EXE, from the Net-SNMP utilities for Windows NT. See the SNMPLICE.TXT file for license information. The complete set of shareware programs is available off the internet. The Zip file that includes the two programs can be found at <http://net-snmp.sourceforge.net> as [ucd-snmp-4.2.3-win32.zip](#) Note that the SNMPTRAPD.EXE program does NOT want the 'SNMP Trap Service' to be running.

Viewing SNMP Traps Sent from GECS

If you have installed HP OpenView on this computer, be sure to stop the 'SNMP Trap' service and the two 'SNMP Emanate...' services that are installed by Openview.

```
C:
CD \GECS\SNMP
GETTRAPS
```

Viewing the MIB:

If you have installed HP OpenView on this computer, you must START the two 'SNMP Emanate...' services that are installed by Openview.

```
C:
CD \GECS\SNMP
DISPMIBS machine community
```

Change 'machine' to the IP name or number of the machine whose MIB you'd like to view and change 'community' to the community you are using for SNMP (i.e. public).

HP OpenView Network Node Manager

Installation Tips:

Install as per the installation guide. Pay attention to the 'preinstallation' steps to follow. You MUST reinstall all available Service Packs for NT/2000/XP/2003 after installing OpenView. If OpenView GPF's on startup, you haven't installed sufficient Service Packs. Note that this program DOES want the 'SNMP Trap' and 'SNMP Emanate...' services to be running.

Loading GECS-MIB into OpenView

Click 'Options' and 'Load/Unload MIBs:SNMP'.

Click 'Load'

Enter:

Location: [C:\GECS\SNMP](#)

Click 'Open'

File name: [GECS-MIB](#)

Click 'Open', 'Ok', 'Ok' and 'Close'

Viewing SNMP Traps Sent from GECS

Click 'Options' and 'Event Configuration'.

Slide down the top list & click on the 'gecstraps' Enterprise.

Click 'Edit', 'Events' and 'New'.

Enter:

Event Name: [TestEvent](#) (no spaces)

Enterprise: [gecstraps](#)

Generic Trap: [Enterprise Specific](#)

Specific Trap Number: [11](#) (the number of the trap being generated in GECS)

Description: [Test Trap from GECS](#)

Click 'Next'.

Click 'All sources' and 'Next'.

Click 'Log and display in category' and select 'Application Alert Alarms'.

Enter:

Severity: [Normal](#)

Event Log Message: [Received trap: generic #G specific #S. \\$# args: \\$*](#)

Click 'Next'

Click 'Next'

Click 'Next'

Click 'Finish'

Click 'File', 'Save' and 'File', 'Close' in the 'Event Configuration' window.

Generate the trap from GECS.

In the 'Alarm Categories' dialog box, click on the button next to 'Application Alert Alarms'.

You should see the GECS generated 'Alarm' in the list.

Viewing the MIB:

Start HP OpenView Network Node Manager. Click Options, MIB Application Builder:SNMP, Edit and New.

Enter:

Application ID: **GECS**
Application Type: **Form**
Application Title: **GECS Information**
'Next'

Add the 'fields' to the form:

'Add'
MIB object ID: **.iso.org.dod.internet.private.enterprises.vinzant.products.gecs**
Click on isGECSDBMSInstalled (the first entry in the section).
With the mouse, slide the list down so you can see isGECSAgentRunning (the last entry in the section).
Press down the Shift Key.
With the mouse, click on isGECSAgentRunning (the last entry in the section).
All 12 of the GECS entries should be highlighted.
Click 'Add'
'Close'

When complete press 'Next'

Menu path: **Configuration->GECS**

Selection Rule: **(isSNMPSupported || isSNMPProxied)**

'Finish'

Close the MIB Application Builder:SNMP

Highlight a computer on the network map that has been configured to use SNMP with GECS.

Click 'Configuration' and 'GECS'.

The information from the MIB will be displayed.

What's Up Gold

Installation Tips:

Install as per the installation guide. Note that this program does NOT want the 'SNMP Trap Service' to be running. Check in 'Services' and stop it, if it is running.

Loading GECS-MIB into What's Up Gold:

Change to the WhatsUp subdirectory

```
C:  
CD "\Program Files\WhatsUp"
```

Load the GECS-MIB information

```
MIBEXTRA C:\GECS\SNMP\GECS-MIB
```

Ignore any 'Failed to open DEFS.TXT' error messages.

Restart What's Up Gold, if running.

Viewing SNMP Traps Sent from GECS

If you have installed HP OpenView on this computer, you must STOP the two 'SNMP Emanate...' services that are installed by Openview.

Click 'Configure' and 'Program Options'.

Click on the 'SNMP Traps' category icon.

Check 'Enable SNMP Trap Handler' and verify the port is set to 162.

Click 'Ok'.

Perform a GECS operation that should generate a trap.

Click 'Logs' and 'SNMP Trap Log'

You should see the trap generated by GECS.

Viewing the MIB:

If you have installed HP OpenView on this computer, you must START the two 'SNMP Emanate...' services that are installed by Openview.

Click 'Tools' and 'SNMP Viewer'.

Enter the IP name or number of a computer that's been configured for GECS and SNMP and click 'Ok'.

Right click on the icon for the computer displayed and select 'View MIB'.

Click on 'iso.org.dod.internet.private.enterprises.vinzant.products.gecs'

on the left and you can see the MIB on the right.

GECSTSND.EXE

The GECSTSND.EXE command line utility can be used to send a trap number and message. Usage:

```
gecstsnd index "text"
```

index The trap index number.

text The trap text to send.

For example:

```
GECSTSND 1115 "This is the trap message"
```

Monitoring & Managing

Monitoring the GECS System

The GECS system is designed to run unattended. However, if an Event occurs that requires notice, GECS has a variety of ways to notify someone that they may need to do something. GECS keeps track of Events and uses Event definitions to determine what to do when a particular Event occurs. For example, an Event such as 'an Agent is not responding' could be defined to notify someone via mail, send an SNMP trap, and cause a log to be written to the Windows event log. A Job that fails can also cause an Event to occur.

Browser Based Client Programs

You can check the status of your GECS system from anywhere in the world you have access to an Internet browser. The web enabled programs do not require any program installation or configuration. As long as the GECS Web Manager program is running on the DBMS/Controller machine, users with access into the GECS system can view the status of the GECS system remotely from most any computer using an Internet browser. Users simply enter the IP Address, HTTP Port number and name of the of GECS Web Manager. See the chapter on Web Client Programs for more information.

GECS Windows Based Administrator Client Program

GECS Windows based Administrator Client program provides a user friendly single point of control to access the GECS system via TCP/IP. Computers running the GECS Administrator client program must have access to the shared directory where the GECS data files are stored (on the DBMS/Controller computer). GECS Users must be set up in the GECS system with appropriate security enabled and their computer must be configured to run the Administrator program. See the Getting Started chapter on configuring GECS PC's for more details.

Events

Events are definable and configurable. There are default GECS Events such as an Agent not responding, job finished with a bad return code, job was skipped due to lateness etc. You can optionally define your own custom Events. See the Events chapter of this manual for more information. See the Getting Started chapter of this manual for information on "Viewing GECS Events".

Checking the Status of Jobs

Use the GECS Administrator program to check the status of your jobs. The Administrator program will display jobs by clicking on the Jobs folder. You can use the default **Job Sentry** view to display a list of Jobs that are Pending, Running, On Hold or Completed within one hour. The default Batch Summary view may also be used. The last column on the right side of the jobs list displays the last Event associated with each job record. You can view all Events associated with each job from the job detail screen via the **This Jobs Events** toolbar button.

The Jobs lists are moveable, sizable and configurable. You may wish to filter the jobs displayed in these list or create you own views and customize them.

To customize your views, right click on the view name and select view properties.

By double clicking on a job from this list you can display the job detail information. Right clicking on a job from the list will give you additional options such as the following:

Pending Jobs

From a list of Pending jobs, you can right click to perform the following functions:

- Add new job
- Delete job
- View detail
- Why this job can't run
- This jobs history
- Copy Job As
- Ignore Job dependencies
- Ignore Job and File Dependencies
- Respect Job and File Dependencies
- Run Job As
- Skip and Reschedule
- Put On Hold

Running Jobs

From a list of Running jobs, you can right click to perform the following functions:

- Add New Job
- Delete Job
- Terminate Job
- View Detail
- This Jobs History

Completed Jobs

From a list of Completed jobs, you can right click to perform the following functions:

- Add New Job
- Delete Job
- View Detail
- This Jobs History
- Copy Job As
- Run Job As
- Rerun Job
- Change Return Code

On Hold Jobs

From a list of On Hold jobs, you can right click to perform the following functions:

- Add New Job
- Delete Job
- Release Hold
- View Detail
- Copy Job As
- Run Job As

Customize Job And Event Views

Customize Job and Event Views so people can be as efficient as possible. Simply right click on the view to make changes.

Create your own Job Views then use the Job View Properties to filter out specific jobs, filter to display jobs scheduled for specific times, Batch Job summaries and much more.

Create your own Event Views then use Event View Properties to filter out specific Events, filter Events for specific times, view open Events, Closed Events and much more.

Views can be shared with other GECS users or kept private.

The screenshot shows the 'Event View Properties' dialog box. It has a 'View' tab and a 'Filters' sub-tab. The 'Name' field is 'All Events' and the 'User' is 'DEFAULTVIEW'. There are checkboxes for 'Share this view with all users' (checked) and 'Auto Update every 15 Seconds'. The 'Sort By' options are 'Date/Time' (selected), 'Event/Date/Time', and 'Job Number'. Under 'Include', there are checkboxes for 'Controller Events', 'Administrator Events', 'DBMS Events', 'Other Events', 'Agent Events', and 'Web Manager Events', all of which are checked. The 'Times' section has radio buttons for 'Show all days' (selected), 'Show for a day that starts at 00:00:00 and lasts for 0 hours', 'Show for a window of time that is the current time minus 0 hours and plus 0 hours', and 'Show for a date range'. A red note at the bottom says 'Check this field if you would like to share this view with other GECS users.'

The screenshot shows the 'Job View Properties' dialog box. It has a 'View' tab and a 'Filters' sub-tab. The 'Name' field is 'Job Sentry' and the 'User' is 'DEFAULTVIEW'. There are checkboxes for 'Share this view with all users' (checked) and 'Auto Update every 15 Seconds'. The 'Sort By' options are 'Job Number', 'Date/Time', and 'Status' (selected). There is a checked checkbox for 'Show Activity Override'. Below this, there are two columns: 'Foreground' and 'Background'. Each has a color selection dropdown. For 'Pending jobs', 'On Hold jobs', and 'Completed Jobs', the 'Foreground' is black and the 'Background' is orange, purple, and blue respectively. For 'Running jobs', the 'Foreground' is black and the 'Background' is blue. To the right of these are radio buttons for 'Scheduled Time', 'Start Time', and 'Finish Time'. The 'Times' section has radio buttons for 'Show for all days' (selected), 'Show for a day that starts at 00:00:00 and lasts for 0 hours', 'Show for a window of time that is the current time minus 1 hours and plus 1 hours', and 'Show for a date range'. A red note at the bottom says 'Check to enable this view to be available for other users.'

Monitoring GECS Using a Browser

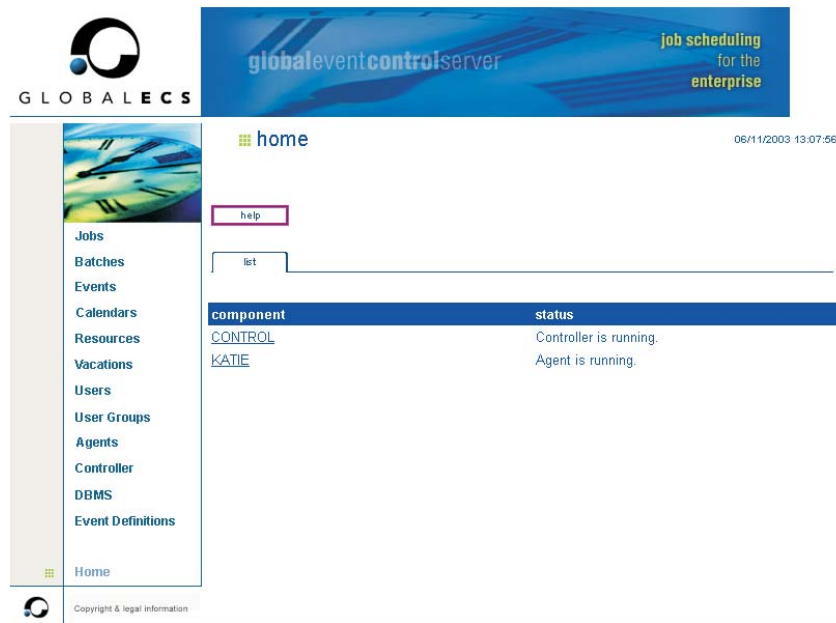
The GECS System can be monitored from remote computers that do not have any GECS programs installed or configured. The GECS Web Manager program makes this possible.

While the Web Manager program is running on the DBMS/Controller computer, you can access the GECS data files.

To access the GECS system from a browser, enter the IP address and port number of the Web Manager. For example:

`http://200.200.201.25:2013`

Before accessing the system the user will be prompted for a GECS user name and password. After entering this information, a web page similar to the following should appear.



In addition to using the Web Manager for access the GECS system via a browser, the status of several GECS components can be accessed directly using their predefined HTTP port numbers.

The four main components of the GECS system (Agent, Controller, DBMS and Web Manager) each use 2 IP ports. One port is used for communication between GECS components. The use of a port for communications between GECS components is required. The other port is used for HTTP communications between GECS components and browsers. The use of a port for HTTP communications is optional and can be disabled by entering a port number of zero (0). The Workstation Setup program will default to the following port numbers.

<u>Component</u>	<u>GECS Port</u>	<u>HTTP Port</u>
Agent	2000	2010
Controller	2001	2011
DBMS	2002	2012
Web Manager	2003	2013

GECS Administration Overview

Since GECS can run continuously, you should design logical job streams to keep your GECS Agents occupied, thus allowing them to fully utilize your hardware and increase your company's productivity.

In a perfect world, your jobs would always run on time with no errors. However, in the event that things don't run as planned, corrective action may be necessary. GECS was developed to react to various Events that could otherwise require user intervention or keep your jobs from running on schedule.

GECS allows you to take pro-active measures when creating your jobs to keep user intervention to a minimum. We recommend that you plan ahead. Determine possible problems which could occur with your jobs.

Lets say you have file transfer tasks that needs to run every business day at 8pm. When the files are available, you need to copy them to a new directory and send them via modem to the home office. You could create a GECS job with trigger files that requires the resource of a modem. If the files are not available, there is nothing to transfer. If the files are available but the modem is busy the files will not be transferred. Problems may include: jobs starting late (i.e. due to lack of trigger file), jobs finishing late, jobs taking too long to run or jobs failing with a bad return code. Once you have determined possible problems, you can create jobs that actually react to these Events.

Minimizing User Intervention

To maximize the amount of work GECS can do and minimize the amount of time you spend worrying about the successful completion of your job streams, we recommend you setup jobs that take care of themselves. As you automate jobs, try to imagine possible problematic Events and plan ahead for those Events. GECS can be set up to react to job run time (amount of time it takes a job to complete), job lateness and job failure. The Actions tab from the Job record is displayed below.

The screenshot shows the 'Job Detail: TEST2' window with the 'Actions' tab selected. The window has a menu bar (File, View, Help) and a toolbar with various icons. The 'Actions' section contains the following configuration options:

- Should this job create events?
- Maximum Minutes: 0 Estimated Minutes: 0
- Activate job [dropdown] if this job is more than 0 minutes late.
- Skip this job, if it is 0 minutes late or if it will finish after 00:00:00 (0 and 00:00:00 = no skip)
- Max Good Return Code: 0 Min Good Return Code: 0
- Activate job [dropdown] if this job fails
- Retry On Return Code: 0 Times To Retry: 0
- Priority: 0 (0 = highest, 9 = lowest)
- For every 0 minute(s) late escalate this jobs priority by 0
- Generate event 0 on job success.
- Generate event 0 on job failure.

The 'Messages' section at the bottom has two text input fields: 'Execute Message:' and 'Pre & Post Messages:'. A status bar at the bottom of the window displays 'Should this job create events?'.

Job Run Time Issues

Setting the Maximum Minutes a Job can Run

GECS can limit the time allowed any particular job. Each job can be assigned a maximum run time using the “Maximum Minutes” field found on the Actions tab in the Job record.

When jobs run longer than their maximum run time, the Agent software terminates the process and all its threads. GECS then records that the job is complete with a return code of 255 and will reschedule it, if necessary. Having a job time out is an error Event that will cause GECS to send Event notification if GECS is configured for error notification.

There are various features and limitations in the operating systems on which GECS runs that cause this to get more complicated. Yet in most cases, GECS can ‘stop’ jobs that run too long and mark them with a “Bad” (255) return code. NLM Agents cannot terminate jobs.

A maximum number of minutes can also be entered at the Agent and user level. To configure your Agent, use the “Maximum Minutes Per Job” field found on the Agent tab in the Agent record. To configure a user, use the “Maximum Job Minutes” field found on the Profile tab in the User record. Before executing the job, GECS will determine the minimum non-zero number of minutes entered for the job, the user, and the Agent. If all three are zero, no restriction will be set.

Events can Alert you of Over Run and Under Run Jobs

GECS Events can be configured to alert you that a running job has exceeded its maximum minutes. From Event Definitions simply set the appropriate Event Definitions.

Setting the Estimated Minutes it takes a job to Run

You can define an estimated number of minutes your job is likely to run using the “Estimated Minutes” field found on the Actions tab in the Job record. If your job exceeds this time you can automatically be notified.

Each time your job runs, GECS can be set up to automatically update the estimated minutes you defined with the job's newly calculated number of estimated minutes. To setup GECS to automatically update estimated minutes for your jobs that you have defined estimated minutes, use the “Update Estimated Minutes” field found on the Controller tab in the Controller record. The estimate is calculated using a weighted average formula.

$$\text{new estimate} = ((\text{old estimate} \times 3) + \text{actual minutes}) / 4$$

Job Lateness Issues

Active Job due to Late Start Time

You can set up your job to activate another job if your job starts late. For instance, lets say if your job is 30 minutes late, it should activate a job called LATEJOB to run, which notifies the operations department that there may be a problem with your job.

Create a job named LATEJOB. The status of this job should be set to “Complete” because you never want it to run on its own. You would then create your job with an appropriate command line. From the Actions tab in the Job record, enter the name of the job to activate (LATEJOB) in the “Activate Job” field, then enter the amount of time in

minutes before the job should be activated.

When this occurs, GECS automatically changes the status of the job to be activated from “complete” to “pending”. GECS will then run the job and generate two separate Events; One for the activation Event and one GECS Event for the job it ran.

Skip Job due to Late Start

You can set up your job to skip if it starts late. Enter the number of minutes that this job should be allowed to be late in the “Skip this job, if it is” field found on the Actions tab in the Job record. After the job is more than 'x' minutes late, GECS will mark it as complete or reschedule it as if it had run with a return code of 255.

Skip Job due to Late Finish

If you need your job to be skipped if it will finish after a specified time of day, enter the time in HH:MM:SS format using the “will finish after” field located on the Actions tab in the Job record.

Before a job is started, its estimated finish time (current time plus estimated run time) is calculated. If the estimated finish time is after the time entered here, the job will be skipped. Leave the field blank or enter 00:00:00 to indicate no maximum finish time. The estimated finish time is compared to the first occurrence of the time entered here after the scheduled time.

Escalate Priority due to Late Start

If your job is late, its priority can be escalated (reduced from its initial value until it equals zero). For every 'x' minutes your job is late, the priority will be escalated by a certain amount. Enter the amount the priority should be escalated by and the number of minutes for each escalation using the “Escalate this job’s priority by” and “for each” fields found on the Actions tab in the Job record.

Never Late

Use the Never Late field to mark jobs as never being late.

Return Code Issues

A job’s return code can be used to determine job success or failure. You can setup your jobs to automatically take actions based on return codes. Several actions are described below. Also, see the Task Automation chapter for more details on setting job return codes.

Maximum Good Return Code

Use the “Maximum Good Return Code” field to enter the highest number your job can return, as its return code, to be considered a successfully completed job. This field can be found on the Actions tab in the Job record. The number you enter in this field can be used to activate the job entered in the “Activate Job” field.

Minimum Good Return Code

Use the “Minimum Good Return Code” field to enter the lowest number this job can return, as its return code, to be considered a successfully completed job. The number you enter in this field is used in conjunction with the activate job field. This number determines if this job should be considered a failed job.

Activate Job due to Bad Return Code

Enter the Job number of the job to be activated (status changed to pending) if this job returns a failed return code. Then, enter the largest return code that should be considered a success.

Retry Job due to Bad Return Code

The “Retry on Return Code” field can be used to retry failed jobs. Enter the minimum job return code that should cause the job to retry. For example: If you want the job to retry if it returns 5 or more as the return code, you would enter '5' in this field. This field can be found on the Actions tab in the job record.

Jobs will retry immediately unless your Agent has been configured with a “Minimum Minutes Between Job Retries”, in which case the job will not retry until that number of minutes has elapsed. Other pending jobs will be executed during this waiting period if they exist. The “Minutes Between Job Retries” field can be found on the Agent tab in the Agent record. Enter '0' in this field if the job should not retry.

To limit the number of times a failed job should retry, populate the “Times To Retry” field which can also be found on the Actions tab in the Job record.

Change Job Return Codes

By right clicking on a Completed Job in one of your jobs list, you can change a failed job’s return code. For example, if you have a failed job that has been manually fixed but is still holding up the rest of your job stream, you can change the failed return code to allow dependent jobs to run. This field can only be changed once.

Generate Event on job Success

This field is designed for you to be able to generate an Event of your choosing when this job runs successfully. You can use Event Definitions to define your Events. Events can cause other jobs to run by using the Depends On Event field from the Dependencies tab on the job record.

Generate Event on job Failure

This field is designed for you to be able to generate an Event of your choosing when this job runs and fails. You can use Event Definitions to define your Events. Events can cause other jobs to run by using the Depends On Event field from the Dependencies tab on the job record.

Execute Message

Agents can display a message before executing a job. If you'd like an Agent to display a message before running this job, enter that message into the Execute Message field.

Jobs that run on Windows Agents that are setup with a command line type of NT Console or DOS will pause until someone presses a key. All other command line type jobs will just temporarily display the execute message then continue on.

Jobs configured with a Windows NT/2000/XP/2003 command line type use a special utility program called **GECSMESG** to display a window with your Execute Message. From this window you can click the OK button to run the job or click the Cancel button to cancel the job from running. When you click the Cancel button the job will not run but will act as if it had run returning a bad return code of 255.

Pre & Post Messages

GECS can create an Event before a job begins and after a job has completed using the Pre and Post Messages fields. Enter the desired message to send using these fields to enable this feature or leave blank and no message will be sent.

These messages appear in the Pre and Post Events that are generated.

GECS Windows Client Programs

Windows Client Programs Overview

The GECS Windows Client programs can be accessed through the GECS Administrator program. The Administrator is composed of a series of programs that can be run by clicking on folder icons. These programs perform three basic functions.

1. They provide a facility for editing, viewing, adding and deleting information in the Jobs, Batches, Studio Worksheets, Events, Reports, Calendars, Resources, Vacations, Users, Security Profiles, Agents, Controller Settings, DBMS Settings and Event Definitions modules.
2. They can print reports and listings of the information from these modules.
3. They allow the GECS system to be updated and monitored.



These Client programs are installed from your Global ECS Windows CD ROM or can be downloaded. To set up additional GECS client machines, see the Configuring GECS Client Computers section in the Getting Started chapter of this manual. For improved performance see the “Enable Data Path” field in the Workstation Setup program.

For detailed information on any field in a Windows client program, you can access help by pressing the <F1> function key while you cursor is positioned over the field. You can also access on line help by clicking on the help pull down menu and selecting help. This chapter will describe the GECS Windows Client programs from the folders below:

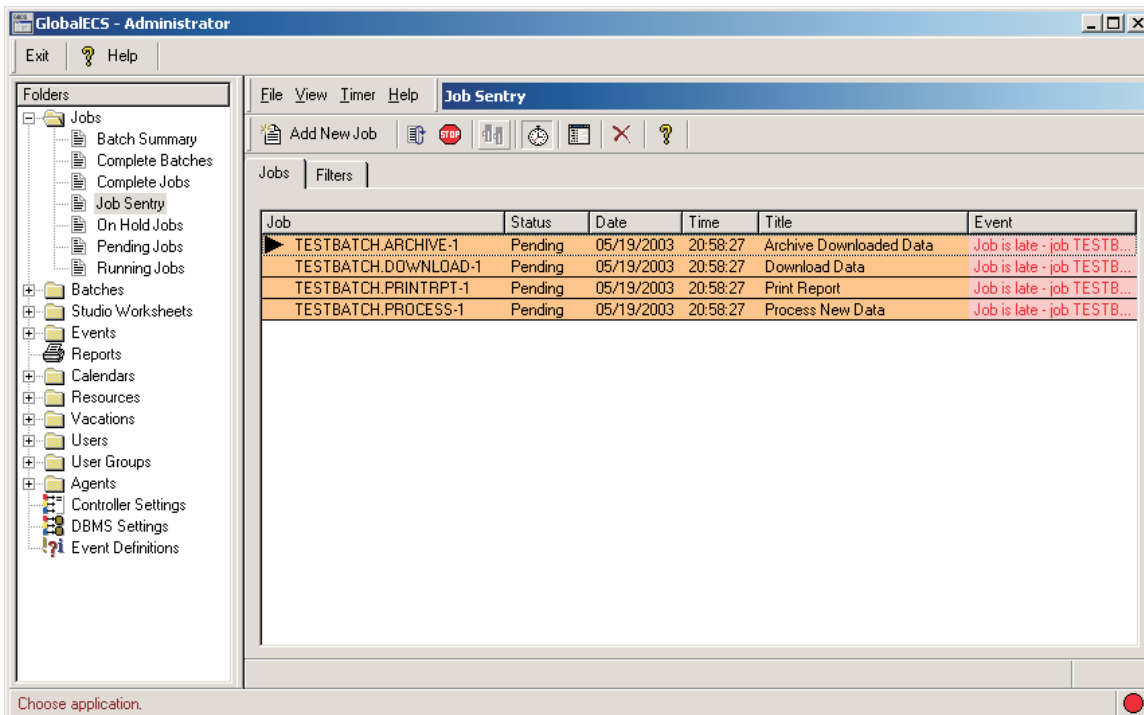


Jobs Lists

The Jobs lists can be displayed by clicking on an existing view or by creating your own custom view. By default GECS ships with the following views: Batch Summary, Complete Batches, Complete Jobs, Job Sentry, On Hold Jobs, Pending Jobs and Running Jobs.

Once you have clicked on a view you can look at job records and filter the job records displayed in the list. By double clicking on a job from this list you can view details about the job. If you right click on a job in the list, several options display depending on the status of the jobs. For instance, if you right click on a 'Completed' job you can add a new job, delete the job, view the job details, view the job history, copy the job, run the job with a new name, rerun or change the job's return code. Right click on a 'Pending' job to add a new job, delete the job, view the job details, display reasons why the job cannot run, view the job history, copy the job, ignore job dependencies, ignore job and file dependencies, respect job and file dependencies, run the job with a new name, skip and reschedule the job or put the job on hold. Right click on a job with an 'On Hold' status and you can add a new job, delete the job, release hold, view the job detail, copy the job as another job or run the job as another job. Right click on a running job to add a new job, delete a job, terminate the running job, view the job details or view the job's history. Right click on the column header to print the list or display a count of the items. Left click on the column header and order the list ascending or descending.

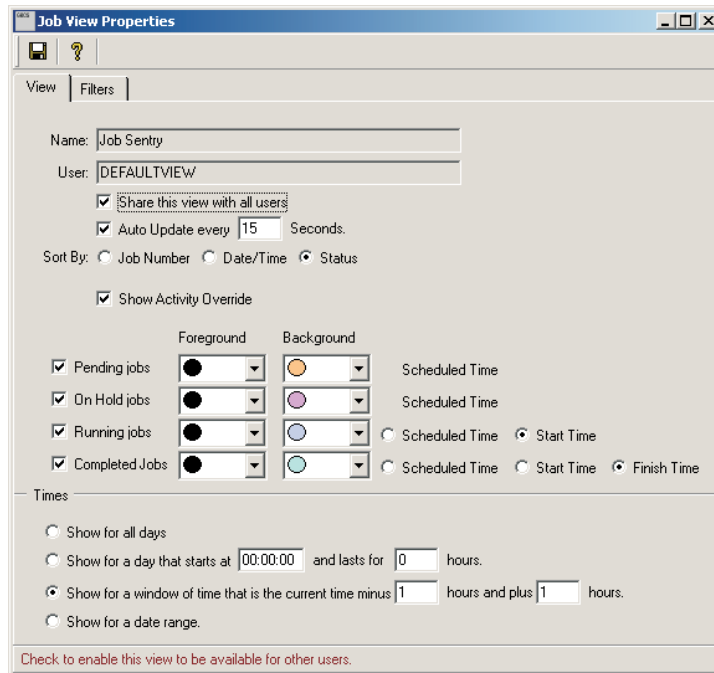
The first button on the toolbar is used for adding new records. The next button is to refresh the list. The third button is used to stop refreshing the list. The fourth button is to display Batch Summary mode. The fifth button enables auto refresh mode. The sixth button display details for the job. The seventh button is for deleting job records. The question mark button launches on line application help. The tabs are for selecting the page to view. The Filters page can be used to select filter criteria such as job range, agent, user or department.



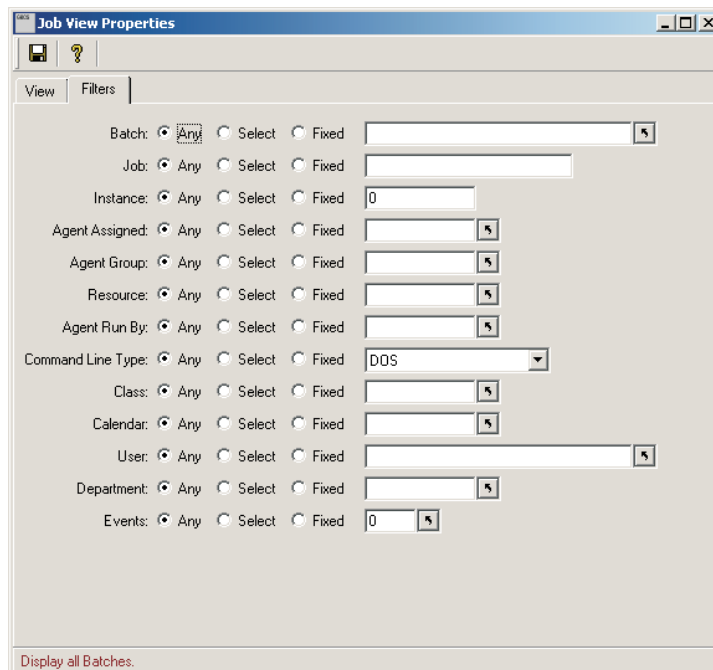
Job View Properties

You can customize the display of your GECS jobs by setting the job view properties. Update the view properties to filter the information displayed in the jobs lists. Right click on the view title to display the Job View Properties screens.

View Tab:



Filters Tab:

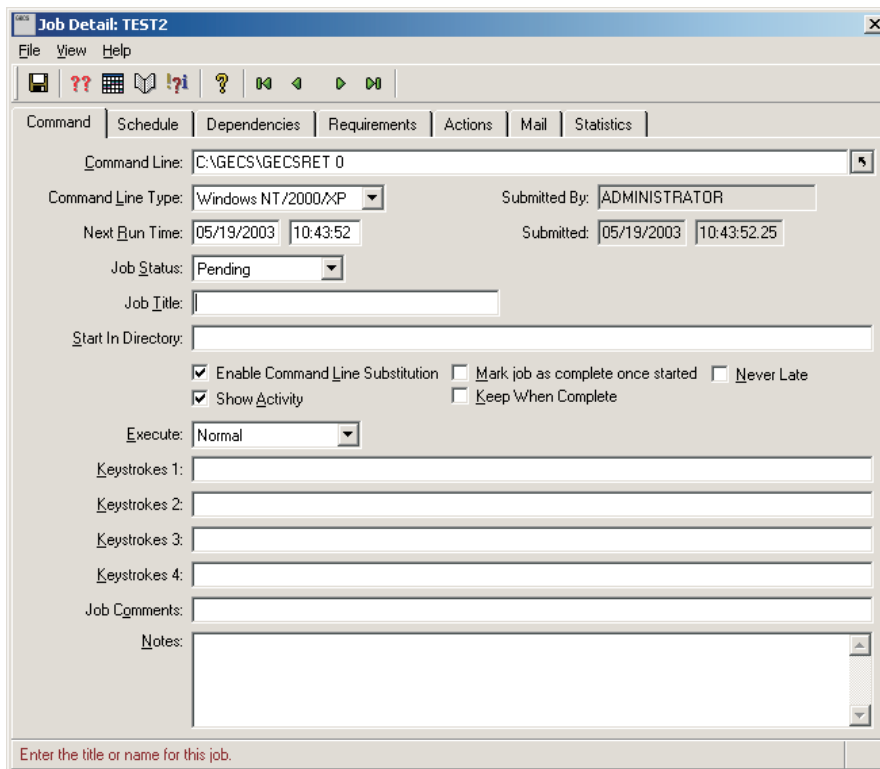


Scheduled Job Detail

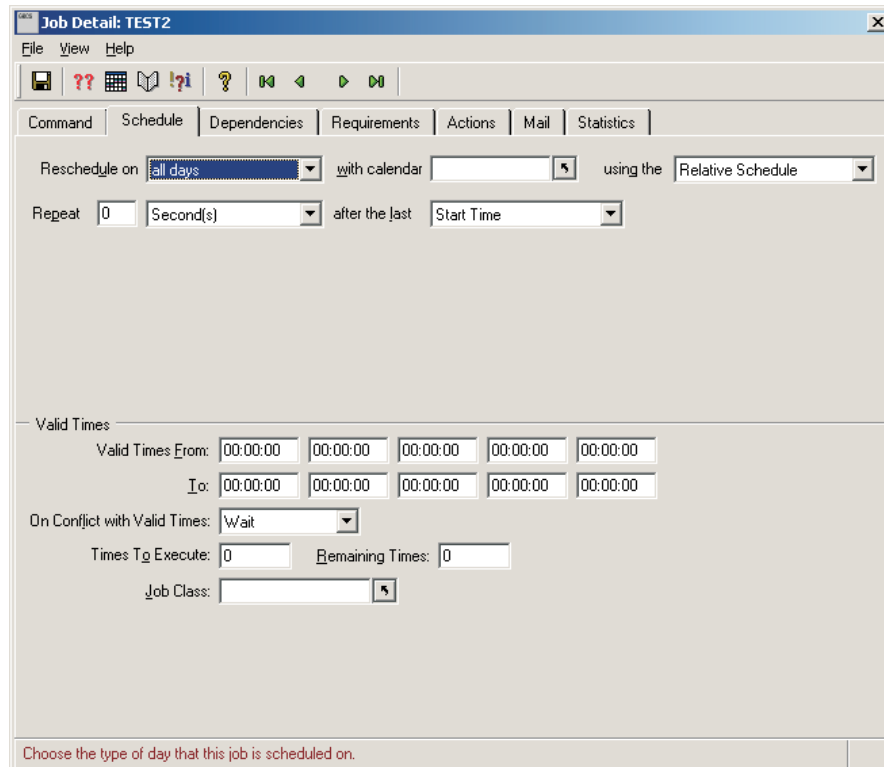
The Job Detail screens allow you to easily add, modify and delete GECS Jobs. This is the most direct way of adding jobs to the GECS data files. Jobs entered through the Job Detail screens are immediately available for execution by your running Agents.

The first button on the toolbar is used for saving records. The next button is for viewing reasons your job will not run and the third button is for looking at your jobs schedule. The fourth button is to display job history. The fifth button is to display Events associated with the job. The question mark button launches on line application help. The green VCR buttons move from first, next, previous and last records in the list. The tabs are for selecting the page to view.

Command Tab:



Schedule Tab:



Job Detail: TEST2

File View Help

Command | Schedule | Dependencies | Requirements | Actions | Mail | Statistics

Reschedule on: all days with calendar: using the: Relative Schedule

Repeat: 0 Second(s) after the last: Start Time

Valid Times

Valid Times From: 00:00:00 00:00:00 00:00:00 00:00:00 00:00:00

To: 00:00:00 00:00:00 00:00:00 00:00:00 00:00:00

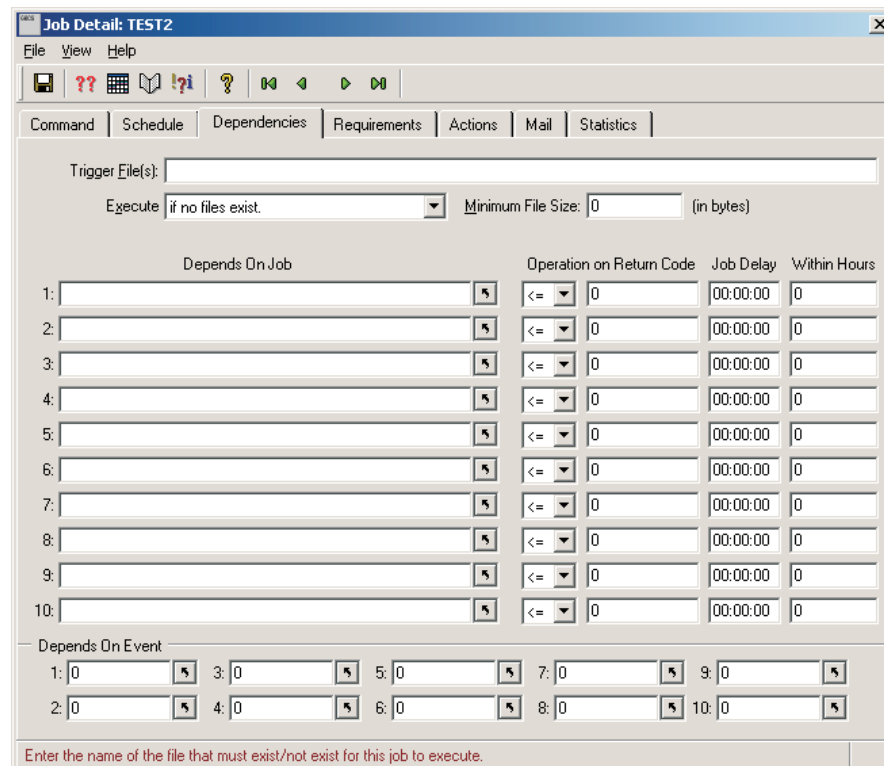
On Conflict with Valid Times: Wait

Times To Execute: 0 Remaining Times: 0

Job Class:

Choose the type of day that this job is scheduled on.

Dependencies Tab:



Job Detail: TEST2

File View Help

Command | Schedule | Dependencies | Requirements | Actions | Mail | Statistics

Trigger File(s):

Execute: if no files exist Minimum File Size: 0 (in bytes)

	Depends On Job	Operation on Return Code	Job Delay	Within Hours
1:		<=	0	00:00:00 0
2:		<=	0	00:00:00 0
3:		<=	0	00:00:00 0
4:		<=	0	00:00:00 0
5:		<=	0	00:00:00 0
6:		<=	0	00:00:00 0
7:		<=	0	00:00:00 0
8:		<=	0	00:00:00 0
9:		<=	0	00:00:00 0
10:		<=	0	00:00:00 0

Depends On Event

1: 0 3: 0 5: 0 7: 0 9: 0

2: 0 4: 0 6: 0 8: 0 10: 0

Enter the name of the file that must exist/not exist for this job to execute.

Requirements Tab:

Job Detail: TEST2

File View Help

Command Schedule Dependencies Requirements Actions Mail Statistics

Execute By Agent

1: [] 3: [] 5: [] 7: [] 9: []
2: [] 4: [] 6: [] 8: [] 10: []

Required Resources

1: [] 3: [] 5: [] 7: [] 9: []
2: [] 4: [] 6: [] 8: [] 10: []

Use Agent Group: []

Operating System & Version: Any [] 0.00

Minimum Disk Space: 0 Megabytes

Supplies: []

Enter an agent that may execute this job.

Actions Tab:

Job Detail: TEST2

File View Help

Command Schedule Dependencies Requirements Actions Mail Statistics

Actions

Should this job create events?

Maximum Minutes: 0 Estimated Minutes: 0

Activate job [] if this job is more than 0 minutes late.

Skip this job, if it is 0 minutes late or if it will finish after 00:00:00 (0 and 00:00:00 = no skip)

Max Good Return Code: 0 Min Good Return Code: 0

Activate job [] if this job fails

Retry On Return Code: 0 Times To Retry: 0

Priority: 0 (0 = highest, 9 = lowest)

For every 0 minute(s) late escalate this jobs priority by 0

Generate event 0 on job success.

Generate event 0 on job failure.

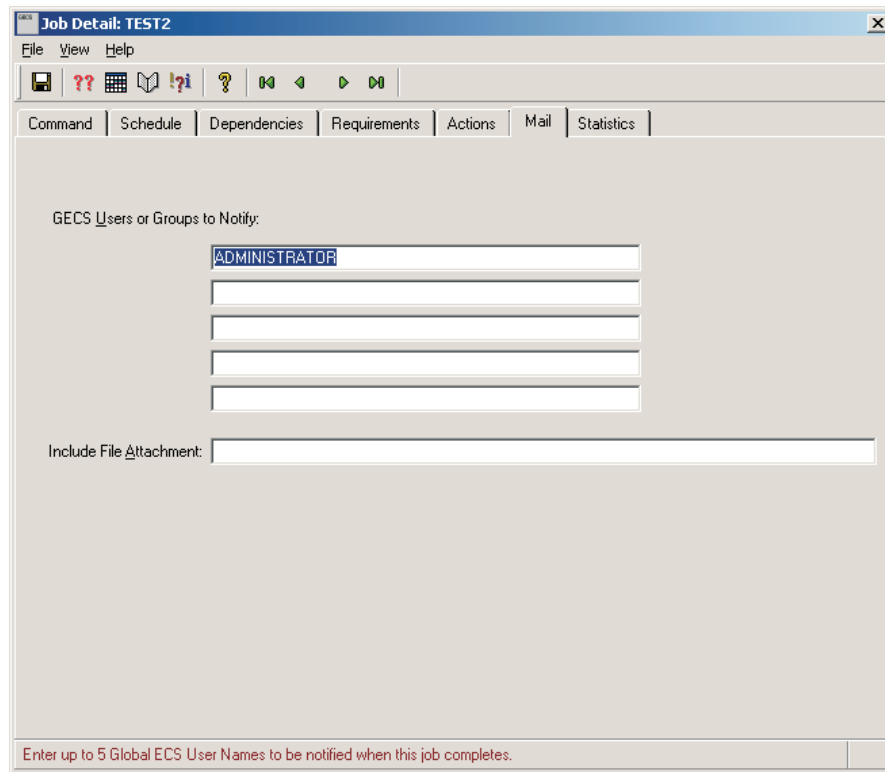
Messages

Execute Message: []

Pre & Post Messages: [] []

Should this job create events?

Mail Tab:



Job Detail: TEST2

File View Help

Command Schedule Dependencies Requirements Actions Mail Statistics

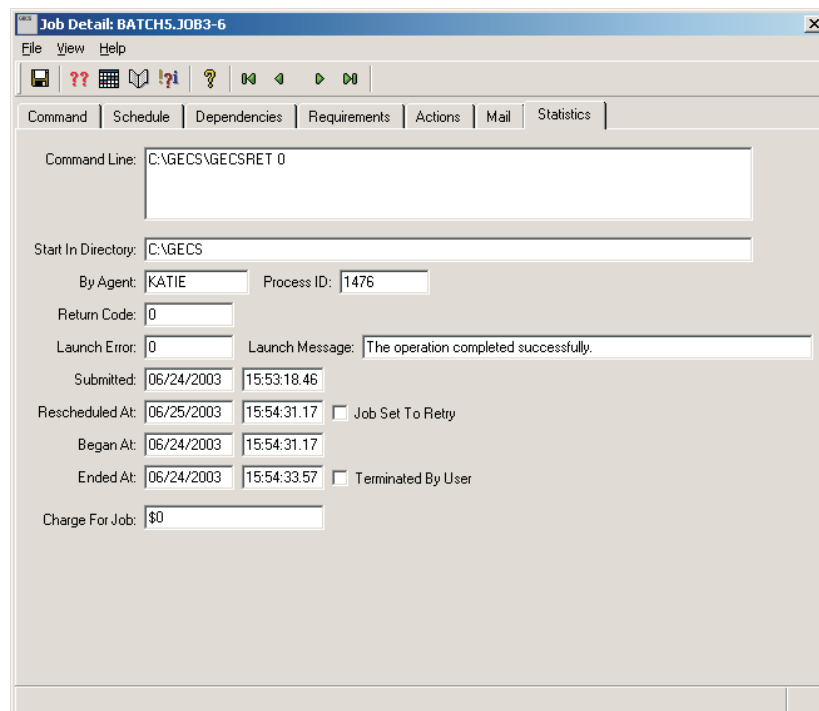
GECS User Names or Groups to Notify:

ADMINISTRATOR

Include File Attachment:

Enter up to 5 Global ECS User Names to be notified when this job completes.

Statistics Tab:



Job Detail: BATCH5.JOB3-6

File View Help

Command Schedule Dependencies Requirements Actions Mail Statistics

Command Line: C:\GECS\GECSRET 0

Start In Directory: C:\GECS

By Agent: KATIE Process ID: 1476

Return Code: 0

Launch Error: 0 Launch Message: The operation completed successfully.

Submitted: 06/24/2003 15:53:18.46

Rescheduled At: 06/25/2003 15:54:31.17 Job Set To Retry

Began At: 06/24/2003 15:54:31.17

Ended At: 06/24/2003 15:54:33.57 Terminated By User

Charge For Job: \$0

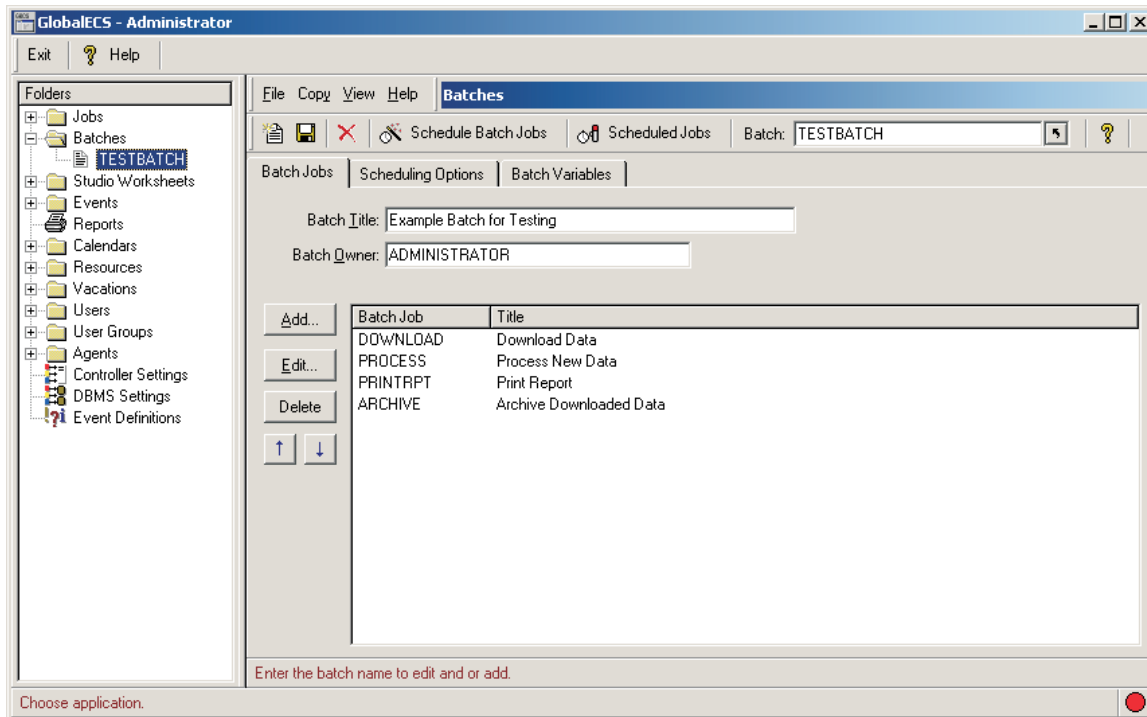
For additional information on jobs, see the Task Automation chapter of this manual.

Batches

The Batches folder allows you to define a batch of processes in an off-line environment and schedule or remove them as a whole unit. When batches, batch variables and batch jobs are entered, they do not impact the GECS system until they are scheduled. The process of scheduling batch jobs creates job records in the GECS system. Once scheduled, Jobs created via Batches are no different than jobs created directly using the Jobs folders.

The first button on the toolbar is used for adding new records. The second button is used for saving records. The third button is for deleting records. The fourth button is for scheduling batch jobs and the fifth button is for displaying scheduled jobs. The question mark button launches on line application help. The tabs are for selecting the page to view.

Batch Jobs Tab:



Batches

Each Batch contains two types of information. First there is information pertaining to that Batch as a whole. Second there is information pertaining to the Batch jobs which comprise the Batch.

Information relating to the Batch as a whole falls into three categories; Batch, Scheduling, and Batch Variables. There are separate tabs for dealing with each type of information. Every Batch must contain Batch information (Batch owner name and Batch name). Schedule and variable information are optional. From the Batch Jobs tab, information pertaining to individual batch jobs is accessed by double clicking the appropriate Batch job from the Batch Jobs list.

How Do Batches Work?

A Batch should be thought of as a process, which can contain any number of individual sub-processes or steps. The steps of a Batch are called Batch Jobs. A Batch is simply a set of related Batch Jobs which describe the individual steps of a process (Batch). Each Batch job specifies the command line of a program to be run for each step of the batch. Dependencies can be created between batch jobs to organize job flow within the Batch.

Once a Batch has been defined and assigned Batch job records, the Batch as a whole is scheduled. Scheduled jobs exist in the JOBS queue. When a Batch is scheduled, its constituent Batch job records are copied into the jobs queue, and thereby become available for processing by the GECS Agents that service the queue.

To cancel the jobs of a scheduled batch, use the Scheduled Jobs screen and select the remove option. (see the Utilities chapter of this manual for a Batch Remove utility). Removing a Batch deletes the job records of the scheduled Batch from the jobs queue.

How Will I Use Batches?

In most cases Batches will be your primary tool for scheduling jobs. Since Batches make it easy to organize related jobs, you will be able to create more sophisticated job streams, and respond to variations in job schedules more rapidly.

What Do Batches Do?

Batches organize a complex set of tasks into a single manageable entity. Information moving through a typical computer system or network more than likely requires a series of changes made by dissimilar products from several vendors. Batches orchestrate the creation and management of multi-step processes.

What is a Batch?

Batches are named records that contain all the information necessary to add job entries to the JOBS queue. Naming a Batch something meaningful such as "MONTHEND", can help make the setup, maintenance and use of Batches more intuitive.

What are Batch Job Records?

A Batch is comprised of one or more Batch jobs. A Batch job record contains most of the information that defines the jobs that will be created when the batch is scheduled. The information entered for Batch job records is very much like the information that is entered when jobs are created manually or when using the Jobs folder.

What are Batch Variables?

Batch variables allow information to be placed into job records at the time they are scheduled. When Batch variables are present for a selected Batch, a dialog is displayed prior to the creation of jobs. The data entered into the edit fields of this dialog are placed wherever the associated variable name exists within the Batch job text fields.

Batch variable substitution is one of the most powerful features of Batches. Before working with variables, acquaint yourself thoroughly with GECS Batches. The function of variables is simple. GECS will look in Batch job records for a defined variable text string and substitute for it a value which is provided at the time the Batch is scheduled. By incorporating variables into your Batches, you can create Batches that will automatically prompt users for information each time they are scheduled. In this way, Batches operate as process templates where parameters are entered at the time the Batch is scheduled. The benefit is that your users can interactively configure the processes of a Batch without actually changing any Batch configurations or job records.

There are two steps to using variables in a Batch. First, place variables in Batch jobs where substitution should occur. Second, define those variables so that GECS will prompt the submitter for values and substitute those values into the Batch jobs. The Batch Variables tab contains Batch variables which have been defined for a Batch. Variable definitions are created and edited using the Batch Variable Edit Screen.

One of the most commonly used areas of Batch variable substitution is on the Batch job command line. Many applications allow for the use of command line options. Batch substitution makes it easy to specify those options (such as dates or times) at the point the Batch is scheduled. Batch variables can be up to 8 characters long. The format of substitution variables used within a Batch job record is '@XXXXXXXX@', where the leading and trailing '@' symbols let GECS know that the encapsulated string is a variable and 'XXXXXXXX' is the name of the variable. For example:

Suppose you have a batch job that should run notepad. For the purposes of this example, you also want notepad to open a particular file when it is run. We know that by passing a filename on the command line, notepad will automatically open a file. The trick is that each time the batch is scheduled, you want to specify a different file to open. You can use Batches to prompt for the file name at the time the Batch is scheduled by defining a Batch variable and placing it in the notepad command line in place of the file name to open.

```
Command Line: notepad.exe @EDITFILE@.txt
```

If EDITFILE has been defined as a Batch variable for the Batch, GECS will prompt for someone to provide the name of the file to open and substitute that name for the Batch variable '@EDITFILE@' in the Batch job.

To manage Batch variables, click on the Batch Variables tab from the Batches folder. The Variables Edit screen will display all variables which have been defined for the Batch. If you choose to add or edit variables, the Batch Variable Edit screen is displayed.

What is Scheduling Batch Jobs?

Scheduling Batch jobs is a process where Batch job information is combined with Batch information to create new job records. These jobs, when executed by GECS, obey the rules set forth in the information entered into the Batch and Batch job forms.

Information entered into the Batch form(s) is replicated into each job record created during the process of scheduling the Batch. Information entered into the Batch job form(s) corresponds one-to-one with each job record when created.

What is Removing Batch Jobs?

The process of removing batch jobs simply deletes the remaining job records created for the Batch. However, it does not delete completed job records.

Scheduling Your Batch

The next run time can be specified on either the Scheduling options tab in main batch screen or the Batch Job Detail screen for each Batch job. If a time is specified on the Scheduling Options main Batch screen, that time will supersede any times entered for each Batch job. If the Scheduling Options “Beginning At” field is left blank, the times on the Batch job screens are used. GECS interpret the time ‘00:00:00’ as midnight, at the beginning of a new day.

There are four ways of specifying the next job run time to apply to jobs created by Batches.

1. Specify the next run time in each Batch job record that is created for the Batch and leave the next run time/”Beginning at” field on the main batch screen Scheduling Options tab blank. Each job will then be created with the particular next run time specified for each individual Batch job record.
2. Leave the next run time field in each individual batch job record set to 00:00:00 (or any other value) and put the desired next run time in the “Beginning at” field of the Scheduling Options tab on main Batch screen. Each job will be created with the next run time specified in the main batch screen.
3. Leave the next run time field in each individual Batch job record set to 00:00:00 (or any other value) and put the special variable @TIME in the next run time, “Beginning at” field of the main Batch screen. Each job will be created with the next run time of the system time at the point the Batch is scheduled.
4. Leave the next run time field in each individual Batch job record set to 00:00:00 (or any other value) and put a Batch Variable in the next run time, “Beginning at” field of the main Batch screen. Each job will be created with the next run time entered on the Batch Variables tab when the batch is scheduled. You must create a Batch variable using Variable Edit in order to have substitution occur when the Batch is scheduled.

Batch Jobs that Repeat

It’s important to keep in mind that Batches do not recur, but the jobs that are created from the Batch can be setup to recur. Batches can be scheduled manually. If for example, you had a set of tasks you would like to have run everyday, you could set them up one of three ways.

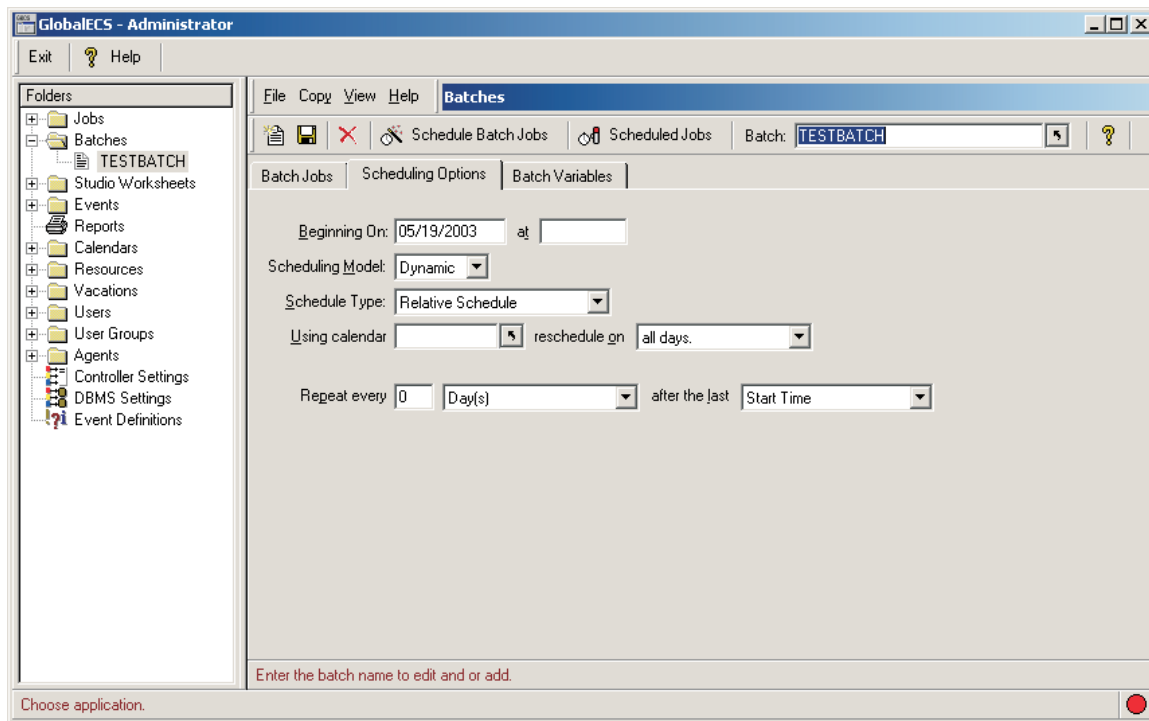
1. Create a Batch and indicate on the Scheduling Options tab that the jobs created by the Batch should repeat every day. Once the Batch is scheduled, the jobs of the Batch will automatically repeat every day with no required intervention. At any point, the Batch can be removed and the jobs will quit running until the batch is scheduled once again.
2. Create a Batch and indicate on the Scheduling Options tab that the jobs created by the Batch should not repeat at all. Schedule the Batch at any interval you like. The scheduled jobs would run only once and stop.
3. Schedule a job to schedule a Batch each day using the command line (GECSBSCH.EXE). You may also choose to create another job to remove the Batch later on in the day (GECSBREM.EXE). The removing of Batch jobs will ensure that if the Batch has not run by a certain time each day, it will be automatically removed and thus not run at all.

Instead, it will be scheduled for execution according to the schedule of the job which does the scheduling of the Batch. It is interesting to note that the two tasks described above (Schedule Batch Jobs and Remove Batch Jobs) could easily be a batch unto themselves.

Scheduling Options Tab:

Batches can be scheduled to run once, many times or indefinitely. From the Scheduling Options tab, you can schedule Batches to repeat using either dynamic or static scheduling. With a dynamic schedule, Batch jobs are created with a date and time that the job should run next. When the jobs complete, the system automatically creates new instances of the job for the next date and time, based on the rescheduling information entered for the Batch. With static scheduling, a separate job record is immediately created for every instance of when the job should run. As with both kinds of scheduling, each job created is set up to run only once and is then marked complete. The advantage of using static scheduling is that it gives you the ability to alter a job stream for a particular day without affecting the schedule on other days. Additionally, Batch jobs can be scheduled for a specific date range.

Note that Batches cannot be scheduled to start in the past. If you use static scheduling and schedule jobs to run with dates or times starting in the past, no job records will be created for those times.



Using Batch Variables

Variables must be used with a beginning and a trailing '@' sign. For example, if a variable named FILENAME is defined, it can be used in a command line as:

DIR @FILENAME@

For example, with this variable named FILENAME, the following batch command lines might be substituted as:

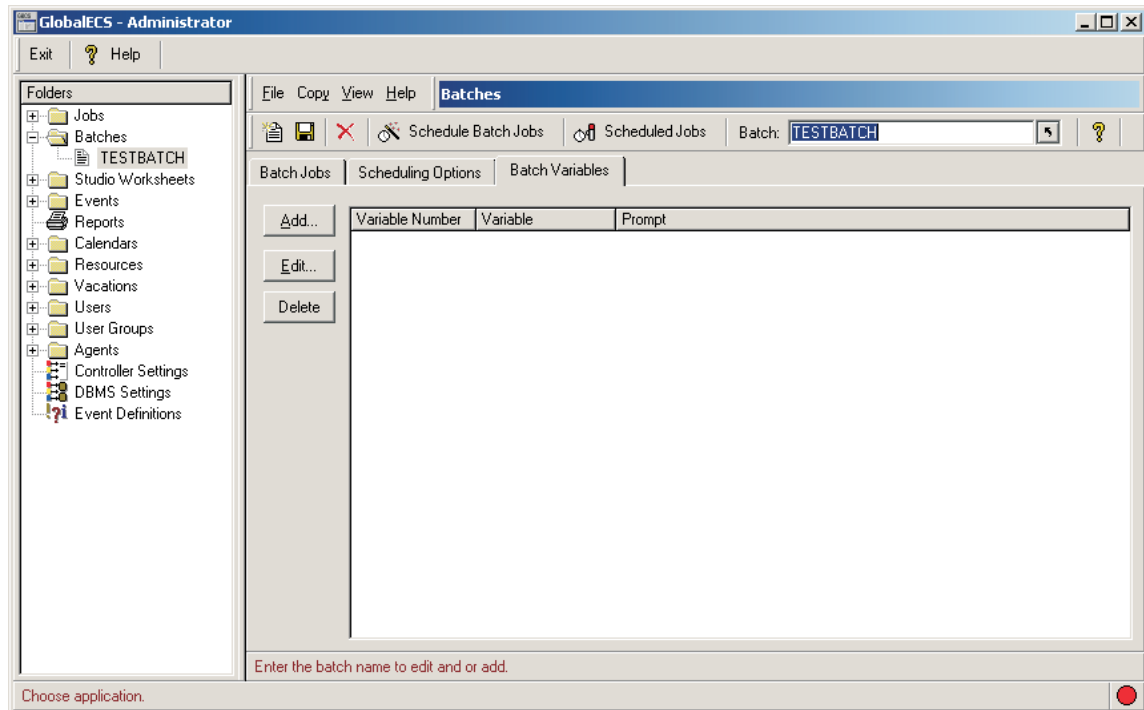
Batch Command Line	Job Command Line
DIR @FILENAME@	DIR TEST2.TXT

Be aware that if you include ‘consecutive’ variables you MUST include the trailing blank on the first variable. ‘Consecutive’ variables are defined as two variables entered with no other characters or spaces between the variables. For example, if you have defined the variables SUBDIR and FILE and enter the values as \abc\ and xyz respectively, the following Batch command line would be substituted as:

<u>Batch Command Line</u>	<u>Job Command Line</u>
DIR @SUBDIR@@FILE@	DIR \abc\xyz

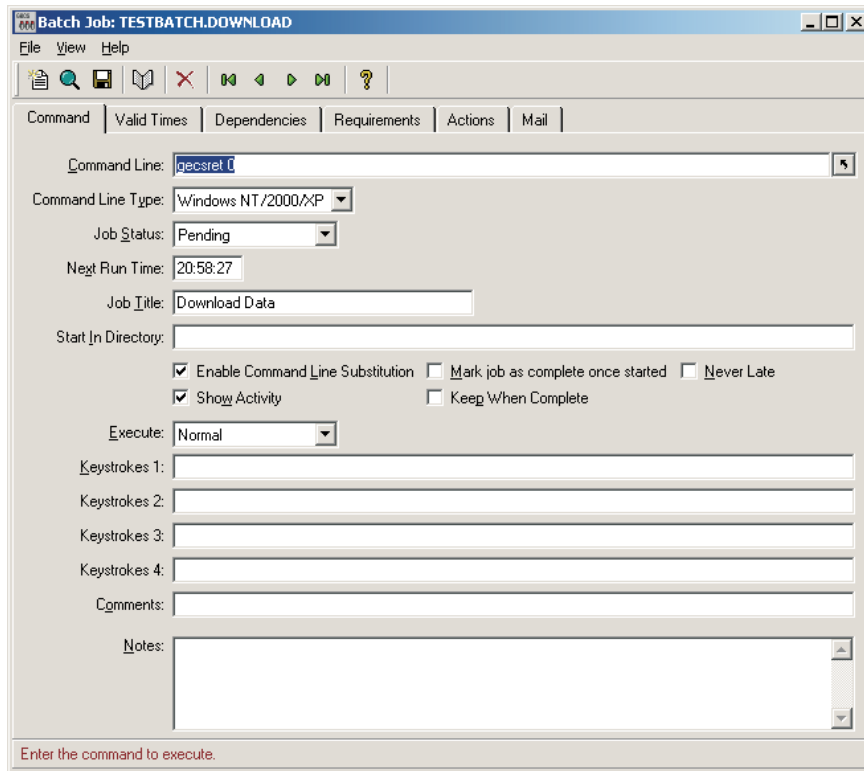
Once the base job information has been added, the next step is to add the Batch variables you will need for the Batch, if any.

Batch Variables Tab:

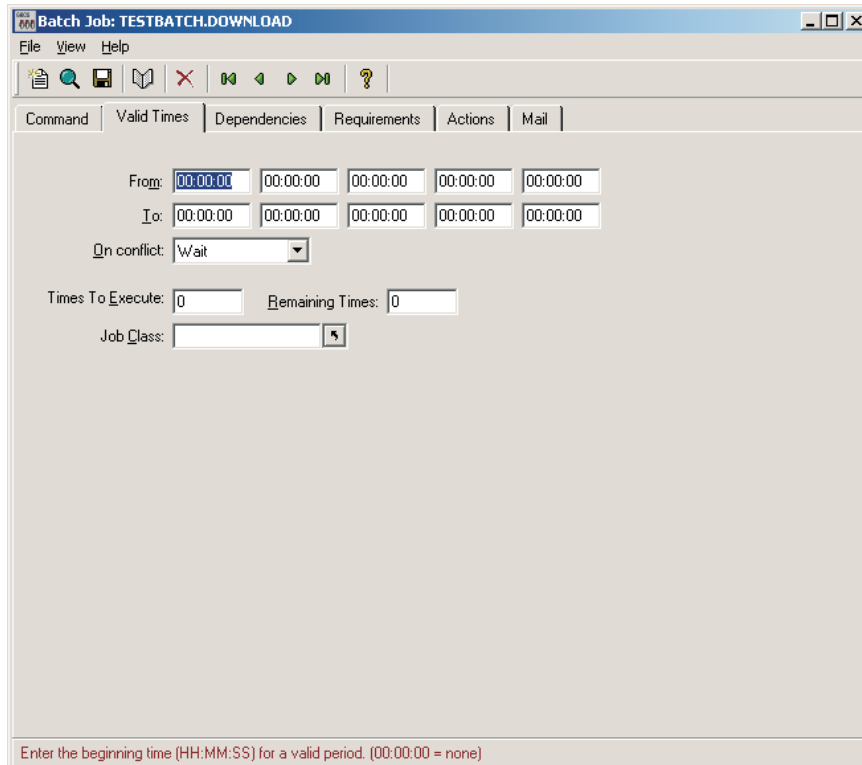


After entering the base Batch information including batch scheduling information and any necessary Batch variables, the next step is to add a Batch job record for each job that should be created from the Batch. The Batch job screens and the fields are much like the Job record screens and fields.

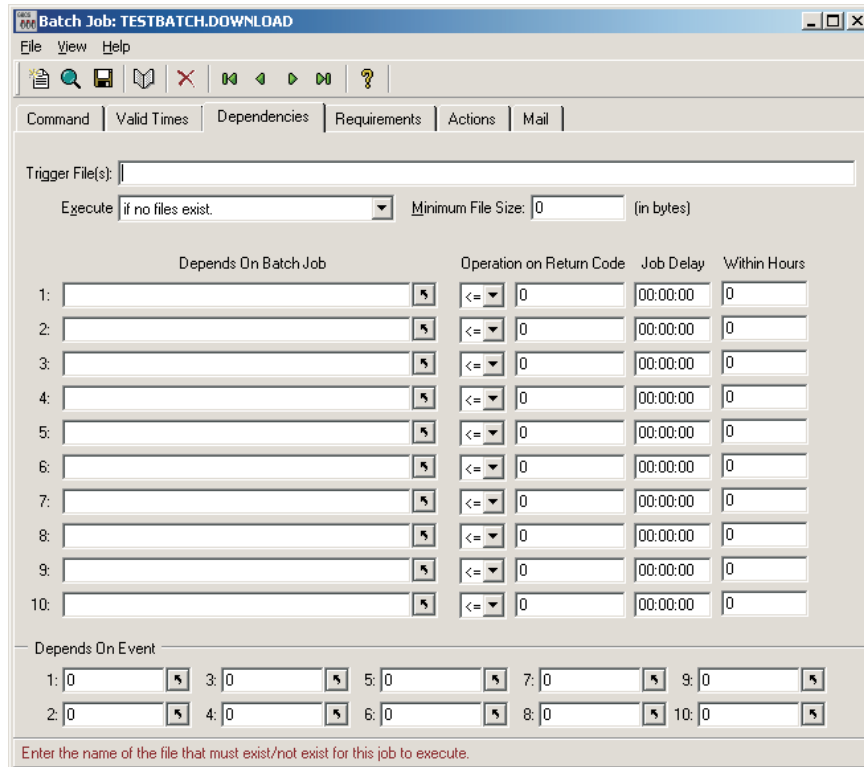
Batch Jobs Command Tab:



Batch Jobs Valid Times Tab:



Batch Jobs Dependencies Tab:



Batch Job: TESTBATCH.DOWNLOAD

File View Help

Command Valid Times Dependencies Requirements Actions Mail

Trigger File(s):

Execute if no files exist Minimum File Size: 0 (in bytes)

	Depends On Batch Job	Operation on Return Code	Job Delay	Within Hours	
1:		<=	0	00:00:00	0
2:		<=	0	00:00:00	0
3:		<=	0	00:00:00	0
4:		<=	0	00:00:00	0
5:		<=	0	00:00:00	0
6:		<=	0	00:00:00	0
7:		<=	0	00:00:00	0
8:		<=	0	00:00:00	0
9:		<=	0	00:00:00	0
10:		<=	0	00:00:00	0

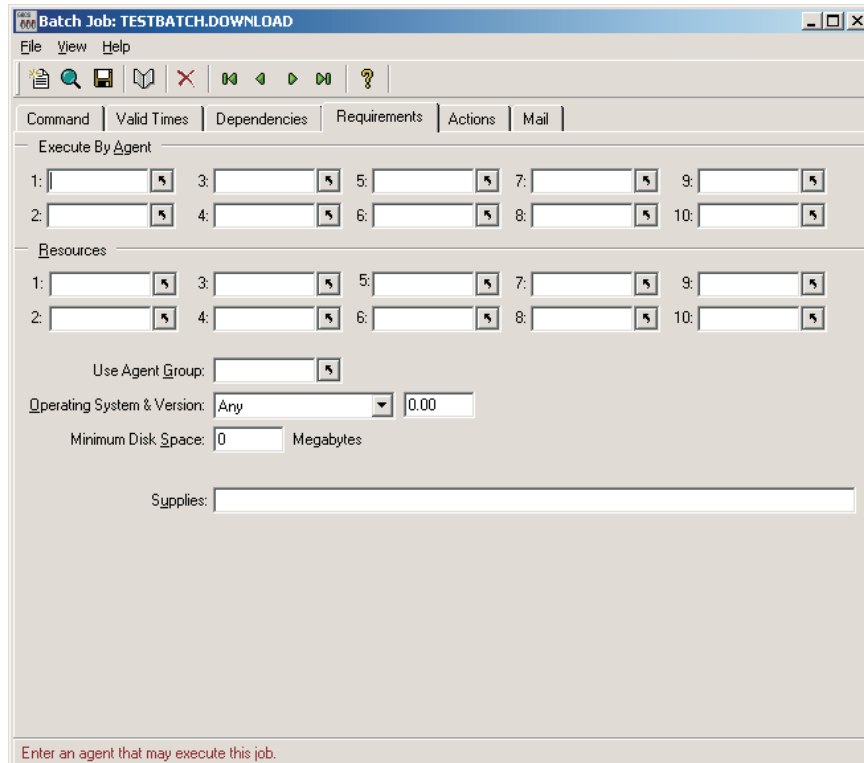
Depends On Event

1: 0 3: 0 5: 0 7: 0 9: 0

2: 0 4: 0 6: 0 8: 0 10: 0

Enter the name of the file that must exist/not exist for this job to execute.

Batch Jobs Requirements Tab:



Batch Job: TESTBATCH.DOWNLOAD

File View Help

Command Valid Times Dependencies Requirements Actions Mail

Execute By Agent

1: 3: 5: 7: 9:

2: 4: 6: 8: 10:

Resources

1: 3: 5: 7: 9:

2: 4: 6: 8: 10:

Use Agent Group:

Operating System & Version: Any 0.00

Minimum Disk Space: 0 Megabytes

Supplies:

Enter an agent that may execute this job.

Batch Jobs Actions Tab:

The screenshot shows the 'Batch Job: TESTBATCH.DOWNLOAD' window with the 'Actions' tab selected. The interface includes a menu bar (File, View, Help), a toolbar with icons for file operations and navigation, and a main configuration area. The 'Should this job create events?' checkbox is checked. Below this, there are several input fields and dropdown menus for configuring job behavior: 'Maximum Minutes' and 'Estimated Minutes' (both set to 0); 'Activate job' dropdown (set to 0) with the condition 'if this job is more than 0 minutes late'; 'Skip this job, if it is 0 minutes late or if it will finish after 00:00:00 (0 and 00:00:00 = no skip)'; 'Max Good Return Code' and 'Min Good Return Code' (both set to 0); 'Activate job' dropdown (set to 0) with the condition 'if this job fails'; 'Retry On Return Code' and 'Times To Retry' (both set to 0); 'Priority' (set to 0, with a note '(0 = highest, 9 = lowest)'); 'For every 0 minute(s) late, escalate this job's priority by 0'; 'Generate event' dropdown (set to 0) for 'on job success'; and another 'Generate event' dropdown (set to 0) for 'on job failure'. At the bottom, there is a 'Messages' section with an 'Execute Message' field and 'Pre & Post Messages' fields.

Batch Jobs Mail Tab:

The screenshot shows the 'Batch Job: TESTBATCH.DOWNLOAD' window with the 'Mail' tab selected. The interface is similar to the previous screenshot, showing the menu bar, toolbar, and configuration area. The 'Mail' tab contains a section for 'GECS Users or Groups to Notify' with five text input fields. The first field contains the text 'ADMINISTRATOR'. Below this is an 'Include File Attachment:' field. At the bottom of the window, a red text note reads: 'Enter up to 5 Global ECS User Names to be notified when this job completes.'

Copying

Copy Batch Job

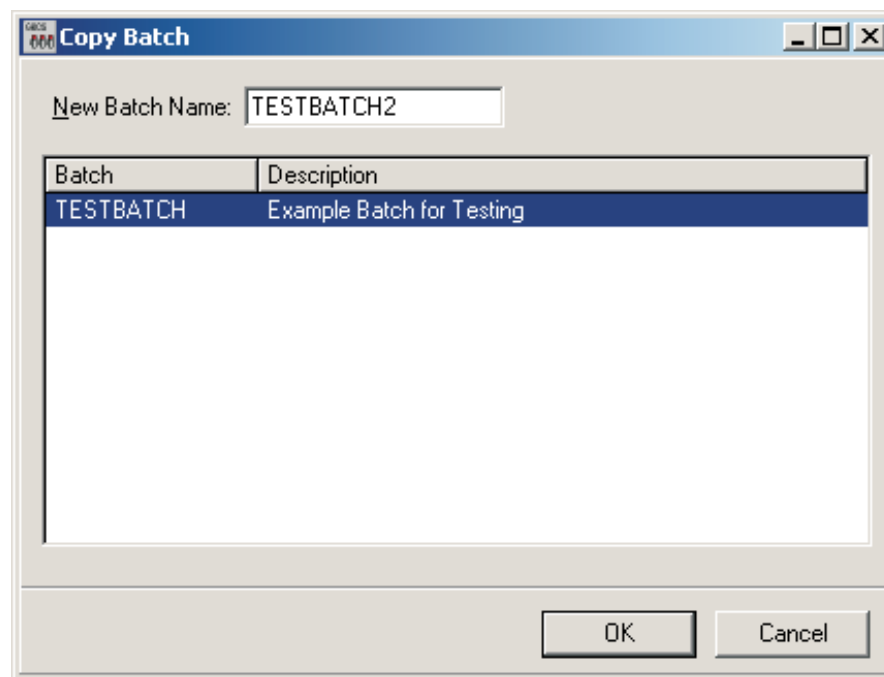
You may copy individual Batch job records into an existing Batch by using the “Copy Batch Job” option. First, pull up the destination batch. Next click on the Copy pull down menu and select Copy Batch Job. You will be presented with a list of all batch jobs on file. To copy an item, either double click on it or highlight it and select copy from the File pull down menu. Copy Batch Job copies a single list entry into the current batch.

Copy Scheduled Job

You may copy individual job records into an existing batch by using the “Copy Scheduled Job” option. This option copies a single list entry into the current batch. Copy scheduled job is particularly useful when getting started with Batches. It helps you avoid re-entry of existing information.

Copy Batch

When copying a Batch, all the information associated with the source Batch is duplicated, including all Batch jobs, Batch schedule and Batch variable records. To copy an existing Batch, choose Copy Batch from the Copy pull down menu. Enter a *new* batch name and then select the Batch to copy.

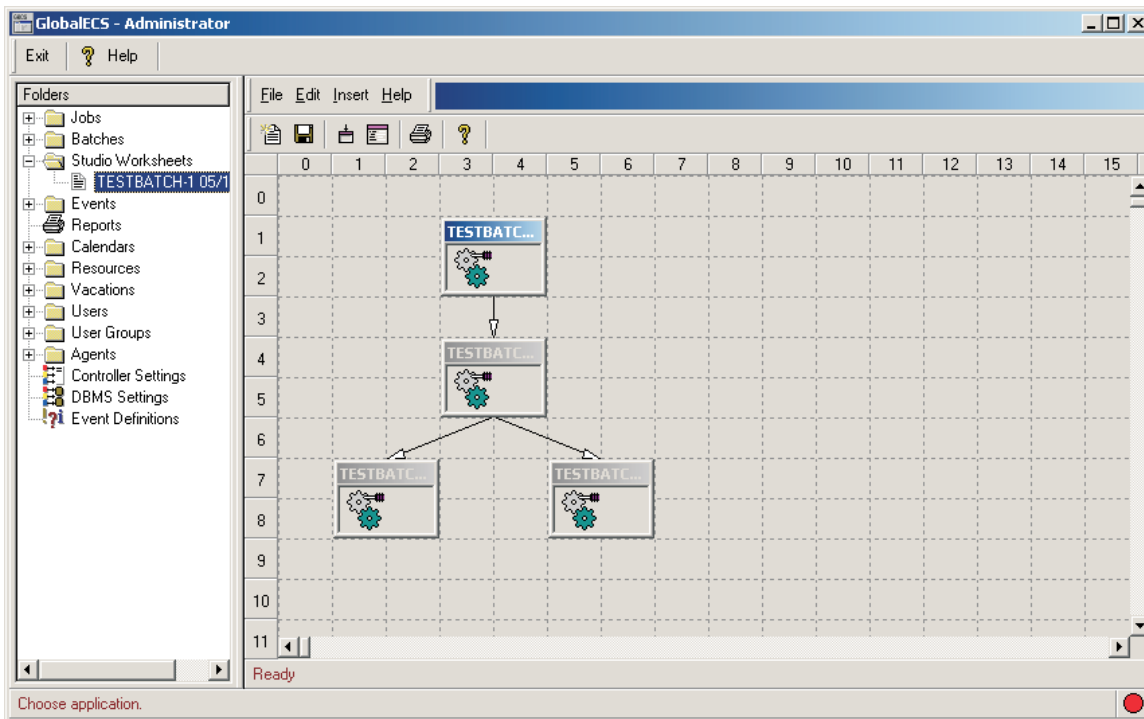


Studio Worksheets

The GECS Studio is a tool to make it easier to set up and maintain complex dependent job streams in a graphical environment. Studio allows you to create a Work Sheet that shows one or more job streams. As the name implies, a work sheet can be thought of as a large sheet of paper where you ‘layout’ your jobs. The jobs in a stream are shown individually on the Work Sheet and are connected with arrows showing their dependencies. The Work Sheets can be printed for hard copy purposes. Jobs can be added or edited directly from the Work Sheet. Existing jobs can be easily added to a Work Sheet. When an existing job is added to a Work Sheet, all the jobs it depends on and all jobs that depend on it are automatically added to the Work Sheet.

Studio Worksheets do not refresh to display the most current job information.

The first button on the toolbar is used for adding a new Studio WorkSheet. The next button is used for saving records. The third button is for creating a new job. The fourth button is for launching the Job Detail screen. The fifth button is for printing. The question mark button launches on line application help.



You can create separate work sheets for your various job streams or you can combine multiple job streams onto a single work sheet.

The easiest way to set up a new job stream is to add the jobs directly in Studio by right clicking on the work sheet and selecting 'New Job' from the displayed menu. Enter the job number for the new job. The 'Job Detail' screen is then displayed so you can enter information about the new job such as the command line to execute. When complete, click on the Save button and then the Exit button. You have added a new job to the jobs file and you have added a job object to the work sheet.

If you already have entered your job streams into the GECS system, you can use the 'Import' function to import one or more jobs onto the work sheet. Right click on the work sheet and select Import from the displayed menu. Enter the job number you want to import to the work sheet and click Import. The existing job you entered as well as any jobs that depend on it and jobs it depends on will appear on the work sheet. Import adds an entire stream of related jobs to the work sheet. To add a single existing job to a work sheet, use the Add Job selection as if you were entering a new job, but enter the number of the existing job you want on the work sheet.

Each work sheet is opened or saved by entering a name such as Nightly Processing Flow. You can name the work sheet when you create it with the Open Work Sheet selection or when you save it with the Save As selection.

Once a job object is on the work sheet, you can single left click on it to select it, double left click to view the detail for the job or right click on the job object and a menu of selections appears. From that menu you can perform a variety of operations including viewing the job detail or changing the icon that appears in the box.

The functions available in Studio are started from the pull down menu, the button bar or the menus that appear from right clicking on the work sheet or the job object.

To import a job stream that is not already represented by a work sheet:

Click on the File Menu, click Import, then press <Enter>. This will import all of your job records onto the Studio work sheet. Notice that job dependencies are attached by an arrow from the parent to the child job.

To add additional GECS Jobs to your job stream:

Open the work sheet containing the job stream you wish to modify. Click on the 'New Job' button. Enter the new job you wish to create and save it.

To delete GECS Jobs from your job stream:

Click on the job you wish to delete. Once the job record is highlighted, right click on the job and click on the Delete selection. Answer, 'Yes', when asked if you are sure you want to delete.

To update GECS Job information:

Double click on the job you wish to update. Make the appropriate modifications and save.

Studio Operations

The following functions are available in the Studio from the pull down menus, button bar or by right clicking on the work sheet or job object.

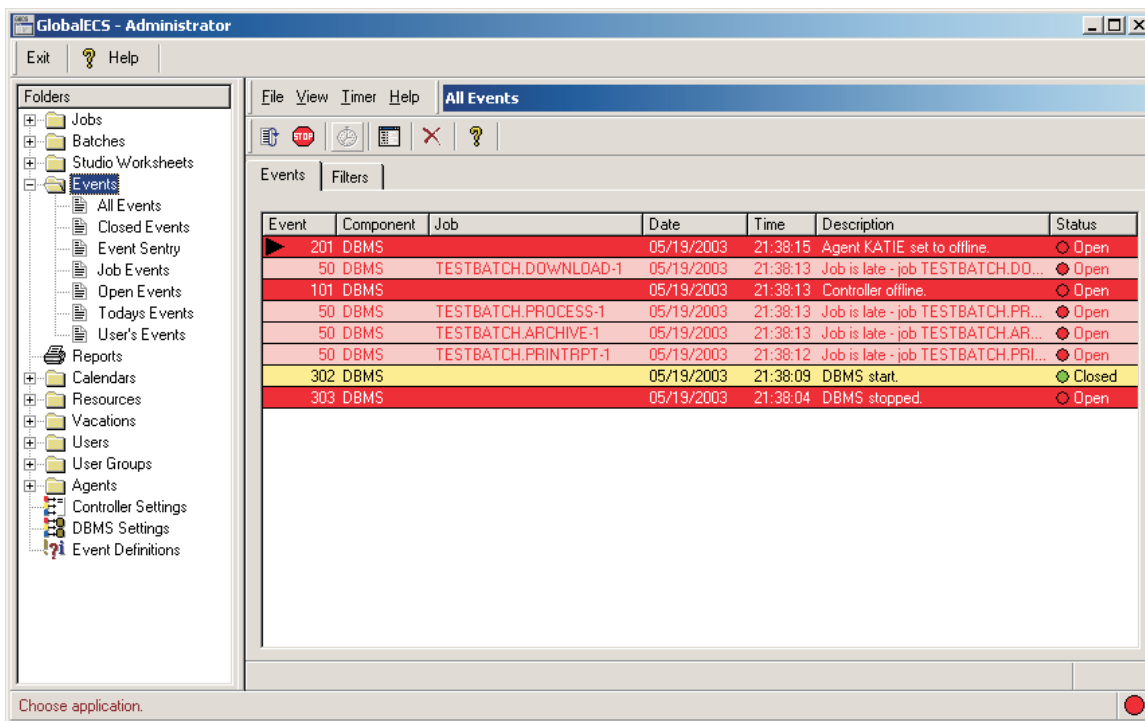
Events

GECS Events can be displayed in customizable lists. You can use the ‘View Properties’ to update the filtering that can be applied to your views. This allows you to choose which Events you would like to see. The Events List(s) can display GECS system and or user defined Events. You can create new views as needed and optionally share the views with other users. By default, GECS ships with the following views of Event lists: All Events, Closed Events, Job Events, Open Events and Users Events.

Once you have clicked on a view you can look at Event records and filter the Event records displayed in the list. You can double click on an Event from the list to view the Event Detail screen. If you right click on an Event in the list you can close the Event, delete the Event, remove your name from the Event or view the details of the occurrence of the Event. Right click on the column header to print the list or display a count of the items. Left click on the column header and order the list ascending or descending.

The first button on the toolbar is used to refresh the list. The next button is used to stop refreshing the list. The fourth button enables auto refresh mode. The fifth button display details for the Event. The sixth button is for deleting the Event record. The question mark button launches on line application help. The tabs are for selecting the page to view. The Filters page can be used to select filter criteria.

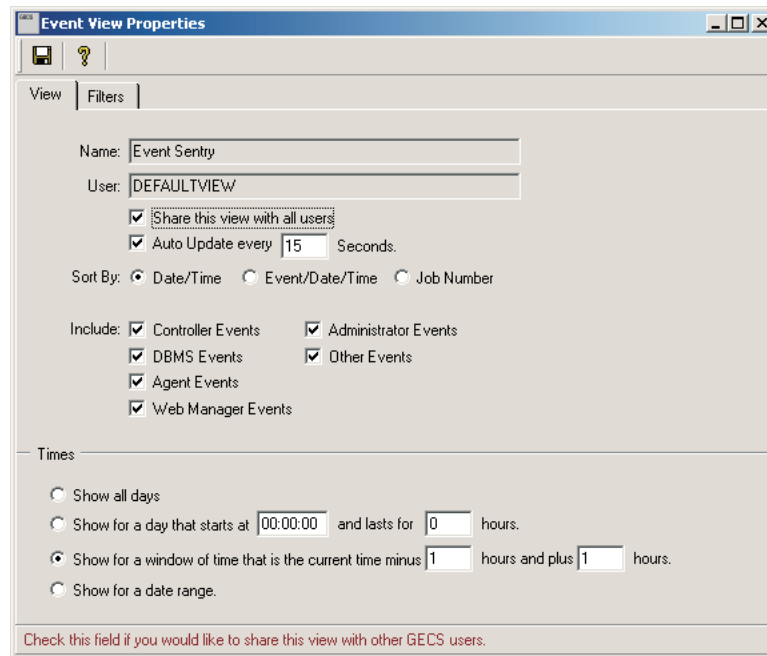
See the Events chapter of this manual for more information on Events.



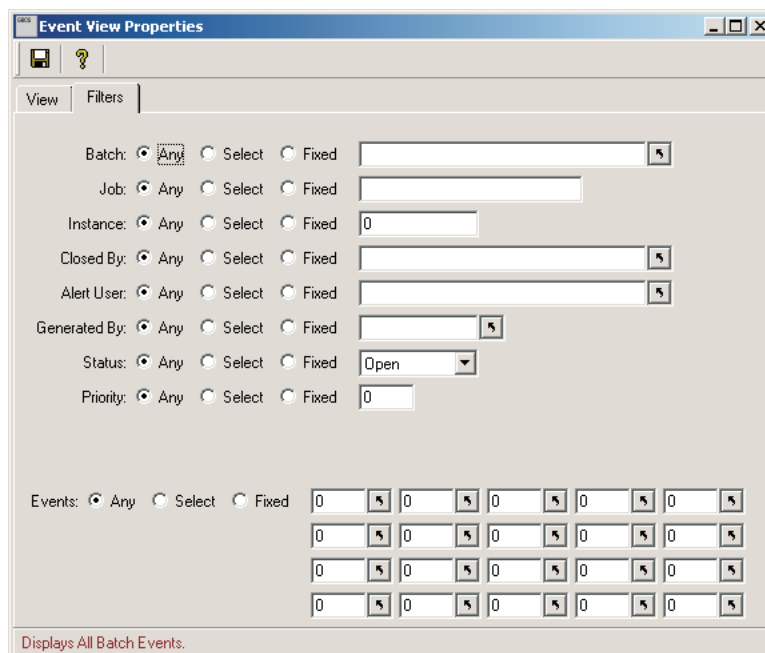
Event View Properties

You can customize the display of your GECS Events by setting the Event view properties. Update the view properties to filter the information displayed in the Events lists. Right click on the view title to display the Event View Properties screens.

View Tab:



Filters Tab:



Event Detail

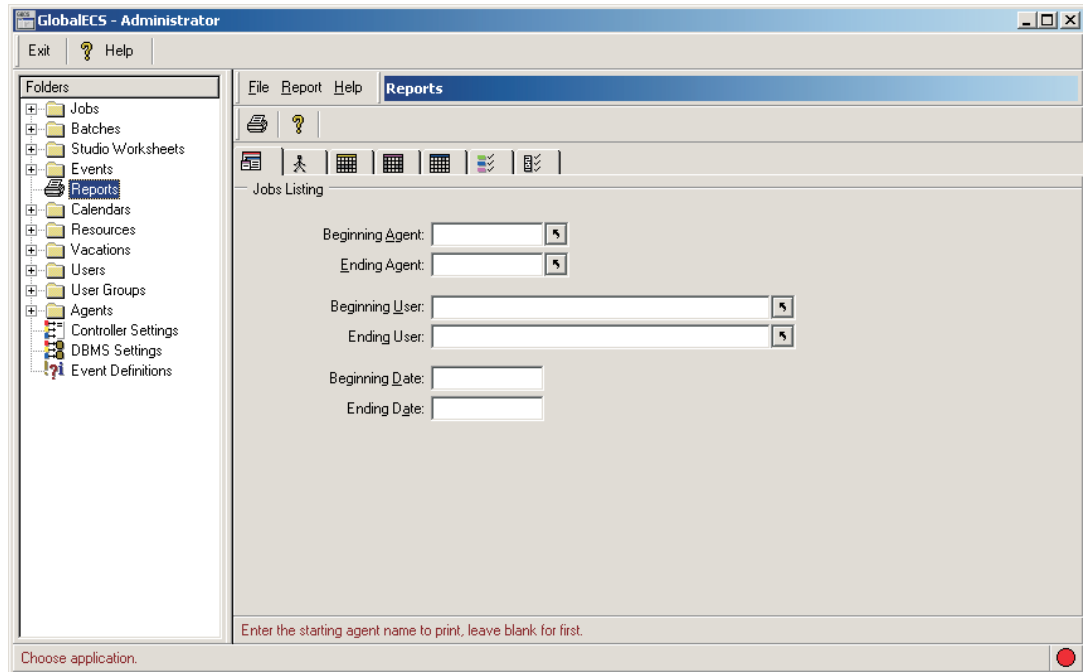
The Event Detail screens allow you to easily close, add comments and delete GECS Events.

The screenshot shows a window titled "Event Edit: 50" with a menu bar containing "File" and "Help". Below the menu bar are icons for a floppy disk and a question mark. The main area is divided into two sections. The top section contains the following fields: "Generated By:" with a dropdown menu showing "DBMS"; "Priority:" with a text box containing "0"; "Component:" with a text box containing "DBMS"; "Job Number:" with a text box containing "TESTBATCH.DOWNLOAD-1"; "Began:" with two text boxes containing "05/19/2003" and "21:38:13"; "Ended:" with two text boxes containing "05/19/2003" and "21:38:13"; and "Message:" with a text box containing "Job is late - job TESTBATCH.DOWNLOAD-1.". The bottom section is titled "Follow up" and contains: "Status:" with a dropdown menu showing "Open"; "Closed By:" with a text box and a small icon; and "Comment:" with a large empty text box. At the bottom of the window, there is a red text label: "Set the status of this particular instance of this Event".

Reports

GECS ships with several standard reports. A screen will appear that prompts for the report parameters or options. Enter the options for the report and select the Print option on the File menu to print the report.

The first button on the toolbar prints the report. The question mark button launches on line application help. The tabs are for selecting the page to view.



Available reports pertain to the following GECS categories:

- Jobs
- Vacation Periods
- Non-Business Days
- Users
- Defined Months
- Resources
- Supplies

Building your own reports

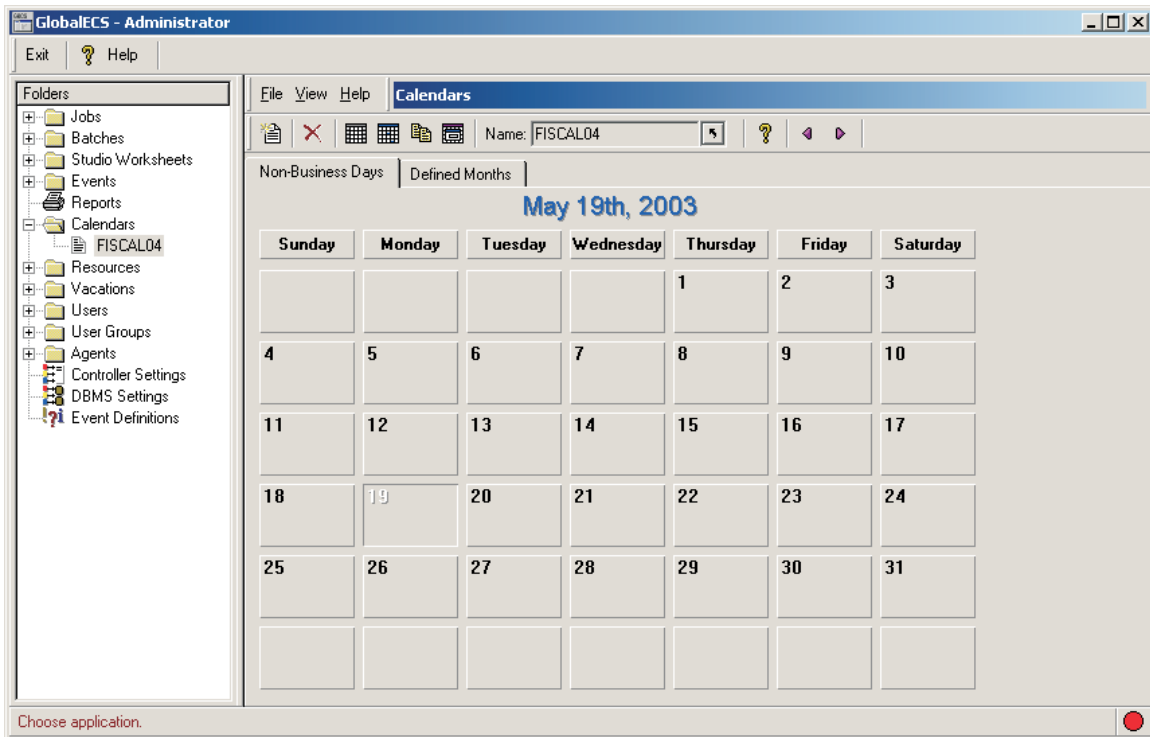
The GECS data files are Ctree files. You can build you own GECS reports of jobs, users, etc., by using most ODBC compatible reporting tool with the Ctree driver installed. Contact your GECS Sales Representative for details.

Calendars

GECS Calendars can be used for setting up both the Defined Months and the Non-Business Days calendars.

The first button on the toolbar is used for adding new records. The next button is used for deleting records. The third button can be used to set non-business days. The fourth button sets the calendar's date range. The fifth button is for copying/merging calendars. The sixth button is for assigning a special title to a non-business day. The question mark button launches on line application help. The two VCR buttons (red) select the previous or next months. The tabs are for selecting the page to view.

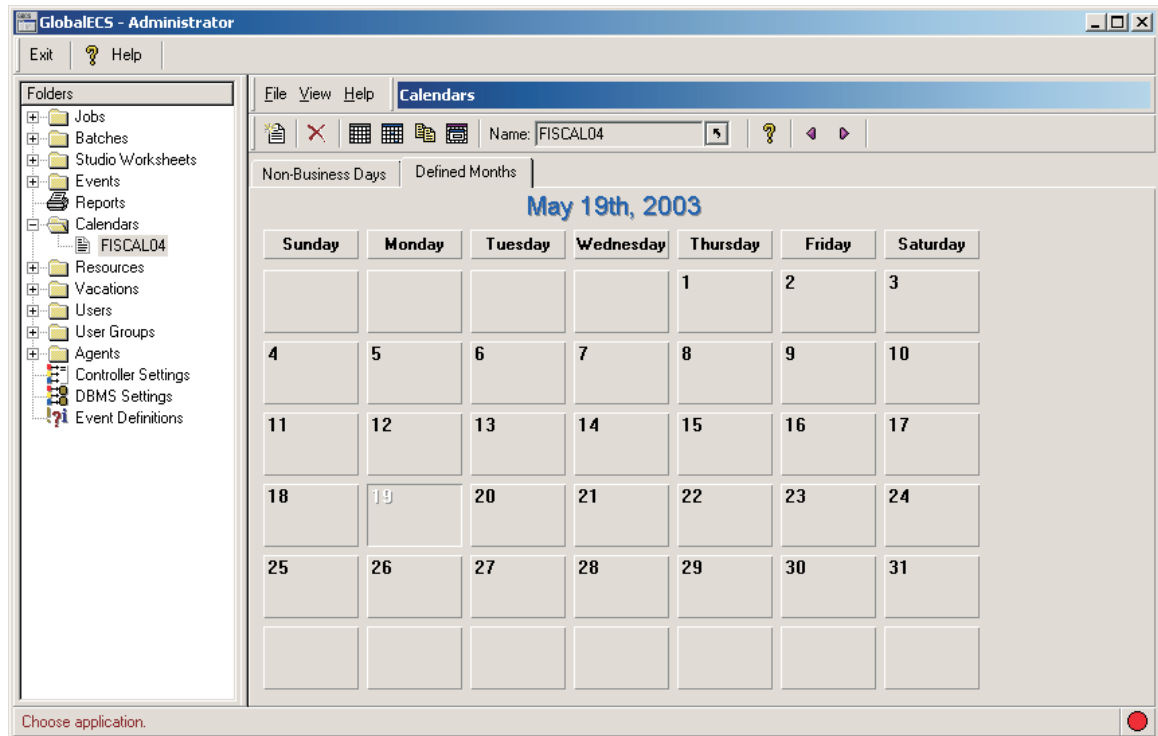
Non-Business Days Tab:



Non Business Days

Job repetition based on business and non-business days uses the information entered in this application when determining the job's next scheduled date. By default, every day is a business day and there are no non-business days. Use this screen to change days from business days to non-business days. Use the arrow keys, Home, End, PgUp and PgDn keys or the mouse to change the referenced day. Once a day is selected, press Enter or double click on the date to make it a non-business day. You can enter an 8 character description for the date if you press Enter to set the date. The program defaults the description to Non-Busi. To change a non-business day back to a business day, simply double click on the date or clear the title field.

Defined Months Tab:



Defined Months

Job repetition based on user defined months uses the information entered in this selection when determining the job's next scheduled date. By default, there are no user defined months. Use this screen to mark the days that are the first/beginning day of a user defined month. The user defined month goes up to the next beginning date entered. They are referred to as user defined months, but could be thought of as user defined repetition periods. Use the arrow keys, Home, End, PgUp and PgDn keys or the mouse to change the referenced day. Once a day is selected, press Enter or double click on the date to mark it as the beginning of a user defined month. You can enter an 8 character description for the date if you press Enter. The program defaults the description to NewMonth. To remove the user defined month, simply press Enter or double click on the date and it will switch back to a normal day.

Set Date Range

The “Set Date Range” button can be used to set a date range for each of your calendars by specifying an effective and expiration date.

Copy Calendar

You can copy one calendar to another calendar by using this screen. The source calendar can be copied such that it adds to the entries in the destination calendar or such that it replaces the entries in that calendar.

The screenshot shows a dialog box titled "Copy/Merge Calendar". It contains two dropdown menus for "From Calendar Name" (set to "FISCAL04") and "To Calendar Name". Below these are two radio buttons: "Merge the 'From Calendar' with the 'To Calendar'" (selected) and "Replace the 'To Calendar' with the 'From Calendar'". There are also two checked checkboxes: "Include Non-Business Days" and "Include Defined Months". At the bottom are "OK" and "Cancel" buttons. A red text note at the very bottom says "Enter the name of the calendar you wish to copy."

Set Non-Business Days

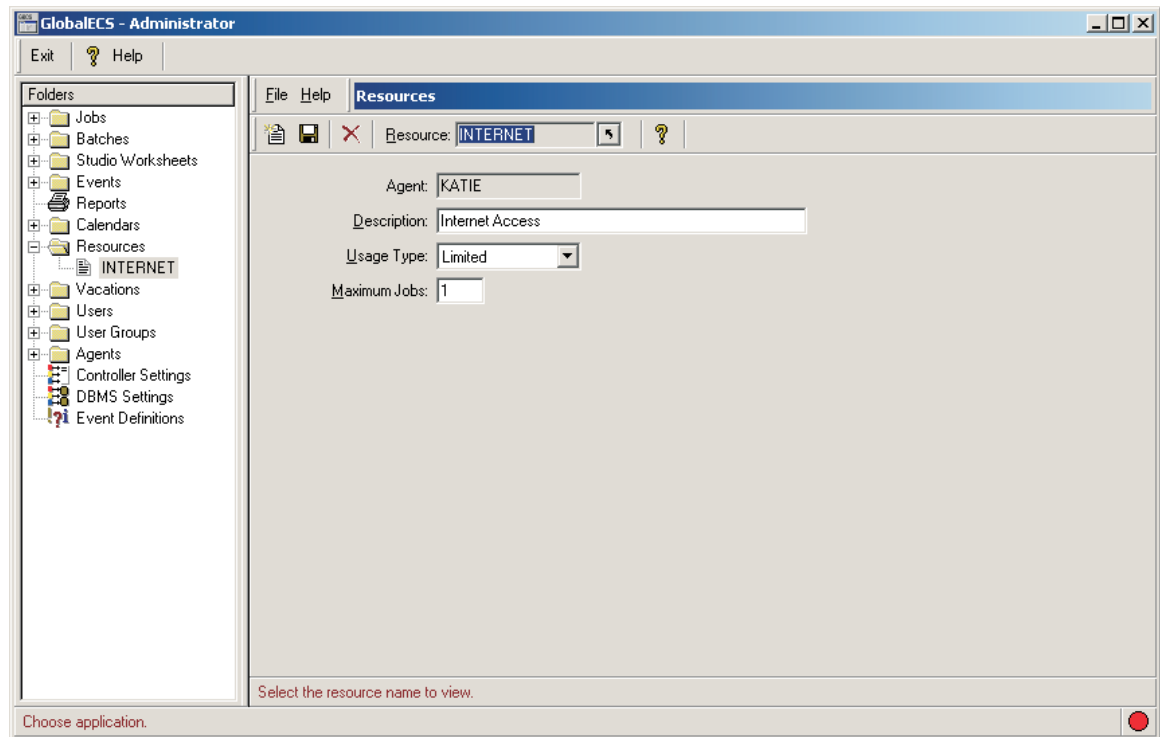
You can automatically set a range of days as business or non-business from this screen. Select the calendar to be set, enter a date range and select the days of the week that should be business, non-business or left unchanged.

The screenshot shows a dialog box titled "Set Non-Business Days". It has a "Use Calendar" dropdown (set to "FISCAL04") and a "with Title" dropdown (set to "Non-Busi"). Below are "Beginning on:" and "and Ending:" text boxes. There are seven dropdown menus for days of the week: Mondays (Unchanged), Tuesdays (Unchanged), Wednesdays (Unchanged), Thursdays (Unchanged), Fridays (Unchanged), Saturdays (Set to Non-Business Days), and Sundays (Set to Non-Business Days). At the bottom are "OK" and "Cancel" buttons. A red text note at the very bottom says "Choose the type of day that the Sunday's within the date range will be set to."

Resources

The Resources client program allows you to define agent and system resources.

The first button on the toolbar is used for adding new records. The next button is used for saving records. The third button is used for deleting records. The question mark button launches on line application help. The tabs are for selecting the page to view.



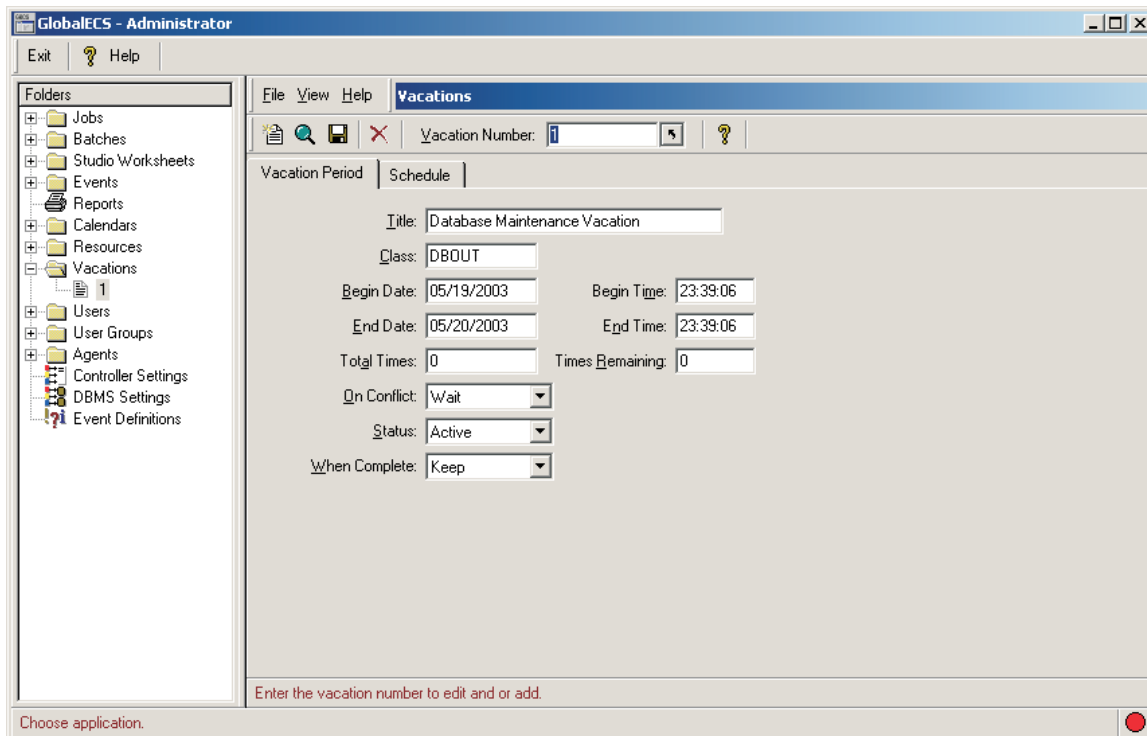
When resources are added with the 'Agent' field blank, they are system resources. When the 'Agent' field contains an agent name, the resource is specific to that agent.

Vacations

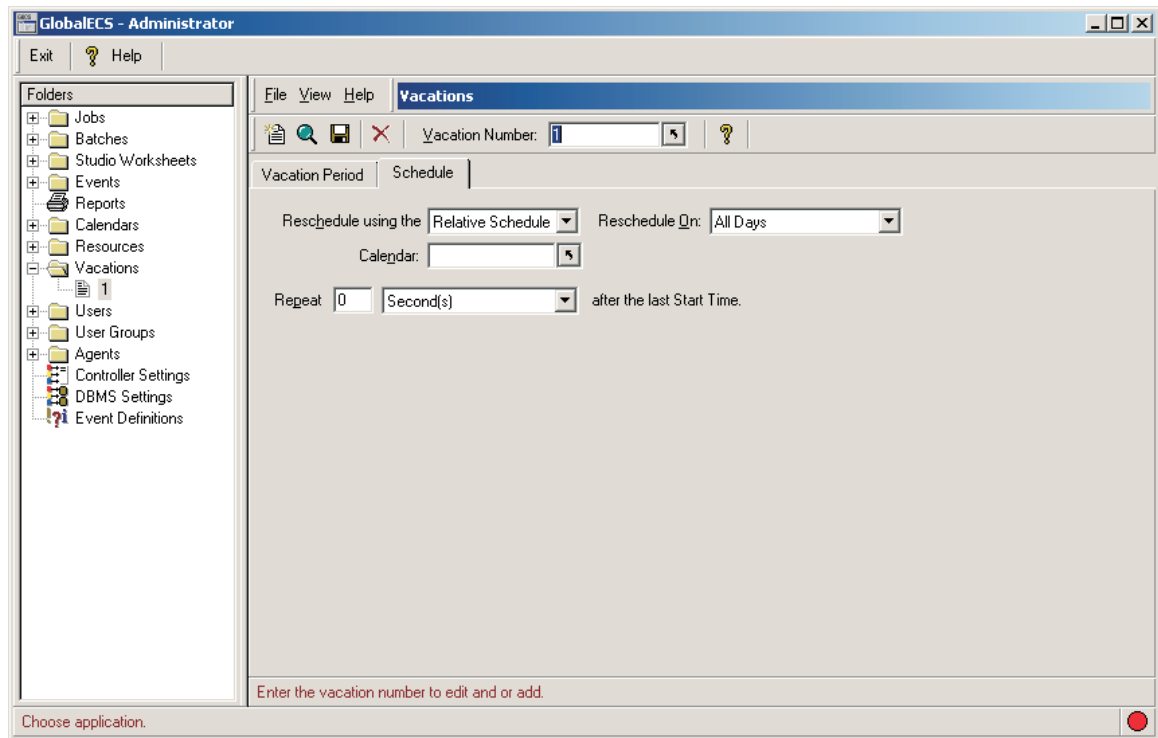
Vacations are periods of time you do not want jobs to run. To add, view or delete vacation period information, use the Vacations client program.

The first button on the toolbar is used for adding new records. The next button brings up a list of records. The third button is used for saving records and the fourth button is for deleting records. Use the prompt field in the button bar for entering the vacation period number to select or add.

Vacation Period Tab:



Schedule Tab:



Vacation Lookup Screen

When the lookup button (magnifying glass) is pressed in the toolbar or the right mouse button is clicked on the prompt field in the button bar, a window appears that allows you to view the vacation periods based on one of the following selections:

Vacations Sorted By Number

This selection lists all the defined vacation periods in numeric order.

Vacations Sorted By Date

This selection lists all the defined vacation periods in the order of their start date and time.

This Vacation Period's Schedule

This selection lists up to the next 20 times this vacation period will be active. If the vacation period doesn't repeat or if it doesn't repeat 20 times, fewer than 20 periods will be listed.

Users

The first step in setting up GECS is to set up users. GECS users are defined with in the Users Screens. Security Profile definition gives GECS users rights to use the various functions in the system and sets limits on the user’s jobs. After you define your first user and Security Profile, GECS security is enabled.

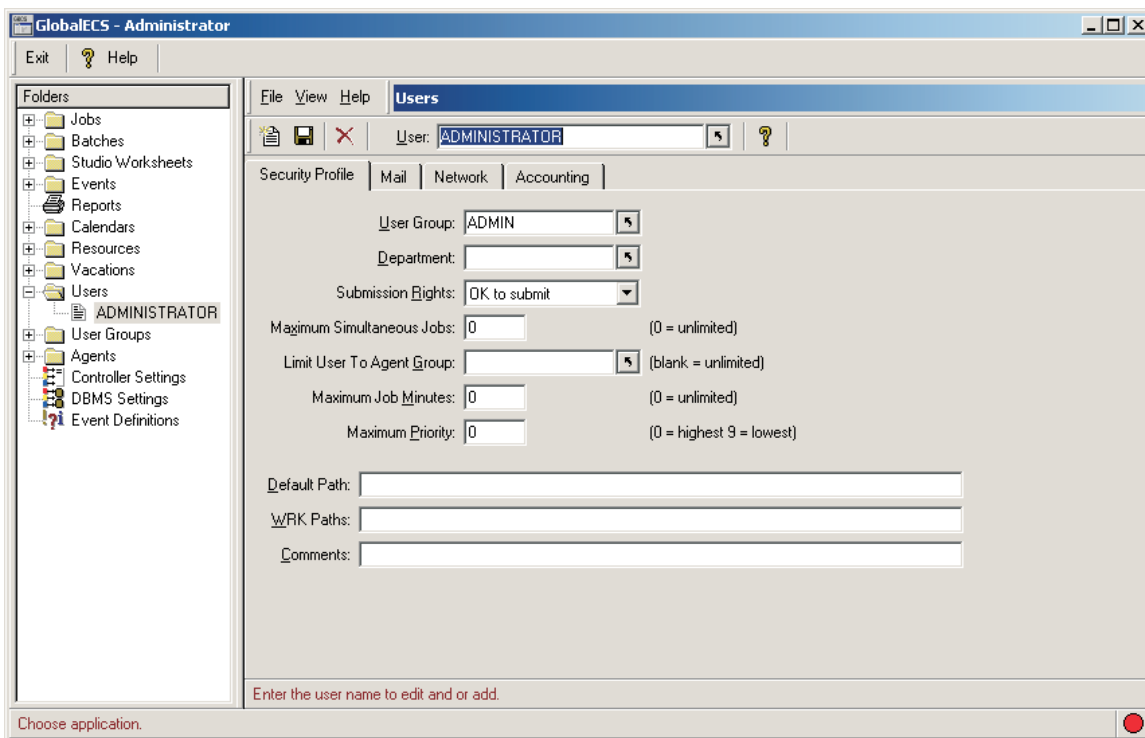
The Workstation Setup program is used to set the type of networking features used with GECS. When using “Microsoft”, “NetWare” or “Lan Manager” networking features, the GECS user name must be the same as the users network name.

When using GECS on a stand-alone PC (“No” networking) or on another type of network, the user name can be anything you want. You will be prompted to enter a valid user name and optional password before you can start any GECS client programs.

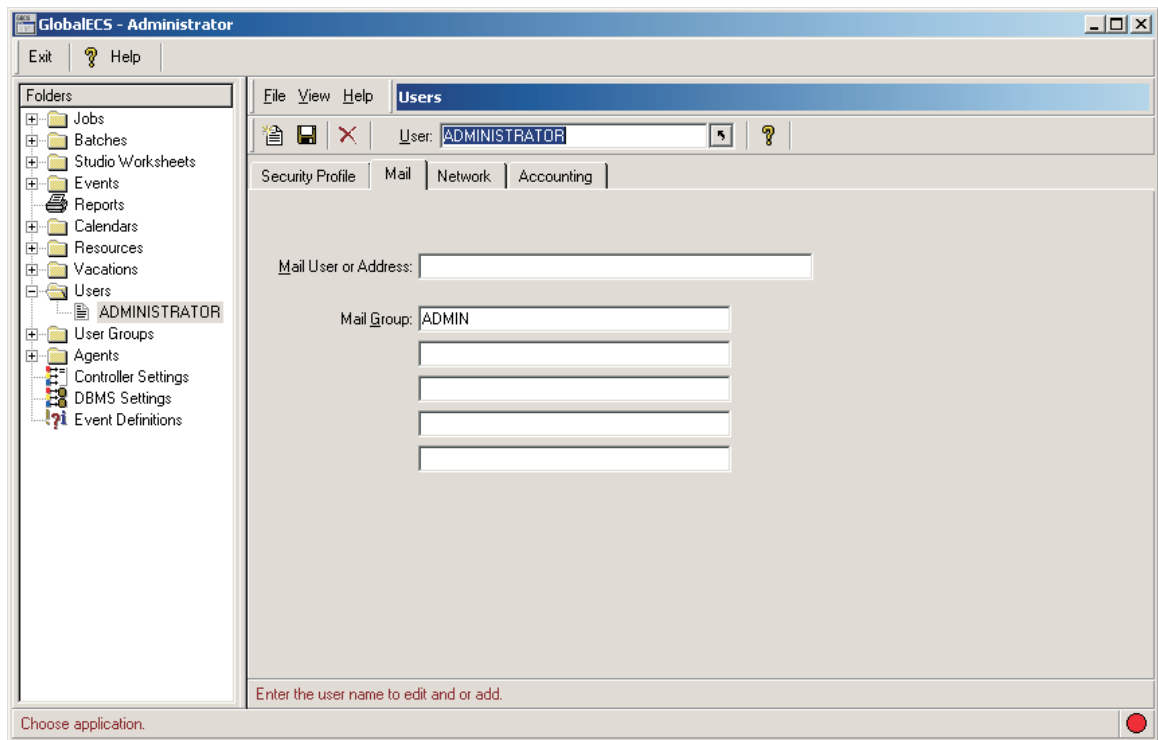
See the GECS Command Line Utilities chapter of this manual for information on ‘USERS’ file utilities.

The first button on the toolbar is used for adding new records. The next button is used for saving records and the third button is for deleting records. Use the prompt field in the button bar for entering the user name to select or add. The question mark button launches on line application help. The tabs are for selecting the page to view.

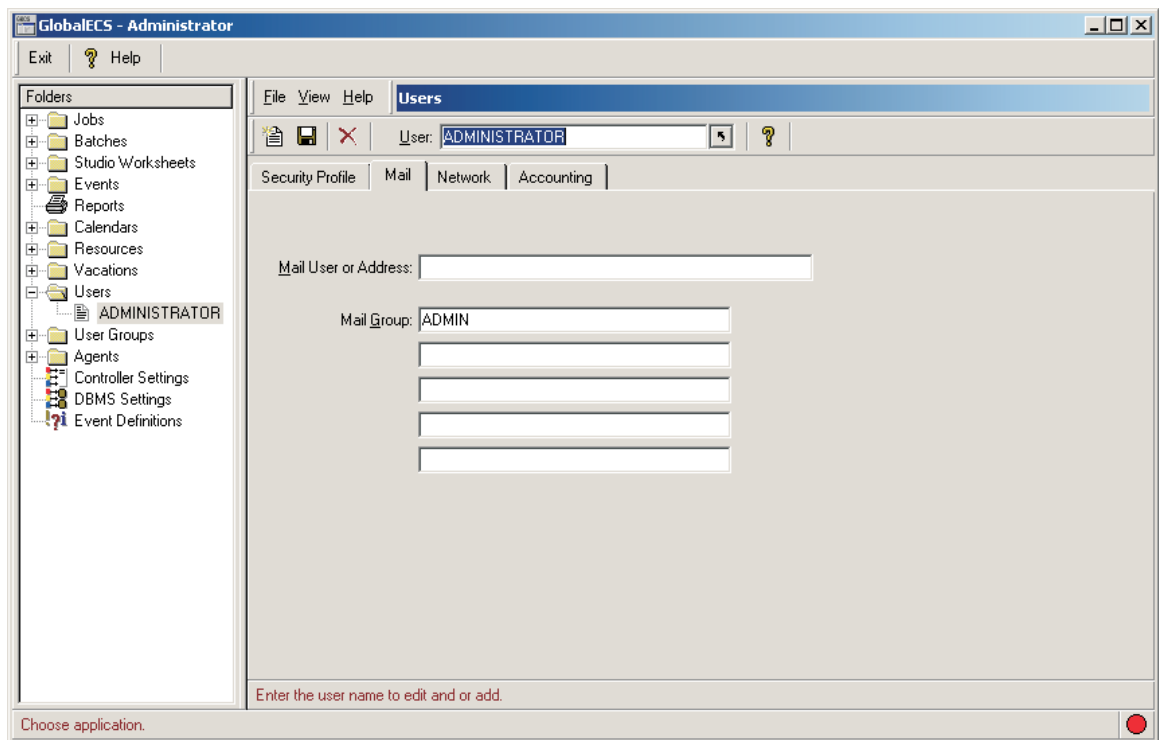
Security Profile Tab:



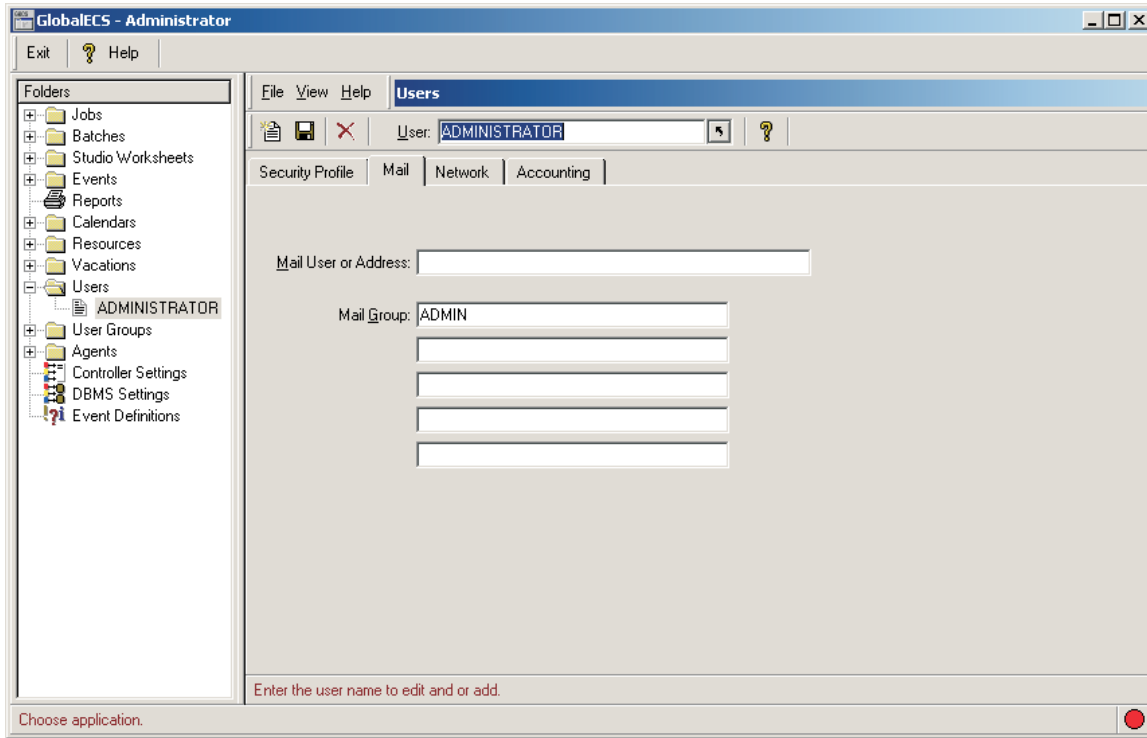
Mail Tab:



Network Tab:



Accounting Tab:

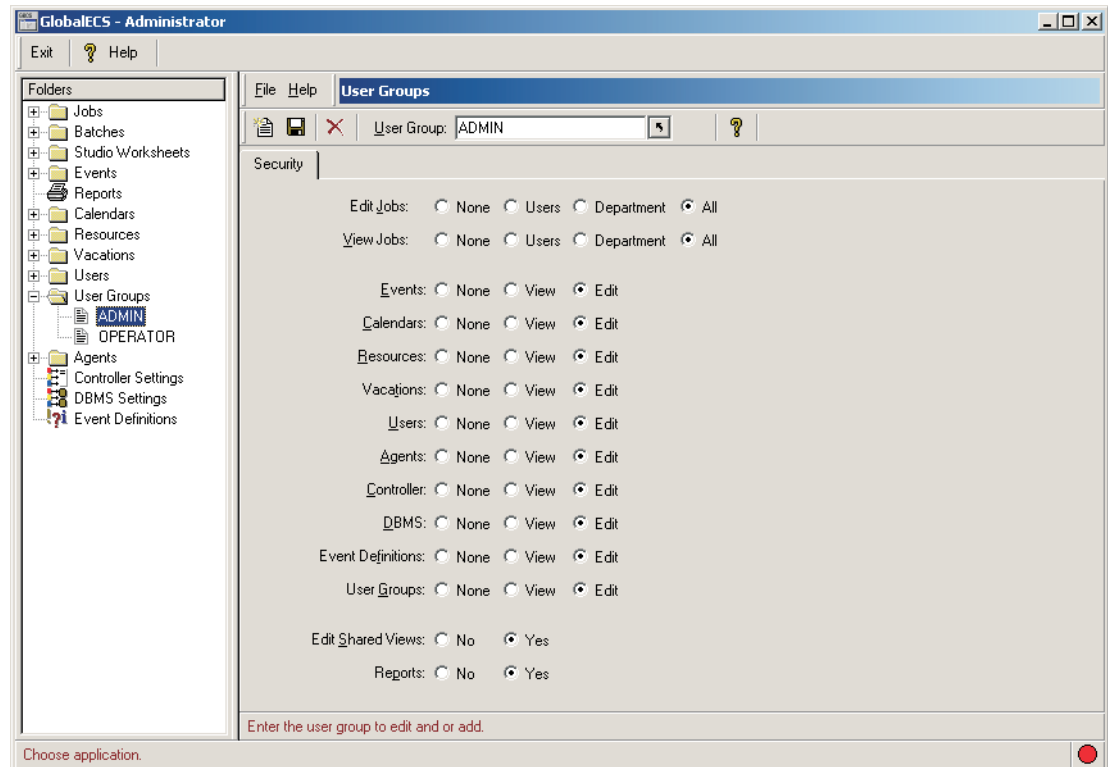


Security Profiles

Security Profile definition gives GECS users rights to use the various functions in the system and sets limits on the user's jobs. After you define your first user and Security Profile, GECS security is enabled.

The first button on the toolbar is used for adding new records. The next button is used for saving records and the third button is for deleting records. Use the prompt field in the button bar for entering the Security Profile to select or add. The question mark button launches on line application help. The tabs are for selecting the page to view.

Security Tab:



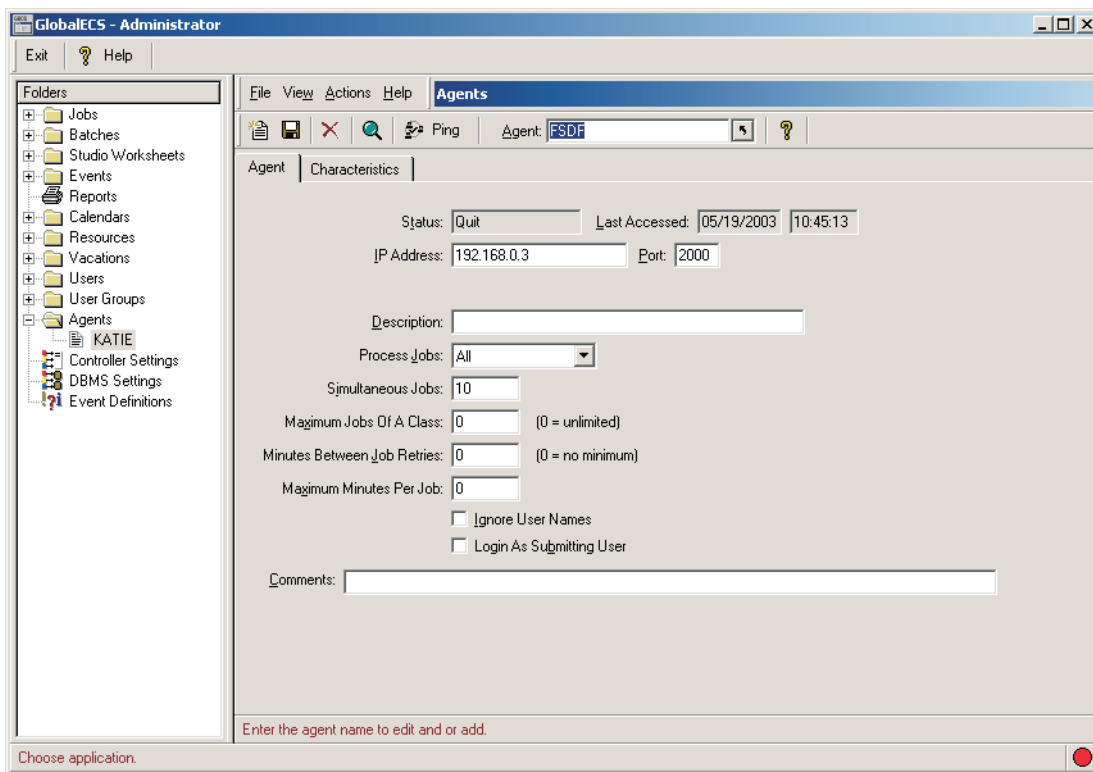
Agents

Agent records describe the operating system and hardware characteristics of the agent, as well as the functions you want the agent to perform. Once agent records are created, agents can either be run from a desktop icon, in Windows, as a service or in Unix, as a daemon.

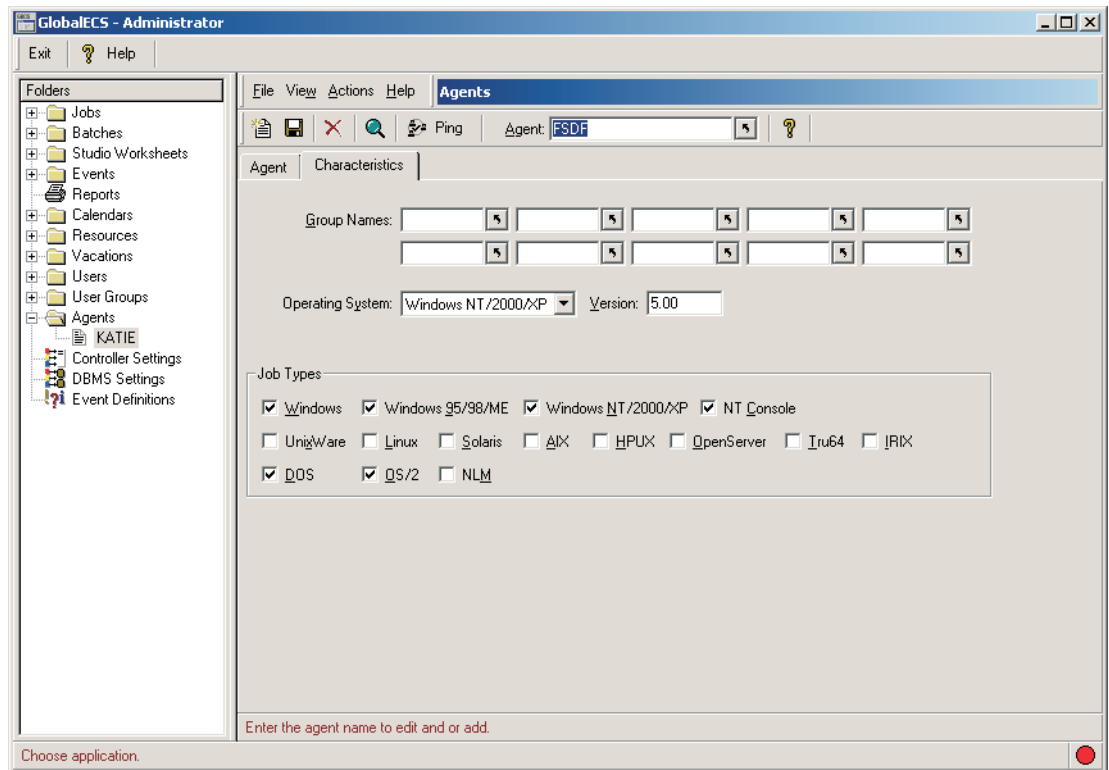
See the Utilities chapter of this manual for information on AGENT file utilities.

The first button on the toolbar is used for adding new records. The next button is used for saving records. The third button is for deleting records and the fourth button opens the agent lookup screen. Use the Agent prompt field in the button bar for entering the agent name to select or add. The question mark button launches on line application help. The tabs are for selecting the page to view.

Agent Tab:



Characteristics Tab:



Controller Settings

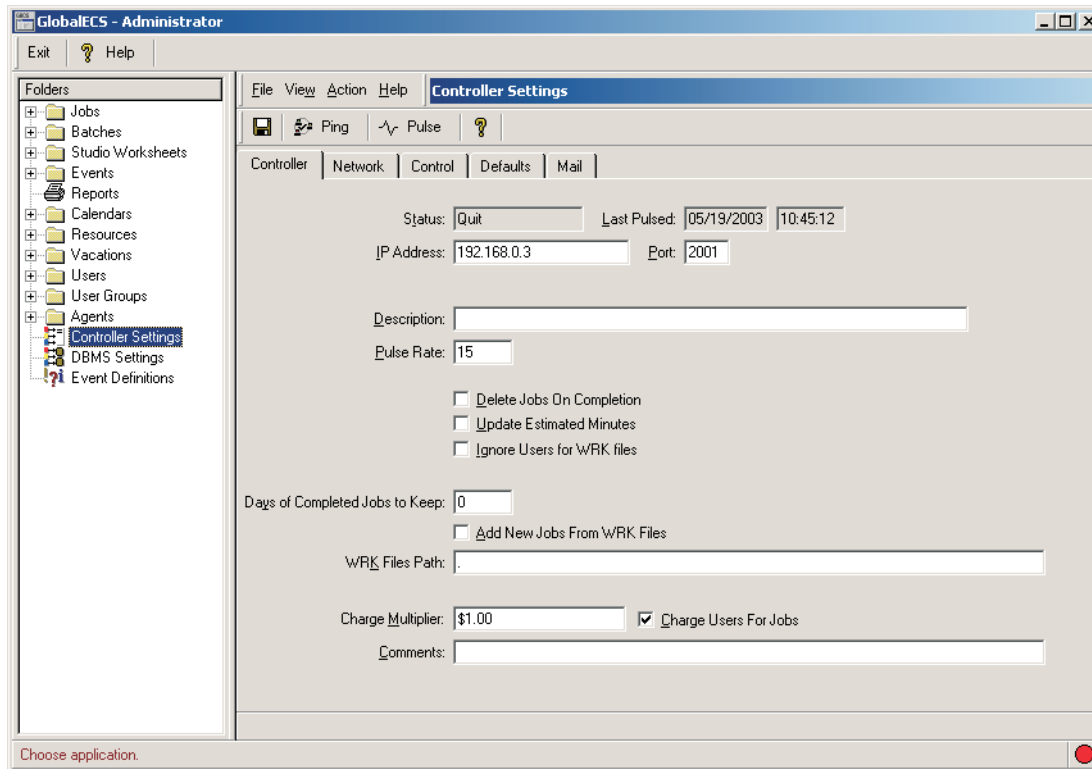
The Controller Screens allows you to modify your GECS controller record. Your controller record describes the functions you want your controller to perform. Your controller can either be run from a desktop icon, or as a Windows service.

The Workstation Setup program is used to create your GECS controller record, controller desktop icon and, when desired, to set up your controller to be run as a service.

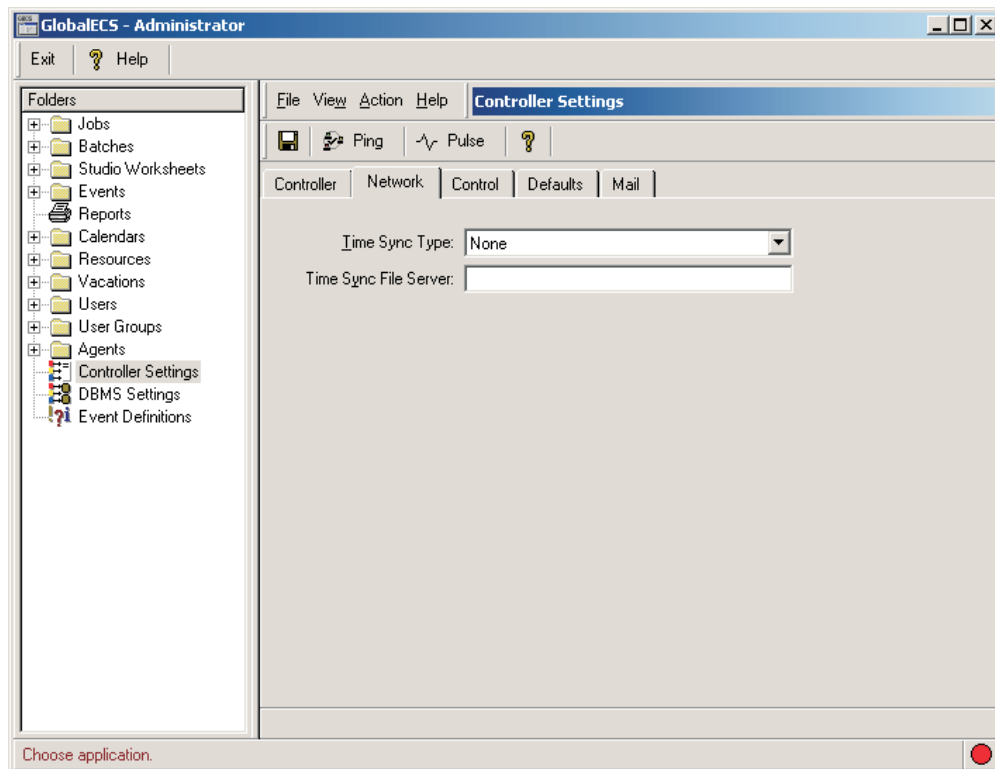
The first button on the toolbar is used for saving the record. The next button allows you to ping the controller program. The third button can be used to automatically pulse the controller. The question mark button launches on line application help. The tabs are for selecting the page to view.

From the Actions pull down menu, you can easily hide, show, minimize, pause, resume, stop, ping or pulse your Controller by selecting one of these options.

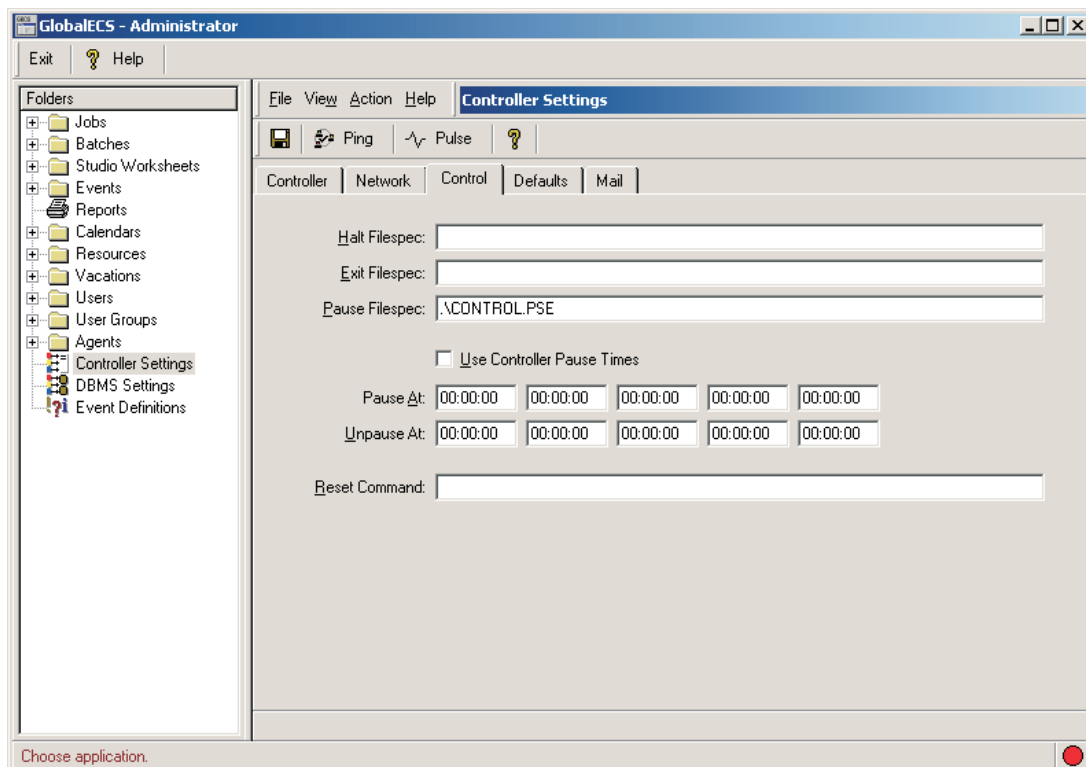
Controller Tab:



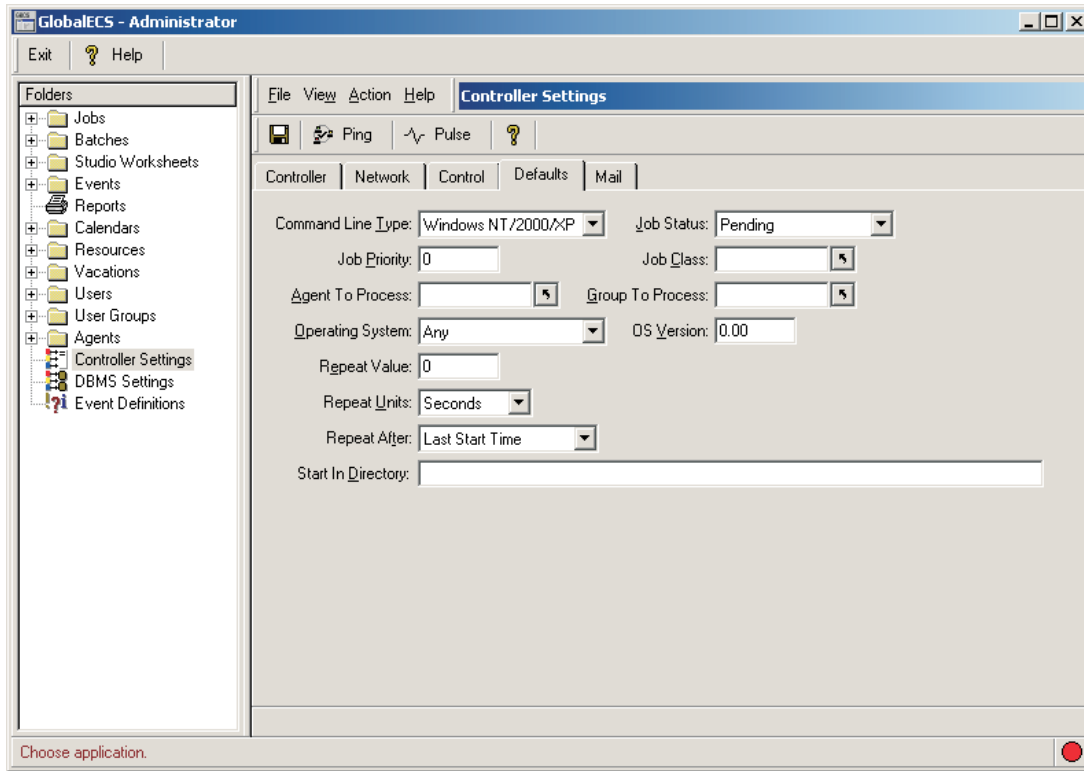
Network Tab:



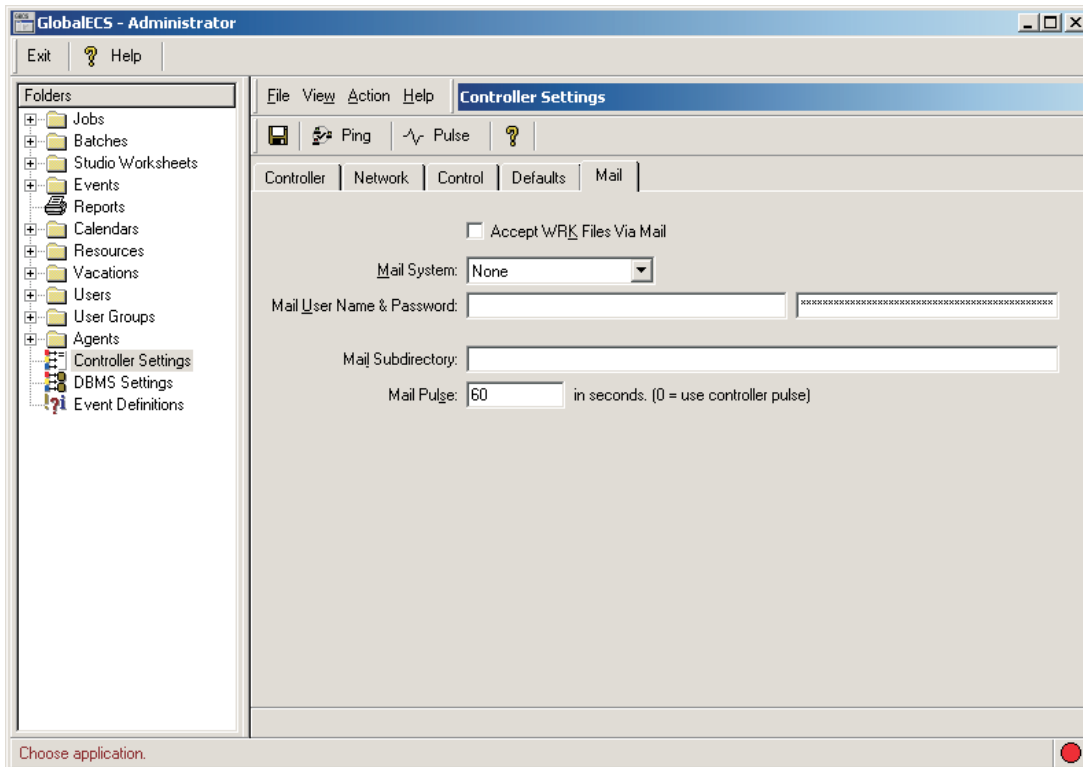
Control Tab:



Defaults Tab:



Mail Tab:



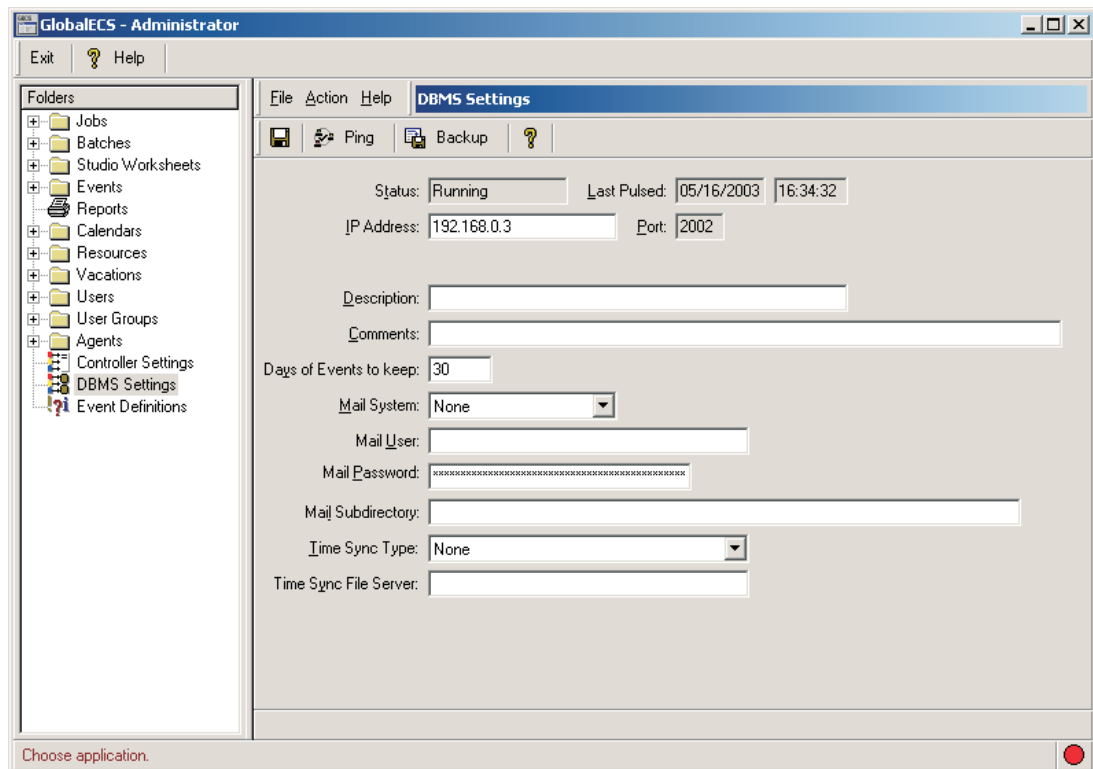
DBMS Settings

The DBMS Screen allows you to modify your DBMS record. The DBMS record describes the functions you want it to perform. Your DBMS can either be run from a desktop icon, or as a Windows service.

The Workstation Setup program is used to create your GECS DBMS record, DBMS desktop icon and, when desired, to set up your DBMS to be run as a service.

The first button on the toolbar is used for saving the record. The next button allows you to ping the DBMS program. The third button can be used to backup the GECS data files. The question mark button launches on line application help.

From the Actions pull down menu, you can easily hide, show, minimize, or ping your DBMS by selecting one of these options.



Event Definitions

vents are things that can cause a job to run or things which may require special notice. Events can be generated by the GECS system or they can be user definable.

Each Event is numbered and contains parameters to allow for special notifications. These notifications include: email, SNMP, network message, Windows event logging, job activation, audible wav file, and color highlighting in the GECS Administrator Events lists.

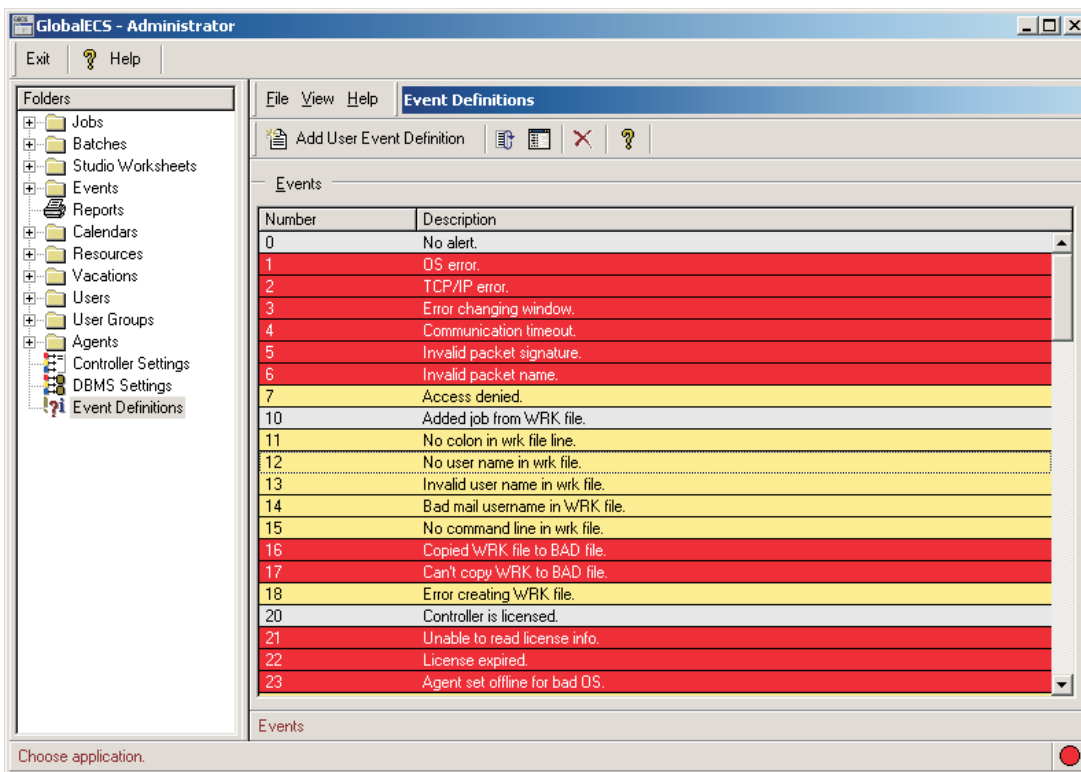
Use the Event Definitions folder to update Event parameters. GECS system Events are numbered from zero to 500 and cannot be deleted. User definable Events can be numbered starting from 1000.

The contents that display in the Users Events View controls whether the User Event Indicator is highlighted in red.

Event Definition Details can be modified using the GECS administrator client program to configure the special notifications mentioned above.

Depending on how you use the GECS system, many Events you will not care about and others you will want to know about if they occur.

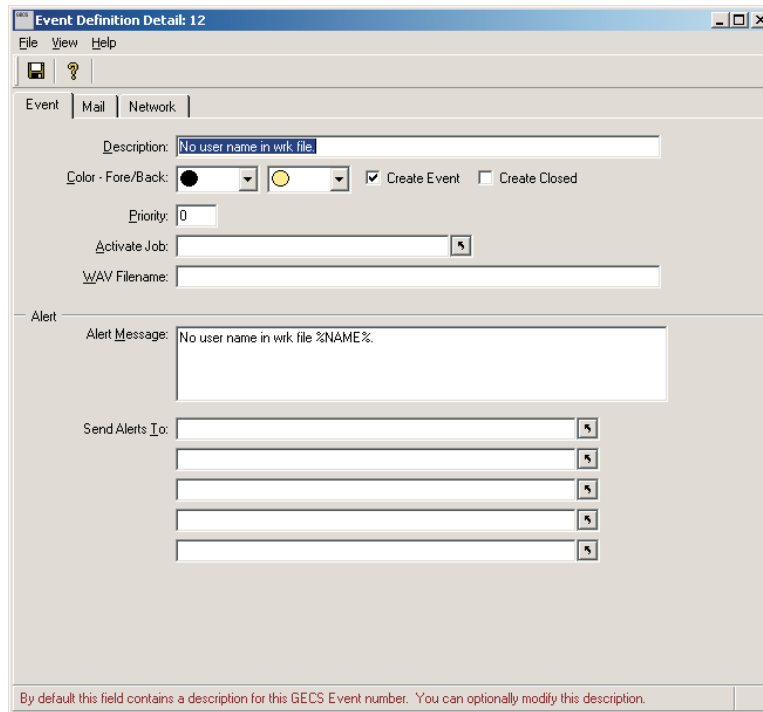
Scroll through this list of Event Definitions and configure the Events you wish to be informed of.



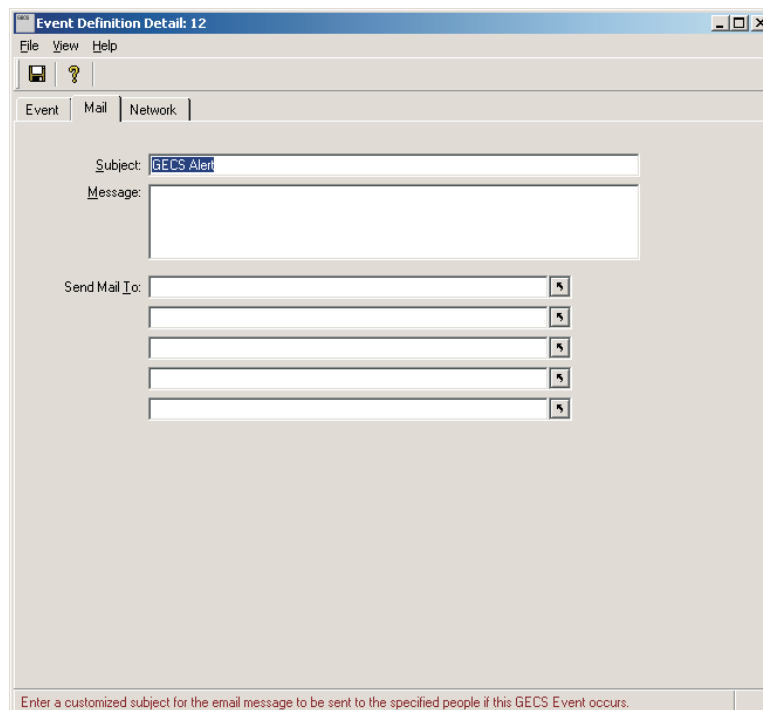
Event Definition Details

The Event Definition Detail screens allow you to modify your GECS Event Definition records.

Event Tab:



Mail Tab:



Network Tab:

Event Definition Detail: 12

File View Help

Event Mail Network

Network Message:

Send Message To:

Windows

Generate Windows Event Log

Windows Event Type: Information

Windows Event Message:

SNMP

Generate SNMP Trap

Trap Number: 0

SNMP Trap Message:

Enter a short description of this Event to be sent to the specified people if this GECS Event occurs.

GECS Agents

Agent Overview

A computer running the GECS Agent (GECSAGNT) software will actually run the jobs users schedule. The GECS Controller dispatches jobs to available Agents. If an Agent is not running the Controller will not dispatch any jobs to it.

Agent records are defined in the GECS system. These records name the Agents, describe the computers the Agents will run on and various other details about the Agent.

The Agent programs can be run as a Unix daemon or from a terminal window on Unix. On Windows, Agents can be run as a service under the system account, as a service under a specified user account or from a desktop icon.

The GECS Workstation Setup program is used to configure the way Windows Agents are to run. You should use the Workstation Setup program to create Agent icons, or when desired, on Windows, to set up your Agents to run as services.

When not run as a daemon or as a service, special commands can be entered at the Agent window. These commands are described later in this chapter.

Installing Windows Agents from CD

Windows Agent programs can be installed from CD ROM. To install additional Agents go to each Agent machine and install the Agent programs using the following instructions:

Windows Agent from CD ROM

- A. Login as Administrator or as an administrator equivalent user.
- B. Insert the GECS Windows CD ROM. The installation program may automatically start after several seconds. If the installation program does not automatically start, click the Start button, select Run and Enter: **D:\SETUP.EXE** (Where D: is your CD ROM drive)
- C. Click the **Install Agent Only** option then click the OK button.
- D. Click the Finish button to display the Global Agent Setup screen.
- E. Again, use the default settings and click the Configure button, then click OK.

Installing Agents from Images

GECS Agent programs can be copied from the Global ECS Windows CD ROM from the AGENT subdirectory or you can FTP the Agent programs from the Global ECS web site (www.globalecs.com). To install Agents from images (EXE/TAR files), go to each Agent machine and install the Agent programs using the following instructions:

Windows Agent Exe File

- A. Login as Administrator or as an administrator equivalent user.
- B. Open a Command Prompt
- C. Enter: **md c:\gecsagnt**
- D. Copy or ftp the EXE file to **c:\gecsagnt** (as binary)
- E. Exit
- F. Click the Start button, select Run, **c:\gecsagnt\gecs-3.11-intel-win32.exe**
- G. Unzip into **c:\gecsagnt**
- H. Unzip, click OK then Close.
- I. Click the Start button, select Run, **c:\gecsagnt\subtypes**

AIX Agent Tar File

- A. Login as the root user.
- B. Enter: **cd /**
- C. **mkdir /gecs-tar**
- D. **cd /gecs-tar**
- E. Copy or ftp the tar file to **/gecs-tar** (as binary)
- F. **tar -xvf geecs-3.11-rs6000-aix.tar**
- G. **cd GECS**
- H. **installp -ac -d . GECS**

HP-UX Agent Tar File

- A. Login as the root user.
- B. Enter: **cd /**
- C. **mkdir /gecs-tar**
- D. **cd /gecs-tar**
- E. Copy or ftp the tar file to **/gecs-tar** (as binary)
- F. **tar -xvf geecs-3.11-hp9000-hpux.tar**
- G. **swinstall -s /gecs-tar/GECS GECS**

Linux Agent Tar File

- A. Login as the root user.
- B. Enter: **cd /**
- C. **mkdir /gecs-tar**
- D. **cd /gecs-tar**
- E. Copy or ftp the tar file to **/gecs-tar** (as binary)
- F. **tar -xvf geecs-3.11-intel-linux.tar**

G. cd GECS

H. rpm -i GECS-3.1-1.i386.rpm (redhat systems)

or

alien -i -k ./GECS-3.1-1.i386.rpm (for debian Linux-Corel)

NLM Agent Tar File

A. Go to a PC running DOS, Windows or Windows NT/2000/XP/2003.

B. Login as SUPERVISOR or ADMIN.

C. Open a command prompt.

D. Enter **md c:\gecsnlm**

E. Copy or ftp the EXE file to **c:\gecsnlm** (as binary)

F. Exit

G. Click the Start button, select Run, **c:\gecsnlm\gecs-3.11-intel-netware.exe**

H. Unzip into **c:\gecsnlm**

I. Unzip, click OK then Close.

J. Click the Start button, select Run, **c:\gecsnlm\install.exe**

SCO UnixWare Agent Tar File

A. Login as the root user.

B. Enter: **cd /**

C. **mkdir /gecs-tar**

D. **cd /gecs-tar**

E. Copy or ftp the tar file to **/gecs-tar** (as binary)

F. **tar -xvf geecs-3.11-intel-unixware.tar**

G. **pkgadd -d /gecs-tar GECS**

Solaris Agent Tar File

A. Login as the root user.

B. Enter: **cd /**

C. **mkdir /gecs-tar**

D. **cd /gecs-tar**

E. Copy or ftp the tar file to **/gecs-tar** (as binary)

F. **tar xvf geecs-3.11-sparc-solaris.tar**

G. **pkgadd -d /gecs-tar GECS**

The above example is for 'sparc' based Solaris. Change all references from 'sparc' to 'intel' for 'intel' based Solaris.

Tru64 Unix Agent Tar File

- A. Login as the root user.
- B. Enter: **cd /**
- C. **mkdir /gecs-tar**
- D. **cd /gecs-tar**
- E. Copy or ftp the tar file to **/gecs-tar** (as binary)
- F. **tar xvf geecs-3.11-alpha-tru64.tar**
- G. **setid -I GECS GECS310**

IRIX Agent Tar File

- A. Login as the root user.
- B. Enter: **cd /**
- C. **mkdir /gecs-tar**
- D. **cd /gecs-tar**
- E. Copy or ftp the tar file to **/gecs-tar** (as binary)
- F. **tar -xvf geecs-3.11-mips-irix.tar**
- G. **inst -a -f GECS -u all**
- H. **installp -ac -d . GECS**

Create Agent Records

Before starting your Agents you need to create a unique Agent record for each Agent. Use the GECS Client programs to create Agent records.

Starting your Agents

Start your Agents on the Agent machines using an appropriate command. Command line usage options include:

`gecsagnt [-n name]...`

- | | |
|----------------|----------------------------------|
| -c ini | INI file to use |
| -h | run hidden |
| -m | run minimized |
| -n name | Agent's GECS name |
| -p port | Use 'port' rather than port 2000 |

-q port	Use 'port' for HTTP rather than port 2010 (0=disable)
-s name	HTTP login name
-t pass	HTTP login password
-u path	Path for misc HTTP files
-v	Verbose messages

For example:

<u>Agent Operating System</u>	<u>Command Line</u>
-------------------------------	---------------------

Unix or Linux	gecsagt [-d] [-n name] [-p port]
---------------	---

NT/2000/XP/2003	use the ' Agent NTAGENT ' icon in the GECS Agent program group or C:\GECS\GECSAGNT.EXE[-n name][-p port]
-----------------	---

NLM	LOAD SYS:\GECS\GECSAGNT.NLM [-n name][-p port]
-----	---

Note that for the NLM Agent, the NETDB.NLM must be loaded in order to run GECSPING.NLM, GECSSSTOP.NLM, GECSHIDE.NLM, GECSSHOW.NLM, PULSENOW.NLM or AGENTRUN.NLM. This NLM is loaded by NW4.11, but has to be loaded by hand for NW5.

The '-d' option tells the Agent to run as a Unix Daemon. Initially, do not run the Unix Agents as a Daemon so you can see the jobs running on the Unix console. You can start the Agent later as a Daemon if you wish.

The '-n name' option gives the Agent a GECS name. Some examples of Agent names are NTAGENT or HPAGENT. The names on all Agents must be unique and defined using the GECS.

Note that the name parameter is optional. If a name is specified using this option, this Agent will ONLY respond to messages specifically sent to that name. If the name option is omitted, the Agent will respond to any request, regardless of the name. It is recommended that you use the name option.

The '-p port' option tells the Agent which TCP/IP port number to use. This parameter is optional. Other start up parameters are described later in this chapter. By default the Agents use port 2000. The range of valid port numbers is 1 to 65536. To stop an Agent when running on the desktop or console, enter 'exit'.

Running a Test Job on New Agents

Set up a test job using the Windows Administrator program - Jobs folder.

1. Click on the **File** pull down menu and select **Add New Job**. Enter: **JOBITEST** then click the **Add** button.
2. Enter the following job parameters:

Command Line: **gecsret 0**

(gecsret is a utility program that returns the value passed as a command line parameter. It is installed in the Agent program subdirectory.)

Command Line Type: Match the OS you are running

3. Click on the Requirements Tab and select an **Execute By Agent**. Choose the name of the new Agent you created. This will force this new job to only run on this particular Agent.
4. **Save** the job.

After several seconds (when the Controller pulses), the test job should run on the Agent machine.

For example, you should be able to see this job in the completed jobs list. If you highlight this job from the list and double click on the entry, completed job information will be displayed on the job's statistics tab.

Troubleshooting

Should you experience problems, go to the Windows machine where the Controller is installed and test communication with the running Agents using the GECSPING utility.

The GECSPING utility is installed with the Controller programs. If you used default directories during installation, GECSPING is in the C:\GECS subdirectory. Enter the following command line:

C:\GECS\GECSPING.EXE name ip_name [port]

The 'name' and 'ip_name' command line options are required. The 'name' is the GECS name you gave the Agent when you started it, such as NTAGENT or HPAGENT. 'Port' is optional. 'Port' is the port number on the Agent machine that will be used for communication from the Controller, and is a number in the range of 1 to 65536. The Agent port defaults to 2000. For example:

C:\GECS\GECSPING HPAGENT zeus.company.com 3000

or

C:\GECS\GECSPING NTAGENT 200.200.200.100

A message will be displayed to indicate whether the specified Agent can be contacted. Note that the 'name' and 'port' options must match the name and port specified when the Agent was started.

Make sure you can successfully ping the Agent before you continue with the next step. If the AGNTPING fails, verify your IP address or name, try a different port number, and verify that you are using the Agent name you used when you started the Agent.

You can go to the computer where the Agent is running and enter the word 'Address', in the Agent window. This will display the name and address the Agent is running as.

Monitoring Your Agents

GECS Events can inform you if you have an Agent that is not running

You can check the status of each of your Agents using the Windows Administrator Agents folder or using the web Client programs.

From the GECS Administrator program, click on the Agents folder, click on the Agent you wish to check, then click on the “Lookup” toolbar button and select “List of Agents”. A window will display the Agent names, description and status of each.

By right clicking on the Agent record from the Administrators list you can easily hide, show or minimize Windows Agents as well as stop or ping an Agent.

The web clients can display a list of problems with the GECS System. These problems may include Agents marked as quit. Agent records can also be accessed from the “Agents” option off your Global ECS, main menu, Home page.

You can view the status of an Agent using a browser by entering the appropriate URL as shown below:

http://ipaddress:http port/name

For example:

http://200.200.200.154:2010/FRAN

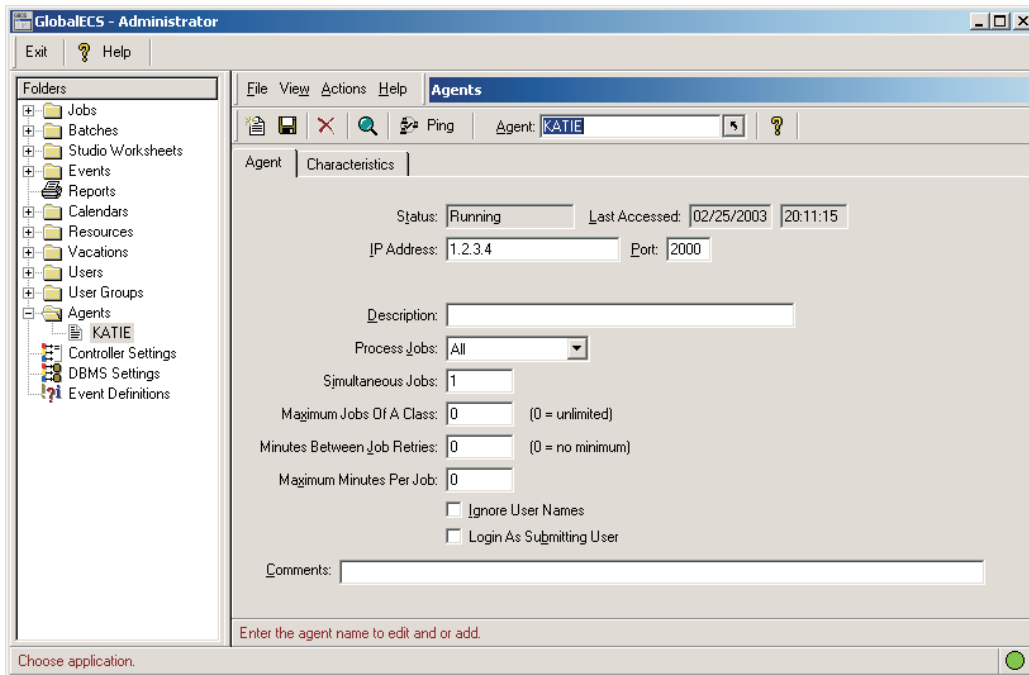
You will then be prompted to enter a user name. By default, you should enter the name of the Agent (FRAN). However, if the Agent was started with the command line parameters `-s name` (HTTP login name) and `-t pass` (HTTP login password) the appropriate user name and password must be used.

Agent Parameters

Agent records are defined in the GECS system. These records name the Agents, describe the computers the Agents will run on and various other details about the Agent. Agent records describe the operating system, IP Address, comments and hardware characteristics of the Agent. Agent records can be created using the web based Client programs or the Windows based Administrator Client program

The GECS web based Client programs are described later in this manual. The Agent parameter field names are the same in the web based clients as in the Windows Client programs. Agent parameters are described below.

The GECS Administrator Windows based Client program, allows you to create, modify and delete Agent records and is displayed below.



Agent Name

Your GECS Agents can be assigned any alpha numeric name up to 8 characters in length. Agent names are forced upper case. Every Agent must have a unique name that must be defined before it can be started.

You should only create as many Agents as you are licensed to run. If you do create more Agent records then you are licensed for, ensure you set the “Process Jobs” field to None, on the Agents you do not intend to use. Otherwise, GECS will determine on its own which Agents to service.

IP Address

The “IP Address” field in the Agent record is used to enter the IP address of the machine that will be running the Agent software as this defined Agent.

Port

The “Port” field in the Agent record is used to enter the port number of the machine that will be running the Agent software as this defined Agent. If this field is left blank GECS will use port 2000.

Last Accessed

The “Last Accessed” date and time fields are used to view the last activity of an Agent. These fields are automatically updated by GECS. These fields cannot be modified.

Description

The “Description” field is used to enter any miscellaneous description about your Agent. This optional description will appear along with the Agent name in various places within the GECS programs.

Process Jobs

The “Process Jobs” field is used to indicate whether this Agent should process:

- | | |
|-----------------|---|
| All jobs | - No restrictions |
| Group jobs | - Only jobs that belong to a specific group |
| None (Inactive) | - No job records. |

When communications fail between the DBMS or Controller and an Agent GECS sets the Agent’s Process Jobs field to “None (Inactive)”. To set the Agent back to “Active” you must update Process Jobs field to either “All jobs” or “Group jobs”.

Simultaneous Jobs

The “Simultaneous Jobs” field is used to specify the number of jobs you would like your Agent to be able to run at one time. If you enter a '0' in this field, the Agent will run an unlimited number of jobs simultaneously which will likely exceed the available defined system resources and generate errors.

Maximum Jobs Of A Class

The “Maximum Jobs Of A Class” field can be used to limit the number of jobs of a given class that can be run at once. Each job can be assigned to a class using the “Job Class” field found in the Job record.

If you have set the maximum simultaneous jobs to 5, you might want to set the maximum jobs of a class to 4. This would keep a single class of jobs from hogging and entire Agent. If you have jobs you never want to have running at the same time, you could set this number to 1 and assign the jobs to the same class. Entering 0 will eliminate any class restrictions.

“Resources” can also be used to limit certain jobs from running at the same time. For details see the Required Resources section in the Task Automation chapter.

Minutes Between Job Retries

Jobs can be defined such that when they return a failing return code they can automatically retry. In some situations, this can cause an Agent to continuously try a failing job when it has other jobs pending. By defining a minimum number of minutes between job retries, you can keep the job from constantly trying the failing job, without giving up on it completely. Use the Agent record's "Minutes Between Job Retries" field to set this time.

Maximum Minutes Per Job

Using the "Maximum Minutes Per Job" field allows you to define a maximum number of minutes that a job can run on your Agent.

GECS monitors job processes while they run and shut down sessions that run longer than is allowed.

GECS for NetWare NLMs monitors its job processes while they run. Command lines that started with the word 'load' are automatically 'unloaded' by the when they run longer than their maximum run time.

A maximum number of minutes can also be entered at the user and job level. Before executing the job, GECS will determine the minimum non-zero number of minutes entered for the job, the user and the Agent and will use that number. If all three are zero, no restriction will be set.

Ignore User Names

By default, GECS will only accept WRK files and dispatch jobs for users that are defined in the GECS Users file. By entering a check mark in the "Ignore User Name" field, GECS will no longer reject WRK files or jobs because they are from undefined users.

When this field is enabled, GECS uses the user definition for the lowest alphabetical name on file in determining how to process jobs.

Login As Submitting User

Most Agents can be configured to login to the network as the submitting user before executing jobs. Enable the "Login as Submitting User" field in the Agent record if an Agent should login as the submitting user before executing jobs.

GECS Agents that can be configured to login as submitting user include: Windows, Linux, AIX, Solaris, HP-UX and Tru64 Unix. GECS Agents that cannot be configured to login as submitting user include: NLM and UnixWare.

When Windows Agents login as submitting user they use the submitting user's rights but not the user's desktop. When Linux, AIX, Solaris, HP-UX or Tru64 Unix Agents login as submitting user, they use the user's rights and the user's environment. (The 'su' command is used and the user's .profile gets executed).

You must also include the user's "Network User Name" from the Users record. (This field is case sensitive). For Windows only the "Network Password" is also required.

When logging in as submitting user on Windows, the Agent account used to start the Agent must be a local user account, not a domain account. The Windows Agents also require the proper security privileges in order to log on as the submitting user. See the "Creating User Accounts" section of this chapter for details.

Linux, AIX, Solaris, HP-UX or Tru64 Unix Agents must be running logged in as root, running as a daemon or on the desktop.

Comments

The “Comments” field is an optional field that can be used to enter a miscellaneous comment about your Agent.

Agent - Characteristics Tab

Agent characteristics are usually defined for Agents in a multi-Agent environment. Characteristics are used to limit the jobs or type of jobs that can run on certain Agents. The Agent Characteristics page contains the fields described below.

Group Names

The “Group Names” field is an optional field which can be used in a multi-Agent environment. This is the name of the group of Agents to which this Agent belongs. Group names may be used to direct selected jobs or selected users’ jobs to be executed on specific Agents.

Up to 10 group names can be assigned to each Agent. To add an Agent group, type the new group name in one of the Agent group fields.

Operating System

The “Operating System” field is used to define the type of operating system of the computer that will run this defined Agent. The information entered here is used to decide if this Agent has adequate capabilities to run particular jobs. Your options are: Other, Windows NT/2000/XP/2003, UnixWare, Netware, Windows 95/98/ME, Linux, AIX, HPUNIX, Solaris, Tru64 and IRIX.

Operating System Version

The “Operating System Version” field is used to define the operating systems version number which is installed on the computer that will run this defined Agent. The information entered here is used to decide if this Agent has adequate capabilities to run particular jobs.

Job Types

The “Job Types” field is required and is used to indicate what command line type(s) of jobs this Agent should be able to run. Your options include:

- Windows NT/2000/XP/2003 - Applies to Windows Agents.
- Windows 95/98/ME - Applies to Windows Agents.
- Windows - Applies to Windows Agents.
- DOS - Applies to Windows Agents.
- OS/2 - Applies to Windows Agents.

NLM	- Applies to NetWare Agents.
NT Console	- Applies to Windows Agents.
UnixWare	- Applies to UnixWare Agents
Linux	- Applies to Linux Agents.
AIX	- Applies to AIX Agents.
HPUX	- Applies to HPUX Agents.
Solaris	- Applies to Sun Solaris Agents.
Tru64 Unix	- Applies to Tru64 (Digital Unix) Agents.
IRIX	- Applies to IRIX Agents.

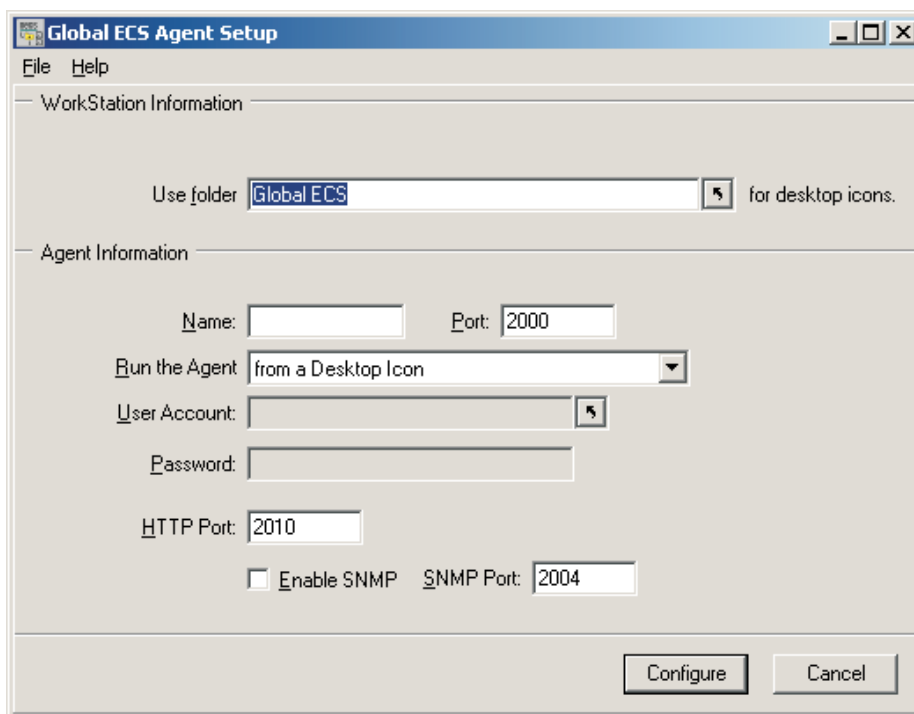
Configuring Agents

Unix Agent programs can be run as a Unix daemon or from a terminal window on Unix. Unix Agents use Unix installation utilities to copy GECS Agent programs to the proper directory. The parameters used when starting Unix Agents determines whether they run as a daemon or from a terminal window.

Windows Agents can be run as a service under the system account, as a service under a specified user account or from a desktop icon. A GECS installation program (SUBTYPES) is shipped for Windows Agents to copy the GECS Agent programs to the proper directory. Unlike Unix Agents, Windows Agents must use a special program to configure the way Windows Agents are to run. The GECS Workstation Setup program configures the Agent computer to create Agent icons for starting the Agent from the desktop, or to set up Agents to run as services.

Windows Agent Configuration

A40SETUP.EXE is the Windows program used to configure your Windows Agent(s). When started, a screen similar to the following will appear:



Use this program to set up your Windows Agents. When run from a Desktop Icon, the Agents must be manually started. When run as a service, the Agent program is automatically started when the computer is started.

Starting and Stopping Agents

When a Windows Agent is run as a service, it will automatically start and run when Windows starts, whether anyone is logged in or not. It will have the rights of the user you indicate it should log in as. You will not be able to see the jobs being run. They will run invisibly.

When a Windows Agent is run on the desktop (not as a service), the Workstation Setup program will create an icon to start the Agent. When you run the Agent on the desktop, you will see the jobs being run.

Run the GECSSTOP program or enter 'exit', 'stop' or 'quit' to stop the Agent.

Agents software is installed from diskette or CD ROM. Each Agent operating system supported by GECS contains an Agent program, an Agent Workstation setup program and a few other programs described below. Generally, the Agent software programs work the same, regardless of operating system.

It is run as follows:

Unix or Linux **gecsagt [-d] [-n name] [-p port]**

Windows desktop Double click your "**Agent NTAGENT**" icon

or **C:\GECS\GECSAGNT.EXE [-n name] [-p port]**

NLM

LOAD SYS:\GECS\GECSAGNT.NLM [-n name] [-p port]

All the command line arguments are optional. The '-d' option tells the Agent to run as a Unix or Linux Daemon. The '-n name' option gives the Agent a GECS name. A record must be entered for each Agent using this 'name'. The names on all Agents must be unique. The '-p port' option tells the Agent which TCP/IP port number to use. By default the Agents use port 2000.

When you run the GECS Agent for HP-UX, UnixWare, Linux, Solaris, AIX or Tru64 as a daemon, they run in the background. They and the jobs they run can't be seen. They will continue to run after you logout. You may want to make entries in the /etc/inittab file so the Agents will automatically start when the operating system starts. The daemon will run with the rights and environment of the user that started it.

There are special startup options listed below. These options can either be run from the command line, or can be entered in the shortcut properties for a Windows Agent when run from a desktop icon.

Run Agent as Desktop vs. Service

Hidden / Minimized

Windows Agents can be run so that they show on the screen, they can be run hidden from view or minimized. From the GECS Administrator program, Agents folder, Actions pull down menu, you can Hide, Show, Minimize, Stop or Ping an Agent. Hide or Minimize allows you to hide or minimize the displayed Agent from view, on the Agent machine, once it is started. Once hidden or minimized, you can bring the Agent back into the foreground by selecting "Show". The Agent can be started in hidden mode by including the -H command line option or started minimized by including the -M command line option:

GECSAGNT.EXE Agentname -H

GECSAGNT.EXE Agentname -M

Where Agentname is the name of your Windows Agent. By including a shortcut icon for your Agent in the startup group with the -H or -M option, the Agent will start hidden or minimized every time your Windows Agent machine is started.

The programs launched by GECS Agent when the Agent is hidden may or may not be hidden themselves depending on whether the job was defined to run normal, minimized or hidden. They may appear in the foreground or hidden whether the Agent is running normally or hidden, depending on the setting for the job.

Running your Agent as a Windows Service

Windows NT introduced the concept of "services". A service is a software program that is automatically started when Windows starts, but before anyone logs in. Services start before the user logs in and continue to run even after the user logs out. Database servers and file servers are types of programs that would normally be run as services. Windows Agents can be installed as a service. GECS will execute submitted jobs as long as Windows is running, even if no one is logged in to the console. There are several setup issues that must be considered as well. Regardless, running GECS as a service under Windows can be used in a wide variety of ways and can greatly enhance the functionality of Windows.

If you are not familiar with using Services, you should not attempt to run your GECS Agent as a service. Also, first time GECS users should always start by running their Agents from a desktop icon. More experienced GECS users can run their Agent(s) as a service, after testing.

Differences When Run as a Service

When a Windows Agent is run as a service, there are several differences in the type of jobs that can be run and the way jobs are run. This is due to the nature of a service and its security. The following list contains the differences in functionality:

Keyboard stuffing is ONLY allowed with DOS programs.

GECS and its jobs are hidden from view when no one is logged in.

Once someone logs in, the jobs GECS is running are visible on the desktop, if the GECS service is running on the system account. This will likely make the Program Manager environment difficult, if not impossible to use. If the jobs are being run on a user account, they will not be visible to the logged in user. For best results, most GECS maintenance can be performed from another Workstation.

Network drives are not mapped until a user logs in and the mappings are lost when the user logs out.

Logging on or off during job execution may interfere with job execution.

Desktops do not get established and neither do things such as drivers/printers/drive mappings/search path/environment variables and a collection of other things.)

By using the default settings, GECS runs in the security context of the local system account and uses the default Station/Desktop. With Windows, the system accounts privileges have been modified to limit access to local and network resources thereby limiting the privileges of GECS and its jobs. To regain control over the resources GECS has access to, GECS must be setup to run within the account of a specific user. Use the procedures outlined below to create an GECS Agent user account and setup GECS to use the new account.

Creating User Accounts

Assigning a specific user account to a GECS Agent allows control over the security access to local and network resources. To setup a GECS Agent user account, Log on to Windows as the system administrator or a user who has rights to create new users. Using the Windows User Manager, create a new user using the information specified below.

```
Username:          NTAGENT (use the Agent name)
Full Name:         GECS
Description:       Logon Account
Password:          xxxxxxxx
[] Password Never Expires
```

Use User Manager's User Rights Policy dialog to grant the required rights to the Agent's user account. The rights required for the Agent to execute the submitted jobs varies with each installation of GECS. These rights MUST be determined by you. In addition to rights required by the executed jobs, the Agent's logon account MUST have the following advanced User Rights. Note that 'Show Advanced User Rights' must be checked to display the necessary rights.

```
Act as part of the operating system
Increase quotas
Log on as a service
Replace a process level token
```

By making the Agent User Account a member of the Administrators group, GECS will have full control of the local system. This may not be the desired behavior of your particular system. To change the rights of the Agent Account, first create a new user group and then make the Agent Account a member of this group, at which point you may change the User rights for this specific group. (See User Manager Help for more information on creating New Groups, New Users and User Rights).

Creating Logon User accounts

In addition to the running in a dedicated log on account, each job that the Agent executes may run within the security context of the user who submitted the job. This feature is enabled by checking 'Login as Submitting User' in the GECS Agent record and by entering the 'Network User Name and Password' in the GECS User record. When entering the 'Network User Name' an optional Domain name may be included before the entered user name. i.e. '\\DOMAIN\username'.

To edit the user accounts that GECS Jobs will log on as, logon to Windows as the system administrator or a user who has rights to edit user accounts. Using the Windows User Manager, select the user to grant the required log on rights.

Use User Manager's User Rights Policy dialog to grant the required rights to the selected users account. The rights required for the Agent to execute the submitted jobs varies with each installation of GECS. These rights MUST be determined by you. In addition to rights required by the executed jobs, the user account MUST have the following advanced User Rights. Note that 'Show Advanced User Rights' must be checked to display the necessary rights.

```
Log on as a service
Log on as a batch job
```

Grant these rights to each user account that will run GECS Jobs.

GECS Service Program

GECS can be run as a service on Windows. The ASERVICE.EXE program is used to start the service. This program is run automatically by the Windows service manager and should never be run directly. This program is only included with GECS Agent for Windows.

GECS Service Installation

The Workstation Setup program for Windows can configure GECS s to run either on the desktop or as services. The services can run using the system account or under a specified user account. Additionally, when jobs are run, the jobs can run logged in as the submitting user or as the user the Agent is running as.

To setup an Agent to run as a Windows service, open the GECS Workstation Setup program. Go to the Agents page, set the "Run " field to either "as a Service using the specified user account" or "as a Service using the system account". When using a user account, press the lookup button on the User Account field to select from a list of user accounts. Enter the password in the Password field. After completing the properties screen press the OK or Next button then click the Configure button.

The Workstation Setup program will automatically configure the specified Agent to run as a service. It will also add the appropriate registry information.

GECS Service Removal

The Windows Workstation Setup program can be used to remove a service. To remove a service, update the "Run" field to "from a desktop icon".

Agent Command Line Utilities

When Agents are not run as a daemon or as a service, special commands can be entered at the Agent window. These commands are listed below:

GECSHIDE	- Used to hide a Windows Agent window
GECSLAUN	- Internal Unix utility
GECSPAUS	- Used to Pause/Unpause remotely
GECSPING	- Used to test the status of Agents
GECSRET	- Used for testing return codes
GECSSHOW	- Used to display a hidden Windows Agent windows
GECSTOP	- Used to stop an Agent
PULSENOW	- Used to immediately pulse your Controller

These and other utilities are described in detail in the GECS Utility Programs chapter of this manual.

Agent Desktop Terminal Commands

When Agents are not run as a daemon or as a service, special commands can be entered at the Agent window. These commands are described below:

Usage:

EXIT, STOP, QUIT	- Shutdown the Agent
HIDE	- Hide the Agent
MINI	- Minimize the Agent
VERSION	- Display version
CLS, CLEAR	- Clear screen
TIME	- Display time
VERBOSE, QUIET	- Toggle verbose messages
ADDRESS	- Display address
LIST	- List processes

Uninstalling GECS Agents

Be sure all GECS programs are stopped before uninstalling.

Windows Client, DBMS, Controller, or Agent

1. From Control Panel, click Add/Remove Programs.
2. Select the Global Event Control Server then choose Uninstall.
3. Indicate whether or not to delete program and data files.
4. Click the Uninstall button.

AIX Agent

1. Login as root.
2. Enter `cd /`
3. Enter `/usr/lib/instl/sm_inst installp_cmd -u -f GECS`
or for the menu driven program enter `smit`
and follow the instructions that appear on the screen

HP-UX Agent

1. Login as root.
2. Enter `cd /`
3. Enter `swremove GECS`

Linux Agent

1. Login as root
2. Enter `cd /`
3. Enter `rpm -e GECS` (Redhat)
(or) `dpkg -r GECS` (Debian)

NetWare Agent

1. Login as ADMIN or equivalent from a Workstation running DOS, Windows or Windows NT/2000/XP/2003.
2. Change to the root subdirectory (i.e. `CD \`)
3. Delete the files from the GECS subdirectory (i.e. `DEL \GECS*.*`)
4. Remove the GECS subdirectory (i.e. `RD \GECS`)

SCO UnixWare Agent

1. Login as root.
2. Enter `cd /`
3. Enter `pkgm GECS`

Solaris Agent

1. Login as root.
2. Enter `cd /`
3. Enter `pkgm GECS`

Tru64 Unix Agent

1. Login as root.
2. Enter `cd /`
3. Enter `setld -d GECS300`

IRIX Agent

1. Login as root.
2. Enter `cd /`
3. Enter `inst -a -R GECS`
or for the menu driven program enter `smit`
and follow the instructions that appear on the screen

GECS Controller

Controller Overview

The Windows computer running your GECS Controller program (GECSPROC.EXE) controls and dispatches jobs to be run by available Agents.

When running, your Controller looks at the JOBS file and determines which Pending job to dispatch to Agents. It checks the availability of each defined Agent. It may also perform a number of other tasks during its “free time”.

Controllers can be run from a desktop icon, or a Windows service using a user account or using the system account.

When your Controller is configured to run on the desktop, the Workstation Setup program creates an icon in the GECS desktop folder. The Controller can then be started by clicking on the icon. While it is running, enter ‘exit’, ‘stop’ or ‘quit’ to shut down the Controller program. When the Controller is running on the desktop, it has the rights of the user logged in. It will only run as long as someone is logged in.

When the Controller is configured to run as a service, it will automatically start and run whenever Windows is running, whether anyone is logged in or not. It has the rights of the user you indicate it should log in as or the system account. You can start and stop the service by clicking on the Services selection on Control Panel.

Installing the Controller Program

The GECS Controller program can be installed from the Global ECS Windows CD ROM or you can FTP the Controller programs from the Global ECS web site. Instructions to install from CD ROM or from images (EXE files) off the web site are listed below. Go to your Controller machine and follow one of the sets of instructions below.

Windows Controller from CD ROM

- A. Login as Administrator or as an administrator equivalent user.
- B. Insert the GECS Windows CD ROM. The installation program may automatically start after several seconds. If the installation program does not automatically start, click the Start button, select Run and Enter: **D:\SUBTYPES** (Where D: is your CD ROM drive)
- C. Click the **Complete Installation** option then click the **OK** button.
- D. Click the **Finish** button to display the Global ECS Setup screen.
- E. Again, use the default settings and click the **Configure** button, then click **OK**.

Windows Controller Exe File

- A. Login as Administrator or as an administrator equivalent user.
- B. Open a Command Prompt
- C. Enter: **md c:\gecsctrl**
- D. Copy or ftp the EXE file to **c:\gecsctrl** (as binary)
- E. Exit
- F. Click the Start button, select Run, **c:\gecsctrl\gecs-3.10-system.exe**
- G. Unzip into **c:\gecsctrl**
- H. Unzip, click OK then Close.

- I. Click the Start button, select Run, **c:\gecsctrl\setup.exe**

The GECS Workstation Setup program can be used to create your Controller record, your Controller desktop icon and, when desired, to setup your Controller to be run as a service.

GECS Express installation will automatically create and start your Controller as a service under the system account.

Monitoring Your Controller

You can check the status of your Controller program using the GECS Administrator Windows Client program or using the Browser based Client programs.

From the Administrator program, click on the Controller Settings option and it displays the status of your Controller and the last time it pulsed.

By right clicking on the Controller Settings option from the GECS Administrator's list you can easily hide, show, minimize, pause, resume, stop, ping or pulse your Controller.

You can view the status of your Controller using a browser by entering the appropriate URL as shown below:

http://ipaddress:http port/name

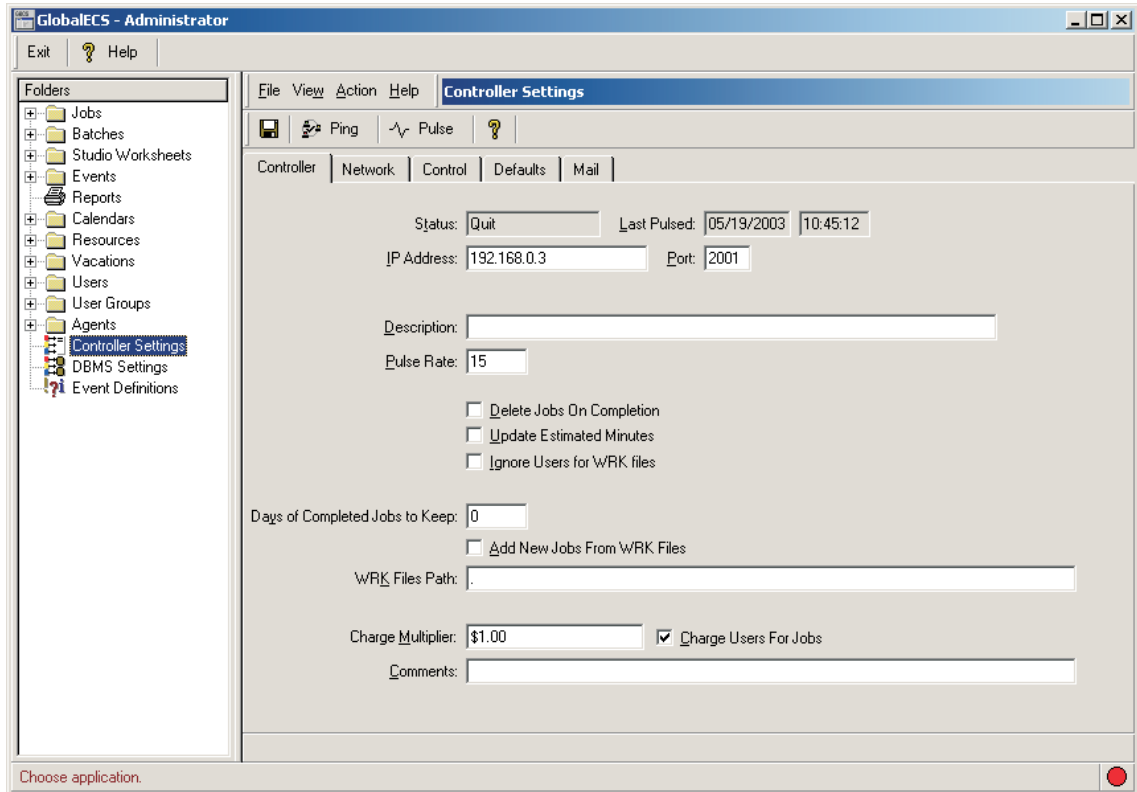
For example:

http://200.200.200.25:2011/CONTROL

You will then be prompted to enter a user name. You should enter the name of your Controller (CONTROL). However, if the Controller was started with the command line parameters **-s name** (HTTP login name) and **-t pass** (HTTP login password) the appropriate user name and password must be used.

Controller Parameters

Your Controller record can be modified using the GECS Client programs. Your Controller record describes the functions you want your Controller to perform. The GECS Administrator Windows Client program is displayed below.



Controller Name

Your Controller name is CONTROL. This record is automatically created when you install GECS. This name cannot be changed or deleted.

Controller Status

The “Controller Status” field displays the status of your Controller. GECS will automatically update this field. Controller status is defined as:

- | | |
|---------|--|
| Quit | - Your Controller has been stopped |
| Running | - Your Controller is running |
| Reset | - Your Controller has been reset |
| Paused | - Your Controller has been paused by its “Pause Filespec” file |

Last Pulsed

The “Last Pulsed” date and time fields are automatically updated by your Controller. This field contains the last "activity" on your Controller. This may be the last time your Controller pulsed, the last time a job was dispatched or other types of activity.

IP Address

The Controller “IP Address” field is used to enter the IP Address of the computer that will run this defined Controller program. The address of the current machine is added by default.

Port

The Controller “Port” field is used to enter the port number on the machine that will run this defined Controller program. The port number defaults to 2001.

Description

The Controller “Description” field is used to enter any miscellaneous description about your Controller. This optional description will appear along with the Controller name in various places within the GECS Client programs.

Pulse Rate

The Controller “Pulse Rate” field contains a number which tells your Controller how often, in seconds, it should poll the system to see if there are any jobs to dispatch. It is NOT recommended that the pulse rate be set under 15 seconds.

There are two features, described below, (pulse now program and pulse file) to help you control pulsing and to minimize the load put on the operating system and hardware by GECS while maintaining responsiveness.

Determining The Proper Pulse Rate

If you set up your Controller with a short pulse rate (30 seconds or less), your Controller will pulse quite frequently and will be responsive. On the other hand, it may put more load on the hardware and operating system due to this frequent checking than is necessary when there are no jobs to dispatch.

Additionally, they may not get enough spare time between pulses to perform their internal housekeeping such as purging of completed jobs. If the pulse rate is set to 60 seconds or more, your Controller will put very little load on the hardware and operating system when there are no jobs to dispatch. On the other hand, it might take a minute or so before jobs are dispatched to Agents.

In general, a 60 second pulse rate should work fine most GECS processing schemes. When GECS is used to dispatch large numbers of one time only jobs submitted by users in an ad hoc fashion, a pulse rate of 30 seconds might be more desirable to deliver to them the responsiveness they are looking for, understanding that the load put on the

hardware and operating system will be somewhat higher.

Pulse Now Program

The program PULSENOW.EXE can be run on your Controller machine at any time to cause it to stop waiting and pulse. You can create an icon to run this program with a command line of:

C:\GECS\PULSENOW.EXE CONTROL IPADDRESS PORT

where '*CONTROL*' is the name of your Controller. '*IPADDRESS*' and '*PORT*' is the IP address and port number assigned to the Windows machine that is running your Controller program.

This program must be running in the computer where your Controller program is run. This program causes your Controller to immediately pulse. If your Controller pulse rate has been set to 60 or 120 seconds or more to keep the Controller's load to a minimum and you believe there is work to be done, you can use this program to cause your Controller to pulse now rather than waiting for the normal pulse time. The Controller will pulse at the next regular pulse time interval after the "Pulse Now".

Pulse File

Additionally, your Controller will look for a 'pulse file' while waiting and once it finds it, it will delete it, stop waiting and pulse. The file is defined in GECS.INI in the Controller's section:

[CONTROLLER]
PulseFile=filespec

When this entry is defined for your Controller, it will look for the specified 'filespec' while it waits.

Delete Jobs On Completion

You may indicate whether non recurring jobs should be deleted when complete or left on file, marked as completed. When you check mark the "Delete Jobs on Completion" field, all jobs this Controller marked complete, will be deleted except those jobs configured to "Keep when complete".

See also the delete only successful jobs on completion GECS.INI file entry. By setting this entry, [Controller] DeleteOnlySuccessfulJobs=1, failed jobs will be left on file.

Update Estimated Minutes

Check mark the "Update Estimated Minutes" field if you would like GECS to automatically update job's estimated run time each time they are run. The estimate is calculated using a weighted average formula.

$$\text{new estimate} = ((\text{old estimate} \times 3) + \text{actual minutes}) / 4$$

Ignore Users for WRK files

By default, GECS will only run jobs for users that are defined in the GECS User record. By check marking this field, GECS will no longer reject jobs because they are from undefined users.

When this setting is set to 'Yes', GECS uses the user definition for the lowest alphabetical name on file in determining how to process jobs.

Days Of Completed Jobs To Keep

GECS can automatically 'trim' your completed job records. If you want GECS to automatically delete completed job records, enter the number of days of completed jobs that should be maintained in the "Days of Completed Jobs To Keep" field. If you don't want it to automatically trim your completed jobs file, enter '0' in this field.

Add New Jobs From WRK Files

The "Add New Jobs" field must be check marked if you want your GECS to look for WRK files and add them as jobs to be executed.

WRK Files Path

Use the "WRK File Path" field to specify the subdirectory where GECS should look for WRK files. This field works much like the PATH command. You can include more than one subdirectory name, separated by a semicolon (;) if you want. For example:

F:\GECS\F:WRKFILES;F:\GECS\DATA\WRKFILES

By default, this field contains a dot (.). The dot causes GECS to look for .WRK in the directory where your GECS programs are installed.

Charge Multiplier

The "Charge Multiplier" field is used to indicate an amount to charge users for executing their jobs. The GECS User record "Charge Per Job" and/or "Charge Per Second" fields must be populated and are multiplied times the number entered in this field.

Charge Users For Jobs

The "Charge Users for Jobs" field is used to indicate whether or not GECS should calculate charges for the jobs that get executed by Agents. You must set the GECS User record's "Charge Per Job" and/or "Per Second Charge" field(s) in order to use this feature.

Comments

The “Comments” field is an optional field that can be used to enter a miscellaneous comment about your Controller.

Controller - Network Tab

The Network tab found in the Controller Settings screens contain several fields which are described below.

Time Sync Type

Your Controller can be configured to synchronize its time using one of the time synchronization methods below:

- None
- Microsoft
- NetWare
- Time Protocol (RFC-868)
- NTP/SNTP (RFC-1305/1361/1769/2030)

Time Sync File Server

The “Time Sync File Server” field can be used to synchronize the computer’s time, that is running your Controller with another computer on the network.

If you wish to time sync to a NetWare file server you must have NetWare drivers installed. Likewise, if you wish to time sync to a Windows Server machine, you must have Microsoft drivers installed.

During every pulse, your Controller with a Time Sync Server name entered will update the time on the machine with the time of the computer specified. For example:

```
TESTSRV1
\\FILESVR
123.123.123.123:37
123.123.123.123:123
```

Controller - Control Tab

The Control tab found in the Controller Settings screens contain a variety of fields as described below.

Halt Filespec

The “Halt Filespec” field is used to define a fully qualified path and file name, that when found, will cause your Controller to immediately stop/terminate (all running jobs) and shut down/exit your Controller. Your Controller

looks for this file during each pulse cycle.

Before restarting your Controller, you must delete the file that caused your Controller to exit. If you don't, your Controller will immediately halt again.

Exit Filespec

The "Exit Filespec" field is used to define a fully qualified path and file name, that when found, will cause your Controller to shut down/exit (once all running jobs have finished). While waiting for running jobs to stop, it will not start any new jobs. Your Controller looks for this file during each pulse cycle.

Before restarting your Controller, you must delete the file that caused your Controller to exit. If you don't, your Controller will immediately exit again.

Pause Filespec

The "Pause Filespec" field is used to define a fully qualified path and file name, that when found, will cause your Controller to stop launching any new jobs until the filespec disappears. While the filespec exists, your Controller "Status" is set to "Paused" and it stays in a sleeping type mode. Your Controller looks for this file during each pulse cycle.

Before restarting your Controller, you must delete the file that caused your Controller to pause. If you don't, your Controller will immediately pause again. See also the "Use Controller Pause Times" field to allow your Controller to automatically create and delete your pause filespec.

Use Controller Pause Times

The "Use Controller Pause Times" field is used to set up your Controller to automatically pause and unpaue itself, as described above, based on the times entered in the "Pause At" and "Unpause At" fields.

To enable this feature, you must have a "Pause Filespec" defined.

Pause At / Unpause At

The "Pause At" and "Unpause At" fields are used to allow your Controller to automatically create and delete the filespec you have defined for your "Pause Filespec". This file will be created and deleted according to the times entered in these fields for when your Controller should automatically pause/resume processing. Your Controller will ignore this field if it is set to 00:00:00 (midnight). For example:

Pause At: 23:00:00

Unpause At: 00:30:00

would pause your Controller daily at 11pm until 12:30am.

To enable this feature, you must have a "Pause Filespec" defined and the field, "Use Controller Pause Times" must be check marked.

Reset Command

The "Reset Command" field is used to define a command line to be executed if your Controller is having a problem. (i.e. The Controller's "Last Pulsed" time has not been updated within its "Reset Minutes".)

Your reset command could send a message, email or even a page, using whatever command line utility you'd like.

For example, in a Novell environment, you might define the Reset Command for CONTROL as:

SEND "Controller CONTROL Requires Attention" to SUPERVISOR

In a Microsoft environment you might define the Reset Command for CONTROL as:

NET SEND Supervisor Controller CONTROL Requires Attention

or run a batch file that calls your paging software, which sends you a page to notify you that your Controller is in trouble:

C:\GECS\BEEPME.BAT

The reset command defined for your Controller will be launched if your Controller is believed to be hung.

Your Controller is considered to be hung when ALL the following occur:

1. Your Controller has a Reset Command defined.
2. Your Controller has a blank Viewed By field.
3. Your Controller has a non-zero value for the Last Access Date & Time fields.
4. Your Controller has a non-zero value for Maximum No Access Minutes field.
5. The Last Access Date & Time PLUS the Maximum No Access Minutes is a time in the past.
6. Your Controller's Status is NOT Quit or Reset.
7. Your Controller's pause, exit or halt files cannot be found.

Besides simply executing the reset command, GECS also changes the "Status" of your Controller to "Reset", so the command will only be executed once.

Note that the program you want GECS to run to reset your Controller may be too large to fit into memory. If you receive "Insufficient Memory" errors trying to execute your reset command, you can begin the command with an asterisk (*). This tells the setup or client program to unload itself before executing the command. You will have all but 30K of your conventional memory available for executing the command.

Controller - Defaults Tab

The fields listed in Controller Settings Defaults tab are used to tell your Controller what it should use as defaults for the jobs it adds. If a particular job parameter is omitted in a WRK file, GECS will use the information entered here for the job. These default values are also used by the GECS Client programs when creating new job records.

Controller - Mail Tab

The Mail tab in the Controller record is used to check email messages for wrk files to convert into jobs.

Accept WRK Files Via Mail

The "Accept WRK File Via Mail" field must be enabled if you want GECS to accept WRK files via email.

GECS is sent a piece of email just as if it was a user. The text of the message contains the lines of the WRK file or the WRK file can be sent to GECS as an attachment to the message. If attachments are sent, the text of the message is ignored.

Mail System

Use the “Mail System” field to indicate the type of mail system you are going to use for GECS to accept WRK files via mail. If email is not going to be used by GECS to pick up WRK files, select None. Your options are:

- None
- Novell MHS
- Microsoft Mail
- cc:Mail
- Notes Mail
- Internet Mail

Mail User Name

GECS can be assigned it’s own email address for checking for WRK files to convert into real jobs.

Use the “Mail User Name” field to enter the email user name assigned to GECS for receiving WRK files. The format is username (with optional[:password]) following the selected email system's name guidelines. For example:

- | | |
|------------------------|------------------------|
| GECSWRK | - for MHS Mail |
| GECSWRK:password | - for MS Mail |
| GECSWRK | - for MS Exchange Mail |
| GECSWRK | - for cc:Mail |
| leave this field blank | - for Notes Mail |
| gecswrk@vinsoft.com | - for Internet Mail |

Mail Password

Use the “Mail Password” field to enter your GECS email password for receiving WRK files. Follow the selected email system guidelines.

You would leave this field blank if you specify a password in the “Mail User Name” field using the optional password parameter.

- | | |
|----------|------------------------|
| password | - for MHS Mail |
| password | - for MS Mail |
| password | - for MS Exchange Mail |
| password | - for cc:Mail |
| password | - for Notes Mail |

password - for Internet Mail

For security purposes the password you enter will not be displayed. This field will automatically be filled in with asterisks.

Mail Subdirectory

Use the “Mail Subdirectory” field to enter the drive and subdirectory of the selected email system. This would typically be something like:

F:\MHS\MAIL	- for MHS
F:\WGPO	- for MS Mail
leave this field blank	- for MS Exchange Mail
M:\CCDATA	- for ccMail
leave this field blank	- for Notes Mail
mail.isp.net	- for Internet Mail

Mail Pulse

The “Mail Pulse” field is used to enter the amount of time, in seconds, you would like your GECS to look for WRK file via mail. 0 = use your Controller’s “Pulse Rate”.

Starting and Stopping your Controller

Desktop Controller Start Up Command Line Options:

The GECS Workstation Setup program creates an icon on the desktop for the Controller. Start it by double clicking on the Controller shortcut icon. This program is started by running GECSPROC.EXE. There are special startup options listed below. These options can either be run from the command line, or can be entered in the shortcut properties for the Controller when run from a desktop icon.

Usage: `gecsproc name [-p portnum]...`

name	Controller’s GECS name “CONTROL”
-c ini	The INI file to use
-h	Run hidden
-m	Start minimized
-p port	Use ‘port’ rather than port 2001
-q port	Use ‘port’ for HTTP rather than port 2011 (0=disabled)
-s name	HTTP login name

-t pass	HTTP login password
-u path	Path for misc. HTTP files
-v	Verbose messages

For example:

GECSPROC.EXE NAME [-P port]
C:\GECES\GECSPROC.EXE control -P 2001

where '*CONTROL*' is the name defined for your Controller and -P for optional port. The default port is 2001.

Your Controller must be running in order to dispatch jobs to your Agents. When the Controller is running on the desktop, it has the rights of the user logged in. It will only run as long as someone is logged in

To shutdown your Controller, type 'exit'. It may take your Controller several seconds to complete the shutdown process.

Information on running your GECS Controller as a service is described later in this chapter.

Your GECS Controller can be run so that it is shown on the screen, or it can be run hidden from view. Once hidden, you can bring it back into the foreground by running the 'Show Controller' command. Your Controller can be started in hidden mode by including the -H command line option:

GECSPROC.EXE CONTROL -H

By including an icon in the startup group with the -H option, your Controller will start hidden every time Windows is started.

Your Controller can also be started minimized by using the -M command line option:

GECSPROC.EXE CONTROL -M

Once minimized, you can open it back up by running the 'Show Controller' command.

Configuring Your Controller

Running the Controller as a Service

Windows NT introduced the concept of "services". A service is a software program that is automatically started when Windows starts, but before anyone logs in. Services start before the user logs in and continue to run even after the user logs out. Database servers and file servers are types of programs that would normally be run as services. The Controller can be installed to run as a service. GECS will execute submitted jobs as long as Windows is running, even if no one is logged in to the console. There are several setup issues that must be considered as well. Regardless, running GECS as a service under Windows can be used in a wide variety of ways and can greatly enhance the functionality of Windows.

By using the default settings, GECS runs in the security context of the local system account and uses the default Station/Desktop. Beginning with Windows NT version 3.5, the system accounts privileges have been modified to limit access to local and network resources thereby limiting the privileges of GECS and its jobs. To regain control over the resources GECS has access to, GECS must be setup to run within the account of a specific user. Use the procedures outlined below to create a GECS user account and setup GECS to use the new account.

Creating User Accounts

Assigning a specific user account to a GECS Controller allows control over the security access to local and network resources. To setup a GECS Controller user account, Log on to Windows as the system administrator or a user who has rights to create new users. Using the Windows User Manager, create a new user using the information specified below.

```
Username:          CONTROL (use your Controller name)
Full Name:         GECS Job Controller
Description:       Job Controller Logon Account
Password:         xxxxxxxx
[] Password Never Expires
```

Use User Manager's User Rights Policy dialog to grant the required rights to the Controller user account. The rights required for the Controller to dispatch the submitted jobs varies with each installation of GECS. These rights **MUST** be determined by you. In addition to these rights, the Controller's logon account **MUST** have the following advanced User Rights. Note that 'Show Advanced User Rights' must be checked to display the necessary rights.

```
Act as part of the operating system
Increase quotas
Log on as a service
Replace a process level token
```

By making the Controller User Account a member of the Administrators group, GECS will have full control of the local system. This may not be the desired behavior of your particular system. To change the rights of the Controller Account, first create a new user group and then make the Controller Account a member of this group, at which point you may change the User rights for this specific group. (See User Manager Help for more information on creating New Groups, New Users and User Rights).

If the Controller using this account reads its data files from a networked file server, the account must have Full Access to the share that is used to reference the file server where the GECS data is located.

GECS Service Program

The CSERVICE.EXE program is used to start the service. This program is run automatically by the Windows service manager and should never be run directly.

GECS Service Installation

The Workstation Setup program C40SETUP.EXE can configure your Controller to run either on the desktop or as services. The services can run using the system account or under a specified user account.

To setup your Controller to run as a Windows service, see the Custom Installation chapter of this manual.

The Workstation Setup program will automatically configure the specified Controller to run as a service. It will also add the appropriate registry information.

GECS Service Removal

The GECS Workstation Setup program can be used to remove a service. To remove a service, simply select Run from a desktop icon option in the Controller Information section of the Workstation Setup program.

Pause GECS Controller from Windows Service Manager

When a “Pause Filespec” is defined for your GECS Controller running as a service, the GECS Controller can be paused using the Windows service manager.

Controller Window Commands

Usage:

EXIT, STOP, QUIT	- Shutdown the Controller
HIDE	- Hide the Controller
MINI	- Minimize the Controller
PULSE	- Pulse the Controller Now
TEST	- Pulse the Controller Now and Test all Agents
VERSION	- Display version
CLS, CLEAR	- Clear screen
TIME	- Display time
LIST	- List active jobs
VERBOSE, QUIET	- Toggle verbose messages
ADDRESS	- Display addresses

Uninstalling GECS

Be sure all GECS programs are stopped before uninstalling.

Windows Client, Controller, or Agent

1. From Control Panel, click Add/Remove Programs.
2. Select the Global Event Control Server then choose Uninstall.
3. Indicate whether or not to delete program and data files.
4. Click the Uninstall button.

GECS DBMS

GECS DBMS Overview

The GECS DBMS program (GECSDBMS.EXE) is one of the most important components of the GECS system. The DBMS allows access to the GECS data files. The DBMS must be running in order to use any of the components of the GECS System. This program is designed to run continuously.

Installing the DBMS Program

The GECS DBMS program can be installed from the Global ECS Windows CD ROM or you can FTP the DBMS program from the Global ECS web site. Instructions to install from CD ROM or from images (EXE files) off the web site are listed below. Go to your DBMS machine and follow one of the sets of instructions below.

DBMS from CD ROM

- A. Login as Administrator or as an administrator equivalent user.
- B. Insert the GECS Windows CD ROM. The installation program may automatically start after several seconds. If the installation program does not automatically start, click the Start button, select Run and Enter: **D:\SUBTYPES** (Where D: is your CD ROM drive)
- C. Click the **Complete Installation** option then click the **OK** button.
- D. Click the **Finish** button to display the Global ECS Setup screen.
- E. Again, use the default settings and click the **Configure** button, then click **OK**.

DBMS Exe File

- A. Login as Administrator or as an administrator equivalent user.
- B. Open a Command Prompt
- C. Enter: **md c:\gecsctrl**
- D. Copy or ftp the EXE file to **c:\gecsctrl** (as binary)
- E. Exit
- F. Click the Start button, select Run, **c:\gecsctrl\gecs-3.10-system.exe**
- G. Unzip into **c:\gecsctrl**
- H. Unzip, click OK then Close.
- I. Click the Start button, select Run, **c:\gecsctrl\setup.exe**

The GECS Workstation Setup program will create your DBMS record, your DBMS desktop icon and, when desired, to setup your DBMS to be run as a service.

GECS Express installation will automatically create and start your DBMS as a service under the system account.

Monitoring Your DBMS

You can check the status of your DBMS using the GECS Administrator client program or using the web Client programs.

The status of your DBMS can be viewed by clicking on the DBMS Settings option from the GECS Administrator program.

By right clicking on the DBMS Settings option from the GECS Administrator's list you can easily hide, show, minimize and ping your DBMS.

You can view the status of your DBMS using a browser by entering the appropriate URL as shown below:

http://ipaddress:httpport/name

For example:

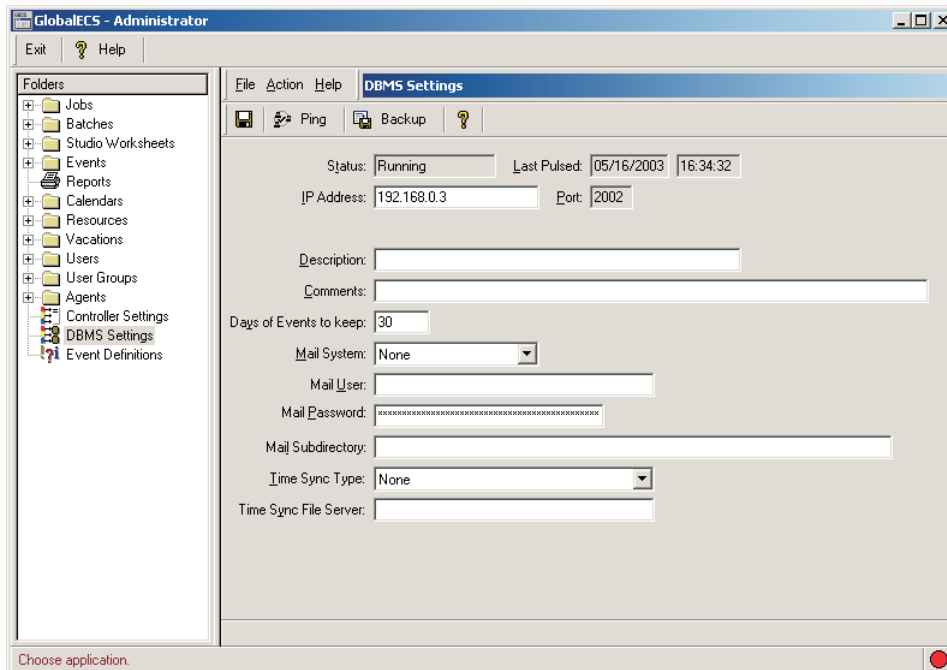
http://200.200.200.37:2012/DBMS

You will then be prompted to enter a user name. You should enter the name of your DBMS (DBMS). However, if the DBMS was started with the command line parameters `-s name` (HTTP login name) and `-t pass` (HTTP login password) the appropriate user name and password must be used.

DBMS Parameters

Your DBMS record is automatically created and can be updated using the GECS Client programs. From the GECS Administrator Client program use the DBMS settings folder to update your GECS DBMS record. Your DBMS record describes the functions you want your DBMS to perform.

The DBMS Settings screen is displayed below.



DBMS Name

Your GECS DBMS is automatically named DBMS. This name cannot be changed.

Status

The DBMS “Status” field displays the status of your DBMS. Your DBMS will automatically update this field. You cannot edit this field. DBMS status is defined as:

Quit	- Your DBMS has been stopped
Running	- Your DBMS is running

IP Address

The DBMS “IP Address” field is used to enter the IP Address of the computer that will run your DBMS program. The address of the current machine is added by default.

Port

The DBMS “Port” field is used to enter the port number on the machine that will run your DBMS program. The port number defaults to 2002.

Description

The DBMS “Description” field is used to enter any miscellaneous description about your DBMS. This optional description will appear along with the DBMS name in various places within the GECS Client programs.

Comments

The “Comments” field is an optional field that can be used to enter a miscellaneous comment about your DBMS.

Days Of Events To Keep

Your GECS DBMS program can automatically 'trim' the list of Events. If you want your DBMS to automatically delete old Event records, enter the number of days of Events that should be maintained in the “Days of Events To Keep” field. If you don't want it to automatically trim the Events, enter '0' in this field.

DBMS Mail

Your DBMS can be configured to send email when a particular Event occurs. You must specify the type of email your DBMS is to send and you must also specify within each Event Definition which Events you wish to send email on.

Mail System

Use the “Mail System” field to indicate the type of mail system you are going to use to send email messages on Events. Each Event you wish to receive email must be configured in Event Definitions. If email is not going to be used with GECS, select No Your options are:

- None
- Novell
- Microsoft Mail
- cc:Mail
- Notes Mail
- Internet Mail

Mail User

The DBMS can be assigned its own mail address. It can then send mail messages when certain GECS Events occur. After configuring your DBMS record to send mail, you simply update the Event Definitions for the Events you would like to be notified of. For example, email can be sent about Events pertaining to your jobs and/or your GECS System.

Use this field to enter the from mail user name assigned to this DBMS. The format is username (with optional[:password]) following the selected mail system's name guidelines.

For example:

- | | |
|------------------------|---------------------------------------|
| DBMS | for MHS Mail |
| ProfileName | for Microsoft Mail |
| DBMS | for cc:Mail |
| leave this field blank | for Notes Mail |
| 12345dbms | for Internet Mail (sending from name) |

Mail Password

Use the “Mail Password” field to enter your GECS DBMS's email password. Follow the selected email system guidelines.

You would leave this field blank if you specify a password in the “Mail User Name” field using the optional password parameter.

password	- for Mail
password	- for Microsoft Mail
password	- for cc:Mail
password	- for Notes Mail
password	- for Internet Mail

For security purposes the password you enter will not be displayed. This field will automatically be filled in with asterisks.

Mail Subdirectory

Use the “Mail Subdirectory” field to enter the drive and subdirectory of the selected email system. This would typically be something like:

F:\MAIL	- for MHS
F:\	- for MS Mail
leave this field blank	- for MS Exchange Mail
M:\	- for ccMail
leave this field blank	- for Notes Mail
mail..net	- for Internet Mail

Time Sync Type

Your DBMS can be configured to synchronize its time using one of the time synchronization methods below:

- None
- Microsoft
- NetWare
- Time Protocol (RFC-868)
- NTP/SNTP (RFC-1305/1361/1769/2030)

Time Sync File Server

The “Time Sync File Server” field can be used to synchronize the computer’s time, that is running your DBMS with another computer on the network.

If you wish to time sync to a NetWare file server you must have NetWare drivers installed. Likewise, if you wish to time sync to a Windows Server machine, you must have Microsoft drivers installed.

When your DBMS has a Time Sync Server name entered it will update the time on the machine with the time of the computer specified. For example:

TESTSRV1

\\

123.123.123.123:37

123.123.123.123:123

Configuring the DBMS

The DBMS must run on a Windows NT/2000/XP/2003 computer. The DBMS can run from a desktop icon, as a service under the system account or as a service under a specified user account. Use the GECS Workstation Setup program to configure the DBMS program.

DBMS Data Backup

You can backup your GECS system data by clicking on the Backup toolbar button in the DBMS Settings screen. This will backup all files which exist in your GECS data directory. By default this directory is C:\GECS\DATA.

You will be prompted to enter the drive and subdirectory of the location where you would like your GECS data directory to be backed up into. This directory is relative to the computer on which the DBMS is running.

The Backup procedure initiates an asynchronous backup of the GECS data files. All database transaction are suspended until the backup is complete. The archived data files may then be safely moved to tape or another storage device. Data file integrity is maintained in the event that a system restore is required.

Scheduled Backups

You can schedule a GECS job to automatically backup up your GECS data files on which ever type of schedule you choose. Use the GECSBKUP command line utility for your jobs command line as show in the example below.

Usage: **GECSBKUP subdir**

(where subdir is the directory where you wish to have your data saved to)

Job Command Line: **C:\GECS\GECSBKUP F:\BACKUP\GECSDATA**

The DBMS will backup the data therefore, the directory entered is relative to the DBMS.

You can also use GECS substitution variables to enable your backup job to copy the data into a separate folder for each day of the week. It is a good idea to have separate copies of data to use to restore from file corruption or user errors. You would schedule your job to repeat daily and use substitution variables as follows:

Job Command Line: **C:\GECS\GECSBKUP F:\BACKUP\GECSDATA\@SCHDATE(%a)**

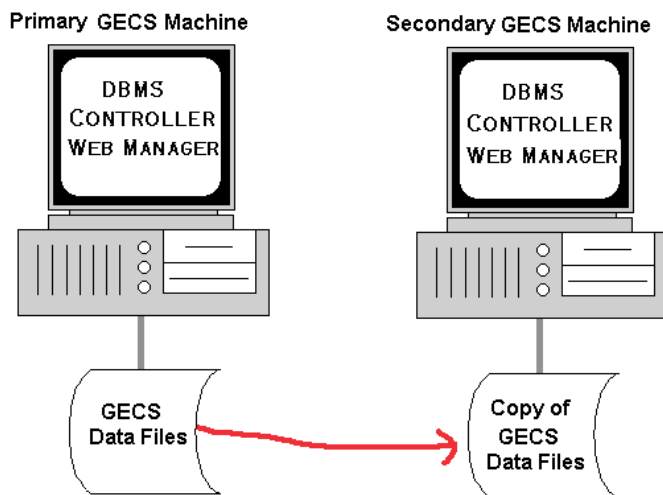
@SCHDATE will substitute the job's schedule date and the (%a) would use the day of the week format such as Sun, Mon, Tue, etc. (Note that substitution variables must be all upper case). You would end up with GECS data copied to the F:\BACKUP\GECSDATA\Sun, F:\BACKUP\GECSDATA\Mon and F:\BACKUP\GECSDATA\Wed folders respectively.

After setting up and running jobs to backup your GECS data files. You should test your scheme by shutting down your system and restoring your data. You should test copying individual .DAT and .IDX files and test copying all files into your GECS Data directory.

Setting up a GECS Fail Over System

The following are recommendations on minimizing the effects of Global ECS system failure. (primary Controller/DBMS machine hangs, loses logical or physical network connection, loses power etc.). Also suggestions to prepare for failure and recovery procedures. Depending on the environment there may be alternative solutions. You should periodically test your fail over and recovery plans.

1. To decrease your chances of failure, install the Global ECS Controller, DBMS, Web Manager and GECS data locally on one Windows machine. We will call this the Primary GECS machine. Do not run any Agents or install other software on this machine. This will eliminate the chances of network problems and eliminate the chances of other software affecting machine performance.
2. Secondary GECS machine: Install and configure Global ECS on a second Windows machine with access to a secondary GECS data folder. This Secondary system should have all GECS components configured to be run 'From Desktop Icons'. The secondary DBMS and Controller programs should NOT be started until needed.
3. Primary GECS machine: Periodically launch a job that copies GECS data to a secondary GECS folder, accessible to the Secondary DBMS/Controller machine.



GECS System Recovery Procedures

If your Primary GECS Machine goes down, there are a couple of quick steps you can take to get GECS up and running on another machine. To start up your fail over system described above, follow the steps below.

1. Once the Primary Machine is no longer running, go to the Backup machine and start the DBMS from a desktop icon. Open the Administrator program and look at your jobs. Depending on when the Data files were copied, you may have some jobs that have very recently run that are not reflected in the set of data you are viewing.
2. Once you have determined which jobs have already run, you can 'Skip and Reschedule' them so they do not run twice. If your data is up to date you may not have to do anything.

3. When Pending jobs have been checked, open the Workstation setup program and configure your GECS components to run as your Primary GECS System was configured, either 'From Desktop Icons' or 'As Services'. Once configured, services will automatically start. Components configured to run on the desktop should be started by double clicking the respective icons.

If you need to restore your Global ECS system and you do not have a fail over system already installed, you can install GECS programs from the Global ECS web site at www.globalecs.com. You must have a backup copy of your data files to restore and you must verify the version of Global ECS programs. Install the GECS programs and configure all components to initially run on the desktop. After installing a new GECS system, shut down all GECS components and copy in your restored data files. Start the DBMS and verify your job records are ok to run. Once your job streams are verified, run the Workstation Setup program and configure your components to run as you like.

Starting and Stopping the DBMS

The DBMS can run from a desktop icon, as a service under the system account or as a service under a specified user account. When run from a desktop icon you can start it by double clicking on the icon. When run as a service, the DBMS program will automatically start when the operating system starts.

There are special startup options listed below. These options can either be run from the command line, or can be entered in the shortcut properties for the DBMS when run from a desktop icon.

DBMS Desktop Startup Command Line Options

Usage: **gecsdbms [-n name]...**

-c ini	The INI file to use
-h	Run hidden
-m	Run minimized
-n name	DBMS's GECS name
-p port	Use 'port' rather than port 2002
-q port	Use 'port' for HTTP rather than port 2012 (0=disable)
-s name	HTTP login name
-t pass	HTTP login password
-u path	Path for misc. HTTP files
-v	Verbose messages

To stop the DBMS program when running from a desktop icon, type 'exit', 'quit', or 'stop' in the DBMS command shell window. To shut down the DBMS running as a service, go to Control Panel, Services and stop the DBMS service.

DBMS Window Commands

When the GECS DBMS program is not running as a service, you can type the following commands into the DBMS window.

Usage:

EXIT, STOP, QUIT	- Shutdown the DBMS
HIDE	- Hide the DBMS
MINI	- Minimize the DBMS
VERSION	- Display version
CLS, CLEAR	- Clear screen
TIME	- Display time
VERBOSE, QUIET	- Toggle verbose messages
ADDRESS	- Display address
CLIENTS	- Display clients
HANDLES	- Display handles
LICENSE	- Display Agent License Information

Uninstalling GECS

Be sure all GECS programs are stopped before uninstalling.

Windows Client, Controller, DBMS or Agent

1. From Control Panel, click Add/Remove Programs.
2. Select the Global Event Control Server then choose Uninstall.
3. Indicate whether or not to delete program and data files.
4. Click the Uninstall button.

GECS Web Manager and Browser Clients

GECS Web Manager Overview

The GECS Web Manager program (GECSWEBS.EXE) allows access via a browser to the GECS data files.

Configuring your Web Manager

The Web Manager must run on a Windows NT/2000/XP/2003 computer. It can run from a desktop icon, as a service under the system account or as a service under a specified user account. Use the GECS Workstation Setup program to configure the Web Manager program.

Starting and Stopping the Web Manager

The Web Manager can run from a desktop icon, as a service under the system account or as a service under a specified user account. When run from a desktop icon you can start it by double clicking on the icon. When run as a service, the Web Manager program will automatically start when the operating system starts.

There are special startup options listed below. These options can either be run from the command line, or can be entered in the shortcut properties for the Web Manager when run from a desktop icon.

Web Manager Desktop Startup Command Line Options

Usage: **gecswebs [-n name]...**

-c ini	The INI file name to use
-h	Run hidden
-m	Run minimized
-n name	Web Manager's GECS name
-p port	Use 'port' rather than port 2003
-q port	Use 'port' for HTTP rather than port 2013 (0=disable)
-u path	Use 'path' for HTTP files rather than the working directory
-v	Verbose messages

To stop the Web Manager program when running from a desktop icon, type 'exit', 'quit', or 'stop' in the Web Manager command shell window. To shut down the Web Manager running as a service, go to Control Panel, Services and stop the Web Manager service.

Web Manager Window Commands

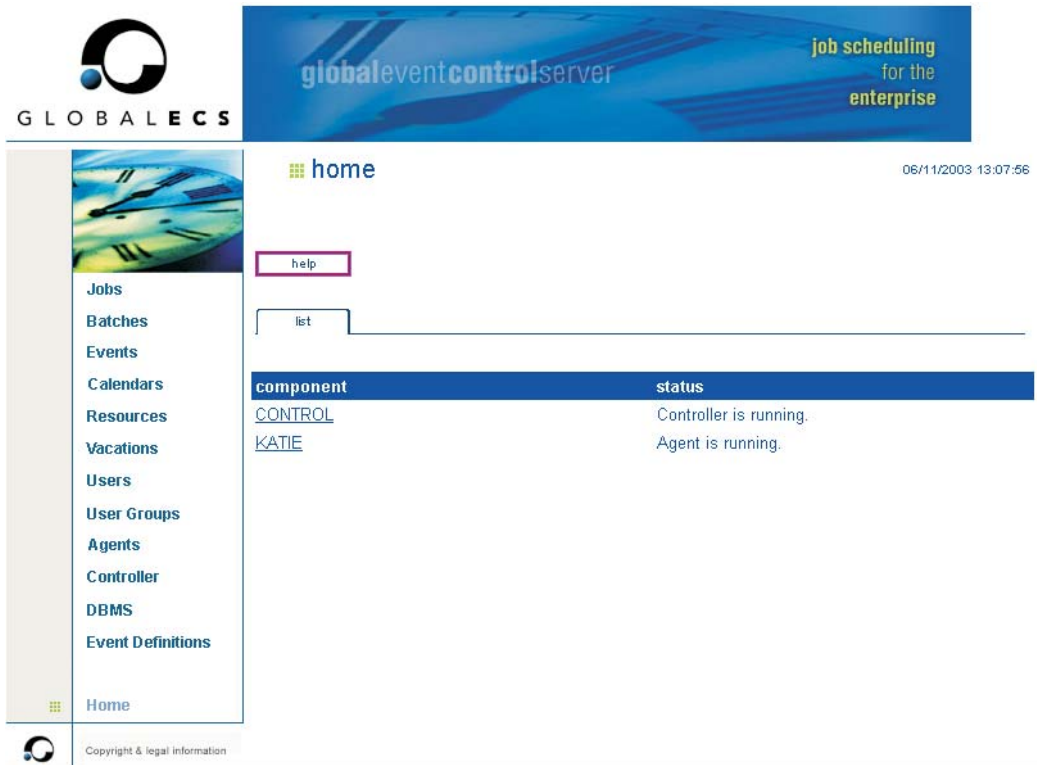
When the GECS Web Manager program is not being run as a service, you can type the following commands into the Web Manager window.

Usage:

- EXIT, STOP, QUIT** - Shutdown the Web Manager
- HIDE** - Hide the Web Manager
- MINI** - Minimize the Web Manager
- VERSION** - Display version
- CLS, CLEAR** - Clear screen
- TIME** - Display time
- VERBOSE, QUIET** - Toggle verbose messages
- ADDRESS** - Display address

Using GECS Browser Client Programs

The Web Manager program allows users to access the GECS data files remotely from most any machine using a browser. After pointing your browser at the URL you are prompted to login to the GECS System. After GECS validates your user name and password, you can monitor or update the GECS system from the web pages displayed on your browser. No software or special configuration is required on users computers.



Opening GECS Browser Client Programs

To check GECS components from a browser, open your browser program and enter the appropriate URL as shown below:

http://ipaddress : port / name

Web Manager

To open your GECS browser Client programs, open your browser program and enter the Web Manager IP Address and HTTP Port Number. For example:

http://200.200.200.25:2013

From a computer where GECS is installed, you can double click the Global ECS browser icon to access the browser Client programs.

You will be prompted to enter a username and password. You can enter any valid GECS user name.

Agents

To check your Agent from a browser, open your browser program and enter the Agent IP Address, HTTP Port Number and Agent Name. For example:

http://200.200.200.205:2010/NED

You will be prompted to enter a username and password. For the user name, enter the name of the Agent, in this example you would enter NED. However, if the Agent was started with the command line parameters **-s name** (HTTP login name) and **-t pass** (HTTP login password) the appropriate user name and password must be used.

Controller

To check your Controller from a browser, open your browser program and enter the Controller IP Address, HTTP Port Number and Controller Name. For example:

http://200.200.200.189:2011/CONTROL

You will be prompted to enter a username and password. For the user name, enter the name of the Controller, you would enter CONTROL. However, if the Controller was started with the command line parameters **-s name** (HTTP login name) and **-t pass** (HTTP login password) the appropriate user name and password must be used.

DBMS

To check your DBMS from a browser, open your browser program and enter the DBMS IP Address, HTTP Port Number and DBMS Name. For example:

http://200.200.200.37:2012/DBMS

You will be prompted to enter a username and password. For the user name, enter the name of the DBMS, you would enter DBMS. However, if the DBMS was started with the command line parameters `-s name` (HTTP login name) and `-t pass` (HTTP login password) the appropriate user name and password must be used.

GECS Utility Programs

GECS Command Line Utilities

GECS ships special command line utility programs that must be run on a command line. These programs install into your GECS directory. Some of these programs require exclusive use of the GECS data files and therefore, can only be run when your GECS programs are shut down. Utility programs include the following:

BATCHDON	- Batch dependencies program
GECSAUSR	- Add users utility
GECSBKUP	- Data backup utility
GECSBREM	- Remove scheduled batch jobs program
GECSBSCH	- Schedule batch jobs program
GECSCALE	- Add calendars utility
GECSKAN	- Can do program
GECSKANT	- Can't do program
GECSKERT	- Certificate Security program
GECSCHNG	- Trigger File Change Utility
GECSCLEA	- Cleanup utility
GECSNUM	- Change job number utility
GECSCONV	- Convert utility
GECSUSE	- Change user utility
GECSDEL	- Job delete utility
GECSDUMP	- Job export utility
GECSDEL	- Event Delete utility
GECSVNT	- Add Events utility
GECSHIDE	- Used to hide a Windows Agent/Controller program window
GECSLAUN	- Internal Unix utility (Agent)
GECSLDEL	- Completed job delete utility
GECSLDUM	- Completed job export utility
GECSOVER	- Job override utility
GECPASS	- Password change program
GECSPAUS	- Used to Pause/Unpause remotely
GECSPING	- Used to test the status of Agents
GECSPURG	- Job purge utility
GECSQUEU	- Queue program
GECSQUIC	- Quick job adding program
GECSRBLD	- Rebuild utility
GECSRET	- (DOSRET, OS2RET, WINRET & WINRET32) Return code testing executables
GECSHOW	- Used to display a hidden Windows Agent/Controller

GECSIZE	- Trigger File Size utility
GECSSTOP	- Used to stop an Agent/Controller
GECSSTP	- Stop job utility
GECSTRIG	- Job trigger utility
GECSVAL	- Validate utility
PULSENOW	- Used to immediately pulse your Controller

BATCHDON - Batch Dependency Utility

This program checks to see that one or more Batches (BATCH2 thru BATCH*n*) have successfully completed since another batch (BATCH1) last ran.add users utility,

BATCHDON.EXE [/WAIT] *jobnum batch1 batch2 ... batchn*

Zero is returned if the batches completed and non zero if they didn't. This job is designed to be the first job in a batch, with the other jobs in the batch depending on it. It can then test to see if the predecessor batch(s) have completed. The program looks at all the jobs in the batch (*batch1*) to see when the last of them finished. The job that launches this program must be excluded from this calculation, since it is running now. Consequently, its job number (*jobnum*) must be included on the command line, so it can be excluded. The /WAIT parameter will cause the program to stop and wait for a key for use in testing and debugging. For example:

<u>BATCH1</u>	<u>BATCH2</u>	<u>BATCH3</u>
BATCH1.1	BATCH2.1	BATCH3.1
BATCH1.2	BATCH2.2	BATCH3.2
BATCH1.3	BATCH2.3	BATCH3.3
BATCH1.4	BATCH2.4	BATCH3.4
BATCH1.5	BATCH2.5	BATCH3.5
BATCH1.6	BATCH2.6	BATCH3.6
BATCH1.7	BATCH2.7	BATCH3.7
BATCH1.8	BATCH2.8	BATCH3.8
BATCH1.9	BATCH2.9	BATCH3.9

BATCH4

BATCH4.1 cmdline BATCHDON BATCH4.1 BATCH4 BATCH1 BATCH2 BATCH3

retry if return code is greater than or equal to 1

number of times to retry = 0 (infinite)

BATCH4.2 depends on BATCH4.1 returning 0

BATCH4.3 depends on BATCH4.1 returning 0

BATCH4.4 depends on BATCH4.1 returning 0

BATCH4.5 depends on BATCH4.1 returning 0

BATCH4.6 depends on BATCH4.1 returning 0

BATCH4.7 depends on BATCH4.1 returning 0

BATCH4.8 depends on BATCH4.1 returning 0

BATCH4.9 depends on BATCH4.1 returning 0

There are four batches of jobs, BATCH1, BATCH2, BATCH3 and BATCH4. Each batch contains a number of jobs. You don't want any of the jobs in BATCH4 to start until all the jobs in BATCH1, BATCH2 and BATCH3 are complete. You would make all the jobs in BATCH4 (except BATCH4.1) depend on BATCH4.1. The BATCH4.1 job would run the BATCHDON program as shown and would be setup to retry on failure as shown.

When used as shown, none of the jobs in BATCH4 would run until all the jobs in BATCH1, BATCH2 and BATCH3 have run. The program also respects the 'maximum good return code' field. If one of the predecessor jobs completed, but with a return code greater than the maximum good return code, the job isn't considered complete.

All the jobs in the predecessor batches (BATCH1, BATCH2 and BATCH3) must repeat as often, or more often, than the jobs in BATCH4.

If not, BATCH4 jobs will repeat with the same frequency as the least often repeating job in BATCH1, BATCH2 or BATCH3.

Note that the batchdon program must be installed on the agent machine along with the client programs installed on the agent machine. This is because the GECS.INI file is required to be on the agent machine.

GECSAUSR - Add Users Utility

The add users utility, GECSAUSR, allows you to automate the process of adding a large number of users to the GECS users file. This program reads a comma separated file that contains a list of user names and optionally their password. The users in the file are added to the GECS users file. A template username is specified and the users that are added are created 'like' the template user. The program is run by entering:

```
GECSAUSR [/NOSTOP] templateuser filename
```

The comma separated file is in the format:

```
"username"  
"username"  
"username"
```

or

```
"username", "password"  
"username", "password"  
"username", "password"
```

For example, if you had manually added a GECS user named JOE and had created the following comma separated file named USERS.CSV:

```
"SALLY", "123"  
"SAM", "234"  
"WALLY", "345"
```

you could have this utility automatically add these users with similar security as existing user JOE, by entering:

```
GECSAUSR JOE F:\USERS.CSV
```

The /NOSTOP option causes the program to exit immediately upon completion.

GECSBKUP - Data Backup Utility

The data backup utility, GECSBKUP, can be run to make backup copies of your GECS data directory. You will need to enter the drive and subdirectory of the location you would like your GECS data directory to be backed up into. For instance:

```
GECSBKUP F:\BACKUP
```

A GECS job can be scheduled to launch this backup utility. This way you can automatically have your GECS data directory backed up as often as you like.

GECSBREM - Remove Scheduled Batch jobs program

Removing scheduled jobs will actually delete, from the JOBS table, the jobs of a previously scheduled GECS Batch. A batch may be removed by using either the standalone GECSBREM.EXE program, which will allow this program to be run unattended as a GECS job, or by using the Client Batches “Remove Instance” or “Remove All” buttons from the “Scheduled Jobs” screen. Completed Jobs will be left on file.

To remove a single instance of a batch, from the client Administrator program, Batches screen, click on the “Scheduled Jobs” toolbar button. From the Remove Scheduled Jobs program and from the scheduled jobs screen in the Batches program you can click on the “Remove Instance” button to remove a single highlighted job.

To remove all jobs previously scheduled from a batch, from Batches, click on the “Scheduled Jobs” toolbar button. From the Remove Scheduled Jobs program and from the scheduled jobs screen in Batches, you can click on the “Remove All” button to remove all jobs for the highlighted batch.

The Remove Scheduled Jobs program (GECSBREM.EXE) may be passed command line parameters to control the operation of the removal process. The first parameter passed may be the name of the Batch to remove. It will then remove the most recent scheduled batch of the batch name specified. Should the removal fail, a message box is displayed indicating the error that occurred and an exit value of 1 is returned to the calling program. Error messages may be silenced using the -Q (Quiet) command line switch.

```
GECSBREM.EXE batchname -Q
```

GECSBSCH - Schedule Batch jobs program

The Schedule Batch Jobs program can be started with the name of the desired Batch passed on the command line. The program will immediately schedule the designated batch. It will stop and prompt for Batch Variables, if any are defined for the Batch. The -Q command line option can be added after the batch name to indicate that the program should run in “Quiet” mode, not stopping for program errors. This will allow the scheduling of a Batch to be automated (run unattended) as a GECS job.

```
GECSBSCH.EXE batchname -Q
```

Note that this program will still prompt for Batch variable input if they have been defined for the Batch when run with the -Q option.

When scheduling a batch via Batches Administrator client program, the currently selected Batch is scheduled. Scheduling a batch using the Schedule Batch Jobs program first presents a list of all the available batches, allowing you to choose which batch to schedule. Double clicking on a batch or highlighting and clicking the “Next” button initiates submission.

The ability to run GECSBSCH.EXE has enormous potential for automating the scheduling of individual batches. These executable programs can be run as a standard GECS job. By running GECSBSCH.EXE as a job, it is possible to daisy chain batches. Consider creating a batch which has as its last step, an item which will run GECSBSCH.EXE passing the name of the next batch to run. In this way, you can create dependent batches.

The batch scheduling process performs the following:

1. Creates new job records and adds them to the jobs queue. Unique job numbers are assigned and are associated exclusively to the batch. This makes it possible to remove scheduled jobs for this batch schedule only.
2. Generates Events for each Batch Scheduled.

GECSCALE - Add Calendars Utility

The add calendars utility, GECSCALE, allows you to automate the process of adding a large number of defined months or non-business days. This program reads a comma separated file that contains a list of dates and optionally their description. The dates in the file are added to either the GECS defined months or non-business days file based on the type entered on the command line. Additionally, the name of the calendar that the entries should be added to is entered on the command line. The program is run by entering:

```
GECSCALE [/NOSTOP] type calendar filename
```

where 'type' is either NONBUSI or DEFMONTH and 'calendar' is the name of the calendar the entries should be added to. If the specified 'calendar' does not already exist, it is created. Any existing entries in the specified calendar remain and the new entries are added to them. The comma separated file is in the format:

```
"mm/dd/yyyy"  
"mm/dd/yyyy"  
"mm/dd/yyyy"
```

or

```
"mm/dd/yyyy", "description"  
"mm/dd/yyyy", "description"  
"mm/dd/yyyy", "description"
```

For example, if you had created the following comma separated file named MONTHS.CSV:

```
"01/01/1996", "Month1"  
"02/02/1996", "Month2"  
"03/03/1996", "Month3"
```

you could have this utility automatically add these defined months to the MYMONTHS calendar by entering:

```
GECSCALE DEFMONTH MYMONTHS F:\MONTHS.CSV
```

The /NOSTOP option causes the program to exit immediately upon completion.

GECSCAN - Can Do Program

The can do program, GECSCAN, produces a list of the jobs that a particular Agent can execute. It is run by entering:

```
GECSCAN [/NOSTOP] Agent [/O:output file]
```

where *Agent* is the name of the Agent you want to test. For example:

```
GECSCAN AGENTNT
```

would produce a list of all the jobs that AGENTNT can execute. The /NOSTOP option causes the program to immediately exit on completion. The /O:output option causes the program to send its output to the specified file, rather than to the screen.

GECSMANT - Can't Do Program

The can't do program, GECSMANT, is just the opposite of GECSMANT. It produces a list of the jobs that a particular Agent cannot execute and it explains why. It is run by entering:

```
GECSMANT [/NOSTOP] Agent [/O:output file]
```

where *Agent* is the name of the Agent you want to test. For example:

```
GECSMANT AGENTNT
```

would produce a list of all the jobs the AGENTNT cannot execute. The /NOSTOP option causes the program to immediately exit on completion. The /O:output option causes the program to send its output to the specified file, rather than to the screen.

GECSMANT - Certificate Management Program

To set up certificate management for your Global ECS system, you must run the GECSMANT program on every computer that will be running GECS components. You must establish a unique password for your system. This password must be entered when this program is run. Any computer without the proper certificate will be locked out of the system. Information about this computer is encrypted with the password to prevent this certificate from being used on other computers. The password is the key to generating the certificate code. We recommend the password exceed 16 characters but no more than 255 characters. Normal rules of command line arguments apply. (i.e. If you are using spaces in your password it should be enclosed in quotes). For example:

```
GECSMANT /NEW abc1234567890wxyz abc1234567890wxyz
```

Where 'abc1234567890wxyz' is your password. It is entered twice for verification.

To disable certificate management you can run the GECSMANT program with the delete option. For example:

```
GECSMANT /DEL abc1234567890wxyz
```

For Windows, you must be logged in as Administrator and you must have the appropriate password to disable this scheme.

For Unix, you should be logged in as root. A file will be created on the machine in the /GECS subdirectory.

GECSMANT - Trigger File Change Utility

The GECSMANT utility allows dependencies on files "changing". This program accepts a file name as an argument. When GECSMANT.EXE first starts, it records (in memory) the time/date stamp of the file that was passed on the command line. It then periodically checks the time stamp of the file. When the time stamp does not match the one in memory, that means the file has been edited/changed. At that point GECSMANT.EXE returns a zero to the OS and terminates. If the file passed on the command line cannot be found, GECSMANT.EXE returns a non-zero value and terminates. The syntax for use is:

```
GECSMANT filespec
```

where *filespec* is the fully qualified path of the file to be watched. For example:

```
C:\GECS\GECSMANT C:\TESTFIL.TXT
```

would be the "Command Line" of the Trigger Job. This job needs to be started BEFORE the file changes and will run until the file changes. The real Job will be the second job that has a "Job Dependency" on the first (Trigger) job.

GECSCLEA - Cleanup Utility

The cleanup utility, GECSCLEA, is provided to help automatically reset your system after an abnormal system failure. The format for executing the clean program is:

```
GECSCLEA.EXE [/NOSTOP] [wrksubdir] [/DEL beg end]
[/PURGE beg end] [/ROLL beg end] [/RESET] [/RECONLY] [/NOWRK]
```

Optional parameters as follows:

/NOSTOP	- causes program to immediately exit upon completion
<i>wrksubdir</i>	- subdirectory to delete wrk files from
/DEL <i>beg end</i>	- delete pending non-recurring jobs from <i>beg</i> through <i>end</i>
/PURGE <i>beg end</i>	- delete completed jobs from <i>beg</i> to <i>end</i>
/ROLL <i>beg end</i>	- roll forward pending recurring jobs from <i>beg</i> through <i>end</i>
/RESET	- mark all jobs currently set as “on hold” to “pending”
/RECONLY	- only “recurring” jobs should be rolled forward. Don’t mark on time jobs complete
/NOWRK	- don’t delete any wrk files

In case of power failure or other system failure, GECS can handle resetting jobs that were running at the time of the system failure by using the GECSCLEA utility. Jobs that were running when the system failed are left “Started”.

The cleanup utility is designed to be run before your Controller restarts after such an outage. It can mark jobs as pending so they will run again as soon as your Controller is restarted, just as if the job had never been started prior to the system failure. This prevents jobs that are not set for retry from being skipped due to system failure. This program resets the “Job Status” flag for any jobs with a started status and sets it back to “Pending”. This will cause your Controller to dispatch the job again, once it is started.

This program cannot be run when any other GECS programs (Controller or clients) are being run. It will error if it can’t open the data files exclusively. The program returns 0 if it is successful, 1 if it failed because the files were in use and 2 if it encountered some other sort of error.

This program is designed to be put in the AUTOEXEC.BAT or STARTUP.CMD file of the machine being run as the by entering something like:

```
F:
CD \GECS
GECSCLEA
IF ERRORLEVEL 2 GOTO ERROR
GECSPROC CONTROL
GOTO DONE
:ERROR
PAUSE
:DONE
```

You might want to test for an error level of 1 as well. If the program returns an error of 1, another might be running the GECSCLEA utility. You might want to wait several minutes before trying to start the Controller. The Controller won’t start if another node is running the cleanup utility. The **WAITKEY.EXE** program can be used for the wait by entering something like:

```
F:
CD \GECS
GECSCLEA
IF ERRORLEVEL 2 GOTO ERROR
IF ERRORLEVEL 1 GOTO WAIT
:START
GECSPROC CONTROL
GOTO DONE
:WAIT
WAITKEY 120 Waiting For Cleanup To Finish.
GOTO START
:ERROR
PAUSE
:DONE
```

This program can also optionally delete job records or roll jobs forward into the future by using command line options.

You might want to delete some or all of your one time only jobs before the system restarts. The program will delete all non-recurring jobs in a particular job number range by entering:

```
GECSCLEA /DEL begnum endnum
```

For example:

```
GECSCLEA /DEL 100 999
```

would delete all non-recurring jobs in the job number range of 100 through 999. You can enter 0 to indicate first and/or last. For example

```
GECSCLEA /DEL 0 0
```

would delete all non-recurring jobs.

You might want to roll forward some or all of your recurring jobs before they start. The program can roll forward recurring jobs until they are scheduled at sometime in the future by entering:

```
GECSCLEA /ROLL begnum endnum
```

For example:

```
GECSCLEA /NOSTOP /ROLL 1000 1999
```

would advance the next scheduled date and time on all recurring jobs in the job number range of 1000 through 1999. You can enter a 0 to indicate first and/or last. For example:

```
GECSCLEA /ROLL 1000 0
```

would roll forward all recurring jobs numbered greater than or equal to 1000.

The 'wrksubdir' option can be added as the first command line option to tell the cleanup program to delete any WRK files from the specified subdirectory. For example:

```
GECSCLEA F:\GECS
```

would cause the cleanup program to delete any WRK files that might exist in F:\GECS or SYS:\GECS.

The GECSCLEA utility can optionally reset jobs that are marked as 'started' to 'pending' by using the /RESET command line option. For example:

```
GECSCLEA /RESET
```

The GECSCLEA utility can optionally purge completed jobs in a particular job number range by using the /PURGE command line option.

```
GECSCLEA /PURGE begnum endnum
```

For example:

```
GECSCLEA /PURGE 1000 2000
```

would delete all completed jobs that had job numbers in the range of 1000 through 2000

These options can be combined on a single command line by entering:

```
GECSCLEA F:\ /DEL 20 0 /ROLL 0 19 /RESET
```

Jobs are rolled forward as if they started when scheduled and took no time to run. This means that the jobs that repeat based on the Last Start Time or Last Finished Time will effectively be rescheduled based on the Last Scheduled Time as they are rolled forward. Most jobs will roll forward rather quickly. Jobs that are scheduled very frequently (every couple seconds) can take some time to roll forward if the Controller has been down for quite a while (several weeks or months).

This program can automate and simplify your recovery after a system outage, but you need to remember that it is a powerful program and should be used carefully.

GECSNUM - Change Job Number Utility

The change job number utility, GECSNUM, can be used to allow you to change the job number of an existing job. The program is run by entering:

```
GECSNUM [/NOSTOP] oldnum newnum
```

The /NOSTOP option causes the program to immediately exit on completion. The *oldnum* should be populated with the old job number to change from and the *newnum* should be populated with the new job number to change to. For example:

```
GECSNUM 155 BKUPJOB
```

This would change job number 155 into a job named BKUPJOB. Likewise:

```
GECSNUM BATCH5.JOBA-105 TESTBATCH.A-1
```

would change job number BATCH5.JOBA-105 into a job named TESTBATCH.A-1.

GECS CONV - Convert Utility

The Convert utility, GECS CONV, converts ECS version 5.1 or GECS version 1.5 data to GECS version 3.1 data. The SERVERS, RESOURCE and LOGS files are not converted. It is run by entering:

```
GECS CONV
```

This program should only be run once. It installs with the Controller programs but in the convert subdirectory.

GECSDEL - Job Delete Utility

The job delete utility, GECSDEL, is a command line utility that can be used to delete a job or a range of jobs either from a prompt or from inside a batch file. This program is run by entering:

```
GECSDEL [/NOSTOP] [/ONLYCOMP] jobnum [endjob]
```

where *jobnum* is the number of the job to be deleted. For example:

```
GECSDEL BATCH1.JOBA-1 BATCH1.JOBZ-1
```

would delete job BATCH1.JOBA-1 thru BATCH1.JOBZ-1 from the JOBS file. The /NOSTOP option causes the program to exit immediately upon completion. The /ONLYCOMP option causes the program to only delete completed jobs. Without this option the specified job is deleted regardless of status. Jobnum is the job number to delete. [endjob] is optional ending job number to delete through. This program checks rights of the user attempting to delete the job. The user must be assigned to a Security Profile that is allowed to edit ALL jobs, not just their own.

GECSUCUSE - Change User Utility

The change user utility, GECSUCUSE, allows you to change the ‘Submitted By’ user name assigned to all or individual user’s job(s). The program is run by entering:

```
GECSUCUSE [/NOSTOP] [/JOB=n.n-n] olduser newuser
```

The /NOSTOP option causes the program to immediately exit on completion. The /JOB= option allows you to specify individual job numbers. The *olduser* should be populated with the old GECS user name to change from and the *newuser* should be populated with the new GECS user name to change to. For example:

```
GECSUCUSE FRED MARILYN
```

This would update the “Submitted By” field of every job with a submitted by name of Fred to Marilyn. Or to change only the “Submitted By” name on job BATCH1.JOB1-1, see the following:

```
GECSUCUSE /JOB=BATCH1.JOB1-1 FRED MARILYN
```

GECSDUMP - Job Export Utility

The Job export/dump utility, GECSDUMP, creates either a fixed length or comma separated value data file from the information in the JOBS file. This utility is great for transferring test jobs to production. You can dump fully tested jobs from your test environment into a .WRK file then let your production Controller pick up the .WRK file and convert it into GECS production jobs. To run the program, enter :

```
GECSDUMP [/NOSTOP] filename type [job[job]]
```

where *filename* is the name of the output file to be created and *type* is the either CSV (Comma Separated Value), CSV2 (Comma Separated Value which includes valid times), FIXED (Fixed Length), WRK (does not dump job names) or WRKX (dumps job names and saves them in the file) to indicate the type of file to be created. A single job number or range of job numbers can be specified. When a range of job numbers is specified, a space should be entered between the beginning number and the ending number. For example:

```
GECSDUMP C:\TEST.DAT WRKX BATCH1.JOB1-1 BATCH1.JOB50-1
```

The /NOSTOP option causes the program to exit immediately upon completion. The file that is created contains the fields in the JOBS file. The CSV, CSV2 and FIXED format files contain most of the fields in the job record. The WRK and WRKX files contain all the fields in the job record. Should the specified ‘filename’ exist, it is deleted before the new one is created without warning.

All the information in the jobs file is exported except the login as a specified user password. The password is not exported. See the “Job Dump Data Files” section in the File Glossary chapter of this manual for a detailed layout of the file formats. See the “Task Automation” chapter of this manual for job parameter WRK file equivalent values.

When GECSDUMP is used to create a WRK file from a single job that has job dependencies, you may need to manually update the WRK file using special dependency WRK file parameters. For instance, you may need to create a WRK file for each job in the dependent job stream, combine the WRK files into one WRK file, then edit the WRK file using Xn: or 2n: parameters to specify the job dependencies.

GECSEDEL - Event Delete Utility

The Event delete utility, GECSEDEL, allows you to delete GECS Event records. The program is run by entering:

```
GECSEDEL [/NOSTOP] [ONLYCLOSED] begdate [enddate]
```

The /NOSTOP option causes the program to immediately exit on completion. The /ONLYCLOSED option allows you to delete only closed Events. The *begdate* should be populated with the date to start deleting and the optional *enddate* when to stop deleting. For example:

```
GECSEDEL /ONLYCLOSED 07/01/2003 09/01/2003
```

This would delete GECS Event that have a Closed status that occurred between July, 1st 2003 and August, 1st 2003.

GECSEVNT - Add Events Utility

The GECSEVNT utility allows you to define and add your own Events to the GECS system. Usage as follows:

```
GECSEVNT num= type= serv= name= ret= j1= u1= u2= u3= u4= u5= j2=
```

Jobs can depend on the occurrence of these Events you create.

num= %NUMBER% of Event (number must be greater than 1000) (required)

type= %TYPE% of Event (0=DBMS,1=Controller,2=Agent,3=WebManager,4=Admin,5=Other) (required)
"Generated By" field

serv= %SERVER% of Event - "Component" field (1-8 characters) (optional)

name= %NAME% of Event (1-255 characters) (optional)

ret= %RETCODE% of Event (number) (optional)

j1= %JOBNUM% of Event (bat.job-inst) (optional)

u1= %USER1% of Event (1-48 characters) (optional)

u2= %USER2% of Event (1-48 characters) (optional)

u3= %USER3% of Event (1-48 characters) (optional)

u4= %USER4% of Event (1-48 characters) (optional)

u5= %USER5% of Event (1-48 characters) (optional)

j2= %JOBNUM2% of Event (bat.job-inst) (optional)

For instance you may need to create an Event that will trigger one of your jobs to run. For example:

```
GECSEVNT num=1005 type=5 serv=CMDLINE j1=BATCH1.JOB5-6
```

GECSHIDE

The GECSHIDE utility will hide a running Agent or your Controller. It is run as:

```
Unix or Linux GECSHIDE name ip_name [port]
```

```
Windows C:\GECS\GECSHIDE.EXE name ip_name [port]
```

```
NLM LOAD SYS:\GECS\GECSHIDE.NLM name ip_name port]
```

The 'name' and 'ip_name' command line options are required. The 'port' option is optional. For example:

```
      GECSHIDE Agent1 joe.fred.com
      or
LOAD SYS:\GECS\GECSHIDE.NLM nlmAgent 234.234.234.234 12345
```

A message will be displayed to indicate whether the command was run. Note that the 'name' and 'port' options must match the name and port specified when the Agent was started.

This program is included with the Agents, Controller and Windows clients.

GECSLAUN

The GECSLAUN utility is used internally by the Unix Agents when they run jobs as the submitting user. This program should not be run by hand. There is no Windows version.

GECSLDEL - Completed Job Delete Utility

The completed job delete utility, GECSLDEL, is a command line utility that can be used to delete completed jobs either from a prompt or from inside a batch file. This program is run by entering:

```
      GECSLDEL [/NOSTOP] jobnum[jobnum]
```

where *jobnum* is the number of the job or the range of jobs to be deleted. When a range is specified, you should enter a space between the beginning number and the ending number. For example:

```
      GECSLDEL 12345 12499
      GECSLDEL BATCH1.JOBA-5 BATCH1.JOBZ-5
```

would delete completed job records for jobs 12345 through 12499. The /NOSTOP option causes the program to exit immediately upon completion.

GECSLDUM - Completed Job Statistics Export Utility

The completed job statistics export/dump utility, GECSLDUM creates either a fixed length or comma separated value data file from the information statistics from a completed job.

To run the program, enter :

```
      GECSLDUM [/NOSTOP] filename filetype
```

where *filename* is the name of the output file to be created and *filetype* is the either CSV (Comma Separated Value) or FIXED (Fixed Length) to indicate the type of file to be created. For example:

```
      GECSLDUM TEST.DAT FIXED
```

The /NOSTOP option causes the program to exit immediately upon completion. The file that is created contains completed job statistics information.

Should the specified 'filename' exist, it is deleted before the new one is created without warning.

GECSOVER - Job Override Utility

The job dependency override utility, GECSOVER, allows you to flag a job such that it should run even though its predecessor jobs haven't run (override the job dependency). It is run by entering:

```
GECSOVER [/NOSTOP] jobnum
```

where 'jobnum' is the number of the job to be overridden. For example:

```
GECSOVER BATCH1.1234-1
```

would flag job BATCH1.1234-1 such that it would run without its predecessor jobs running first. The /NOSTOP option causes the program to exit immediately upon completion.

GECSPASS - Password Change Program

The password change program, GECSPASS, lets you change the encrypted network passwords in the GECS data files without having to run the GECS client programs. This program is useful if you require frequent user password changes and you don't want users to be allowed to edit users from the GECS Clients. This program is run by entering:

```
GECSPASS [/NOSTOP] username password
```

where *username* is the user record to be changed in the GECS user file and *password* is the new password to be assigned to the user. For example:

```
GECSPASS JOE LAWNMOWER
```

would change the network login password of the GECS user named JOE to LAWNMOWER. The /NOSTOP option would cause the program to exit immediately on completion.

If the user running this program (based on their network login name) is allowed to edit users in the client programs, they can use this program to change anyone's password. If they are not allowed to edit users in the client programs, they can only change their own password.

GECSPAUS

The GECSPAUS utility allows you to pause and unpauses your Controller from any computer that has this program installed. It is run as:

```
Unix or Linux  GECSPAUS on|off name ip_name [port]
Windows       C:\GECS\GECSPAUS.EXE on|off name ip_name [port]
NLM           LOAD SYS:\GECS\GECSPAUS.NLM on|off name ip_name port]
```

'On' =pause Controller, 'off' =unpause Controller, 'name' and 'ip_name' are the Controller's GECS name and Controller's ip address. These command line options are required. The 'port' option is optional. The port defaults to 2001. For example:

```
GECSPAUS control on joe.fred.com
or
LOAD SYS:\GECS\GECSPAUS.NLM on control 234.234.234.234 2001
```

A message will be displayed to indicate whether the command was run. Note that the 'name' and 'port' options must match the name and port specified when the Controller was started.

This program is included with the Agents, Controller and Windows clients.

GECSPING - Ping GECS Component

To test communications between your Controller, Clients or your running Agents you can use the GECSPING utility. This utility is very similar to PING. From the computer running your Controller, Agent or GECS Windows Client programs you can launch the GECSPING utility to check for a response from a specified GECS component. This utility is very helpful for trouble shooting.

If you used default directories during installation, GECSPING is in the C:\GECS subdirectory. Enter the following command line:

```
C:\GECS\GECSPING.EXE name ip_name [port]
```

The 'name' and 'ip_name' command line options are required. The 'name' is the GECS name of the component being tested, such as NAGENT or CONTROL. 'Port' is optional. 'Port' is the port number on the GECS component computer. It is a number in the range of 1 to 65536. For example:

```
C:\GECS\GECSPING Agent1 zeus.company.com
```

or

```
C:\GECS\GECSPING control 200.200.200.100 2001
```

A message will be displayed to indicate whether the specified component can be contacted. Note that the 'name' and 'port' options must match the name and port specified when the component was started.

Make sure you can successfully ping the component before you continue with the next step. If the GECSPING fails, try a different port number, verify your IP address or name, and verify that you are using the component name you used when you started the component.

You can go to the computer where the component is running and enter 'Address'. This will display the name and address the component is running as.

GECSPURG - Job Purge Utility

The job purge utility, GECSPURG, deletes old job records. It is run by entering:

```
GECSPURG [/NOSTOP] [/COMPONLY] mm/dd/yyyy
```

Where all jobs created prior to the 'mm/dd/yyyy' date are deleted. For example:

```
GECSPURG 12/19/1998
```

would delete all jobs created prior to December 19th 1998. The /NOSTOP option causes the program to exit immediately upon completion. The /COMPONLY option will only delete jobs with a completed status.

GECSQUEUE - Queue Program

The job queue program, GECSQUEUE, lists the contents of the job queue. It can list all jobs, all jobs assigned to an Agent group, all jobs assigned to an Agent and all jobs submitted by a user. The program is run by entering:

```
GECSQUEUE [/NOSTOP] [/G:group] [/S:Agent] [/N:user] [/A] [/O:output]
```

The optional /G, /S and /N options let you limit the list to jobs that match the specified criteria. For example:

```
GECSQUEUE /G:GROUP1
```

would produce a list of the jobs assigned to an Agent GROUP1. The /NOSTOP option causes the program to immediately exit on completion. The /A option causes the program to include all jobs in the list, even if their time has not come due. The /O:output option causes the program to send its output to the specified file, rather than to the screen. Jobs that have trigger file dependencies that are not met, do not display in this list.

GECSQUIC - Quick Job Adding Program

The quick job adding program, GECSQUIC, is used for quickly adding pending WRK files from a command line. To start this program enter:

```
GECSQUIC subdir C:command
```

where *subdir* is the subdirectory where the pending work file should be created and *command* is the command that should be executed. For example:

```
GECSQUIC F:\GECS C:COPY F:\X F:\Y
```

would create a WRK file in the F:\GECS or SYS:\GECS subdirectory. These programs can also be used to “reactivate” a completed job. To do this enter:

```
GECSQUIC subdir J:jobnum
```

where *subdir* is the subdirectory where the pending work file should be created and *jobnum* is the job number of the existing job that should be reactivated. For example:

```
GECSQUIC F:\GECS J:101
```

would create a work file in the F:\GECS or SYS:\GECS subdirectory that would tell GECS to reactivate job 101. These programs normally stop at the end and display a message indicating they were successful. To avoid this stop at the end, include the /NOSTOP command line option such as in:

```
GECSQUIC /NOSTOP \GECS C:\test.exe
```

GECSRBLD - Rebuild Utility

As with any file system, under certain unusual circumstances (i.e. power or hardware failure) it is possible that the GECS data files could become corrupted and GECS will give an error (i.e. I/O error) when it attempts to access them. To help deal with these rare situations, the GECSRBLD, rebuild utility is provided.

WARNING: No GECS programs should be running when this programs is run.

The Rebuild utility allows you to rebuild a damaged files. It is run by entering:

```
GECSRBLD filename
```

```
GECSRBLD all
```

where *filename* is the name of the GECS data file to be rebuilt or *all* will rebuild all of the data files.

After the rebuild utility is complete, temporary files will be deleted. In most situations, all the data will be recovered from the corrupted file, but in some circumstances, some of the data will be lost. After rebuilding a file, use the Client programs to validate the rebuilt data.

GECSRET - Job Return Code Program

The job return code program, GECSRET, can be used to test your job streams with various job return codes. Your “command line” should be as follows:

```
c:\gecs\gecsret retval
```

where *retval* is the return code you’d like the program to return. This program simply returns the specified value as its return code. For example, create a GECS job named “TEST” and specify the following job parameters:

```
Command Line: c:\gecs\gecsret 8
```

```
Command Line Type: choose the appropriate operating system
```

Where c:\gecs is your Agent directory and 8 is the value you would like the program to return.

When you have finished, save your job and exit. After your job has run, ensure your job returned 8 by viewing your completed job statistics.

The GECSRET program is installed with the Agents and Controller.

GECSSHOW - Display Agent or Controller

The GECSSHOW utility will unhide a hidden or display a minimized Agent or your Controller. It is run as:

```
Unix or Linux  GECSSHOW name ip_name [port]
```

```
Windows       C:\GECs\GECSSHOW.EXE name ip_name [port]
```

```
NLM           LOAD SYS:\GECs\GECSSHOW.NLM name ip_name port]
```

The ‘name’ and ‘ip_name’ command line options are required. The ‘port’ option is optional. For example:

```
GECSSHOW Agent1 joe.fred.com
```

or

```
LOAD SYS:\GECs\GECSSHOW.NLM nlmAgent 234.234.234.234 12345
```

A message will be displayed to indicate whether the command was run. Note that the ‘name’ and ‘port’ options must match the name and port specified when the Agent or your Controller was started.

This program is included with the Agents, Controller and Windows clients.

GECSSIZE - Trigger File Size Change Utility

The Trigger File Size Change utility, GECSSIZE, can be run to monitor a file until the file size changes. The “GECSSIZE” utility allows dependencies on file size “changing”. This program accepts a file name as an argument. When GECSSIZE.EXE first starts, it records (in memory) the size of the file that was passed on the command line. It then periodically checks the size of the file. When the size does not match the one in memory, that means the file has been changed. At that point GECSSIZE.EXE returns a zero to the OS and terminates. If the file passed on the command line cannot be found, GECSSIZE.EXE returns a non-zero value and terminates. The syntax for use is:

```
GECSSIZE filename
```

Where ‘filename’ is the file to wait for a size change. For example:

```
GECSSIZE C:\TEST1\TESTFILE.TXT
```

GECSSTOP - Stop Agent or Controller

GECSSTOP will cause the specified GECS Agent or your Controller to stop and unload itself. To stop a running Agent, run the following commands:

Unix or Linux	<code>GECSSTOP name ip_name [port]</code>
Windows	<code>C:\GECS\GECSSTOP.EXE name ip_name [port]</code>
NLM	<code>LOAD SYS:\GECS\GECSSTOP.NLM name ip_name [port]</code>

The 'name' and 'ip_name' command line options are required. The 'port' option is optional. For example:

```
GECSSTOP Agent1 abraham.mycompany.com 4000
or
C:\GECS\GECSSTOP.EXE ntAgent 123.124.125.126
```

A message will be displayed to indicate whether the specified Agent was stopped. Note that the 'name' and 'port' options must match the name and port specified when the Agent was started.

This program is include with the Agents, Controller and Windows clients.

GECSSTP - Stop Job Utility

The stop job utility (GECSSTP) allows you to tell GECS to terminate a running job from a command line utility. It is run by entering:

```
GECSSTP [/NOSTOP] jobnum
```

where 'jobnum' is the number of the currently running job to be stopped. For example:

```
GECSSTP 1234
```

would tell the Agent that is currently running job 1234 to terminate it. The /NOSTOP option causes the program to exit immediately upon completion.

GECSTRIG - Job Trigger Utility

The job trigger utility , GECSTRIG, flags a job as pending and sets the next scheduled date and time to the current time to trigger a completed job to run. It is run by entering:

```
GECSTRIG [/NOSTOP] jobnum
```

where 'jobnum' is the number of the job to be triggered. For example:

```
GECSTRIG 1234
```

would flag job 1234 such that it would run immediately. The /NOSTOP option causes the program to exit immediately upon completion.

GECSVAL - Validate Utility

The Validate program, GECSVAL, analyzes the data files without attempting to correct problems. All other GECS programs must be stopped before running this program. It validates all the GECS data files. It is run by entering:

```
GECSVAL filename
GECSVAL all
```

Where *'filename'* is the name of the GECS data file to be validated or *'all'* will validate all of the data files.

It will stop if it encounters any problems in the files. If the Validate program encounters problems, you should run the GECSRBLD utility.

PULSENOW

The PULSENOW utility allows you to automatically pulse your Controller from any machine that has this program installed. It is run as:

Unix or Linux	PULSENOW name ip_name [port]
Windows	C:\GECS\PULSENOW.EXE name ip_name [port]
NLM	LOAD SYS:\GECS\PULSENOW.NLM name ip_name port]

The *'name'* and *'ip_name'* command line options are required. The *'port'* option is optional. The port defaults to 2001. For example:

```
PULSENOW control joe.fred.com
or
LOAD SYS:\GECS\PULSENOW.NLM control 234.234.234.234 2001
```

A message will be displayed to indicate whether the command was run. Note that the *'name'* and *'port'* options must match the name and port specified when the Controller was started.

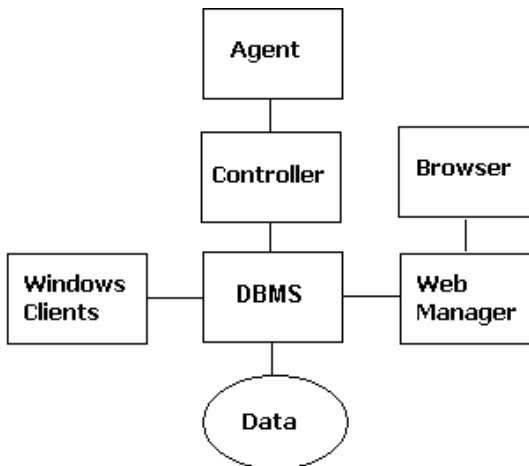
This program is included with the Agents, Controller and Windows Client programs.

GECS Custom Installation

GECS Configurations

The Basic Architecture

GECS version 3 standard architecture when installed using the Express Installation is as follows:



The Express installation option installs all of the GECS components onto one computer. The Controller, DBMS and Web Manager programs run as services. The Agent, window's clients and browser are started from icons on the desktop.

To change this standard configuration, you can select custom installation from the Workstation Setup program.

See the Configuration Worksheet chapter of this manual to help organize the computers that make up your Global ECS System.

You might want the Agent to run as a service or you might want the Controller and DBMS to run from icons on the desktop. To make changes like this to a system that was configured using Express installation:

1. Shutdown your Administrator client program or any other users might be running.
2. Start the GECS Workstation Setup (C40SETUP.EXE).
3. Make the desired changes. Each page describes a portion of the system. For example, to make the Web Manager program run from an icon on the desktop, rather than as a service, go to the Web Manager page by pressing the 'next' button. Change the 'Run' selection to 'from a Desktop Icon' and continue to press 'next' and 'configure' buttons until the program completes. Be careful not to accidentally change any other fields.
4. Once the configuration is complete, the Web Manager will no longer run as a service and you will find an icon in the Global ECS folder to start it manually by double clicking the Web Manager program shortcut icon.

Improper use of Workstation Setup can prevent your system from working.

The following configurations are described next:

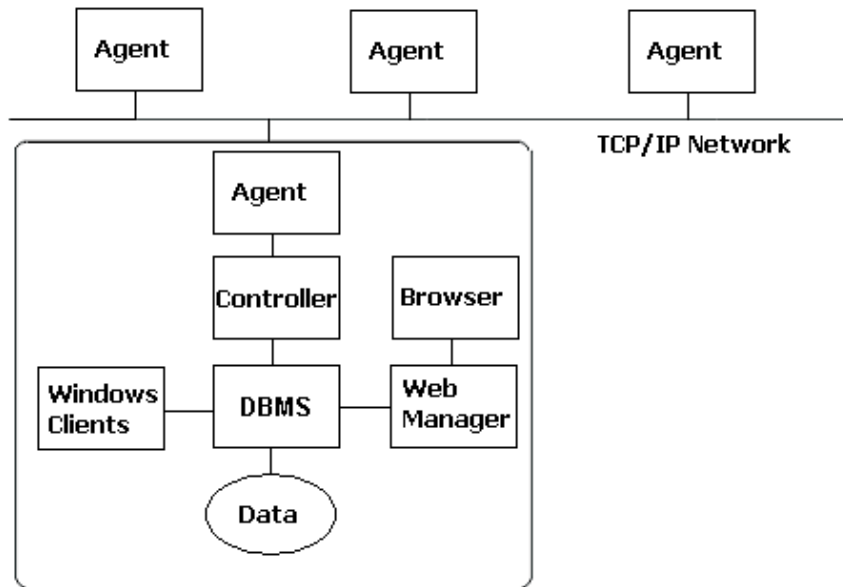
1. Adding Agent computers
2. Adding Windows Client programs on other computers
3. Managing the GECS system from a browser
4. Installing the system across multiple computers

Adding Agent Computers

To add additional GECS Agents to your system, you need to first add new Agent information to the GECS system using either the Windows Administrator Client program or from the browser client using the 'Agents' option. Then you need to go to the Agent computer and install and start the Agent software.

Note that the IP address you enter for the Agent record is critical so GECS can communicate with the Agents. See the section in the Getting Started chapter on installing Agents for more information.

Once you have added additional Agents to your system it will look something like this:

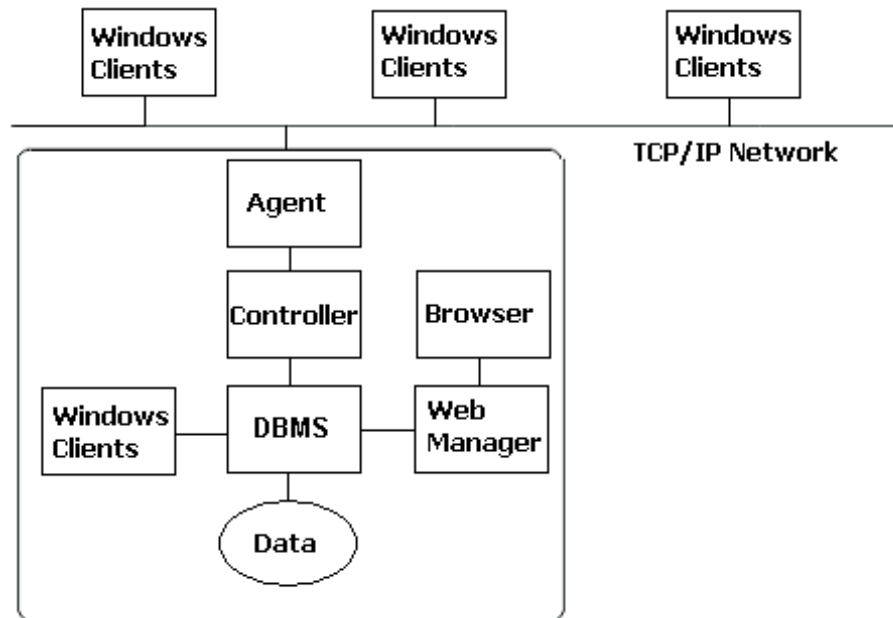


There are any number of reasons to add Agents to your system including:

1. Support for additional operating systems
2. Increase system throughput
3. Increase system reliability

Adding Windows Client Programs on Users Computers

Windows Client programs can be installed on users computers. Your GECS system will then look something like:

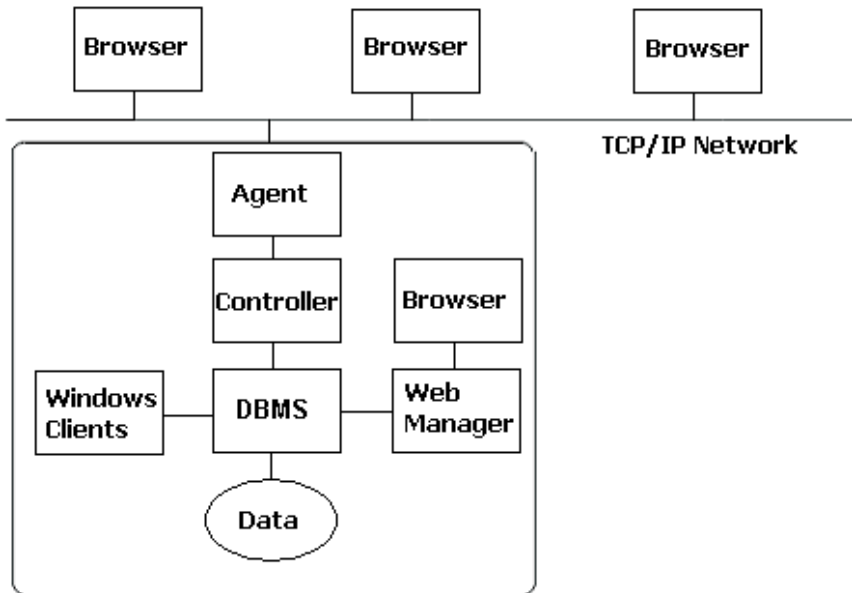


Once the Windows Client programs are installed on users computers, they can be used to configure and manage the GECS system.

See the section in the Getting Started chapter for more information on installing just the Windows clients on users computers.

Managing the GECS System from a Browser

When the GECS System is configured so it can be managed from computers using a browser, it is configured like this:



No software installation or special configuration is required at the computers where the browser is run. To access the Web manager simply enter the URL:

http://ipaddress:port

For example, if the 'Primary Computer' is at IP address 123.123.123.123, the GECS Web Manager was started on port 2013 (the default), you would enter the URL:

http://123.123.123.123:2013

When the Browser first connects to the Web manager, you will need to enter the name and password of a valid GECS user. Note that the GECS Web manager uses simple HTML and should be compatible with most browsers with no special configuration.

Note that you can also check whether the Agents, Controller or DBMS are running by querying them with your browser. They begin to listen for HTTP packets when they start and will respond to browser queries. Use the same URL format to query these components:

http://ipaddress:port/gecsname

For example, if the IP address is 123.123.123.123, the Agent was started with HTTP port of 2010 (the default) and the Agent was started with name of 'pete' (specified in the Workstation Setup program during configuration), you would enter the URL:

http://123.123.123.123:2010/pete

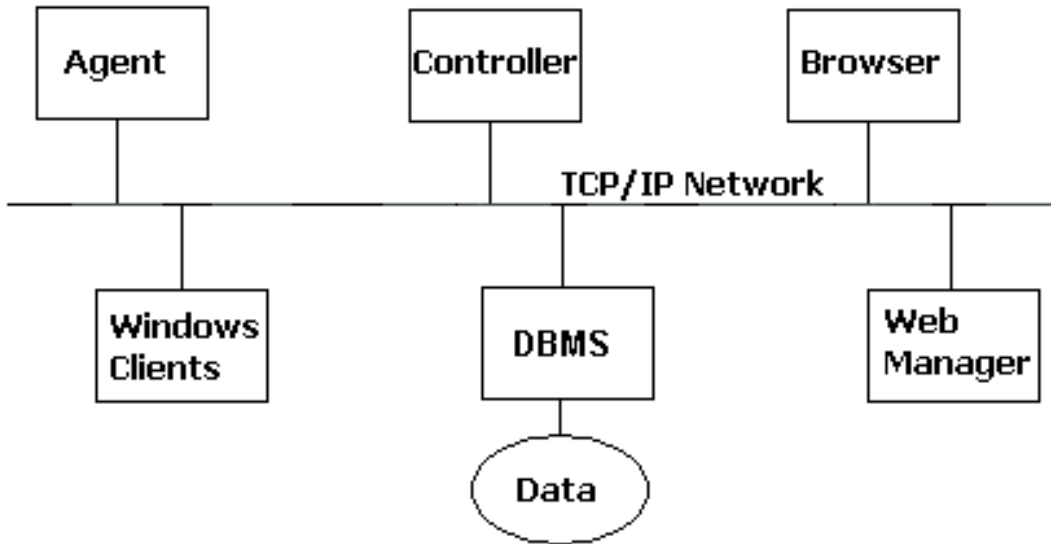
You will be prompted for a username and password. By default the username to enter is simply the Agent name 'pete' without a password. You can specify a different username and password by using the `-s` and `-t` command line options when the Agent is started. See the Agents chapter of this manual for details on starting your Agents.

Querying the Controller or DBMS works the same other than different ports and names are specified.

Default HTTP Ports:	Agent	2010
	Controller	2011
	DBMS	2012
	Web Manager	2013

Installing the GECS System Across Multiple Computers

The examples shown so far show the bulk of the GECS system installed in a single computer. For a variety of reasons, you might want to spread the system across more than one computer. When each part of the system is installed in a separate computer it looks like this:



To install a distributed system like this, you would:

1. Draw a diagram like the one above of the system you wish to install. Put the IP addresses, ports and GECS names for each of the computers on the diagram. Go to the computer that will run the DBMS and install it. When installing the DBMS, you will need to know your license information. In the Workstation Setup program, enter the information about the computers where the other parts of the system will be running.
2. Shutdown any Client programs such as the Administrator that you or any other users might be running.
3. Go to the computer that will run the Windows Clients and install them. In the Workstation Setup program, enter the information about the computers where the other parts of the system will be running.
4. Go to the computer that will run the Agents and install them. In workstation setup, enter the information about the computers where the other parts of the system will be running.
After installing the Agents, go to the computer where the Windows Clients are installed and enter the new Agents records.
5. Go to the computers that will run the Controller and install it. In workstation setup, enter the information about the computers where the other parts of the system will be running.
6. Go to the computer that will run the Web Manager and install it. In workstation setup, enter the information about the computers where the other parts of the system will be running.

Custom Installation Program

The Workstation Setup program can be run in Express or Custom modes. The two methods do the same thing, the Express mode assumes a simple single machine configuration while the Custom mode allows you to change many aspects of the system configuration.

In Custom mode, the Workstation setup program presents a series of screens. You press the next and previous buttons to switch between screens. Each screen allows you to configure a particular component of your GECS System. The screens are:

DBMS	Is the DBMS on this machine and if not where is it?
Controller	Is the Controller on this machine and if not where is it?
Web Manager	Is the Web Manager on this machine and if not where is it, if anywhere?
Agent	Is there an Agent on this machine?
Client Programs	Should icons be created for Windows clients on this machine?
Desktop	What folder should be used for desktop icons?
License	What is your company name and license number?
Configure	Go ahead and configure this machine as entered.

The information entered in the GECS Workstation Setup program is used to create the GECS.INI file in your Windows (C:\WINNT) directory. The entries are saved in the registry so the next time Workstation Setup is run on this computer, it will default to your previous entries.

A note about IP addresses.

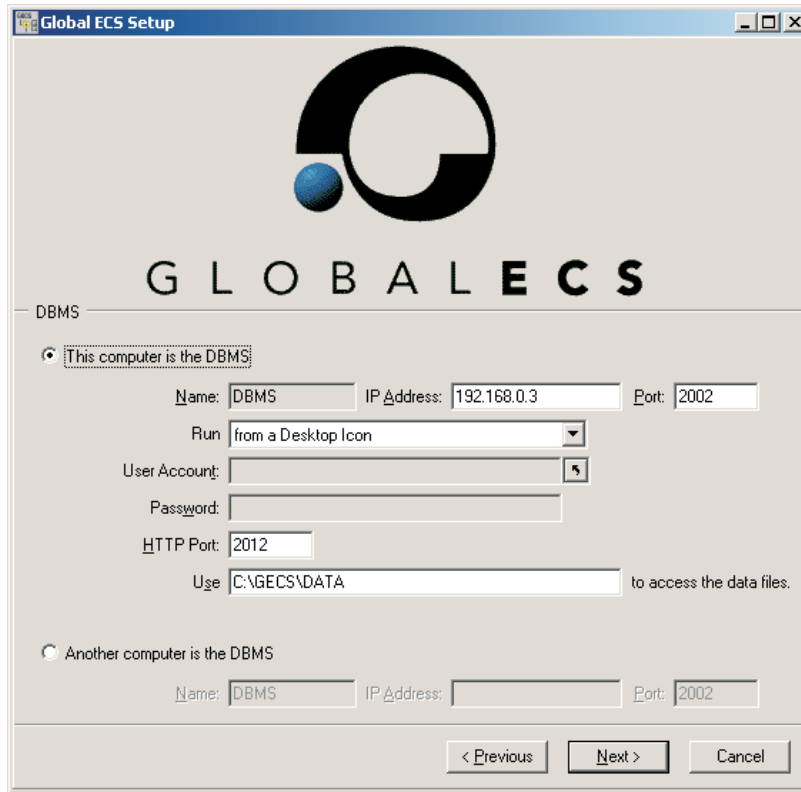
The Workstation Setup program has a number of places where you will need to enter the IP address of the computer where the particular component is running. These IP addresses can be entered either as numbers or as DNS names. Numbers (i.e. 123.123.123.123) have the advantage of not needing to be translated before use. DNS names have the advantage of being able to be assigned dynamically and the actual underlying number can change as long as the name remains the same. You and your network administrator will need to determine whether to configure with numbers or names.

A note about IP ports.

The four main server components of the system (Agent, Controller, DBMS and Web Manager) each use 2 IP ports. One port is used for communication between GECS components. The use of a port for communications between GECS components is required. The other port is used for HTTP communications between GECS components and browsers. The use of a port for HTTP communications is optional and can be disabled by entering a port number of zero (0). The Workstation Setup program will default to the following port numbers:

<u>Component</u>	<u>GECS Port</u>	<u>HTTP Port</u>
Agent	2000	2010
Controller	2001	2011
DBMS	2002	2012
Web Manager	2003	2013

DBMS

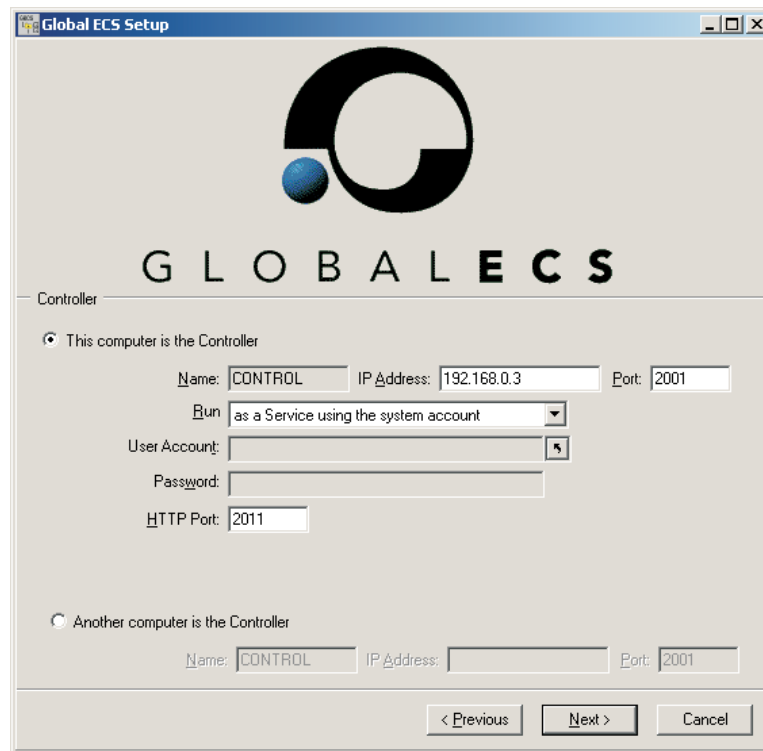


Use this page to indicate whether you want the DBMS to run in this computer or whether you are going to have it run in another computer. There MUST be a DBMS somewhere in your system.

If you want the DBMS to run on this computer, you must enter its IP address and ports. You must also indicate whether it should run on the desktop, as a service on the system account or as a service on a user account. You must also indicate where on the local hard drive the data should physically be stored.

If you are going to run the DBMS on another computer, you must enter the IP address and port where it will run.

Controller



The screenshot shows the 'Global ECS Setup' window. At the top is the Global ECS logo, a stylized 'G' with a blue sphere. Below the logo, the text 'G L O B A L E C S' is displayed in a spaced-out font. The window is titled 'Controller' and contains two radio button options:

- This computer is the Controller
- Another computer is the Controller

Under the first option, there are several input fields and a dropdown menu:

- Name: CONTROL
- IP Address: 192.168.0.3
- Port: 2001
- Run: as a Service using the system account (dropdown menu)
- User Account: (empty text box)
- Password: (empty text box)
- HTTP Port: 2011

Under the second option, there are three input fields:

- Name: CONTROL
- IP Address: (empty text box)
- Port: 2001

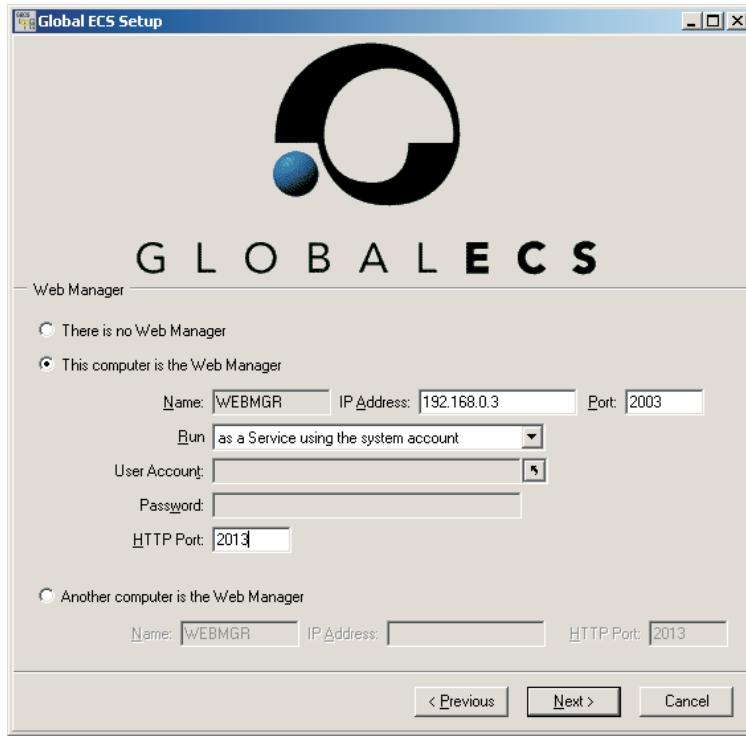
At the bottom of the window, there are three buttons: '< Previous', 'Next >', and 'Cancel'.

Use this page to indicate whether you want the Controller to run in this computer or whether you are going to have it run in another computer. There **MUST** be a Controller somewhere in your system.

If you want the Controller to run on this computer, you must enter its IP address and ports. You must also indicate whether it should run on the desktop, as a service on the system account or as a service on a user account.

If you are going to run the Controller on another computer, you must enter the IP address and port where it will run.

Web Manager

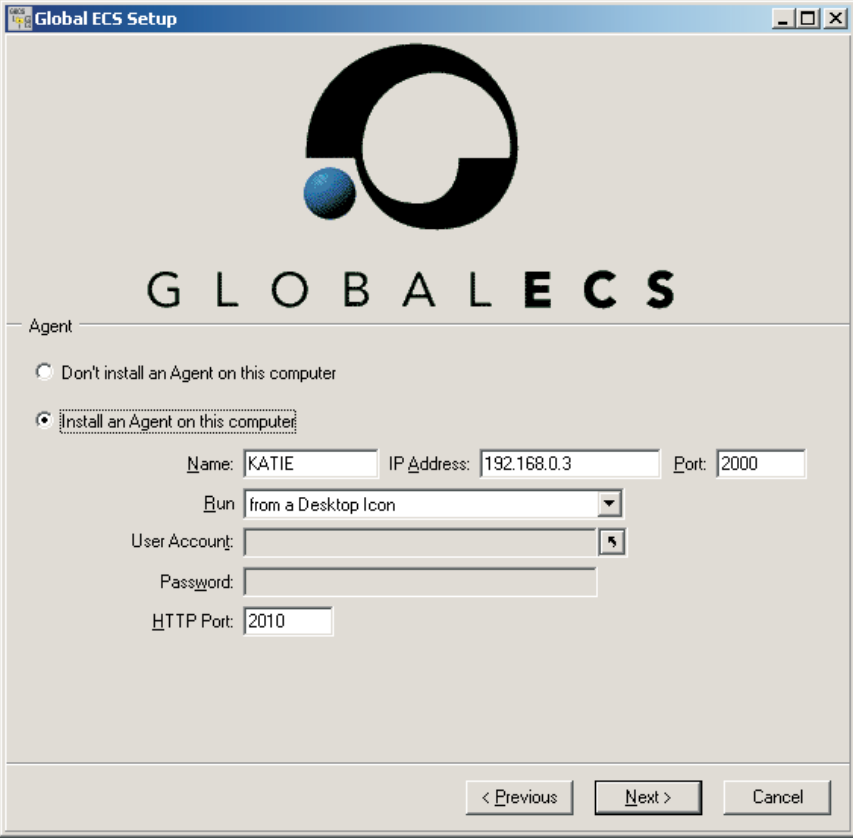


Use this page to indicate whether you will run a Web Manager and whether you want the Web Manager to run in this computer or on another computer.

If you want the Web Manager to run on this computer, you must enter its IP address and ports. You must also indicate whether it should run on the desktop, as a service on the system account or as a service on a user account.

If you are going to run the Web Manager on another computer, you must enter the IP address and port where it will run.

Agent



The screenshot shows the 'Global ECS Setup' window with the 'Agent' tab selected. The window title is 'Global ECS Setup'. At the top center is the Global ECS logo, a stylized 'G' with a blue sphere. Below the logo, the text 'G L O B A L E C S' is displayed in a spaced-out font. The 'Agent' section contains two radio buttons: 'Don't install an Agent on this computer' (unselected) and 'Install an Agent on this computer' (selected). Below the selected option are several input fields: 'Name' (KATIE), 'IP Address' (192.168.0.3), 'Port' (2000), 'Run' (from a Desktop Icon), 'User Account' (empty), 'Password' (empty), and 'HTTP Port' (2010). At the bottom right are three buttons: '< Previous', 'Next >', and 'Cancel'.

Use this page to indicate whether you will run an Agent in this computer.

If you want to run an Agent on this computer, you must enter its name, IP address and ports. You must also indicate whether it should run on the desktop, as a service on the system account or as a service on a user account.

Client Programs



Use this page to indicate whether you want icons created for the Windows Client programs on this computer. If you want icons created for the Windows Client programs, indicate the type of network security to be used. The three types can be summarized as:

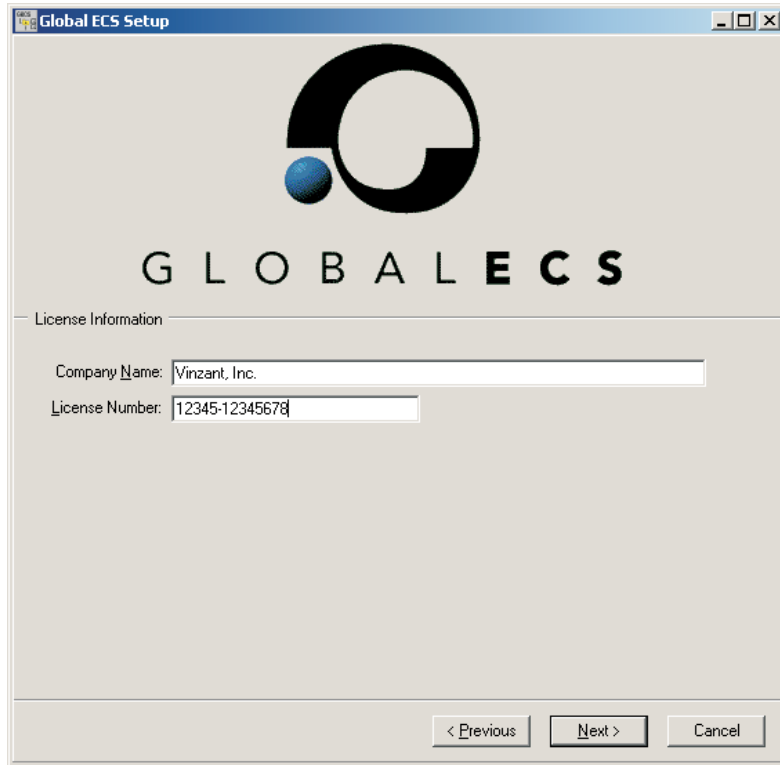
- No Network** This method prompts the users for their GECS name and password.
- Microsoft** This method uses your Windows NT login name for GECS security.
- Novell** This method uses your NetWare login name for GECS security.

Desktop



Use this page to indicate which folder the icons should be created in. This page will not be displayed if there are no icons to create on this computer.

License



Use this page to enter your GECS license information. This page is only displayed if you are configuring this computer to have a DBMS on it.

Configure



This page is simply a last warning that you are about to configure your system to match your entries. Once you press 'Configure' your configuration will be changed.

Technical Reference

GECS.INI File

GECS uses a locally stored ASCII text configuration file named GECS.INI. It serves several important purposes:

- 1) It determines where all the GECS programs look to find the data files.
- 2) It contains run-time information for your GECS components such as screen size, position and settings for your Client programs.
- 3) It determines how date substitution variables are formatted.

When you run the GECS WorkStation Setup program, this file is automatically generated and stored locally in your WINNT directory. It can be edited with any standard text editor such as Edit or Notepad.

The file is laid out much like a Windows INI file. The file is setup in several sections, [AGENT], [APPLICATIONS], [CONTROLLER], [CONTROLS], [DBMS], [ENVIRONMENT], [FILES], [FORMAT], [FORMS], [OPTIONS], [STUDIO] and [WEBMANAGER]. All the GECS programs will look for this file in the default subdirectory when they start. The programs can be passed the name of an alternative configuration file on the command line by using the /C:filename command line option. For example:

```
C:\GECS\GECSADMIN.EXE -C:c:\winnt\MYGECS.INI
```

It is important to note that by improperly altering the [FILES] section, you can cause GECS to generate errors and fail to operate. You may want to make a note of any special changes you manually make to your GECS.INI file.

Some entries are created automatically by the GECS WorkStation Setup program or by other programs as they are opened.

[AGENT] Section

In certain circumstances it may be necessary to adjust certain parameters including keystuffing parameters. This can be accomplished by creating a GECS.INI file in the WINNT directory of the machine where the Agent is running. The file may look similar to this:

```
[AGENT]
CaptionRetries=12
KeyDelay=100
KeySwitch=1
SHELL=COMMAND.COM /e:1024
SHELL32=CMD.EXE
SyncFrequency=600
SyncServer=
SyncTimeout=60
SyncType=0
TV_SECTimeout=1
```

`CaptionRetries`, by default, tries 12 times to find the window with the specified caption text on the title bar.

`KeyDelay` sets the time, in milliseconds, to pause between each key sent to an application. The default value is set to 100ms. If keystrokes are sporadically lost, increasing this value to a higher value, like 400ms, may remedy this situation.

Setting the `KeySwitch` entry from 1 to 0 should keep the Agent from changing focus to the application window with every keystroke.

`Shell` is used if you have a DOS command line type job and you need additional environmental space. You can use the Agent section to change the environment allocated to these jobs. By default, jobs are launched using /e:1024.

`Shell32` is used if you have Windows NT/2000/XP/2003 or NT Console command line type jobs that need additional environmental space. You can use the Agent section to change the environment allocated to these jobs. By default, jobs are launched using /e:1024.

The `SyncFrequency` entry defines how often in seconds the Agent should time synchronize. This entry defaults to 600 seconds.

The `SyncServer` entry is used to specify the server computer that the Agent should synchronize its time to. This entry is blank by default.

The `SyncTimeout` entry tells how long, in seconds, it should try to synchronize its time. This entry defaults to 60 seconds.

The `SyncType` sets the type of time synchronization that should be used. 0=none, 1=Microsoft, 2=NetWare, 3=Time protocol (RFC-868) and 4=NTP/SNTP (RFC-1305/1361/1769/2030). This entry defaults to zero.

The `TV_SECTimeout` entry defines the amount of time, in seconds, the thread block should wait when selecting a packet. This entry defaults to 1 second.

[APPLICATIONS] Section

The [Applications] section contains configuration information for GECS Windows Client programs. This section is updated by GECS when Configuration Options or window positioning is changed. This section should not be changed manually.

[CONTROLLER] Section

The [CONTROLLER] section can contain a variety of options. For example:

```
[CONTROLLER]
AgentTimeout=15
BackupPulse=15
DeleteOnlySuccessfulJobs=1
KillFrequency=30
MessageAsKill=0
PredecessorStyle=0
PrimaryController=
PulseFile=
ResetOnReconnect=0
SendAttempts=5
SMTPLogin=
SMTPFrom=
SyncFrequency=600
SyncTimeout=60
TV_SECTimeout=1
WrkFilesPerPulse=
```

The `AgentTimeout` entry defines how long, in seconds, the Controller should wait for a response from an Agent. This entry defaults to 15 seconds.

The `BackupPulse` entry is reserved for a future version.

By default, the controller setting "Delete jobs on completion" deletes all completed jobs when they complete. By using `DeleteOnlySuccessfulJobs`, the controller will only delete the 'successful' jobs (those with a return code that's less than or equal to the 'max good return code' entered for the job) when they complete. The 'failed' jobs will be left on file.

The `KillFrequency` entry is reserved for a future version.

The `MessageAsKill` entry allows the job parameter "Execute Message" to be executed when a job is killed by GECS. (0=no, 1=yes). This entry defaults to zero.

The `PredecessorStyle` entry allows jobs be rescheduled using predecessor style dependencies. (0=no, 1=yes). This entry defaults to zero.

The `PrimaryController` entry is reserved for a future version.

The `PrimaryController` entry defines the name and address of the primary Controller computer in the format of (`GECSName@IPAddr:Port`). This entry is blank by default.

The `PulseFile` entry defines the name of the pulse file to use for your Controller. The pulse file can force your Controller to immediately poll the GECS system. This entry is blank by default.

The `ResetOnReconnect` entry allows the Controller to tell its Agents to reset (kill all running jobs) when it reconnects to them after communications have failed (0=no, 1=yes). This entry defaults to zero.

The `SendAttempts` entry defines how many times the Controller should try to send packets to Agents. This entry defaults to 2 times.

The `SyncFrequency` entry defines how often, in seconds, the Controller should synchronize its time. This entry defaults to 600 seconds.

The `SyncTimeout` entry defines how long, in seconds, the Controller should try to synchronize its time. This entry defaults to 60 seconds.

The `TV_SECTimeout` entry defines the amount of time in seconds the thread block should wait when selecting a packet. This entry defaults to 1 second.

The `WrkFilesPerPulse` entry defines how many WRK files GECS should convert into jobs during each pulse. This number can range from 0 to 65,000. If GECS finds there are more WRK files to convert it will immediately pulse again to read in more files.

[CONTROLS] Section

The [Controls] section contains configuration information for GECS Windows Client programs. This section is updated by GECS when Configuration Options or window positioning is changed. This section should not be changed manually.

[DBMS] Section

The [DBMS] section can contain a variety of options. For example:

```
[DBMS]
AgentTimeOut=15
ClientDelayPulse=600
DataPath=C:\GECS\DATA
DBMSTimeout=10
DelJobEvents=1
DoLocalDataAccess=1
HeartBeat=60
MaxClientDelay=600
PrimaryDBMS=
RecvTimeout=3
SecondaryDBMS=
SendAttempts=5
SyncFrequency=600
SyncServer=
SyncTimeout=60
SyncType=0
TV_SECTimeout=1
```

The `AgentTimeOut` entry sets the amount of time, in seconds, the DBMS should try to talk to the Agent before giving up.

The `ClientDelayPulse` entry sets how often the DBMS should check for missing clients.

The `DataPath` entry lists the directory where the GECS data files are located. By default a dot (.) indicates that the data files exist in the GECS data directory (C:\GECS\DATA). There are several important things to keep in mind

about how GECS components access data files when determining how to setup their location.

1) Your GECS DBMS cannot use drive letters when run as a service. It must use UNC (Universal Naming Convention) or 'domain' and 'share' names by making an entry such as:

```
\\DOMAIN1\C$\GECS\DATA
```

2) The other GECS programs can all use drive letters by making an entry such as:

```
C:\GECS\DATA
```

3) The GECS NLMs cannot use drive letters. They must access the data files using the NetWare naming convention of '*servername/volume:*' by making an entry such as:

```
FS1/SYS:\GECS\DATA
```

The `DBMSTimeout` tells GECS programs how long, in seconds, they should try and talk to the GECS DBMS. This entry defaults to 10 seconds.

The `DelJobEvents` entry determines whether Events associated with jobs should be deleted when job records are deleted. This entry defaults to 1 which means 'yes' automatically delete GECS Events associated with job records when job records are deleted. 0 would not delete Events.

The `DoLocalDataAccess` entry can be set =1 to allow the Client programs to access the data files directly instead of going through the GECS DBMS program to access the data. Direct data access will usually be faster making the Client programs seem more responsive. You must specify a `DataPath` when this option is enabled.

The `HeartBeat` entry sets how often the GECS programs should send a heartbeat ping to the DBMS. This entry defaults to every 60 seconds.

The `MaxClientDelay` entry defines after how many seconds should the DBMS decide that the Client programs have disappeared. It will then close open files and free resources. This MUST be greater than the `HeartBeat`. This entry defaults to 600 seconds.

The `PrimaryDBMS` entry is reserved for a future version.

The `RecvTimeout` entry sets how long the DBMS should wait to receive a response from Agents.

The `SecondaryDBMS` entry is reserved for a future version.

The `SendAttempts` entry defines how many times programs should attempt to send packets to the DBMS. This entry defaults to 5 times.

The `SyncFrequency` entry defines how often in seconds the DBMS should time synchronize. This entry defaults to 600 seconds.

The `SyncServer` entry is used to specify the server computer that the DBMS should synchronize its time to. This entry is blank by default.

The `SyncTimeout` entry tells the DBMS how long, in seconds, it should try to synchronize its time. This entry defaults to 60 seconds.

The `SyncType` sets the type of time synchronization that should be used by the DBMS. 0=none, 1=Microsoft, 2=NetWare, 3=Time protocol (RFC-868) and 4=NTP/SNTP (RFC-1305/1361/1769/2030). This entry defaults to zero.

The `TV_SECTimeout` entry defines the amount of time, in seconds, the thread block should wait when selecting a packet. This entry defaults to 5 seconds.

[ENVIRONMENT] Section

The [ENVIRONMENT] section can be used to define environmental variables that Windows Agents can set prior to job execution. For example:

```
[ ENVIRONMENT ]
JOBNUM=@JOBNUM
AGENT=@AGENT
PARENT=GECS
```

Only a limited number of the special GECS substitution variables can be used. These must be set for each Windows Agent separately in each Agent's local GECS.INI configuration file.

[FORMAT] Section

The [FORMAT] section can contain an option which determines how date substitution variables are formatted. For example:

```
[ FORMAT ]
DATE=0
DATES=0
DateFormatShort=string
DateFormatLong=string
TimeFormat=string
```

Note that either DATE=n or DATES=n can be used.

GECS can format date substitution variables in five different formats:

n	Format	Example
0	mm/dd/yyYY	12/31/99 or 12/31/1999
1	dd-mm-yyYY	31-12-99 or 31-12-1999
2	ddMMMyyYY	31DEC99 or 31DEC1999
3	mm-dd-yyYY	12-31-99 or 12-31-1999
4	dd/mm/yyYY	31/12/99 or 31/12/1999

Some date substitution variables will produce 2 digit years (i.e. @DATE) and some will produce 4 digit years (i.e. @DATEL). Note that if this section is omitted, GECS defaults to format 0 (mm/dd/yyYY).

You can also use the 'string' to override the default formatting or the formatting specified by 'Date=n'. The 'string' is a formatting string that can contain one or more of the following special fields:

- %b abbreviated month uppercase (JAN)
- %c abbreviated month capitalized (Jan)
- %B month (January)
- %m month (2 character)
- %d day (2 character)
- %l month (1 or 2 character)
- %2 day (1 or 2 character)
- %n day with suffix (1st, 2nd)
- %y year (2 character)
- %Y year (4 character)
- %A day of week (Monday)
- %a day of week (Mon)
- %H hour in 24 hour format
- %I hour in 12 hour format

%M minute
%S second
%T hundredths of seconds
%p AM or PM

For example:

```
[FORMAT]
DateFormatShort=%m.%d.%y
DateFormatLong=%B %n, %Y
TimeFormat=%H:%M
```

would cause the following output:

```
@DATE 12.31.02
@DATEL December 31st, 2002
@TIME 23:59
```

Note that 'TimeFormat' overrides the default formatting of @TIME and @SCHTIME, but not @MTIME. @MTIME uses "%H:%M:%S" regardless of what 'TimeFormat' is set to.

Lastly, you can use formatting strings with the substitution variable to override any other formatting specified by including the formatting string in parenthesis immediately after the substitution variable and before any date math. For example:

```
@DATE(%m) 12
@DATEL(%1.%2.%y) 12.31.02
@TIME(%I o'clock) 11 o'clock
@DATE(%d)+1d 1
```

No spaces are allowed between the substitution variable and the parenthesis. Empty parenthesis will use the default formatting.

[FORMS] Section

The [Forms] section contains configuration information for GECS Windows Client programs. This section is updated by GECS when Configuration Options or window positioning is changed. This section should not be changed manually.

[OPTIONS] Section

The [Options] section is used to store default values for the GECS Windows clients. Each GECS user has a unique set of defaults. This section is automatically updated by GECS and should not be altered manually.

```
[Options]
User_AppID_ControlID=Value
```

[STUDIO] Section

The [Studio] section contains configuration information for the GECS Studio client program. This section is updated when the Configure options are set. This section should not be changed manually.

```
[STUDIO]
DetailYPos=5
DetailXPos=61
AutoLoadSheet=TEST WORKSHEET
WorkSheets=TEST WORKSHEET
AutoLoad=1
ShowPages=0
```

[WEBMANAGER] Section

The [WEBMANAGER] section can contain an option to set the amount of seconds the “Problems” html page automatically updates with information. For example:

```
[WEBMANAGER]
RefreshRate=15
```

This rate defaults to 15 seconds.

Updating a GECS.INI file

To successfully make changes to a configuration file, perform these steps:

1. Shutdown your GECS DBMS.
2. Stop all users from running GECS Client programs and utilities.
3. If you intend to change the location of any data files, copy the data files to the new location and rename the original copies of the files to an extension of .OLD so they won't accidentally be used.
4. Double click on the notepad icon labeled GECS.INI from your GECS Controller folder (or use any text editor) to edit each locally stored GECS.INI file on every machine where applicable.
5. Restart your Controller and test the GECS programs before allowing your users to start using them.

Time Synchronization

In a distributed multiple PC environment such as is found with GECS, time synchronization can keep your system operating in an efficient fashion. Some network operating systems provide a mechanism to synchronize machines on the LAN. If your environment offers such a feature, it should be used whenever possible.

GECSTIME.EXE

The GECSTIME command line utility can be run to display the current date and time. Usage:

```
gecstime tp|snmp ipnameaddr [port]
```

tp sntp	Use Time Protocol (tp) or Simple Network Time Protocol (sntp).
Ipnameaddr	The time server's IP name or address. (i.e. time.nist.gov)
Port	The time server's port (optional). Defaults to 37 for tp and 123 for sntp.

For example:

```
gecstime sntp 192.43.244.18
```

Network Time: GMT = Wed Jun 11 16:11:30 2003

Local = Wed Jun 11 11:11:30 2003

Computer Time: GMT = Wed Jun 11 16:11:39 2003

Local = Wed Jun 11 11:11:39 2003

The GECS DBMS, Controller, Web Manager and Agent components of GECS can all be configured to synchronize time using one of the following time synchronization methods: NetWare, Microsoft, Time Protocol (RFC-868) or NTP/SNTP (RFC-1305/1361/1769/2030).

NetWare Time Synchronization

When the Novell configuration of GECS is used, certain components of GECS can synchronize with NetWare file servers. For Windows, this requires the use of client software from Novell. The NetWare client software provided by Microsoft will not allow GECS to synchronize its time with NetWare file servers. In the DBMS and Controller records, you can choose the NetWare time synchronization method and enter the name of the NetWare file server that should be used to synchronize with. The Web Manager program and Agent software must be configured to synchronize by updating the GECS.INI file settings.

```
SyncType=2  
SyncServer=servername
```

There are also GECS.INI settings for the time synchronization frequency and timeout values for all these components by updating the following sections: [CONTROLLER], [DBMS], [WebManager] and [AGENT] with the following entries:

```
SyncFrequency=600  
SyncTimeout=60
```

Your DBMS or Controller must be logged in to the file server that it is going to synchronize with. NLM s can synchronize their time with any file server that has the NetWare user 'VINZANT_USER' defined in its bindery. This user is created automatically by the NLM installation program on the file server where the GECS data files are located.

Microsoft Time Synchronization

Your DBMS or Controller can synchronize time with a Windows server or workstation when the Microsoft network drivers are used. Enter the name of the Windows server to synchronize with in the DBMS or Controller record. The user under whose account the Windows DBMS or Controller is running must have rights to change the system time. The Web Manager program and Agent software must be configured to synchronize by updating the GECS.INI file settings.

```
SyncType=1  
SyncServer=\\servername
```

There are also GECS.INI settings for the time synchronization frequency and timeout values for these components by updating the following sections: [CONTROLLER], [DBMS], [WebManager] and [AGENT] with the following entries:

```
SyncFrequency=600
SyncTimeout=60
```

Time Protocol (RFC-868)

Your DBMS or Controller can synchronize time using Time Protocol (RFC-868) by updating the DBMS or Controller record with the method “Time Protocol (RFC-868)” and the IP Address or name of the host to synchronize time with. For example:

```
Time Protocol (RFC-868)
TIME.NIST.GOV 37
```

The user under whose account the Windows DBMS or Controller is running must have rights to change the system time. The Web Manager program and Agent software must be configured to synchronize by updating the GECS.INI file settings.

```
SyncType=3
SyncServer=hostname or IPADDRESS [port]
```

There are also GECS.INI settings for the time synchronization frequency and timeout values for all of these components by updating the following sections: [CONTROLLER], [DBMS], [WebManager] and [AGENT] with the following entries:

```
SyncFrequency=600
SyncTimeout=60
```

NTP/SNTP (RFC-1305/1361/1769/2030)

Your DBMS and Controller components can synchronize time using NTP/SNTP (RFC-1305/1361/1769/2030) by updating the records with the method “NTP/SNTP (RFC-1305/1361/1769/2030)” and the IP Address or name of the host to synchronize time with. For example:

```
NTP/SNTP RFC-1305/1361/1769/2030)
TIME.NIST.GOV 37
```

The user account the DBMS or the Controller is running under must have rights to change the system time. The Web Manager program and Agent software must be configured to synchronize by updating the GECS.INI file settings.

```
SyncType=4
SyncServer=hostname or IPADDRESS [port]
```

There are also GECS.INI settings for the time synchronization frequency and timeout values for these components by updating the following sections: [CONTROLLER], [DBMS], [WebManager] and [AGENT] with the following entries:

```
SyncFrequency=600
SyncTimeout=60
```

The local time of each computer will be adjusted to match the file server or time server time according to the entry set for the SyncFrequency in the GECS.INI file. By default the SyncFrequency is set to every 600 seconds.

The SyncTimeout tells how long the GECS component should try and time synchronize. By default it will only try for 60 seconds then quit trying until the next SyncFrequency.

If you have been using the Novell SYSTIME utility as part of your job flow to correct time shift, you should be able to eliminate these jobs and use the time synchronization built into GECS. Additionally, if you have jobs that change the system time, built in time synchronization should help correct this problem. On the other hand, if your job stream relies on the system time being artificially changed, you should not use the time synchronization feature built

into GECS as it will negate your artificial time change.

For more information on Time Protocol (RFC-868) or NTP/SNTP(RFC-1305/1361/1769/2030) you can reference the Internet sites for these time server methods.

Time Change Issues

GECS uses the computer's local system time to determine when jobs should be run, how long they ran, and how long ago they ran. There are two types of time changes that can be expected. The time might slide forward or back an hour due to daylight savings time or the time might slide forward or back small amounts due to time synchronization. The GECS architecture is based on several assumptions.

1. A job's scheduled time is entered in the local time of the computer.
2. Time moves forward, it doesn't go backwards.

Due to the importance of time to GECS, special time change handling has been built into the system to handle situations where time goes 'backwards'. When GECS discovers that time has gone backwards (i.e. it was 02:00:00 and it's now 01:58:00) it stops processing and waits for the time to get back to the original time (02:00:00).

Changes Due To Synchronization

When time synchronization is used to handle the 'drift' that is normal for PC clocks either by using the synchronization built into the LAN or the synchronization built into GECS, these changes are typically small (usually less than one second or two) and the effects of the system waiting for the time to catch up should be unnoticeable.

Changes Due To Spring Daylight Saving Time

When Daylight Savings Time goes into effect in the spring and time springs forward, the clock goes from 01:59:59 to 03:00:00. The effect of this time change is small and generally benign. There are several special items worth noting.

1. Jobs running before the time change and finishing after the time change will appear to have run an hour longer than they actually ran.
2. There will appear to be a backlog of jobs immediately after the time change, as an hours worth of jobs will immediately come due.
3. The night when the time change occurs contains one less hour of processing time.

Changes Due To Fall Daylight Savings Time

When Daylight Savings Time ends in the fall and time falls back, the clock goes from 01:59:59 to 01:00:00. The effect of this time change is moderate, though generally benign. There are several special items worth noting.

1. Jobs running before the time change and finishing after the time change will appear to have run in less time than they actually ran.
2. Jobs that finish during the hour after the time change will appear to all finish at about 02:00:00.
3. GECS will sit idle for the hour after the time change, waiting for the time to get back to 02:00:00.
4. The night when the time change occurs contains one extra hour of processing time, though the GECS will sit idle for that hour.

To prevent GECS from sitting idle for this hour requires user intervention. After the time has changed, shut down GECS and once it has been shut down, restart it.

Minimizing the Effects Of Daylight Savings Time Changes

The only certain way to eliminate all effects of Daylight Savings Time Changes is to shutdown GECS prior to the time change and then to restart it after the time change. Only in the most time sensitive situations should this be required. The built in time change handling capabilities of GECS should be able to handle most situations, with the anomalies described above.

Configuring GECS for Sound

A wide variety of sound cards are available today. Each requires its own set of Windows drivers. Drivers for the most popular sound card drivers are included with Windows. Windows drivers for other sound cards are provided with the sound cards. The sound card driver configuration required for each card may vary. Follow the instructions provided with your sound card. GECS will be able to play WAV files on your sound card once it's properly configured. To test your sound card installation for GECS:

1. Select Control Panel
2. Select Sounds. If "Sound" is not shown as an icon, your configuration is incorrect.
3. Single click on a WAV file from the list on the left. If you cannot select a WAV file, your configuration is incorrect.
4. Press the "Test" button. If sound is produced, your sound card is properly configured.

Using GECS Event WAV Files

GECS can play specified WAV files when certain GECS Events occur. Use the Events Definitions option in the Windows Administrator program to specify a fully qualified WAV file name to announce your Events. You can use ones you record yourself or ones you purchase. Simply specify the desired WAV file in the Event Definition WAV file name field. For example:

`C:\WINDOWS\TADA.WAV`

To test whether your WAV file is compatible with GECS, try the WAV file using Media Player, Sound Recorder or the Control Panel Sound section.

GECS Licensing Restrictions

GECS tracks the Agents being run and compare this information to the information from the license number installed for your system. The license information can be seen in several places. The Windows Administrator client program contains the Help menu selection 'Help About' where your license information can be viewed. The Workstation Setup programs for Windows is used to update the license information. This program displays the name of the company the software is licensed to in the main window. Evaluation licenses will expire on a particular date and most purchased licenses will be limited to particular number of running Agents and the type of Agent. An Agent will not be serviced by GECS if:

1. The license is expired.
2. There are already too many Agents running.
3. The license is not for this type of Agent (i.e. Windows, NLM, & Linux versus Unix).

4. The license file cannot be located.

With a five Agent license you can run five Agents at a time. If you attempt to start a sixth Agent, GECS will randomly decide which Agent has breached the license and which Agent to stop servicing.

The license information is contained in a file named ECSDRIVE.EXE. If you should get an error that the license information cannot be located, check the GECS.INI entry for this file to see that it properly points to the drive and subdirectory where this file is located. By default, this file is in the subdirectory where your GECS data files are located. Do not distribute this file to anyone. Your company's name and license number are contained in this file and will be displayed when the Windows client software is run. It is also important to keep track of the license number label from your printed license agreement. GECS will not run without a valid license number. Should you need to reinstall your software, you will need this number.

NetWare Issues

Microsoft vs. Novell Drivers

The NetWare specific features of GECS require the use of drivers from Novell for Windows. The NetWare drivers from Microsoft can be used, but will not provide the NetWare specific functions available when the drivers from Novell are used, such as NetWare messaging. If you are using NetWare drivers from Microsoft, you should configure the system in Workstation Setup as using No Network or a Microsoft network.

Bindery Emulation

In a NetWare 4 or 5 environment, bindery emulation is required for the NetWare specific flavors of GECS.

Microsoft/LAN Server Network Issues

User Names

The Microsoft/LAN Server network flavor of the client program does NOT check to see that the network user names entered as GECS user names are valid when they are added. GECS user names that are not valid network user names will not be usable. GECS user names must be the same as network user names. The network user names used when submitting jobs must match GECS user names or the job will not run.

Event Network Messaging

When GECS Events are setup, in Event Definitions, to notify via Network Message, GECS uses the Messenger Service to send the message. The Messenger Service must be running in the DBMS machine that is going to send messages and in all workstation nodes that are to receive messages. Additionally, each node that is to receive a message must be running the Netpopup Service. If the Netpopup Service is not run, the messages are written to a log file, but aren't displayed on the workstation. If the Messenger Service is not run, users cannot be notified that jobs have been completed via network messaging.

No Networking Issues

User Names

GECS is unable to determine a user name based on the user's network name with this flavor. The GECS Windows Client programs will determine the user name by prompting the user for a user name and password each time the programs are started. The user name and password can also be passed on the command line for the programs by including the /U: and /P: options on the command line. For example:

```
C:\GECS\PROGNAME.EXE /U:username /P:password
```

Where PROGNAME.EXE is the name of the GECS Windows client program. The user name entered at the prompt (or on the command line) must be a user name that has been defined in the GECS user file. The password must be the password entered in the Network Password field for the user. The password is not visible on the screen (it appears as stars (*)) and is stored in an encrypted fashion. To eliminate the password, fill the Network Password field with spaces. If a user has no password, no password needs to be passed on the command line or entered in at the prompt.

Event Network Messaging

No Event network messaging is available when using the "No" Networking option from the GECS Workstation Setup program.

GECS Security

Access to the GECS Client programs

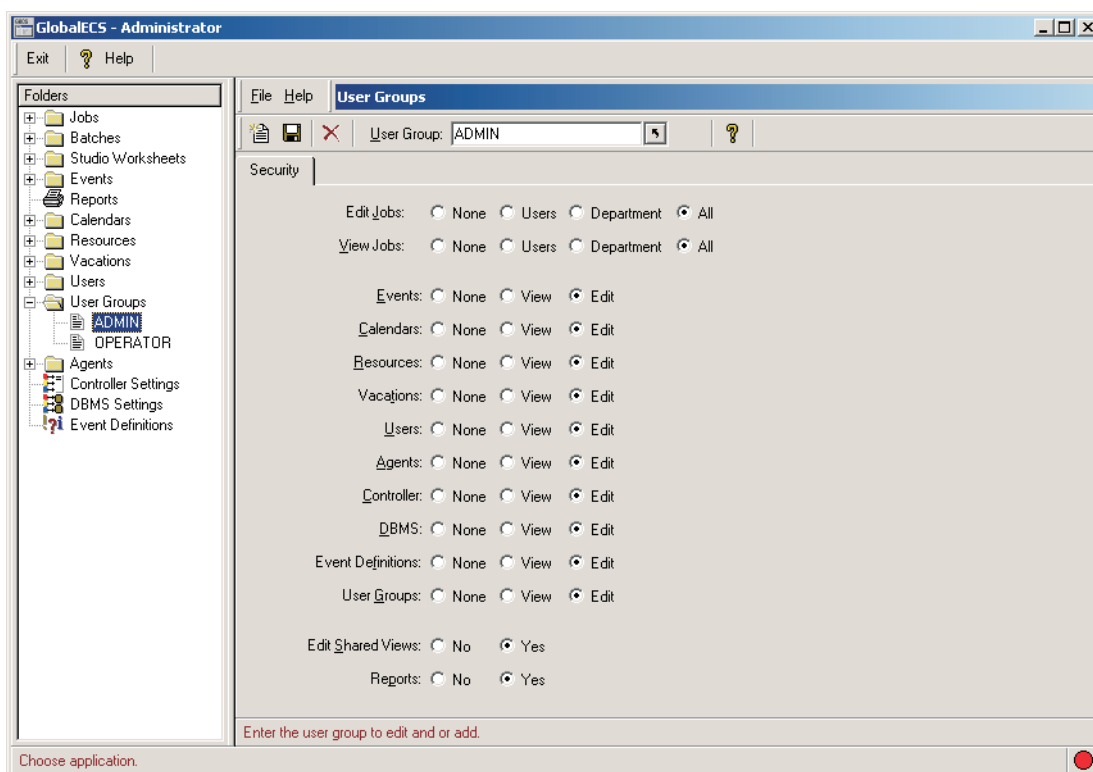
The Global Event Control Server® has its own security system that determines what users can and can't do with the GECS Client programs. These rights are defined in Security Profiles. Each GECS User must be associated with a Security Profile.

When using the Microsoft/LAN Server or No network configuration, the Client programs will only allow valid GECS users access. Consequently, it is imperative that the first user added have rights to access ALL of the GECS Client program components.

One GECS user is automatically created when the GECS software is first installed. This user is made part of the ADMIN Security Profile and thus given access to all components of the GECS system as displayed above.

By default an ADMIN and OPERATOR Security Profile are defined. Once a Security Profile has been created and defined, Users can be assigned to the specified Security Profile thus giving them access to the specified GECS Client program components as defined for the Security Profile.

You can create as many GECS Security Profiles as necessary. The ADMIN default Security Profile can be modified but cannot be deleted. The OPERATOR default Security Profile can be modified and/or deleted.



Security Enhancements

The security in GECS 3.10 has been substantially enhanced. The enhancements have been developed in conjunction with staff from the Center for Education and Research in Information Assurance and Security (CERIAS) at Purdue University. The goal of the enhancements was to accomplish these goals:

No one should be able to view the communications as it is been transmitted between components. To accomplish this, we have enhanced the encryption scheme used to encrypt communications packets. We are using a 64 bit block cipher encryption scheme with 128 bit keys.

No one should be able to record packets and replay them at another time. The encryption keys used by the system are constantly changing. Packets encrypted at one time cannot be decrypted at another time. This prevents packets from being replayed.

Components must be able to verify that communications are valid. To accomplish this, we allow users to create certificates that are unique for their computer and installation. The certificates are used as part of the encryption scheme. Certificates are optional. If you decide to employ this option, it must be manually set up. See the following instructions for certificate management set up.

Setting Up Packet Encryption

To enable packet encryption, you must run the Certificate program (GECSCERT) described below.

Client programs that are configured to directly access the GECS data files cannot take advantage of this data encryption. This is because the direct data access method is performed by the operating system and network drivers not the GECS DBMS.

To configure GECS to run without direct data access, open the Workstation Setup program and ensure the 'Enable Data Path' field on the Client Programs page is not enabled.

Setting Up GECS Certificate Management

To set up certificate management for your Global ECS system, you must run the GECSCERT program on every computer that will be running GECS components. You must establish a unique password for your system. This password must be entered when this program is run. Any computer without the proper certificate will be locked out of the system. Information about this computer is encrypted with the password to prevent this certificate from being used on other computers.

The password is the key to generating the certificate code. We recommend the password exceed 16 characters but no more than 255 characters. Normal rules of command line arguments apply. (i.e. If you are using spaces in your password it should be enclosed in quotes). For example:

```
GECSCERT /NEW abc1234567890wxyz abc1234567890wxyz
```

Where 'abc1234567890wxyz' is your password. It is entered twice for verification.

To disable certificate management you can run the GECSCERT program with the delete option. For example:

```
GECSCERT /DEL abc1234567890wxyz
```

For Windows, you must be logged in as Administrator and you must have the appropriate password to disable this scheme.

For Unix, you should be logged in as root. A file will be created on the machine in the /GECS subdirectory.

File Glossary

File Glossary

GECS Data Files

The GECS data files must be located in the subdirectory specified in the GECS.INI file. This file contains a listing for each file. The GECS.INI file must be in the 'WinNT' directory (i.e. C:\WINNT). Users must have read/write access to the subdirectory where the GECS data files are located.

This file contains late breaking news on this version which is not included in this manual.

READ.ME

This file contains custom configuration information used by many of the GECS programs. This file is created automatically when GECS is installed. It can be created by hand for special Windows Agent configuration.

GECS.INI

These files are the actual data files that hold the client program's information. The Client programs and the Controller program must have access to these files.

ALERTS.DAT
BATCHDET.DAT
BATCHES.DAT
BATCHVAR.DAT
BUSIDAY.DAT
CALTYPE.DAT
DEFMONTH.DAT
EVENTDEF.DAT
EVENTS.DAT
EVTVIEWS.DAT
JOBS.DAT
JOBVIEWS.DAT
RESOURCE.DAT
SERVERS.DAT
UGROUPS.DAT
USERS.DAT
VACATION.DAT
WRKSHEET.DAT
WRKITEM.DAT

ALERTS.IDX
BATCHDET.IDX
BATCHES.IDX
BATCHVAR.IDX
BUSIDAY.IDX
CALTYPE.IDX
DEFMONTH.IDX
EVENTDEF.IDX
EVENTS.IDX
EVTVIEWS.IDX
JOBS.IDX
JOBVIEWS.IDX

RESOURCE.IDX
SERVERS.IDX
UGROUPS.IDX
USERS.IDX
VACATION.IDX
WRKSHEET.IDX
WRKITEM.IDX

These files are the empty copies of the actual data files that are used by the Rebuild programs to rebuild the data files.

ALERTS.CLD
BATCHDET.CLD
BATCHES.CLD
BATCHVAR.CLD
BUSIDAY.CLD
CALTYPE.CLD
DEFMONTH.CLD
EVENTDEF.CLD
EVENTS.CLD
EVTVIEWS.CLD
JOBS.CLD
JOBVIEWS.CLD
RESOURCE.CLD
SERVERS.CLD
UGROUPS.CLD
USERS.CLD
VACATION.CLD
WRKSHEET.CLD
WRKITEM.CLD

ALERTS.CLI
BATCHDET.CLI
BATCHES.CLI
BATCHVAR.CLI
BUSIDAY.CLI
CALTYPE.CLI
DEFMONTH.CLI
EVENTDEF.CLI
EVENTS.CLI
EVTVIEWS.CLI
JOBS.CLI
JOBVIEWS.CLI
RESOURCE.CLI
SERVERS.CLI
UGROUPS.CLI
USERS.CLI
VACATION.CLI
WRKSHEET.CLI
WRKITEM.CLI

These files are installation files:

SETUP.INI
SETUP.EXE
GTREE.DLL
VERSION.TXT
SETUP.BMP
READ.ME
AUTORUN.INF
DATAINST
CLNTINST
AGNTINST
LASTDISK
COMMANDS.TXT
DISK

This data file holds the last parameters or options selected for reports client program.

JSETREPO.DAT

These files contain the command lines that the GECS Windows Agent should run before and after every NT Console or DOS command line type job. These files must be accessible by Windows Agents.

PRECMD.TXT
POSTCMD.TXT

GECS Browser Client Files:

*.GIF
*.HTML
*.JPG

This file contains the online manual in Adobe Acrobat format.

GECSMAN.PDF

GECS Program Files

The GECS program files (BAT, CMD, EXE, COM and Windows DLL files) must be in the default subdirectory or in the search path when the programs are started.

These files are the Windows DLLs that contain program code that the Windows client setup programs need in order to operate.

GECS32.DLL
GECSAPI.DLL
GECSTREE.DLL
GTREE.DLL
GECSBMAN.DLL
GECSCAL.DLL
GECSSLOG.DLL
GECSSLOGO.DLL
GECSSRES.DLL
GECSSRPTS.DLL
GECSSRVA.DLL
GECSSRVC.DLL
GECSSUSER.DLL
GECSSVAC.DLL

JOBVIEW.DLL

These files are different versions of the Windows DLL GECS32.DLL. Depending on the network selected in Workstation Setup, one of these files will have been copied to GECS32.DLL. GECSNW32.DLL is used if NetWare Client for Windows Novell from Novell are being used. GECSMS32.DLL is used when the Microsoft client software supplied with Windows is installed. GECSNN32.DLL is used for no networking.

GECSNW32.DLL
GECSMS32.DLL
GECSNN32.DLL
ECSW.DLL

This program is the Windows Client program.

GECSADMN.EXE

These Windows Agent programs allow keystrokes to be passed to DOS programs in your jobs.

KS.EXE
KSLOAD.COM
WAITKEY.EXE

These files are Btrieve conversion files.

WDBUEI32.DLL
W32MKSET.DLL
W32MKDE.EXE
WDBAU132.DLL
W32MKRC.DLL
W32MKSET.EXE
W32MKSET.HLP
WBTRV32.DLL

This program allows login passwords to be changed in the GECS user file.

GECPASS.EXE

This program displays a list of jobs in the queue.

GECSQUEUE.EXE

This program displays a list of jobs an Agent can run in the queue.

GECSKAN.EXE

This program displays a list of jobs an Agent can't run in the queue.

GECSKANT.EXE

This program can be used to rebuild/convert the GECS data files.

GECSRBLD.EXE

This program can be used to validate the GECS data files.

GECSVAL.EXE

This program can be used to add calendar entries.

GECSCALE.EXE

This program can be used to add users.

GECSAUSR.EXE

This program can be used to flag jobs to override dependencies.

GECSOEVER.EXE

This program can be used to trigger completed jobs.

GECSTRIG.EXE

This program can be used to purge old jobs.

GECSPURG.EXE

This program can be used to change a job's number.

GECSCNUM.EXE

This program can be used to change the submitting user on a job.

GECSCUSE.EXE

This program can be used to flag a running job for termination.

GECSSTP.EXE

This program is used to launch 16 bit Windows programs under Windows NT/2000/XP/2003 when you want to be able to get the return code.

LAUNCH16.EXE

ECSW.DLL

These programs are used internally when Windows Agents and Controllers are run as a service.

ASERVICE.EXE

CSERVICE.EXE

DSERVICE.EXE

WSERVICE.EXE

This program can be used to test job return codes from Windows Agents.

WINRET32.EXE

WINRET.EXE

DOSRET.EXE

OS2RET.EXE

GECSRET.EXE

This program is used to cause your Windows Controller to pulse at any given time.

PULSENOW.EXE

This program is the GECS Windows Agent program.

GECSAGNT.EXE

This program can be used to hide or minimize the Windows Controller or Agent programs.

GECSHIDE.EXE

This program can be used to check whether a GECS Agent or Controller is running.

GECSPING.EXE

This program can be used to stop a GECS Controller or Agent.

GECSSTOP.EXE

This program can be used to show a hidden or minimized Windows Controller or Agent.

GECSSHOW.EXE

This program can be used to tell a GECS Agent to immediately run a command.

AGENTRUN.EXE

This program can be used to convert ECS 5.1 or GECS 1.5 data to GECS2.0 format. It is installed in a \CONVERT subdirectory 'under' the program directory along with the necessary Btrieve DLL's.

GECSCONV.EXE

This program is the actual GECS Controller program.

GECSPROC.EXE

This program is the DBMS program.

GECSDBMS.EXE

This program is the Web Manager program.

GECSWEB.S.EXE

This program can be used to delete jobs from the jobs file without using the Client programs.

GECSDDEL.EXE

This program can be used to delete logs from the logs file without using the Client programs.

GECSLDEL.EXE

This program can be used to pause and unpaue your Windows Controller remotely.

GECSPAUS.EXE

This program can be used to allow one batch to depend on other batches.

BATCHDON.EXE

This program can be used to uninstall GECS from a Windows computer.

GECSUNIN.EXE

This program can be used to export jobs from the jobs file.

GECSDUMP.EXE

This program can be used to export completed jobs.

GECSLDUM.EXE

This program can be used to cleanup the jobs and monitor files automatically after a system failure.

GECSCLEA.EXE

This is the application help file used for the Windows Client programs.

GECSHLP.HLP

This program is the Workstation Setup program that configures and adds icons to your client machines. It also configures GECS.INI.

W40SETUP.EXE

This program is the Workstation Setup program that configures and adds icons to your Windows Controller machine. It also configures GECS.INI.

C40SETUP.EXE

GECSUTIL.EXE

This program is the Workstation Setup program that configures and adds icons to a Windows Agent machine. It also configures GECS.INI, the registry and services.

A40SETUP.EXE
A40SETUP.HLP

This file is used by the Workstation Setup program.

DATALIST

This file is read by the Windows Workstation Setup program. It tells the program about the group to create and the icons that should be created.

GROUP32C.TXT
GROUP32A.TXT
GROUP32W.TXT

Other Files Created

When your Controller tries to load a WRK file that has syntax errors in it, it renames the file to filespec.BAD. During operation, your GECS Controller may create the following file:

*.BAD

When Windows Agents execute jobs with command line types set to NT Console or DOS, GECS creates a batch file. This file is created in the Agent's default subdirectory. It may also be created in the Local Subdirectory defined for the Agent if it is defined to login as submitting users.

random.BAT
random.CMD

Files with a .wrk extension can be created using any text editor or emailed to GECS and can be converted into jobs.

*.WRK

When the Rebuild utility is used, it creates temporary files with the name:

NEWFILE.DAT
NEWFILE.IDX

Files named *JOBNUM*.EL can be used to send return codes to your Windows Controller.

jobnum.EL

Other Required/Optional Files

Your Windows Agents may need to find the command processor. These files should be specified in the COMSPEC environmental variable.

COMMAND.COM
CMD.EXE

Overview of Data File Structure

The Global Event Control Server® is comprised of various programs and data files that work together to create a system for scheduling and executing jobs. The various components are broken up to allow for configurations with varying levels of security and so that GECS can be easily interfaced to other applications.

The various programs work with two sets of data files. The main GECS data files hold scheduled jobs, users, Controller, Agents and Events. Newly submitted jobs can be stored in WRK files. When GECS has no jobs to dispatch, it can look for WRK files and add them to the Scheduled Jobs file to be executed by your Agents. This two layer method of adding jobs does two things. First it allows GECS to validate jobs before adding them to the real files. Second, it provides a convenient way for other programs to schedule jobs. WRK files are simple text files.

The principle data files used by GECS are:

ALERTS

This data file contains Events to be displayed in the User's Events lists.

BATCHDET

This data file contains a record for each defined batch job.

BATCHES

This data file contains a record for each defined batch.

BATCHVAR

This data file contains a record for each defined batch variable.

BUSIDAY

This data file contains a record for each date that is a non-business day. Jobs can be rescheduled based on business and non-business days.

CALTYPE

This data file contains a record for each defined calendar.

DEFMONTH

This data file contains a record for the first day of each defined month.

EVENTDEF

This data file contains a record for each defined job.

EVENTS

This data file contains a record for each defined job.

EVTVIEWS

This data file contains a record for each defined job.

JOBS

This data file contains a record for each defined job.

JOBVIEWS

This data file contains a record for each defined job.

RESOURCE

This data file contains a record for each defined resource. The file contains a record for each that contains the resource and a record for each system resource.

SERVERS

This data file contains a record for each defined Controller and Agent.

UGROUPS

This data file contains a record for each defined resource. The file contains a record for each that contains the resource and a record for each system resource.

USERS

This data file contains a record for each defined GECS user.

VACATION

This data file contains a record for each defined vacation period. A vacation period is a period of time that jobs of a particular class should not be allowed to run. Jobs scheduled to run during a vacation period either reschedule themselves or wait until the vacation period ends before running.

WRKSHEET

This data file contains a record for each work sheet created in the GECS Studio client program.

WRKITEM

This data file contains a record for each item on the GECS Studio work sheets.

PRECMD.TXT

This ASCII text file contains command lines that you would like to have executed before each job is run. This file is used system wide and will be run before every Windows NT Console, DOS or OS/2 command line type job.

POSTCMD.TXT

This ASCII text file contains command lines that you would like to have executed after each job is run. This file is used system wide and will be run after every Windows NT Console, DOS or OS/2 command line type job.

GECS.INI

This ASCII text file contains information about the location of the GECS data files for all GECS programs. See the "Technical Reference" chapter of this manual for details.

Using ODBC to Access GECS Data

You can use ODBC drivers to access GECS data. These drivers are available by purchasing the GECS SDK product. For information you may contact Vinzant, Incorporated at 800-355-3443 or www.vinsoft.com.

Job Dump Data Files

Fixed Length Files

Each record has a fixed length of 2104 bytes (including the terminating CR/LF). Each field is a fixed length. Numeric fields are right justified zero filled. Trailing spaces in text fields are included. Dates and times are in the format of MM/DD/YYYY and HH:MM:SS respectively. The jobs are written to the file in job number order. Each FIXED record has a fixed number of fixed length fields. Note that this file format does not include many of the job parameter fields.

The file layout is :

Field	Offset	Len	Format	Notes
jobnum	0	10	xx...xx	job number
cmdline	10	128	xx...xx	command line to execute
path	138	128	xx...xx	Path to change to before executing
nextdate	266	10	mm/dd/yyyy	date of next execution
nexttime	276	8	hh:mm:ss	time of next execution
repunit	284	5	nnnnn	0=sec, 1=min, 2=hr,3 =day, 4=week, 5=month, 6=year, 7=business day, 8=non-businessday, 9=defined month
repvalue	289	9	nnnnnnnnn	number of units before repeat
rephase	298	5	nnnnn	0=from start, 1=from end, 2=from schedule
group	303	8	xxxxxxxx	execute by Agent machine in this group
priority	311	5	nnnnn	0=high, 9=low
status	316	5	nnnnn	0=pending, 1=started, 2=On Hold, 3=completed
Agent	321	8	xxxxxxxx	Agent to execute
username	349	48	xx...xx	user who submitted job
osreq	397	5	nnnnn	operating system required 0=Other, 1=Any, 2=WinNT/2000/XP/2003, 3=UnixWare, 4=NetWare, 5=Win95/98/ME, 6=Linux, 7=AIX, 8=HPUX, 9=Solaris, 10=OS/400, 11=Tru64, 12=IRIX
comment	457	128	xx...xx	misc comments
execafter	585	10	xx...xx	job number to execute after
title	595	30	xx...xx	description of job
diskspace	630	9	nnnnnnnnn	minimum megabytes of disk required
maxretval	639	5	nnnnn	max ret value for execafter
totaltimes	644	5	nnnnn	total times to repeat 0=infinite
timesleft	649	5	nnnnn	remaining times to execute
substcmd	654	5	nnnnn	substitute command line 0=no, 1=yes
filespec	659	128	xx...xx	execute if this file exists

fileexist	787	5	nnnnn	0=when none of the files exist, 1=when any of the file exists, 2=when any file exists and can be opened sharable, 3=when any file exists and can be opened exclusively, 4=when all files exist, 5=when all files can be opened sharable, 6=when all files can be opened exclusive.
timeafter	792	8	hh:mm:ss	time after excafter job finishes
class	800	8	xxxxxxxx	maps to vacation file
relaabs0	808	5	nnnnn	0=relative repetition, 1=absolute repetition, 2=day of week, 3=special
nth	813	5	nnnnn	number of variable units
daytype	818	5	nnnnn	0=days, 1=business days, 2=non- business days, 3=weeks, 4=months, 5=sundays, 6=mondays, 7=tuesdays, 8=wednesdays, 9=thursdays, 10=fridays, 11=saturdays
begend	823	5	nnnnn	0=from beginning, 1=from end, 2=on or after beginning, 3=on or before end
period	828	5	nnnnn	0=week, 1=month, 2=defined month, 3=quarter, 4=half, 5=year
osver	833	5	nn.nn	the minimum operating system version
keys	838	255	xx...xx	1st set of keys to shove into the keyboard buffer
exaft02	1093	10	xx...xx	run job after
exaft03	1103	10	xx...xx	run job after
exaft04	1113	10	xx...xx	run job after
exaft05	1123	10	xx...xx	run job after
exaft06	1133	10	xx...xx	run job after
exaft07	1143	10	xx...xx	run job after
exaft08	1153	10	xx...xx	run job after
exaft09	1163	10	xx...xx	run job after
exaft10	1173	10	xx...xx	run job after
exret02	1183	5	nnnnn	max ret value of job to run after
exret03	1188	5	nnnnn	max ret value of job to run after
exret04	1193	5	nnnnn	max ret value of job to run after
exret05	1198	5	nnnnn	max ret value of job to run after
exret06	1203	5	nnnnn	max ret value of job to run after
exret07	1208	5	nnnnn	max ret value of job to run after
exret08	1213	5	nnnnn	max ret value of job to run after
exret09	1218	5	nnnnn	max ret value of job to run after
exret10	1223	5	nnnnn	max ret value of job to run after
extim02	1228	8	hh:mm:ss	time after excafter job finishes
extim03	1236	8	hh:mm:ss	time after excafter job finishes
extim04	1244	8	hh:mm:ss	time after excafter job finishes
extim05	1252	8	hh:mm:ss	time after excafter job finishes

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extim06	1260	8	hh:mm:ss	time after execafter job finishes
extim07	1268	8	hh:mm:ss	time after execafter job finishes
extim08	1276	8	hh:mm:ss	time after execafter job finishes
extim09	1284	8	hh:mm:ss	time after execafter job finishes
extim10	1292	8	hh:mm:ss	time after execafter job finishes
retryafter	1300	5	nnnnn	retry job if it returns = this number - 0=noretry
maxjobmin	1305	5	nnnnn	maximum minutes job should be allowed to run
minnotcode	1310	5	nnnnn	minimum return code to notify submitter of completion
exetype	1315	5	nnnnn	0=DOS, 1=Win31, 2=OS/2, 3=WinNT/2000/XP/2003, 4=NLM, 5=Win95/98/ME, 6=NT Console, 7=UnixWare, 8=Linux, 9=AIX, 10=HPUX, 11=Solaris, 12=OS/400, 13=Tru64, 14=IRIX
showactivity	1320	5	nnnnn	0=no,1=yes
estjobmin	1325	5	nnnnn	estimated minutes job should run
keys2	1330	255	xx...xx	2nd set of keys to shove into the keyboard buffer
keys3	1585	255	xx...xx	3rd set of keys to shove into the keyboard buffer
keys4	1840	255	xx...xx	4th set of keys to shove into the keyboard buffer
subdate	2095	10	mm/dd/yyyy	date submitted
subtime	2105	8	hh:mm:ss	time submitted
escalmin	2113	5	nnnnn	escalalte after minutes late
failjob	2118	10	xx...xx	job to reactivate on failure
keepdone	2128	5	nnnnn	keep job Completewhen complete
latejob	2133	10	xx...xx	job to reactivate if late
launchmode	2143	5	nnnnn	launch job in this mode
maxgoodret	2148	5	nnnnn	maximum good return code
maxminlate	2153	5	nnnnn	maximum minutes late
message	2158	80	xx...xx	pre job message
relate0	2238	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate1	2243	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate2	2248	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate3	2253	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate4	2258	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate5	2263	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate6	2268	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate7	2273	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate8	2278	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
relate9	2283	5	nnnnn	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
resource0	2288	8	xx...xx	required resource
resource1	2296	8	xx...xx	required resource
resource2	2304	8	xx...xx	required resource
resource3	2312	8	xx...xx	required resource
resource4	2320	8	xx...xx	required resource

resource5	2328	8	xx...xx	required resource
resource6	2336	8	xx...xx	required resource
resource7	2344	8	xx...xx	required resource
resource8	2352	8	xx...xx	required resource
resource9	2360	8	xx...xx	required resource
Agent1	2368	8	xx...xx	run on Agent
Agent2	2376	8	xx...xx	run on Agent
Agent3	2384	8	xx...xx	run on Agent
Agent4	2392	8	xx...xx	run on Agent
Agent5	2400	8	xx...xx	run on Agent
Agent6	2408	8	xx...xx	run on Agent
Agent7	2416	8	xx...xx	run on Agent
Agent8	2424	8	xx...xx	run on Agent
Agent9	2432	8	xx...xx	run on Agent
sun	2440	5	nnnnn	run on sunday
mon	2445	5	nnnnn	run on monday
tue	2450	5	nnnnn	run on tuesday
wed	2455	5	nnnnn	run on wednesday
thu	2460	5	nnnnn	run on thursday
fri	2465	5	nnnnn	run on friday
sat	2470	5	nnnnn	run on saturday
caltype	2475	8	xx...xx	calendar type
escalprior	2483	5	nnnnn	escalation priority
beenescal	2488	5	nnnnn	has the jobs priority been escalated
CR/LF	2493	2	OD0A	carrage return/linefeed
—				
2495				

Comma Separated Files

Each field is separated with a comma (.). Text fields are enclosed in double quotes (“). If the text fields contain any double quotes (“”), they are changed to single quotes (‘). Trailing spaces in text fields are omitted. Dates and times are also enclosed in double quotes and are in the format of “MM/DD/YYYY” and “HH:MM:SS” respectively. Numeric fields are NOT enclosed in quotes. The jobs are written to the file in job number order. Each CSV record has a fixed number of variable length fields. Each record is terminated with a CR/LF.

The file layout is :

Job Record Field Name	Abbreviation	Format	Notes
Job	number	n,	batch.number-instanc
Command Line	cmdline	“xx...xx”,	command line to execute
Start In Directory	path	“xx...xx”,	path to change to before executing
Schedule Date	nextdate	“mm/dd/yyyy”,	date of next execution
Schedule time	nexttime	“hh:mm:ss”,	time of next execution
Relative-Repeat	repunit	n,	0=sec, 1=min, 2=hr, 3=day, 4=week, 5=month,

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			6=year,7=business day,8=non-business day, 9=defined month
Relative-Repeat	repvalue	n,	number of units before repeat
Relative-after last	rebase	n,	0=from start, 1=from end, 2=from schedule
Use agent group	group	"xx...xx",	execute by agent machine in this group
Priority	priority	n,	0=high,9=low
Job Status	status	n,	0=pending,1=started, 2=on hold, 3=completed
Execute by Agent 1	agent	"xx...xx",	agent to execute
Submitted By	username	"xx...xx",	user who submitted job
Operating System	osreq	n,	operating system required 0=Other, 1=Any, 2=WinNT/2000/XP/2003, 3=UnixWare, 4=NetWare, 5=Win95/98/ME, 6=Linux, 7=AIX, 8=HPUX, 9=Solaris,10=OS/400, 11=Tru64, 12=IRIX
Job Comments	comment	"xx...xx",	misc comments
Depends On Job 1	execafter	n,	job number to execute after
Job Title	title	"xx...xx",	description of job
Minimum Disk Space	mindiskspace	n,	minimum megabytes of disk required
Return Value 1	maxretvalue	n,	max ret value for execafter
Times To Execute	totaltimes	n,	total times to repeat 0=infinite
Remaining Times	remainingtimes	n,	remaining times to execute
Enable cmd line Substi	substcmd	n,	substitute command line 0=no, 1=yes
File(s) To Check	filespec	"xx...xx",	execute if this file exists
Execute	fileexist	n,	0=when none of the files exist, 1=when any of the files exist, 2=when a file exists and can be opened sharable, 3=when a file exists and can be opened exclusive, 4=when all files exist, 5=when all files can be opened sharable, 6=when all files can be opened exclusive
Job Delay 1	timeafterjob	"hh:mm:ss",	time after execafter job finishes
Job Class	class	"xx...xx",	maps to vacation file
Using The	relaabso	n,	0=relative repetition, 1=absolute repetition, 2=day of the week, 3=special
Absolute-Repeat on Day nth		n,	number of variable units
Absolute-Repeat on Day daytype		n,	0=days, 1=business days, 2=non-business days, 3=weeks, 4=months, 5=sundays, 6=mondays, 7=tuesdays, 8=wednesdays, 9=thursdays,10=fridays, 11=saturdays
Absolute-Repeat on day begend		n,	0=after beginning, 1=before end, 2=on or after beginning, 3=on or before end
Absolute-the	period	n,	0=week,1=month,2=defined month, 3=quarter,4=half,5=year
Operating Sys Version	osver	n.nn,	the minimum operating system version
Keystrokes 1	keys	"xx...xx",	1st set of keys to shove into the keyboard buffer
Depends On Job 2	exaft02	n,	run job after

Depends On Job 3	exaft03	n,	run job after
Depends On Job 4	exaft04	n,	run job after
Depends On Job 5	exaft05	n,	run job after
Depends On Job 6	exaft06	n,	run job after
Depends On Job 7	exaft07	n,	run job after
Depends On Job 8	exaft08	n,	run job after
Depends On Job 9	exaft09	n,	run job after
Depends On Job 10	exaft10	n,	run job after
Return Code 2	exret02	n,	max ret value of job to run after
Return Code 3	exret03	n,	max ret value of job to run after
Return Code 4	exret04	n,	max ret value of job to run after
Return Code 5	exret05	n,	max ret value of job to run after
Return Code 6	exret06	n,	max ret value of job to run after
Return Code 7	exret07	n,	max ret value of job to run after
Return Code 8	exret08	n,	max ret value of job to run after
Return Code 9	exret09	n,	max ret value of job to run after
Return Code 10	exret10	n,	max ret value of job to run after
Job Delay 2	extim02	"hh:mm:ss",	time after excafter job finishes
Job Delay 3	extim03	"hh:mm:ss",	time after excafter job finishes
Job Delay 4	extim04	"hh:mm:ss",	time after excafter job finishes
Job Delay 5	extim05	"hh:mm:ss",	time after excafter job finishes
Job Delay 6	extim06	"hh:mm:ss",	time after excafter job finishes
Job Delay 7	extim07	"hh:mm:ss",	time after excafter job finishes
Job Delay 8	extim08	"hh:mm:ss",	time after excafter job finishes
Job Delay 9	extim09	"hh:mm:ss",	time after excafter job finishes
Job Delay 10	extim10	"hh:mm:ss",	time after excafter job finishes
Retry on Error Code	retryafter	n,	retry job if it returns = this num - 0=noretry
Maximum Minutes	maxjobminutes	n,	maximum minutes job should be allowed to run
Minimum Notify Code	minnotifycode	n,	minimum return code to notify submitter of completion
Job (Status &) Type	exetype	n,	0=DOS, 1=Win31, 2=OS/2, 3=WinNT/2000/XP/2003, 4=NLM, 5=Win95/98/ME, 6=NT Console, 7=UnixWare, 8=Linux, 9=AIX, 10=HPUX, 11=Solaris, 12=OS/400, 13=Tru64, 14=IRIX
Show Activity	showactivity	n,	0=no,1=yes
Estimated Minutes	estjobminutes	n,	estimated minutes job should run
Keystrokes 2	keys2	"xx...xx",	2nd set of keys to shove into the keyboard buffer
Keystrokes 3	keys3	"xx...xx",	3rd set of keys to shove into the keyboard buffer
Keystrokes 4	keys4	"xx...xx",	4th set of keys to shove into the keyboard buffer
Submitted Date	subdate	"mm/dd/yyyy",	date submitted
Submitted Time	subtime	"hh:mm:ss"	time submitted
Escalate for each x	escalmin	n,	escalate after minutes late

File Glossary

Reactive Job if this	failjob	"xx...xx",	job to reactivate on failure
Keep When Complete	keepdone	n,	keep job when complete
Reactive Job if this	latejob	"xx...xx",	job to reactivate if late
Execute	launchmode	n,	launch job in this mode
If this jobs ret code	maxgoodret	n,	maximum good return code
If this job is more	maxminlate	n,	maximum minutes late
Execute Message	message	"xx...xx",	pre job message
Operation On RetCode1	relate0	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode2	relate1	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode3	relate2	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode4	relate3	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode5	relate4	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode6	relate5	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode7	relate6	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode8	relate7	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode9	relate8	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Operation On RetCode10	relate9	n,	0 <=, 1 <, 2 =, 3 >, 4 >=, 5 <>
Resources 1	resource0	"xx...xx",	required resource
Resources 2	resource1	"xx...xx",	required resource
Resources 3	resource2	"xx...xx",	required resource
Resources 4	resource3	"xx...xx",	required resource
Resources 5	resource4	"xx...xx",	required resource
Resources 6	resource5	"xx...xx",	required resource
Resources 7	resource6	"xx...xx",	required resource
Resources 8	resource7	"xx...xx",	required resource
Resources 9	resource8	"xx...xx",	required resource
Resources 10	resource9	"xx...xx",	required resource
Execute By Agent 2	agent1	"xx...xx",	run on agent
Execute By Agent 3	agent2	"xx...xx",	run on agent
Execute By Agent 4	agent3	"xx...xx",	run on agent
Execute By Agent 5	agent4	"xx...xx",	run on agent
Execute By Agent 6	agent5	"xx...xx",	run on agent
Execute By Agent 7	agent6	"xx...xx",	run on agent
Execute By Agent 8	agent7	"xx...xx",	run on agent
Execute By Agent 9	agent8	"xx...xx",	run on agent
Execute By Agent 10	agent9	"xx...xx",	run on agent
Weekly Schedule	sun	n,	run on sunday
Weekly Schedule	mon	n,	run on monday
Weekly Schedule	tue	n,	run on tuesday
Weekly Schedule	wed	n,	run on wednesday
Weekly Schedule	thu	n,	run on thursday
Weekly Schedule	fri	n,	run on friday
Weekly Schedule	sat	n,	run on saturday
With Calendar	caltype	"xx...xx",	calendar type
Escalate this job's	escalprior	n,	escalation priority
	beenescal	n	has the jobs priority been escalated
	CR/LF	0DOA	carrage return/linefeed

Completed Job Dump Data Files

Fixed Length Files

Each record has a fixed length of 2104 bytes (including the terminating CR/LF). Each field is a fixed length. Numeric fields are right justified zero filled. Trailing spaces in text fields are included. Dates and times are in the format of MM/DD/YYYY and HH:MM:SS respectively. The jobs are written to the file in job number order. Each FIXED record has a fixed number of fixed length fields.

The file layout is :

Field	Offset	Len	Format	Notes
jobnum	0	10	xx...xx	job number
cmdline	10	128	xx...xx	command line to execute
path	138	128	xx...xx	To path to change to before executing
begdate	266	10	mm/dd/yyyy	beginning date
begtime	276	8	hh:mm:ss	beginning time
enddate	284	10	mm/dd/yyyy	ending date
endtime	294	8	hh:mm:ss	ending time
nextdate	302	10	mm/dd/yyyy	next scheduled date
nexttime	312	8	hh:mm:ss	next scheduled time
agent	320	8	xx...xx	agent that ran job
priority	328	5	nnnnn	priority
retvalue	333	5	nnnnn	return code
username	338	48	xx...xx	user that submitted job
title	386	30	xx...xx	job title
schddate	416	10	mm/dd/yyyy	date rescheduled for
schdtime	426	8	hh:mm:ss	time rescheduled for
charge	434	15	nn...nn.nn	charge
set4retry	449	5	nnnnn	was job set for retry
newprob	454	5	nnnnn	is job an unviewed problem
CR/LF	459	2	0D0A	carrage return/linefeed
	—			
	461			

Comma Separated Files

Each field is separated with a comma (.). Text fields are enclosed in double quotes (“). If the text fields contain any double quotes (“”), they are changed to single quotes (‘). Trailing spaces in text fields are omitted. Dates and times are also enclosed in double quotes and are in the format of “MM/DD/YYYY” and “HH:MM:SS” respectively. Numeric fields are NOT enclosed in quotes. The jobs are written to the file in job number order. Each CSV record has a fixed number of variable length fields. Each record is terminated with a CR/LF.

The file layout is :

Field	Format	Notes
jobnum	“text”,	batch.number-instance
cmdline	“text”,	command line
path	“text”,	command line changed to

File Glossary

begdate	"mm/dd/yyyy",	beginning date
begtime	"hh:mm:ss",	beginning time
enddate	"mm/dd/yyyy",	ending date
endtime	"hh:mm:ss",	ending time
nextdate	"mm/dd/yyyy",	next scheduled date
nexttime	"hh:mm:ss",	next scheduled time
agent	"text",	agent that ran job
priority	n,	job priority
retvalue	n,	return code
username	"text",	submitting user name
title	"text",	job title
schddate	"mm/dd/yyyy",	original scheduled date
schdtime	"hh:mm:ss",	original scheduled time
charge	n.nn,	charge for job
setforretry	n,	was job set for retry (0=no,1=yes)
newproblem	n	is job an unviewed problem (0=no,1=yes)
CR/LF	0D0A	return/linefeed

Error Numbers

Description of Errors

GECS displays error messages that typically describe the situation. Sometimes however, GECS will include an error number in the message. The error numbers relate either to the database or the operating system. The database related error numbers are displayed in the format:

Some sort of message. database error *n*.

where *n* is the database error number.

The operating system errors are displayed in the format:

Some sort of message. *N-n*.

where *N* is the first portion and *n* is the second portion.

Database Errors

1	Invalid operation	37	Begin transaction
2	I/O error	38	Transaction control file
3	No open	39	End/abort error
4	Key not found	40	Transaction maximum files
5	Duplicates error	41	Transaction operation
6	Invalid key number	42	Incomplete accelerated access
7	Different key number	43	Invalid data record address
8	Invalid positioning	44	Null key path
9	End of file	45	Inconsistent key flags
10	Modifiable error	46	Access denied
11	Invalid file name	47	Maximum open files
12	File not found	48	Invalid alternate sequence definition
13	Extension error	49	Key type error
14	Pre-open error	50	Owner already set
15	Pre-image error	51	Invalid owner
16	Expansion error	52	Error writing cache
17	Close error	53	Invalid interface
18	Disk full	54	Variable page error
19	Unrecoverable error	56	Incomplete index
20	Record manager inactive	80	Conflict
21	Key buffer error	81	Lock error
22	Record buffer	82	Lost position
23	Position block	83	Read outside transaction
24	Page size	84	Record in use
25	Create I/O error	85	File in use
26	Number of keys	86	File full
27	Key position	87	Handle full
28	Record length	88	Mode error
29	Key length	90	Device full
30	Btrieve file name	91	Server error
31	Extend error	92	Transaction full
32	Extend I/O error	93	Incompatible lock type
34	Extend Name	94	Permission error
35	Directory error	97	Data message too small
36	Transaction error	98	Internal transaction error

200	XQLP is not loaded	247	User does not have access for all of the fields specified
201	Invalid function code	248	Invalid size
202	Invalid cursor ID	249	Incompatible field types
203	Invalid master password	250	Cannot recall view
204	Invalid file name	252	X\$View is not open
205	Invalid password	254	Cannot create VIEW dictionary file
206	Maximum number of cursors has been exceeded	255	Field is not an index
207	Invalid field	256	Relation must specify at least one file
208	The position parameter value is out of range for this function	257	Dictionary filename has been previously defined
209	Invalid user or group name	258	Error updating dictionary file definition
210	Buffer is not large enough to hold all of the data	259	Error inserting new dictionary file definition
211	Maximum record size has been exceeded	260	Error updating X\$Rights file
212	Maximum index size has been exceeded	261	A variable data type field must be last field in a view or file def.
213	Read access error	262	A variable data type field may not be defined as an index
214	Cannot change field rights while file has alter rights	263	A view may not be sorted by a variable data type field
215	Invalid lock flag	264	Cannot modify or remove the master user
217	A join is not allowed on a view ordered by a user-defined sort	265	Invalid session identified
218	A maximum of 8 files may be joined	266	Only one session can be active at a time
219	A maximum of 24 index segments is allowed	267	Only one dictionary can be open at a time
220	No matching indexes on secondary keys	269	Cannot create X\$User dictionary file
221	Invalid syntax for expression or restriction	270	Cannot open X\$User dictionary file
222	Insufficient memory in XQLP	271	Cannot create x\$Rights dictionary file
223	Invalid data type for expression	272	Cannot open X\$Rights dictionary file
224	Invalid character in numeric data	273	Cannot read or update X\$User dictionary file
225	The maximum number of fields for an ORDER BY is 8	274	Unable to assign owner name to physical file
226	Rec. count specified exceeds # of records returned by last xFetch	275	Duplicate Name for Group or User
227	Operand must be a dictionary field	276	User is not the master user
228	Invalid data length in buffer	277	Invalid access rights code
229	Field already exists in this file definition	278	Invalid option
230	Incomplete restriction statement	279	Invalid mask
231	No fields are defined in the view	281	Attribute is not in the dictionary
232	Field must be in the view	282	Invalid character in data
234	Cannot create external index file	283	Invalid range value
235	Invalid option for an I/O operation	284	Specified value is not in list of valid values
236	Cannot update a view with an external index	285	Error opening data dictionary file
237	Index descriptor missing for supplemental index	286	Attempt to turn off/on security when security is already off/on
238	Supplemental index does not exist	287	Data dictionary is not assigned
239	File in the view definition is not in current dictionary	288	Data dictionary is in use
240	Field in the view definition is not in the current dictionary	290	Data dictionary already exists
241	Cannot update a dictionary file	291	Data dictionary does not exist in the specified directory
242	User does not have write access to this file	292	Invalid month number
243	User does not have access to update a field	293	Invalid day of month
244	User does not have write access to all fields in this file	294	Invalid time range
245	Data dictionary file may not be deleted	295	Invalid open code
246	User does not have file definition or change rights		

296	Error opening data file for BTRIEVE STAT function call	404	Unable to store SQL statement
297	Field may not be deleted from view	405	File already exists
298	Mismatched Quotes	406	No files found to Store, Recall or Delete
299	Invalid join index for 'file:n.field'	407	Invalid filename
300	Missing operator for conditional, expected'::'	408	Error writing output
301	No restriction has been defined	409	Please ENTER an SQL statement first
302	Not a computed field	410	Unable to SAVE configuration
303	Cannot update current sort index if more than one file is in the view	411	Unable to open dictionary files
304	Cannot change another user's password	412	Insufficient memory
305	View name not found in dictionary	413	Out of DOS file handles
306	Error occurred while storing view definition	414	Maximum width for XQLI data window is 1,024 bytes
307	The computed field specified for the join is not in the view	415	Maximum page length exceeded
308	I/O error	416	Maximum page width exceeded
309	Valid owner access codes are 0, 1, 2, and 3	417	Invalid dimensions for editing window
310	User does not have access for all of the files specified	501	Invalid keyword
311	Transaction processing has not been activated	502	Invalid SELECT statement
312	Transaction aborted	503	Invalid function code
313	Transaction already started	504	Invalid OPEN mode
314	Transaction cannot be initiated-file recovery required	505	Each item in the attribute list must be enclosed in quotation marks
315	Cannot change dictionary or data path within a transaction	506	Invalid INSERT statement
316	You cannot remove Btrieve from memory while XQL is loaded	507	Invalid UPDATE statement
317	Dictionary is locked by another user within a transaction	508	Invalid DELETE statement
318	Cannot update view that includes files opened in READONLY mode	509	Invalid SET statement
319	Value list definition error	510	Can only create a TABLE, VIEW, INDEX, DICTIONARY, or GROUP
320	Character list definition error	511	Index name is missing
321	Default value definition error	512	Invalid GRANT statement
322	Range list definition error	513	Username missing on GRANT/REVOKE
323	Cannot remove a file definition for a file in the view	514	Table name is missing
324	Unmatched parentheses	515	TABLE keyword should follow ALTER
325	Record length error	516	ADD, MODIFY, or DROP keyword expected
326	Stack overflow	517	The FROM clause is missing
327	Null key error	518	Sort order follows field name
328	Invalid syntax for date/time arithmetic	519	AS expected
329	Invalid number of decimal places	520	BY expected
330	Invalid data format	521	You must supply a view name for the CREATE VIEW statement
331	Invalid operation performed on security group	522	Unknown keyword
332	Dictionary files have not been converted to version 2.xx	523	GRANT/REVOKE option is missing
333	Error storing index definitions	524	Field list is allowed only on SELECT or UPDATE
334	Supplemental index name already exists	525	Password must be specified for SET SECURITY
335	Invalid join option	526	Name cannot be a reserved word
336	Conversion error	527	Missing user password
401	Please log in first	528	Must provide a character after the equal sign
402	Error opening file that contains the SQL statement	529	Must supply one or more owner names after the equal sign
403	Error recalling stored SQL statement	530	Must supply a dictionary path after the equal sign
		531	Must supply a data file path after the equal sign

532	Missing '='	825	Cannot do AVG or SUM on STRING, DATE, or TIME data types
533	Invalid data type specified	826	Missing or unbalanced parentheses following WHERE clause
534	SELECT keyword expected when creating a view	827	GROUP BY field must be in the view list
535	Index attribute expected	828	WHERE clause must be specified last
536	Dictionary field name expected	829	Invalid syntax for computed field
537	Field name already exists in this definition	830	Operand expected
538	Index name is not in the field list	831	Operand in HAVING clause must be a group aggregate or constant
539	Index is already defined in this definition	832	Stored view buffer is inconsistent-cannot be recalled
540	Field list expected after SELECT, ORDER BY, or GROUP BY	833	Field must be in the view list
541	Restrict text expected after WHERE or HAVING	835	Invalid option for XQLStat
542	DICTIONARY, INDEX, TABLE, VIEW, or GROUP keyword expected	836	Invalid mask
543	Mismatched quotation marks	837	Invalid delimiter
544	Directory path must be specified	838	Number of fields in all view lists must match
545	INTO keyword expected	839	Type or size mismatch in corresponding fields
546	Maximum string size is 255 bytes	840	Stack overflow
547	Attribute list is missing	841	Unable to create temporary file
548	Invalid syntax: WORK or TRANSACTION keyword expected	842	Subquery in HAVING clause
549	ORDER BY clause must be specified last	843	DOS path not specified
550	Alias name has already been defined	845	Field/Heading mismatch
551	Invalid characters for dictionary name	846	Unspecified field name
552	Missing SELECT clause	847	Invalid syntax in WHERE clause
553	Field name too long	848	Multiple DISTINCT keywords
554	Security group name expected	849	Insufficient buffer space for WHERE clause
555	Expected IN DICTIONARY clause	850	Data value cannot be converted to new data type
800	Insufficient memory in XQLM	851	SELECT statement may not access the same files as INSERT or UPDATE
801	Maximum number of cursors has been exceeded	852	Record count must be greater than zero
802	XQL Manager is not active	853	Access denied
803	User must log in first	854	No index defined
804	Invalid position	855	Data conversion requires two views
805	Invalid size	856	Invalid number of values on INSERT
806	Invalid number of decimal places	2001	Insufficient memory in OS/2
807	Invalid variable	2002	Incorrect parameter in OS/2
808	Unresolved variables	2101	Data message buffer is too small
809	Field in statement is not in the recalled view	2102	Redirection buffer is too small
810	Invalid number	2103	NW\$SQL is not active on the requested server
811	Invalid month	2104	Only one dictionary may be open at a time
812	Invalid day of month	2105	Server buffer is too small
813	Invalid time range	2106	NW\$SQL data message buffer too small
815	Invalid join field	2107	Maximum number of active views has been exceeded
816	Field name is not defined in this table	2108	Device is not assigned to a file server
818	Field in view must be a group aggregate or in GROUP BY list	2109	Too many file servers attached
819	Invalid table name		
820	Comparison operator expected in HAVING clause		
821	Invalid cursor ID		
822	Data buffer is too small		
823	ORDER BY index must be in the view list		
824	Missing or unbalanced parentheses		

10002	Key value already exists	10050	Could not lock node
10003	Could not delete since pntr's don't match	10051	Could not unlock node
10004	Could not find key to delete	10052	Variable length keys disabled OR invalid key type
10005	Cannot call delete w/o verification with duplicate keys	10053	File mode inconsistent with c-tree config
10006	c-tree(...) jump table error	10054	Attempt to write a read only file
10007	Terminate user	10055	File deletion failed
10008	sysiocod value when FNOP_ERR caused by conflicting open requests (server)	10056	File must be opened exclusive for delete
10009	sysiocod value when FNOP_ERR, DCRAT_ERR or KCRAT_ERR caused by device access error	10057	Proper lock is not held (CHECKLOCK/READ)
10010	INTREE parameters require too much space	10058	LOADKEY called with incorrect key number. You cannot continue
10011	Bad INTREE parameters	10059	LOADKEY called with key out of order You may skip this key & continue
10012	Could not open file: not there or locked	10060	Percent out of range
10013	Unknown file type	10061	NULL fcb detected during I/O
10014	File corrupt at open	10062	File must be opened exclusively
10015	File has been compacted	10063	Start file / log file serial number error
10016	Could not create index file	10064	Checkpoint past end of log file
10017	Could not create data file	10065	Not enough memory during tran processing
10018	Tried to create existing index file	10066	Log file entry failed to find checkpoint
10019	Tried to create existing data file	10067	Could not rename file
10020	Key length too large for node size	10068	Could not allocate memory for control list
10021	Record length too small	10069	Node does not belong to index
10022	File number out of range	10070	Transaction already pending
10023	Illegal index member info	10071	No active transaction
10024	Could not close file	10072	No space for shadow buffer
10025	Bad link in deleted node list. REBUILD	10073	LOGFIL encountered during shadow only
10026	File number not active	10074	Recovery: two active tran for user
10027	drm before beginning of data records	10075	Recovery: bad tran owner
10028	Zero drm in ADDKEY	10076	Recovery: bad tran type
10029	Zero drm in data file routine	10077	Recovery: file name too long
10030	drm exceeds logical end of file	10078	Transaction abandoned: too many log extents or dynamic dump wait exhausted
10031	Flag not set on record in delete chain	10079	Could not log file opn/cre/cls/del
10032	Attempt to delete record twice in a row	10080	NULL target or bad keyno
10033	Attempt to use NULL ptr in read/write	10081	Transaction allocation error
10034	Predecessor repeat attempts exhausted	10082	User allocation error
10035	Seek error: check sysiocod value	10083	ISAM allocation error
10036	Read error: check sysiocod error	10084	Maximum users exceeded
10037	Write error: check sysiocod error	10085	Reduce lock to read lock after update
10038	Could not convert virtual open to actual	10086	Dead lock detected
10039	No more records available	10087	System not quiet: files in use
10040	Index node size too large	10088	Linked list memory allocation error
10041	Could not unlock data record	10089	Memory allocation during tran processing
10042	Could not obtain data record lock	10090	Could not create queue
10043	Version incompatibility	10091	Queue write error
10044	Data file serial number overflow	10092	Queue memory error during write
10045	Key length exceeds MAXLEN parameter	10093	Queue read error
10046	File number already in use	10094	Pending error: cannot save or commit tran
10047	c-tree has not been initialized	10095	Could not start task
10048	Operation incompatible with type of file	10096	Start-file/log open error
10049	Could not save file		

- | | |
|---|---|
| 10097 Bad user handle | 10143 Communications handler not installed |
| 10098 Bad transaction mode | 10144 Application could not id output queue |
| 10099 Transaction type / filmod conflict | 10145 Could not find COMM software |
| 10100 No current record for isam datno | 10146 Could not update free space info |
| 10101 Could not find isam keyno request | 10147 Space to be reused is not marked deleted |
| 10102 Could not open ISAM parameter file | 10148 WRTVREC cannot fit record at recbyt |
| 10103 Could not read first 5 parameters in ISAM parameter file | 10149 Varlen less than minimum in ADDVREC |
| 10104 Too many files in ISAM parameter file | 10150 Server is shutting down |
| 10105 Could not undo ISAM update. Rebuild Files | 10151 Could not shut down. transactions pending |
| 10106 Could not read data file record in ISAM parameter file | 10152 Could not extend logfile |
| 10107 Too many keys for data file in ISAM parameter file | 10153 Buffer too small |
| 10108 Incorrect keyno for index member in parameter file | 10154 Zero length record in REDVREC |
| 10109 Too many key segments defined in ISAM parameter file | 10155 Native system failure |
| 10110 Could not read segment record in ISAM parameter file | 10156 Timeout error |
| 10111 Could not read index file record in ISAM parameter file | 10158 REDVREC record not marked active |
| 10112 LKISAM(ENABLE) found pending locks | 10159 Zero recbyt value |
| 10113 No memory for user lock table | 10160 Multi-user interference: index information updated by the time user got to actual data record |
| 10114 1st byte of data record equals delete flag or bad variable length record mark | 10161 User appears inactive |
| 10115 Key segments do not match key length | 10162 Server has gone away |
| 10116 Bad mode parameter | 10163 No more room in server lock table |
| 10117 Could not read index member record | 10164 File number out of range |
| 10118 NXTSET called before FRSET for keyno | 10165 No file control block available |
| 10119 FRSET called for index with wrong keytyp | 10166 No more ct file control blocks in server |
| 10120 Data record length exceeds rebuild max | 10167 Could not read request |
| 10121 Tried to update data with ctISAMKBUFhdr on | 10168 Could not send answer |
| 10122 Attempt to change fixed vs variable len | 10169 Create file already opened (in recovery) |
| 10123 Var length header has bad record mark | 10170 Bad function number |
| 10124 # of indices does not match (OPNIFIL) | 10171 Application msg size exceeds server size |
| 10125 c-tree already initialized | 10172 Could not allocate server msg buffer |
| 10126 Bad directory path get | 10173 Could not identify server |
| 10127 Could not send request | 10174 Could not get server message id |
| 10128 Could not receive answer | 10175 Server could not allocate user msg area |
| 10129 c-tree not initialized | 10176 Could not get server msg status |
| 10130 Null file name pointer in OPNIFIL | 10177 Could not set message server msg size |
| 10131 File name length exceeds msg size | 10178 Unexpected file# assigned to [si] in rcv |
| 10132 No room for application message buffer | 10179 Server is at full user capacity |
| 10133 Server is not active | 10180 Could not read symbolic key name |
| 10134 Could not get servers message id | 10181 Could not get mem for key symb name |
| 10135 Could not allocate application id | 10182 No room for sort key. increase MAXFIL |
| 10136 Could not get application msg status | 10183 Could not read file field number values |
| 10137 Could not set message appl msg size | 10184 Attempt to reallocate set space |
| 10138 Could not get rid of application msg | 10185 Not enough memory for addt'l sets-batches |
| 10139 Badly formed file name | 10186 Set number out of range |
| 10140 Variable record length too long | 10187 Null buffer in rthread.c |
| 10141 Required message size exceeds maximum | 10188 Null target buffer in rthread.c |
| 10142 Application MAXLEN > server's MAXLEN | 10189 Join_to skip |
| | 10190 Join_to error |
| | 10191 Join_to null fill |
| | 10192 Detail_for skip |
| | 10193 Detail_for error |
| | 10194 Detail_for null fill |
| | 10195 Could not get mem for dat symb name |

10196	Exceeded RETRY_LIMIT in RTREAD.C	10447	Only the file's owner can perform op
10197	Could not get memory for ifil block	10448	Permission to set file definition denied
10198	Improper ifil block	10449	ADMIN has opened file. Cannot delete file
10199	Schema not defined for data file	10450	Invalid user id
10370	Sort base: errors SORT_ERR + 101 thru 126 see CTSORT.C or CTERRC.H for error listing	10451	Invalid password
10400	Resource already enabled	10452	Server could not process user/acct info
10401	Resources not enabled	10453	No such server
10402	File must be exclusive to enable res	10454	Service not supported
10403	Empty resource id	10455	User does not belong to group
10404	Output buffer too small	10456	Group access denied
10405	Resource id already added	10457	File password invalid
10406	Bad resource search mode	10458	Write permission not granted
10407	Attempt to get non-resource info	10459	File delete permission denied
10408	Resource not found	10460	Resource not enabled
10409	Not in use: available	10461	Bad permission flag
10410	User not active	10462	No directory found in superfile
10411	Not a superfile	10463	File id uniqueness error
10412	WRL to WXL commit promote pending(CIL)	10464	ISAM level logon not performed
10413	Superfile host not opened	10465	Incremental Index: dnumidx < 1
10414	Cannot nest superfiles	10466	Incremental Index: dfilno not a ISAM file
10415	Illegal ADDKEY to superfile	10467	Incremental Index: aidxnam NULL for 1st
10416	Illegal DELBLD to superfile	10468	Incremental Index: active tran not allowed
10417	Cache page size error	10469	Negative I/O request
10418	Max name inconsistency	10470	Guest logons disabled
10419	Host superfile does not support recovery	10471	Error deleting sortwork file
10420	Key update with pending transaction	10472	Error creating unique name
10421	Filter not supported yet	10473	Error opening first dummy file
10422	Other functions not sup	10474	Too few handles available min 3
10423	Incomplete	10475	Error closing dummy file
10424	Add list err	10476	Error unlinking dummy file
10425	Batch in progress	10477	Error getting first data area
10426	No batch active	10478	Sinit phase not previously performed-srelease
10427	Status info already returned	10479	Sreturn phase already started
10428	No more info, batch cancelled	10480	No records in data buffers
10429	Bufsiz too small for record	10481	Sint phase not previously performed-sreturn
10430	Request is empty or inconsistent	10482	Not enough memory
10431	Aggregate/serialization lock denied	10483	No valid record pointers in merge buffers
10432	Fixed length string requires len in DODA	10484	Error opening sortwork file
10433	Segment def inconsistent with schema	10485	Error creating sortwork.00x file
10434	Very long def block not supported	10486	No records fit in output buffer
10435	File def memory error	10487	Nerror reading sortwork file
10436	Bad def number	10488	Bytes in buf merge buf size
10437	defptr NULL during GETDEFBLK	10489	Error adjusting file pointer
10438	Requested def blk is empty	10490	Error closing sortwork.00x
10439	No conversion routine for Definition Block	10491	Error closing sortwork file
10440	Dynamic dump already in progress	10492	Error deleting sortwork file
10441	No memory for dynamic dump file buffer	10493	Error renaming sortwork.00x
10442	One or more files not available for dump	10494	Error closing output file
10443	File length discrepancy	10495	Error creating output file
10444	Could not create file during dump rcv	10496	Insufficient disk space
10445	Not enough data to assemble key value	10498	Old log file found during log create
10446	Bad key segment mode	10499	Mismatch between rcv log & file id

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|--|--|
| 10500 Server could not init SQL engine | 10556 Could not write primary, switching |
| 10501 Could not init SQL for a user | 10557 Could not write mirror,suspend mir |
| 10502 Could not access SQL master info | 10558 Could not save primary, switching |
| 10503 Could not continue SQL request | 10559 Could not save mirror, suspend mir |
| 10504 Server does not support SQL | 10560 Only one of each monitor at a time |
| 10505 User profile does not enable SQL | 10561 SYSMON: dynamic dump begins |
| 10506 Could open save-restore file | 10562 SYSMON: dynamic dump ends |
| 10507 Could not process save-restore file | 10563 SYSMON: dynamic dump ends (errors) |
| 10508 Save restore inconsistency | 10570 Incomplete compression |
| 10509 Duplicate server | 10571 Index rebuild required |
| 10510 Active chkpnt at start of roll-forward | 10572 Incomplete compression & index re-build
required |
| 10511 Index nodes form illegal loop: rebuild | 10573 Primary\mirror out-of-sync. Copy good
file over bad. |
| 10512 Data file loop detected | 10574 Incomplete compression & primary mirror
out-of-sync |
| 10513 FPUTFGET does not support CTSBLDX () | 10575 Index rebuild required & primary mirror
out-of-sync |
| 10514 Queue has been closed | 10576 Incomplete compression & index re-build
required & primary\mirror out-of-sync |
| 10515 Cannot convert old IFIL structure | 10587 Close/delete deferred: pending tran |
| 10516 ctNOGLOBALS not allocated | 10588 Attempt to close or delete file with
pending tran |
| 10517 'regid' is not registered | 10589 Member of ADMIN group required |
| 10518 'regid' is already registered | 10590 Could not find ISAM context ID |
| 10519 Index logical EOF error | 10591 Old context ID. Call CLSICON() |
| 10520 Attempt to update index with inconsistent
tran# | 10592 Context ID exists |
| 10521 Could not allocate memory for the streettalk
login message buffer | 10595 Varlen too small in PUTCRES |
| 10522 Userid in INTISAM does not match current
login id | 10596 Missing information |
| 10527 Index must be rebuilt:see CTSTATUS.FCS | 10597 Could not initialize expression |
| 10528 Key segment length error | 10598 Could not evaluate conditional exp |
| 10529 System checkpoints terminated | 10600 No more client threads |
| 10530 Client does not match server | 10601 ctVERIFY detected problems with idx |
| 10531 Index reorg entry error | 10602 No memory for system lock table |
| 10532 TRANSAV called with AUTOSAVE on | 10603 Could not allocate FCB |
| 10533 File header high-water-mark overflow | 10604 Could not increase user files |
| 10534 Yransaction # overflow | 10605 Records with bad (all FF) serial #s |
| 10535 ctree not registered. Call REGCTREE | 10606 Could not handle file encoding |
| 10536 Only automatic REGCTREEs allowed | 10607 Recovery could not enable encoding |
| 10538 Client-side bad function array type | 10608 IIDX attributes do not match file |
| 10539 sysiocod when file does not appear to contain
any valid information | 10610 CTHIST target=NULL |
| 10540 Null parameter | 10611 CTHIST could not access log |
| 10541 Transaction log cannot be written | 10612 CTHIST must be called with ctHISTfirst |
| 10542 Could not create mirror file | 10613 CTHIST can only access data or index |
| 10543 Could not open mirror file | 10614 No valid ISAM map from index to data |
| 10544 Could not close mirror file | 10615 Cannot get index info from data filno |
| 10545 Could not delete mirror file | 10616 CTHIST cannot be called during a tran |
| 10546 Could not write to mirror file | 10617 Did not find target |
| 10547 Could not save mirror file | 10618 Log scan terminated: EOF or bad entry |
| 10548 Could not read from mirror | 10619 CTHIST on data file: recbyt==0 |
| 10549 Mismatch between mirror headers | 10620 Bufsiz too small |
| 10550 Attempt to open primary w/o mirror: or'ing in
a file mode of MIRROR_SKP permits a
primary to be opened w/o error | 10621 Transaction type not expected |
| 10551 File already opened without mirror | 10622 Must reset CTHIST first position |
| 10555 Could not read primary, switching | |

10623	Not enough memory for CTHIST	10650	Duplicate keys purged and logged
10624	Net change only applies to specific match of key or record	10651	Could not process dup key log
10625	Must specify exactly one matching criteria (user & node may be combined)	10652	Duplicate keys rejected and listed
10626	Encountered an UNDTRAN going forward: must completely restart this CTHIST sequence	10653	Attempt to exceed mapped lock limit
10627	Unknown type of request	10654	Record length too long for log size
10628	Must specify filno	10655	Could not reopen using freopen
10629	Could not initialize internal file ID	10656	Transaction log header is bad
10630	Unexpected length in log entry	10657	Could not create copy file
10633	Null plen (pointer to size)	10658	Could not write copy file
10634	Negative length specified	10659	Could not read entire original file
10635	Could not create thread sync object	10660	Rbld complete, but failed mirror copy
10636	Thread sync object 'get' failed	10661	Failed process dup log and copy mirror
10637	Thread sync object 'rel' failed	10662	Dup purged, but could not copy mirror
10638	Queue message truncated to fit	10663	Dup rejected, but could not copy mirror
10639	Semaphore must be init with count>0	10664	Primary log (or start) file failed
10640	Semaphore already initialized	10665	Mirrored log (or start) file failed
10641	Thread sync object 'cls' failed	20001	Unable to communicate with backup dbms
10649	.. reserved ...	20002	Backup packet sent to primary dbms

MAPI Error Codes

0	SUCCESS_SUCCESS	13	ATTACHMENT WRITE FAILURE
1	USER ABORT	14	UNKNOWN RECIPIENT
2	FAILURE	15	BAD RECIPTYPE
3	LOGIN FAILURE	16	NO MESSAGES
4	DISK FULL	17	INVALID MESSAGE
5	INSUFFICIENT MEMORY	18	TEXT TOO LARGE
6	ACCESS DENIED	19	INVALID SESSION
8	TOO MANY SESSIONS	20	TYPE NOT SUPPORTED
9	TOO MANY FILES	21	AMBIGUOUS RECIPIENT
10	TOO MANY RECIPIENTS		
11	ATTACHMENT NOT FOUND		
12	ATTACHMENT OPEN FAILURE		

VIM Error Numbers

- | | |
|----------------------------|---------------------------|
| 0 SUCCESS | 14 NAME EXISTS |
| 1 FAILURE | 15 NAME NOT FOUND |
| 2 FATAL | 16 NOT SUPPORTED |
| 3 ALL PARAMS REQUIRED | 17 NO COMMON CERTIFICATES |
| 4 ATTACHMENT NOT FOUND | 18 NO DEFAULT |
| 5 BAD PARAM | 19 NO MATCH |
| 6 BUFFER TOO SMALL | 20 NO SIGNATURE |
| 7 CONVERSION NOT SUPPORTED | 21 NO SUCH ATTRIBUTE |
| 8 INSUFFICIENT MEMORY | 22 OPEN FAILURE |
| 9 INVALID CONFIGURATION | 23 PASS REQUIRED |
| 10 INVALID OBJECT | 24 READ FAILURE |
| 11 INVALID PASSWORD | 25 UNSUPPORTED TYPE |
| 12 INVALID SELECTOR | 26 UNSUPPORTED VERSION |
| 13 INVALID SIGNATURE | 27 WRITE FAILURE |

WinExec Errors

When a Windows Agent experiences a problem attempting to launch a job, they will display the WinExec() error number that relates to the problem as follows:

- | | |
|--|---|
| 0 System was out of memory, executable file was corrupt, or relocations were invalid. | 14 Type of executable file was unknown. |
| 2 File was not found. | 15 Attempt was made to load a real-mode application (developed for an earlier version of Windows). |
| 3 Path was not found. | 16 Attempt was made to load a second instance of an executable file containing multiple data segments that were not marked read-only. |
| 5 Attempt was made to dynamically link to a task, or there was a sharing or network protection error. | 19 Attempt was made to load a compressed executable file. The file must be decompressed before it can be loaded. |
| 6 Library required separate data segments for each task. | 20 Dynamic-link library (DLL) file was invalid. One of the DLLs required to run this application was corrupt. |
| 8 There was insufficient memory to start the application. | 21 Application requires Microsoft Windows 32-bit extensions. |
| 10 Windows version was incorrect. | |
| 11 Executable file was invalid. Either it was not a Windows application or there was an error in the .EXE image. | |
| 12 Application was designed for a different operating system. | |
| 13 Application was designed for MS-DOS 4.0. | |

Global ECS System Configuration Worksheet

Global ECS Configuration Worksheet

It is important to keep track of the computer names and IP Addresses of each component being used in your Global ECS job scheduling system. This configuration can be very simple or very complex. The following worksheet can be used to help organize the computers that make up your Global ECS System.

Smaller installations may not need to use every cell in this worksheet where larger systems may need to create copies of this worksheet to include more agents. A sample configuration is displayed below.

GECS Component	Component Name	Operating System	IP Address (Name)	IP Port	Http Port
DBMS	DBMS	Windows	123.123.123.123	2002	2012
Controller	CONTROL	Windows	123.123.123.123	2001	2011
Web Manager	WEBMGR	Windows	123.123.123.123	2003	2013
Agent (I)	WILBER	AIX	123.123.123.1	2000	2010
Agent (II)	LINDA	Linux	123.123.123.2	2000	2010
Agent (III)	SETH	Solaris	123.123.123.3	2000	2010
Agent (IV)	LISA	Windows	123.123.123.4	2000	2010
Agent (V)	PETE	Tru64	123.123.123.5	2000	2010

The chart on the following page can be photo copied and used for your GECS System configuration.

Port Default Values

Component	IP Port	Http Port
Controller	2001	2011
DBMS	2002	2012
Web Manager	2003	2013
Agents	2000	2010

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