Scale Eight℠ Global Storage Service

User Guide

Copyright

625 Second Street
San Francisco, CA 94107

User Guide Version 1.5

Contents

Preface

This guide explains the Scale Eight[SM] Global Storage Service and how to store, manage, and serve files. It explains how to prepare for the Scale Eight installation, as well as how to work with the Scale Eight exported file systems, monitor storage usage, and solve common problems.

The appendix describes the physical properties of the Scale Eight[TM] Global Storage Port device installed at your site. The Global Storage Port provides seamless operation with Scale Eight services.

This guide discusses only the features of the Global Storage Service and the tasks that you perform to work with it. This guide does not explain the fundamentals of how to work with mounted files systems, nor does it explain how to design and implement your Web and directory structure.

Audience

This guide serves as a tool for planning the installation of your Scale Eight service and for those administering the service.

This guide assumes that you are familiar with NFS and CIFS. You should have a thorough understanding of servers, file management, and content delivery.

Conventions Used in This Guide

Words and sample scripts in `monospaced font` are on-screen elements that must be typed exactly as shown.

Here are some conventions used in syntax descriptions:

Element	Description
`on-screen element`	Plain computer font indicates an element that you must type exactly as shown. If there are special symbols (for example, + or &), you must also type them exactly as shown.
placeholder	Italic text indicates a placeholder that you must replace with an appropriate value.

For More Information

For technical problems, please contact the Scale Eight[SM] Service Management Center (SMC). You can reach the SMC through any of the following:

Toll Free Number: 1.866.214.9832

Direct Line: 1.415.348.6880

Email: smc@s8.com

For more information, consult the Scale Eight Web site at http://www.s8.com.

1

Global Storage Service Overview

The Scale Eight Global Storage Service delivers a revolutionary system for storing, managing, and serving files.

With the Global Storage Service, Scale Eight provides the physical storage facilities for your files and manages these facilities to ensure data availability, security, extra capacity, and easy access. To optimize access, Scale Eight maintains a global view of your file system so that all authorized users are able to see the same view of your data, regardless of location or type of access.

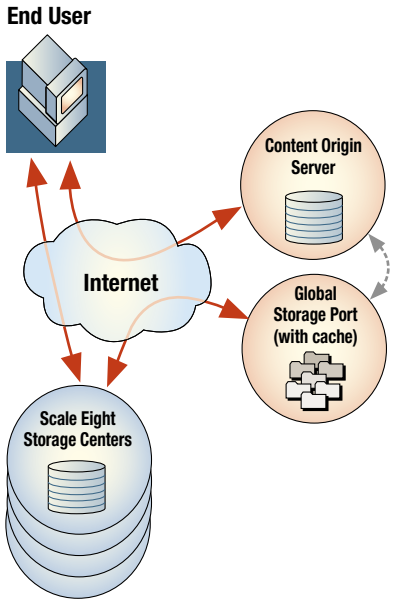
The Global Storage Service also provides tools for you to monitor your usage and manage your data stored with Scale Eight.

This chapter describes the design, components, and benefits of the Global Storage Service, including the following topics:

- an overview of the service and components
- how to store and retrieve files
- how to view storage usage statistics and patterns
- how Scale Eight ensures the availability of stored files
- how Scale Eight protects your files
- how Scale Eight manages and monitors the system
- how you can monitor your account and usage

Introducing the Global Storage Service

The Global Storage Service stores, serves, and manages files. At the heart of the service, Scale Eight[SM] Storage Centers provide the physical storage facilities. Scale Eight Global Storage Ports, located at your sites, provide CIFS and NFS access to your data. The Global Storage Ports communicate with Storage Centers over the Internet and with CIFS and NFS clients over your local area network (LAN). End users can access files from the servers on your network, or directly from the Storage Centers using a special URL.



This section provides details about the primary components of the Global Storage Service, including:

- **Scale Eight[SM] File System**

  The Scale Eight File System, or 8FS, provides a view of your files in the Global Storage Service directory structure. You have your own directory structure in the global Scale Eight File System.

- **Scale Eight[SM] Storage Centers**

  Storage Centers provide the storage repository at a specific geographic location. Storage Centers utilize a large number of processors and cost-effective, high-density disk drives, coordinated by sophisticated, parallel systems technology.

- **Scale Eight[SM] Global Storage Network**

  The powerful, intelligent network that transports files to the Storage Centers, your sites, and end users.

- **Scale Eight[SM] Service Manager**

  Service Manager displays statistics for your Scale Eight service account and usage. With Service Manager, you can easily monitor storage usage, file downloads, and changes in account activity.

- **Scale Eight[SM] Service Management Center**

  This is a command center continuously operated by Scale Eight personnel. The center's staff monitors, manages, and troubleshoots the Global Storage Service for all customers, as well as provides expert customer support.

- **Scale Eight[TM] Global Storage Port**

  A low-profile device that resides at your site and attaches to the local network. This device provides transparent access to the Scale Eight service and the Storage Centers through a CIFS or NFS interface.

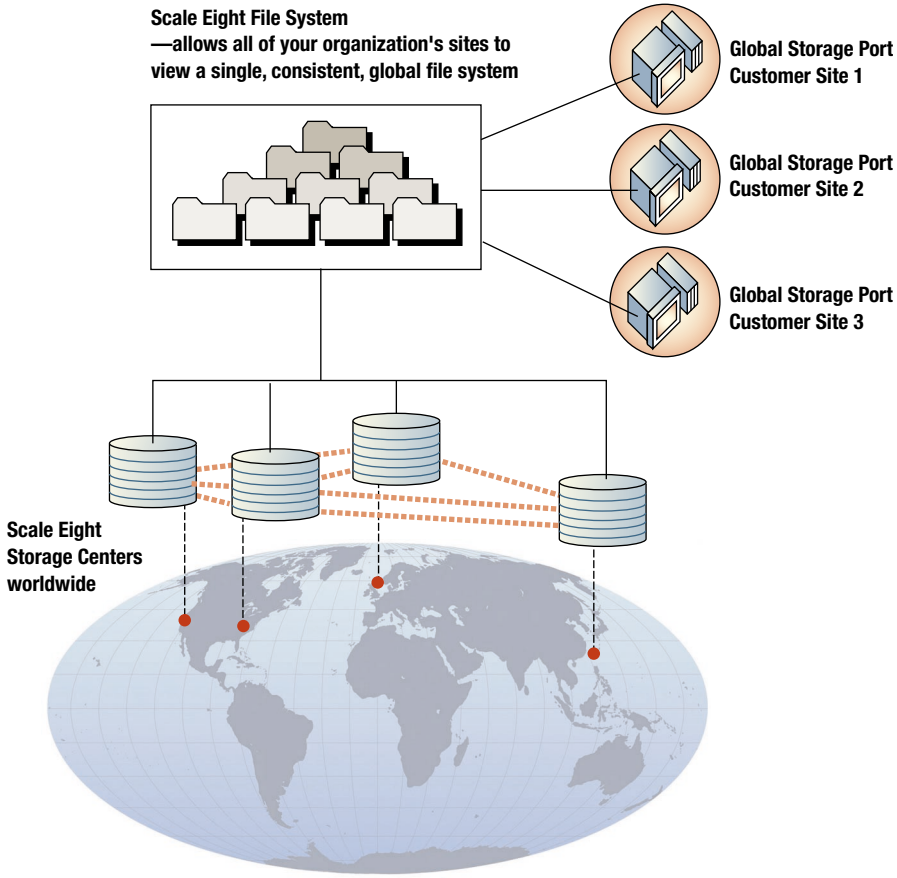
The following sections describe how these components work together to provide the Global Storage Service.

The Scale Eight File System

The Global Storage Service lets you easily share information between users, applications, and locations. You simply publish files to your Scale Eight File System (8FS) and authorized users anywhere in the world can access them.

Global Access of Single View of File System

The 8FS tracks files and maintains a single, comprehensive image of your data. End users see the same view of your Scale Eight file system from any location on the Internet.



Each site with a Global Storage Port can view and modify the same view of the Scale Eight file system, regardless of the geographic location. You can update files from any location with a Global Storage Port and every location with a Global Storage Port automatically sees the changes.

This type of file sharing is especially useful to share data with geographically dispersed users and to maintain a single file system used and understood by your global community.

To effectively support the global view of your file system, the 8FS provides read/write cache coherency. Cache coherency ensures that all versions of the same file throughout the system are the most recent.

When dealing with multiple Global Storage Ports and Storage Centers that are acting together where each location has its own cache memory, it is possible to have many copies of a single file, one in main memory and one in each of the cache memories. When one copy of the value is changed, the other copies must also be changed. Cache coherency ensures that changes in these shared values are propagated throughout the system in a timely fashion and that multiple facilities can access and modify the same files.

The Scale Eight service also provides global n-plication, a feature that lets you easily mirror your file systems to any Scale Eight Storage Center. When you create a file system in Service Manager, you simply designate which Storage Centers you want to use to store and access your files. This feature lets you easily replicate your file system to locations around the world to effectively service a global customer base.

Open File Management

The Scale Eight service includes a useful feature known as Open File Management. With this feature, you can update files at the same time that users access them. If the Global Storage Service receives a request for a file prior to or during an update, the service returns the earlier version of the file, while requests received after the update completes return the new version of the file. Once all requests

received prior to or during the update have been satisfied, the service deletes the earlier version.

Distributed File System

Behind the scenes, the 8FS is physically distributed across multiple locations to provide complete disaster protection. Automatic geographic load balancing and traffic management services between sites ensure that file requests are directed to the fastest Scale Eight repository. If a particular location becomes unavailable due to a fiber cut or other disaster, the Scale Eight system automatically diverts new requests to the closest Storage Center.

Scale Eight Storage Centers

The building blocks of the Scale Eight service are the Storage Centers—multiple facilities housing the storage foundation for the Global Storage Service.

Storage Centers operate on the West and East Coast of the United States, as well as internationally in London, England and Tokyo, Japan.

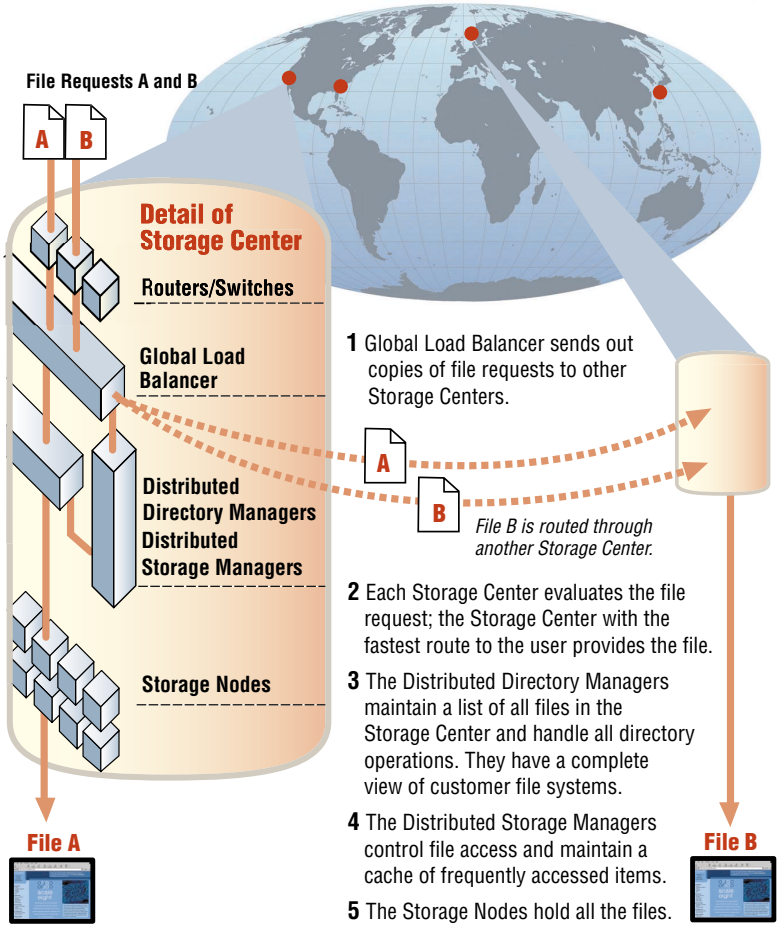
A Storage Center is based on a cluster of hundreds of storage nodes that act as a single storage device. In the cluster, software distributes data and computation among the nodes. When a node fails, other nodes provide the services and data formerly provided by the missing node. When a node is added or repaired, the cluster software migrates some data and computation to that node. The cluster design improves data availability, fault tolerance, system manageability, and performance.

Each node in the cluster consists of a processor and multiple disk drives, running Scale Eight software. The storage nodes provide the permanent, secure storage for all files. Each file placed in the Storage Centers is assigned a unique Scale Eight file identifier to specify its location in the cluster.

Storage Centers communicate with one another to store files, replicate files, and to present a complete view of your file system. Nodes communicate with one another through a multi-cast protocol called the Distributed Object Storage Protocol (DOSP). The DOSP links hundreds of nodes into a single, unified storage cluster. The DOSP ensures that all

the caches remain synchronized and coherent even across multiple geographic locations.

The Storage Center system has been optimized to support a massive number of simultaneous download transactions. Traffic management software provides load balancing across these locations and ensures file requests are directed to the fastest Scale Eight repository. When a user requests a file from Scale Eight, global load balancers in each Storage Center evaluate the file request; the Storage Center with the fastest route to the user provides the file.



The Storage Center operates far more quickly than the Internet and introduces a negligible delay to the overall file transit time.

The Storage Centers employ strategically placed caches to optimize performance and reduce file delivery times. Front-end servers cache frequently accessed files to provide the shortest path to popular objects. The front-end server caches throughout the Storage Centers are synchronized to maintain coherency ensuring both massive capacity and fast access for frequently accessed files.

The Scale Eight Global Storage Network

Scale Eight has designed and implemented a Global Storage Network to complement the Storage Center design and to provide optimal data transfer options.

Scale Eight carefully designed its network architecture for redundancy, capacity, and availability. Every layer of the network architecture prevents single points of failure. If a failure occurs anywhere on the network, the design ensures that users are not affected by outages.

Integrating Scale Eight With Your Site

The Scale Eight service utilizes a thin server—the Global Storage Port—to provide a transparent connection into the Scale Eight storage service. The Global Storage Port is installed at your site and communicates with local servers over a LAN connection.

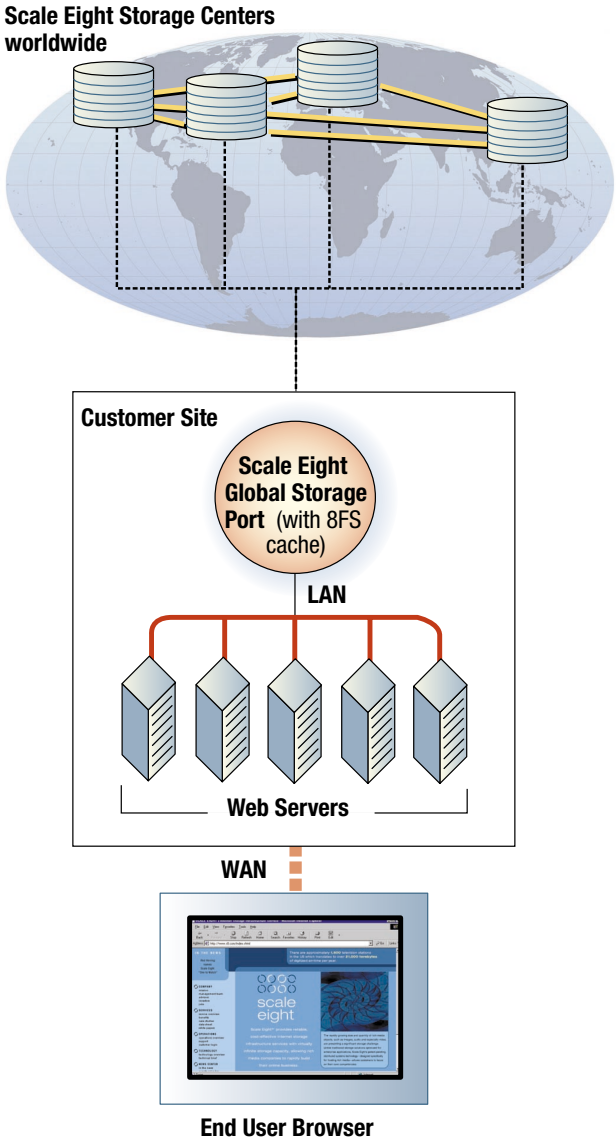
Each Global Storage Port has a complete view of your Scale Eight file system and provides files when requested. The Global Storage Port maintains a cache of frequently accessed files and retrieves additional files from the Storage Center on demand.

Behind the scenes, the Scale Eight software moves files to and from the Global Storage Port as if they were locally stored within the Global Storage Port. The Global Storage Port connects to Storage Centers over the Internet through a storage tunnel—a persistent, software-based connection.

The Global Storage Port also provides direct download access between users and the Storage Center. In this case, users access files in the Storage

Centers through a custom URL created and maintained by the Global Storage Port.

The following graphic shows how a Global Storage Port integrates with a sample site.



The Global Storage Port also provides direct download access between users and the Storage Centers. In this case, users access files in the Storage Centers through a custom URL created and maintained by the Global Storage Port. Chapter 3, “Global Storage Service Access Strategies,” describes how to store and manage files.

Global Storage Ports let you set up multiple file systems so you can use the same device for many applications. Statistics for each file system are tracked separately within your account. You can use Service Manager to create and manage your file systems. See Chapter 4, “Account Access With Service Manager,” for more information.

Ensuring Data Availability

All components in the Scale Eight architecture are backed by sophisticated failover and recovery mechanisms, avoiding any single point of failure that could affect the operation of the Global Storage Service.

Scale Eight’s network architecture guarantees that every Global Storage Service file exists in at least two geographically separate locations at all times. If any problem or failure damages one of those two copies, a new copy is automatically created within a few seconds to replace the damaged copy.

Additionally, the Global Storage Port devices are always installed in pairs to ensure continuous service in case of a hardware or software failure. (For information about the failover design, see page 76.)

All Scale Eight systems, including the Global Storage Port devices, are remotely accessible for software reconfiguration and upgrades.

Protecting Your Data

Scale Eight realizes that maintaining the security of your files is of critical importance. One of Scale Eight’s central responsibilities is to prevent unauthorized access to your data.

Through industry-established best practices, design features, and state-of-the-art facilities, Scale Eight protects your data from damage and loss, and keeps it private, confidential, unaltered, and safe from malicious or unintentional damage.

Scale Eight employs the best security technology available to control access to your files. These methods include the use of cryptographically secure message authentication codes and network encryption using SSL. You can also encrypt your own files, complementing the robust security built into the Scale Eight service.

See Chapter 5, “Security and Access Control,” for detailed information.

Managing the Service

The Scale Eight Service Management Center (SMC) is staffed around the clock, seven days a week, and is available to provide expert customer support if you encounter a problem with the service.

The SMC is staffed by system administrators who are supported by Scale Eight’s engineering staff. From this operations center, all Scale Eight systems around the world—even Global Storage Port devices on customer sites—can be monitored and maintained. In this way, Scale Eight can perform software reconfiguration and deliver upgrades, as well as monitor the devices to detect any problems.

NOTE: Global Storage Port upgrades occur only during a specified window defined in your Service Level Agreement.

The SMC uses the latest network and system monitoring tools, and can immediately dispatch Scale Eight engineers to customer sites, if necessary.

The SMC is located at Scale Eight’s corporate offices in San Francisco, California.

Monitoring Your Account With Service Manager

Scale Eight extends its monitoring capabilities to you through Scale Eight Service Manager. Service Manager allows you to track usage and performance statistics through a standard browser-based interface. Service Manager tracks statistics such as total storage capacity and consumption, average bandwidth, and Global Storage Port usage. You can view current statistics and monthly statistics over the past year.

With Service Manager, you can also manage your account. You can easily view Service Level Agreement and billing information, create subaccounts, clear the cache of a Global Storage Port, control bandwidth usage, and set security preferences.

Chapter 4, “Account Access With Service Manager,” describes how to monitor your Scale Eight service usage and use the features of Service Manager.

2

Preparation and Configuration

The Global Storage Service is set up and installed by trained Scale Eight technicians. Before the installation, you need to complete some planning and site preparation.

This chapter discusses the steps you need to take to prepare for the installation, including:

- collecting information and completing the Customer Account Record
- setting up the installation area and preparing the physical connections
- assigning network addresses
- creating a list of servers that will access the Global Storage Port device

Collecting Information Prior to Installation

Prior to installation, the Scale Eight sales team provides you with a Customer Account Record (CAR). This form helps you prepare for the installation and asks you for some basic information about your site and the technical contacts within your organization for the service.

You need to provide:

- Contact information
- Technical escalation steps
- Checklist of site environment—the section “Physical Components” later in this chapter describes the requirements
- Network values and IP addresses reserved for the Scale Eight equipment—the section “Network Values” later in this chapter details the requirements
- Billing information

When you have completed the Customer Account Record, please return it to your Scale Eight sales representative.

Preparing the Installation Site

Before the Scale Eight technician can install the hardware, you need to ensure that your site is prepared for the Scale Eight equipment.

Meeting Physical Requirements

You need to provide the following physical elements:

- Space for the Scale Eight equipment—for a typical installation, this is a total of three units of rack space (3U).

  You need to provide space for two Global Storage Port devices, each requiring 1U of rack space, and space for the Power Distribution Unit, requiring 1U of space.

  Scale Eight also needs to know the type of hardware configuration: shelves, 19" rack mount, mid-mount, front-mount, or desktop.

  NOTE: You can install additional Global Storage Ports and power units, depending on the requirements of your site. Your Scale Eight representative can help you determine if any custom options are appropriate.

- Five network connections terminated at the Global Storage Port location.
- Global Storage Port access to pre-wired connections to two external IP switch ports with ports 80, 9216, and 22 open. (See the following section for more information about external connections.)
- Pre-wired connections to three internal IP switch ports. (See the following section for more information about internal connections.)
- A 110 V AC outlet.

The Customer Account Record helps you identify and prepare each required component.

Supplying the Network Configuration

For the Global Storage Service, you need to allocate network addresses and provide information about your network. For example, each Global Storage Port requires two assigned IP addresses—one to communicate with the internal network (LAN) and one to communicate with the external network (Internet).

Prior to installation, you need to allocate and provide the following values:

- Network Values.

  The typical Global Storage Service configuration requires the following addresses allocated and reserved for Scale Eight equipment:

  - 2 assigned internal IP addresses. These are for the network adapters in the Global Storage Port that communicate with your Local Area Network.
  - 1 assigned internal IP address for the remote power unit.
  - 1 assigned internal IP address to act as a virtual IP address for the Global Storage Port devices to support the failover mode.

    The active Global Storage Port assumes this IP address. The virtual IP ensures a consistent address for all requests to the Global Storage Ports, regardless of which Global Storage Port is currently active and which is available for failover.
  - Internal Gateway Value.
  - Internal Subnet Mask Value.
  - 2 assigned external IP addresses. These are for the network adapters in the Global Storage Port that communicate with the Internet.
  - External Gateway Value.
  - External Subnet Mask Value.
- A list of clients that will access the Global Storage Port device. Please provide IP addresses or a range of addresses.
- Global Storage Port access to pre-wired connections to two external IP switch ports with ports 80, 9216, and 22 open.

Prior to the installation, complete the Customer Account Record with the required values.

NOTE: This section describes the requirements for a typical installation. Your Scale Eight sales representative can provide additional options. A few custom scenarios are provided on the Customer Account Record.

Specifying Scale Eight Configuration Options

During installation, you need to indicate if you want to use Scale Eight^{SM} URLs (8RLs) to let users download files directly from the Scale Eight Storage Centers. (For more information about 8RLs, see the section in Chapter 3, “Providing User Access With 8RLs.”)

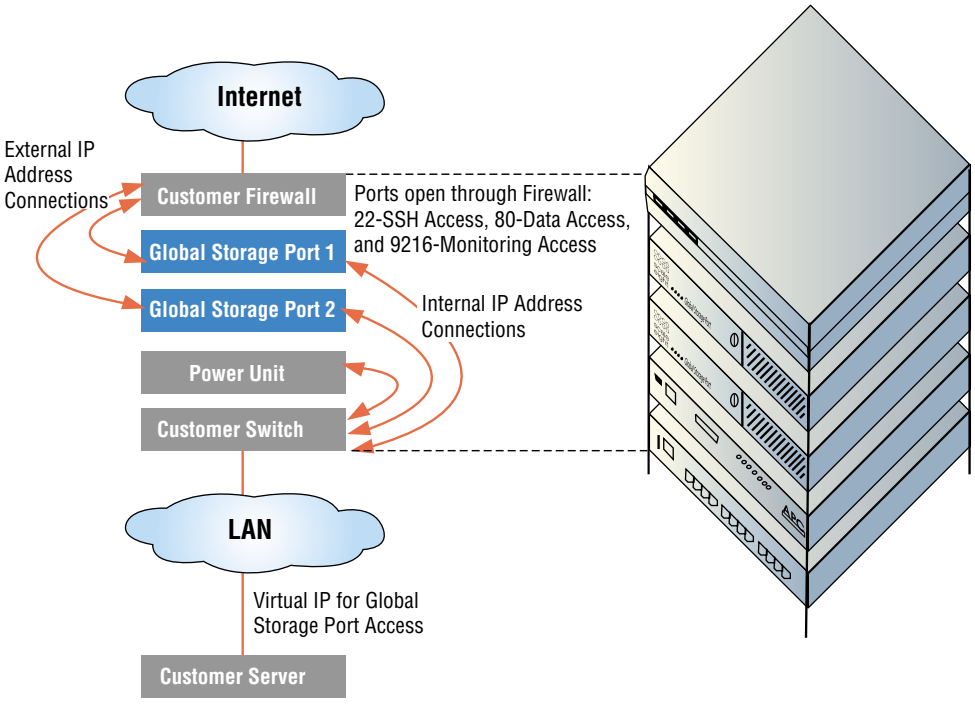
If you sign up for 8RL access, you need to specify a timeout for the 8RLs. When a user accesses an 8RL, that 8RL is valid for the length of the timeout. If the user requests the 8RL again, the timeout is reset to the default value. By default, the 8RLs expire after 24 hours. The timeout can be set to any length up to two weeks.

8RL expiration timeouts protect against Internet users exchanging 8RLs and providing access to unauthorized users.

If you need to make changes to your 8RL timeout after installation, contact the SMC.

Understanding a Typical Site Configuration

The following figure demonstrates the standard Global Storage Service configuration at a customer site. The figure also shows the integration of the network values.



Installed Equipment

During a typical installation, a Scale Eight technician installs the following equipment at your site:

- Global Storage Port devices—customized thin servers each with three network adapters. A typical site configuration has two Global Storage Port devices.
- Power distribution unit—lets the Scale Eight SMC perform remote administration and restart the Global Storage Port devices, if necessary.
- Serial cables and Ethernet cables—including a cross-over Ethernet cable to connect the Global Storage Port devices.

3

Global Storage Service Access Strategies

This chapter discusses how you store files with the Scale Eight Global Storage Service and how you make those files available for downloads.

The topics covered in this chapter include:

- directly accessing files through the Global Storage Port
- retrieving stored files through a URL
- optimizing performance
- unmounting Scale Eight file systems

Understanding Access Methods

The Global Storage Service provides two methods to access stored data through the Global Storage Port device.

- **Global Storage Port File Access**

  This is the simplest method. It provides immediate Global Storage Service access through a standard file system interface (either NFS or Microsoft CIFS).

- **End User Access with 8RLs**

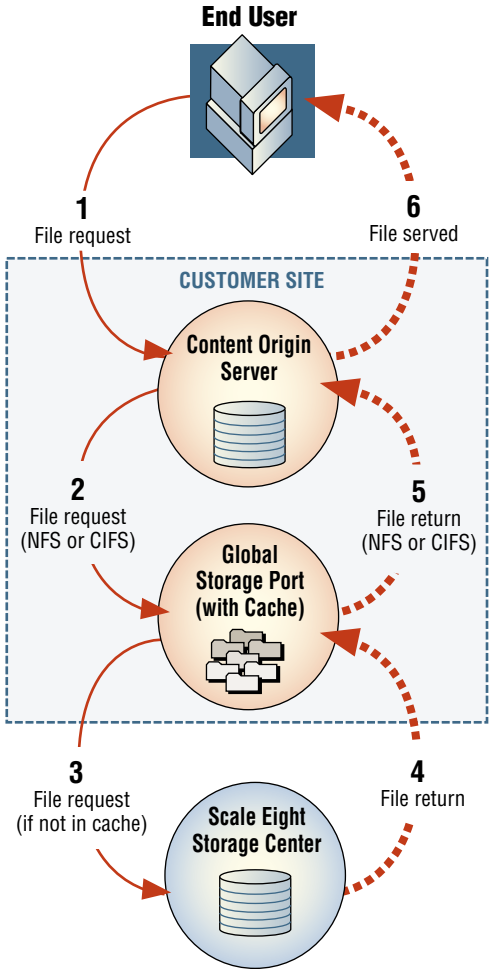
  Global Storage Port maintains a list of the files in the directory and provides a Scale Eight URL (8RL) for each file. The 8RL lets the end user download the file directly from the Storage Centers.

You can use different access methods interchangeably. You can select the best method to fit your site architecture and business model.

Providing Global Storage Port File Access

The most straightforward access method uses the Global Storage Port device to provide immediate access through a standard file system interface (either NFS or CIFS). You simply mount your Scale Eight file system and access your data over your LAN.

With this method, all file transactions go through your site, including your server and the Global Storage Port.



Mounting the Scale Eight File System

The Global Storage Port device is configured to provide file system access through NFS and CIFS. All you need to do is mount the file system to access your Scale Eight storage.

NOTE: The Scale Eight file system exported on the Global Storage Port device is named `/scale8fs/export/` for NFS, and `\\`*hostname*`\scale8fs` for CIFS.

For NFS: The Global Storage Port device uses the Network File System (NFS) so you can easily mount the Scale Eight file system from any machine that supports NFS. Use the standard `mount` command with the `–t` option. For example,

`mount -t nfs` *hostname*`:/scale8fs/export` */mount-point*

The hostname (and IP address) for the Global Storage Port device is specified during installation. For the NFS client to mount the file system, the Global Storage Port must recognize the client from its mount list. You specify the clients that can access the Global Storage Port during installation.

You access and manage files using standard file operations for your operating system.

For CIFS: The Global Storage Port device lets you seamlessly connect and work with Scale Eight file systems from Windows with standard Windows OS commands.

The Global Storage Port device appears in the Network Neighborhood. The name and IP address of the machine are provided during installation.

You access and manage files using standard Windows OS operations. You can map the Scale Eight file system to a drive letter, or access it through the network.

The file system is `\\`*hostname*`\scale8fs`.

Copying Files to Scale Eight

Once you have mounted the Global Storage Port file system, you can easily copy files to the Storage Centers. The uploaded files will be part of the `/scale8fs/export/` file system for NFS, and `\\`*hostname*`\scale8fs` for CIFS. Beyond this, you determine the directory structure in this file system.

As a content provider, you normally initiate content uploads using straightforward NFS or CIFS file copy and save commands.

NOTE: The Global Storage Service has a maximum file size of 2 GB. This is sufficient for any known media file (because the large objects, such as DVD files, consist of multiple files).

The Global Storage Service includes a useful feature known as Open File Management. With this feature, you can update files at the same time that users access them. If Global Storage Service receives a request for a file prior to or during an update, the service returns the earlier version of the file, while requests received after the update completes return the new version of the file. Once all requests received prior to or during the update have been satisfied, the service deletes the earlier version.

Retrieving Files

When a user requests a file stored with Scale Eight, the server at your site sends a file request to the Global Storage Port through NFS or CIFS. The Global Storage Port either returns the file from its cache or retrieves it from the Storage Center. The server then passes this file to the user.

Providing User Access With 8RLs

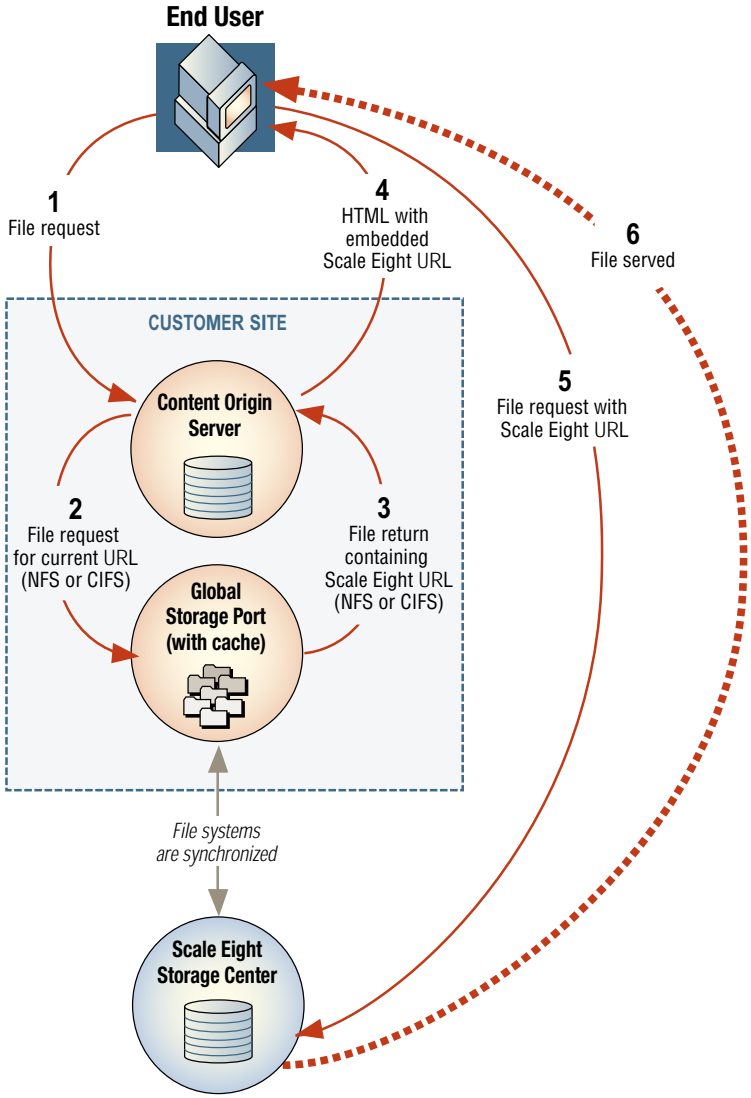
The Global Storage Service enables file downloads directly from Scale Eight to the user.

For each file stored with Scale Eight, the Global Storage Port automatically generates an 8RL, which is simply an authenticated URL. By embedding an 8RL in the Web page HTML sent to the user, you can send files directly from the Storage Centers to the user's browser. This transaction is completely transparent to the user—who perceives that he or she is accessing files from the original Web site, while in the background, the Scale Eight system delivers the files directly from the Storage Center.

The 8RL access method helps you offload traffic from your Web site and minimizes bandwidth use at your site.

NOTE: To use 8RLs, you need to sign up for this feature during installation or contact the Service Management Center.

The following figure shows the 8RL download process.


End User
1
File request
4
HTML with
embedded
Scale Eight URL
6
File served
CUSTOMER SITE
Content Origin
Server
5
File request with
Scale Eight URL
2
File request
for current URL
(NFS or CIFS)
3
File return
containing
Scale Eight URL
(NFS or CIFS)
Global
Storage Port
(with cache)
File systems
are synchronized
Scale Eight
Storage Center

With 8RLs, the Global Storage Port maintains a separate file system containing the Scale Eight file URLs stored in a standard NFS or CIFS directory format. Each file in the 8RL file system contains the corresponding Scale Eight URL that, in turn, contains the unique file identifier and Scale Eight authentication certificate.

The filenames and directories in the 8RL file system are the same as those in `scale8fs`. The difference is the content. The files in `scale8fs` contain the content. The files in the 8RL file system contain an 8RL to the location of the file in the Storage Centers. For NFS, the 8RL file system is named `/scale8fs/8RL/export`; for CIFS, the 8RL file system is *hostname*\`8RL`.

The Global Storage Port ensures the 8RL file system always matches the structure of the `scale8fs` file system.

The 8RL Format

The 8RL format is:

http://*ScaleEightDomain*/*FileIDandMAC*/*AuthCode*/*FilePathName*

The components of an 8RL perform the following:

- the first part is the domain name, identifying the location of the file within the Global Storage Service
- the second part contains the unique address of the file in the Storage Center and a message authentication code (MAC) that prevents forgery and unauthorized access
- the third part is an optional section where you can add an additional authorization code
- the last part is another optional section that you can use to identify the path and file name of the requested file

Mounting the 8RL File System

To use the 8RLs, you need to mount the 8RL file system on your server.

NOTE: The 8RL file system is exported as a read-only file system.

For NFS: To mount the 8RL file system, use the `mount` command with the `-t` option. For example,

`mount -t nfs` *hostname*`:/scale8fs/8RL/export/ /`*mount-point*

The hostname (and IP address) for the Global Storage Port device was specified during installation.

You access and manage files using standard file operations for your operating system.

NOTE: The 8RL file system must be mounted in addition to the `/scale8fs/export/` file system—do not mount the 8RL file system without the `/scale8fs/export/` file system.

For CIFS: The Global Storage Port device appears in the Network Neighborhood with the `\\`*hostname*`\8RL\` directory. You access and manage files using standard Windows OS operations. You can map the file system to a drive letter or access it through the network.

Downloading With 8RLs

By embedding an 8RL in the Web page HTML, files can be sent directly from the Scale Eight Storage Centers to the user's browser.

Recognizing the File Type

All 8RLs returned by a Global Storage Port are in the form:

http://*ScaleEightDomain*/*FileIDandMAC*/*AuthCode*/*FilePathName*

You can append arbitrary information to the 8RL, such as a filename. Most of the information appended to the 8RL is invisible to the Scale Eight Storage Center with the exception of the filename extension, which determines the MIME type.

For example, the URL

http://*ScaleEightDomain*/*FileIDandMAC*/*AuthCode*/`PEGGYLEE.MP3`
causes the Storage Center to return the correct MIME type, and the user receives the default filename of `PEGGYLEE.MP3` and the MIME type for MP3s.

Customizing 8RL Timeouts

When you sign up for 8RL access, you specify a timeout for the 8RLs. When a user accesses an 8RL, that 8RL is valid for the length of the timeout. If the user requests the 8RL again, the timeout is reset to the default value.

The timeout can be set to any length ranging from three hours to two weeks.

If you want to make changes to your 8RL timeout, contact the SMC.

Verifying Transfers Into Storage Centers

After you copy a file to your Scale Eight file system, you may want to verify that the file successfully transferred to the Storage Centers.

In general, be sure you allow enough time for files to be copied to the Storage Centers. Every three seconds, a Global Storage Port process checks for new files to copy to the Storage Centers. The total time required for the file copy operation depends on system activity, connection speed, and the size of the file. You will not be able to access the file until it is completely copied to the Storage Center.

You can test to ensure that your file is in the Storage Center by attempting to access it through an 8RL. Because each file has a corresponding 8RL, you can use the 8RL to verify the file is in the Storage Centers. When you can successfully read the 8RL (use the `cat` command to read the 8RL file), the file has been transferred completely to the Storage Centers. If the file has not been completely copied yet, the read pauses until the file copy completes.

❖ **IMPORTANT: Do not delete the local copy of the file until you are sure the file has been successfully copied into the Storage Center.**

You can also verify the file is in the Storage Center by examining the Scale Eight file system.

To verify that a file is in the Storage Center:

1. **Examine your Scale Eight file system to see if the filename appears.**
2. **If you are overwriting a file by the same name, make sure the size matches the size of the updated file.**

NOTE: If a Global Storage Port encounters a problem and the backup Global Storage Port takes over during a file transfer, the copy will not be complete. If you were trying to overwrite a file, the original file will still appear. For this reason, it is a good practice to verify file uploads.

Optimizing Performance

The Global Storage Port has been designed and customized for optimum performance at your site. However, there are a few additional enhancements you can make to ensure the best possible service.

For best performance, follow these guidelines:

- Ensure the Global Storage Port input and output connection capabilities match. For example, you will encounter problems if you have a 100BaseT line into the Global Storage Port, but only have a 10BaseT line between the Global Storage Port and the Storage Center.
- Set Ethernet connections to 100 Mbps at full duplex at the switch.
- Mount NFS file systems with a large read/write block size, such as 8192.

If you experience any problems with performance, contact the SMC. Often, the SMC can perform additional optimization related to your specific network environment.

Unmounting Scale Eight File Systems

If you no longer want the Scale Eight file system attached to your server, you need to disassociate the file system from its mount point.

For NFS: Use the `umount` command:

- On the command line, enter the `umount` command as follows: `umount` *mount-point*

In this command line, *mount-point* is the directory to which this file system was mounted.

The error message "*source*`: Device busy`" indicates that you, or other users, are accessing files or directories on the file system mounted on *source*. If you are the only user on the system, simply change your current directory to a directory that is not on this file system and reenter the `umount` command. If other users are accessing this file system, ask them to finish their work and change their current directory so that you can unmount the file system.

For CIFS: The Global Storage Port device appears in the Network Neighborhood. Use standard Windows methods to disconnect the network drive. For example, in Windows, use the Disconnect Network Drive command from the Tools menu.

4

Account Access With Service Manager

You can access and monitor your Global Storage Service account information with Service Manager. Using a standard browser interface, Service Manager provides access to vital system statistics, such as total storage capacity, bandwidth usage, and Global Storage Port statistics.

This chapter describes how to use Service Manager to track your Global Storage Service. The chapter includes the following topics:

- accessing Service Manager
- navigating Service Manager
- viewing account and file system statistics and graphs
- adding file systems
- viewing Global Storage Port statistics
- changing your password
- exiting Service Manager

Accessing Service Manager

To use Service Manager, you need a Web browser, a user name, and a password. Your user name and password are provided during installation. If you do not have your user name or password, contact the SMC.

You can access Service Manager through any computer on the Internet that is equipped with a browser supporting secure transactions. For best performance, use Internet Explorer 5.0 on the Windows operating system.

To view your Global Storage Service account and usage information:

1. **Open a Web browser and go to the Scale Eight Service Manager Web site—https://servicemanager.s8.com.**

   —or—

   In a Web browser, go to the Scale Eight home page (http://www.s8.com) and click the Customer Login button.

   The login button appears in the navigation bar along the left side of the Scale Eight home page.

   A new window opens and displays the Customer Login page.

   The login page is part of a secure site that protects your account information.

2. **Type your user name and password and click Log In.**

   The Terms and Conditions dialog box appears.

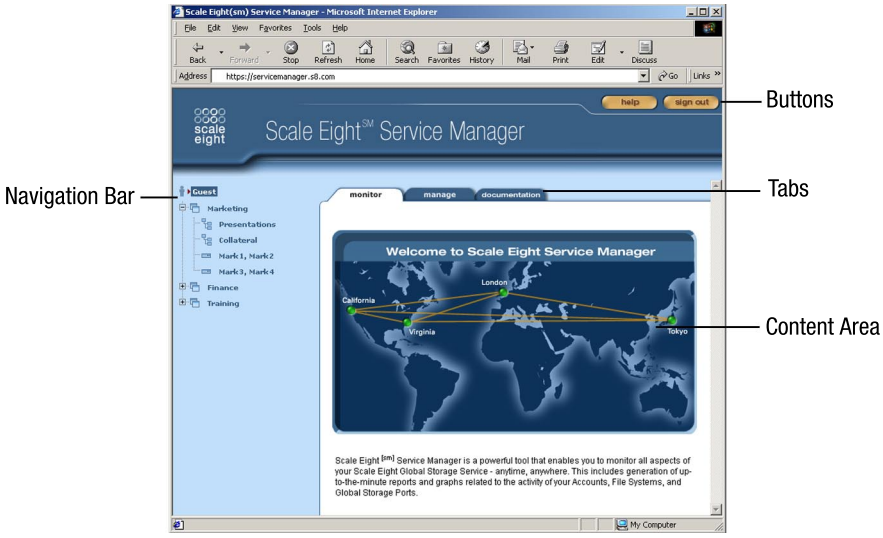
3. **Read the usage conditions and click OK to agree to the terms.**

   The Service Manager welcome page appears.

   A navigation bar appears on the left side of the page. The navigation bar contains a list of accounts, file systems, and Global Storage Ports associated with your user name.

Navigating Service Manager

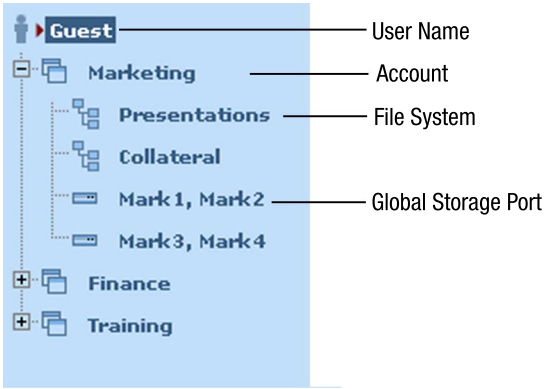
The Service Manager window contains several areas, each with links and buttons to help you access information quickly. This section describes the elements of each area.



Using the Navigation Bar

The navigation area to the left side of the page provides quick access to information and statistics for various components of the service. A unique icon represents each component.

Items with a plus sign preceding them can be expanded to show additional components. The currently selected item in the navigation bar is highlighted and a red arrow appears in front of it.



At the top of the navigation bar, your user name appears next to an icon of a person. All the accounts and file systems associated with your user name appear. When you click the icon or your user name, the Welcome page appears.

The other components of the navigation bar include:

- **Available Accounts**

  All accounts associated with your user name appear in the navigation bar. When you click the account icon or the account name, the Account Overview page appears. The Account Overview page displays storage summaries for the account. Tabs and links appear along the top of the content area providing access to more detailed information as well as to management tasks.

  You can have multiple accounts, depending on how you set up the service.

- **File Systems**

  File systems, indicated by a file hierarchy icon, appear under each available account.

  When you click the name or the icon, the File System Overview page appears. Links appear along the top of the content area providing access to more detailed information.

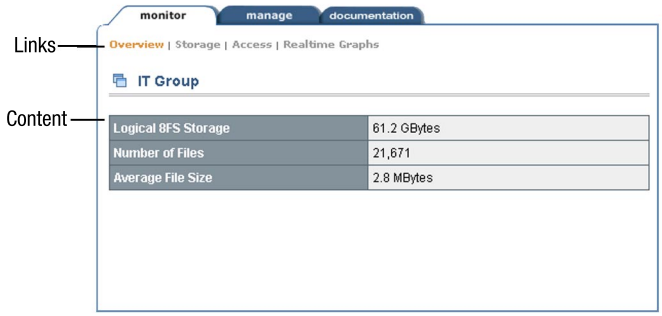
- **Global Storage Ports**

  Global Storage Ports, indicated by the computer icon, show activity and information for a specific pair of Global Storage Ports. (The statistics represent the combined activity of a pair because Global Storage Ports are installed in pairs to support failover with one Global Storage Port active at any one time).

  When you click the Global Storage Port name or icon, a page with statistics for that Global Storage Port appears. Tabs and links appear along the top of the content area providing access to more detailed information and to management tasks.

Displaying Information in the Content Area

Information and statistics appear in the content area. You can change the information displayed by selecting different elements in the navigation bar or by clicking the links at the top of the content area.



Using the Buttons

Along the top of the Service Manager window, two buttons appear that are available throughout your Service Manager session.

The following buttons are available:

- **Help**—displays contact information for customer support.
- **Sign Out**—ends your Service Manager session and shows the Customer Login page.

Using the Tabs

Service Manager also provides tabs to help you easily access specific information. Once you select an account or file system, the tabs appear along the top of the content area. Each tab contains links to help you quickly access the information you want.

The following tabs are available:

- **Monitor tab**—lets you choose to view storage and bandwidth statistics (or graphs) of accounts, Global Storage Ports, and file systems.
- **Manage tab**—lets you make changes to your account. For an account, you can add file systems or change your password.

  NOTE: The Manage tab does not appear for file systems or Global Storage Ports.
- **Documentation tab**—lets you access online help, including an online version of this user guide and a glossary of terms.

Viewing Account Statistics

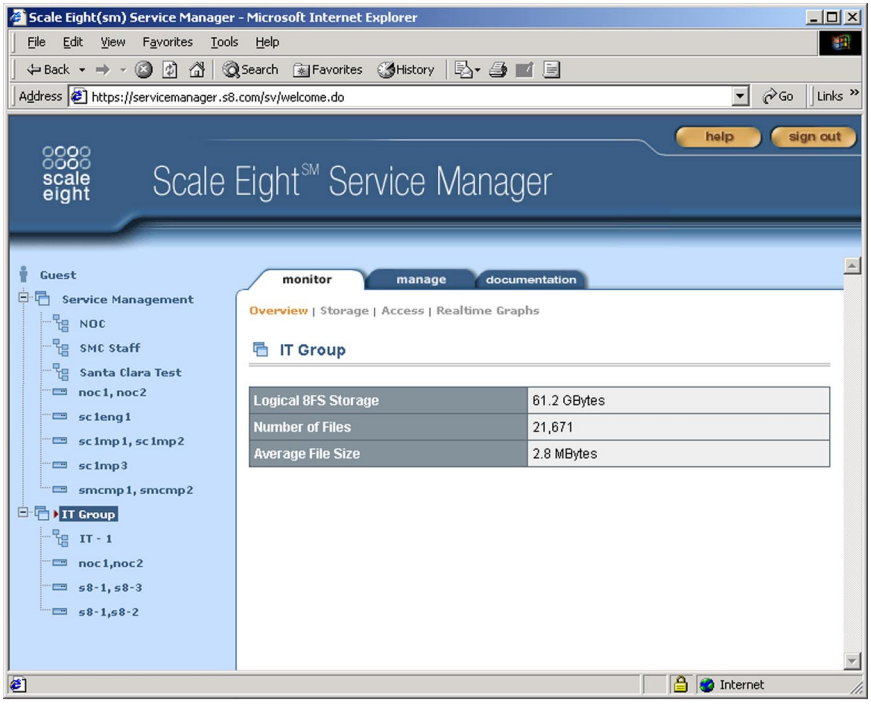
Service Manager lets you display usage information for Global Storage Service accounts.

To view account statistics:

- **In the navigation bar, click the account name you want to view.**

  NOTE: When you select an account, statistics are shown for that component and any related file systems and Global Storage Ports. To isolate the statistics for a specific file system or Global Storage Port, click that icon.

  When you click an account name, an overview page appears and displays current usage information.



The overview page displays current account statistics for logical 8FS storage, number of files stored, and average file size.

You can view more detailed information by clicking the links along the top of the content area of the Monitor tab. In addition to the overview page, links appear for storage, access, and realtime graphs.

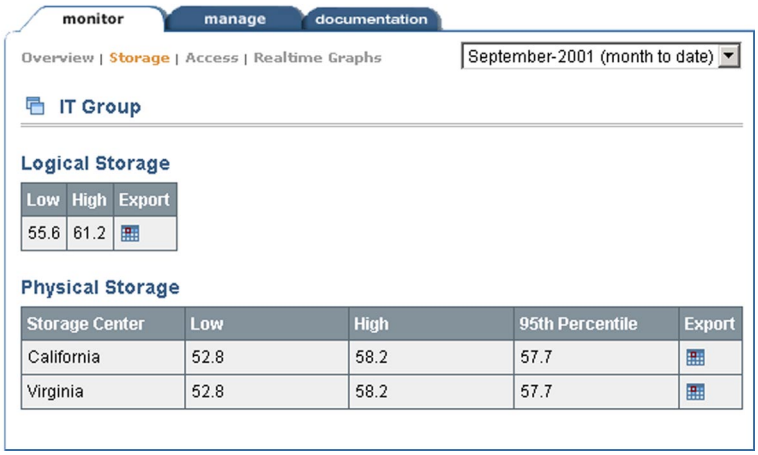
The following sections describe the content of these links.

Viewing the Storage Summary for an Account

The Storage summary section of the Monitor tab shows current storage statistics for the selected account.

To display the Storage summary:

1. **Select an account in the navigation bar.**
2. **In the Monitor tab, click the Storage link.**



For each account, you can see logical and physical storage statistics.

The logical storage statistics reflect your system wide storage, displaying low and high storage values for the month. Physical storage statistics appear for each Storage Center.

Physical storage values appears for the minimum and maximum amount of data stored in each Storage Center as well as the 95th percentile value, which serves as the basis for monthly storage fees.

NOTE: Logical storage refers to the customer view of the way data is stored. Physical storage refers to the real organization of a system. For example, a logical description of a file system stored with Scale Eight might include many copies of the same file in different locations; however, because the Scale Eight system only stores one copy of a file (identified by file contents), the physical description of the storage system will only include one copy.

Allow approximately 5 minutes for recent transactions and activity to be visible in Service Manager.

You can download the storage data to a comma-separated value (CSV) file. The downloaded file provides file and storage information for each day of the month. Click the icon in the Export column to download the data file.

You can choose to view data for previous months by selecting a month from the menu in the upper-right corner.

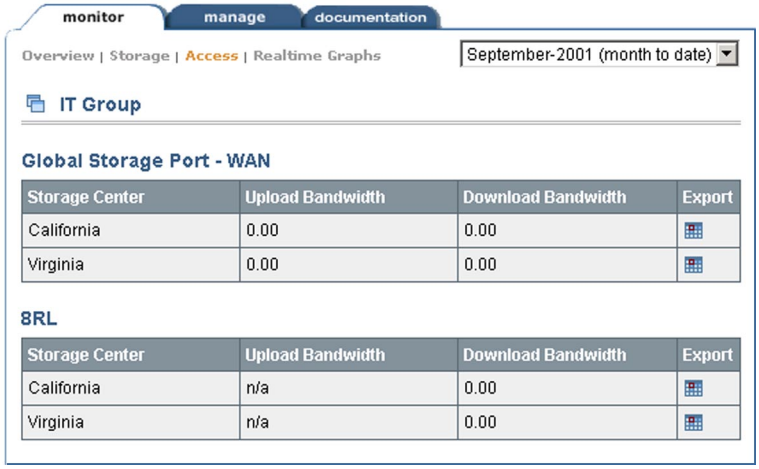
Viewing the Access Summary for an Account

The Access section contains information about bandwidth related to file access and data transfers.

To display the Access summary for an account:

1. **Select an account in the navigation bar.**
2. **In the Monitor tab, click the Access link.**

For each account, you can find the upload and download bandwidth statistics for each Storage Center.



Bandwidth statistics appear for the different access methods: Global Storage Port and 8RL Data appears for each Storage Center that you use.

By default, access information appears for the current month. You can view the access statistics for previous months by selecting a different time period from the menu at the upper-right corner.

You can also download the data for a specific Storage Center as a CSV file. Click the icon in the Export column to download the file.

Viewing Graphs for Account Activity

Service Manager provides the option to view graphs of your account data over time letting you display trends for your account.

To access graphs for account activity, select an account from the navigation bar. The overview page for that account appears. In the Monitor tab, click the Realtime Graphs link at the top of the content area. The View Graph page appears.

You can generate graphs based on the following specifications:

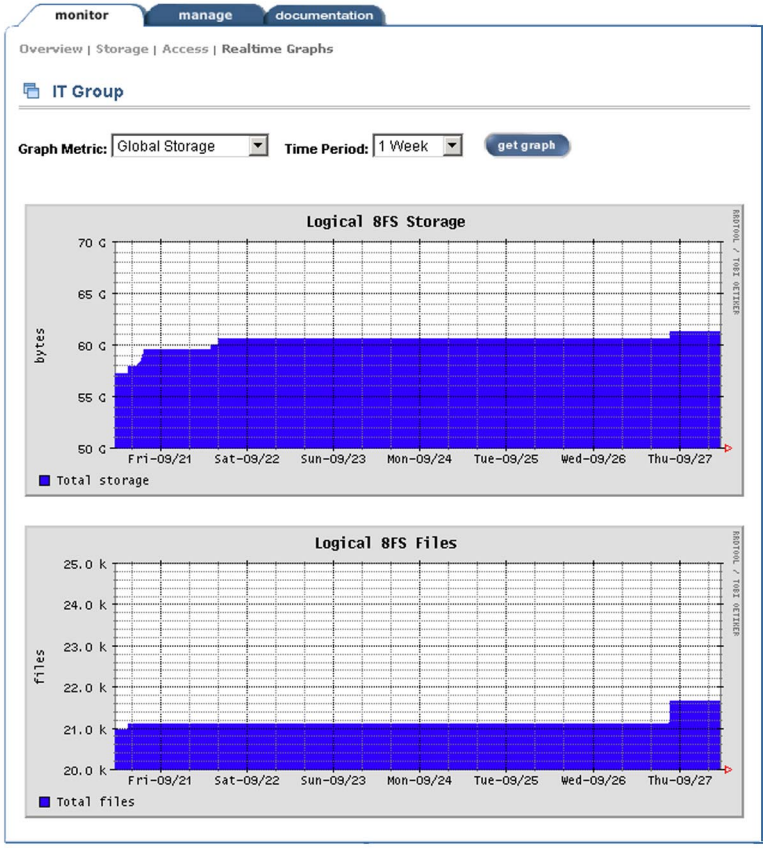
- **Graph Metrics**

  You can choose to display graphs for global storage or bandwidth.

- **Time Period**

  By default, graphs appear for statistics for the current month to date. You can change the time period for the charts, ranging from 1 hour to 1 year.

When you select new graph parameters, click the Get Graph button. Service Manager displays the graphs reflecting the new parameters.



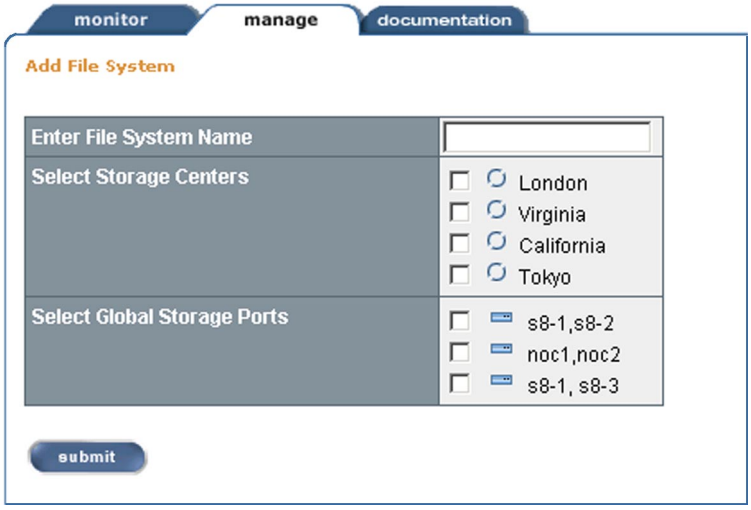
Managing Your Account

You can use Service Manager to add file systems for your Global Storage Service. When you add a file system, you can track your storage and bandwidth usage just for that file system, or view activity as part of the account.

To add a file system:

1. **Select the appropriate account in the navigation bar.**
2. **Click the Manage tab.**

   The Add File System page appears.



3. **Type a name for the new file system.**
4. **Select the Storage Centers to store the files.**

   You need to select at least two Storage Centers.

5. **Select the Global Storage Ports that you want to have access to this file system.**

   You can select as many as you want.

6. **Click Submit.**

A message appears when the system successfully adds the file system and the new file system appears in the navigation bar.

NOTE: Currently, you cannot use Service Manager to delete or rename a file system. Please call the SMC to perform this task.

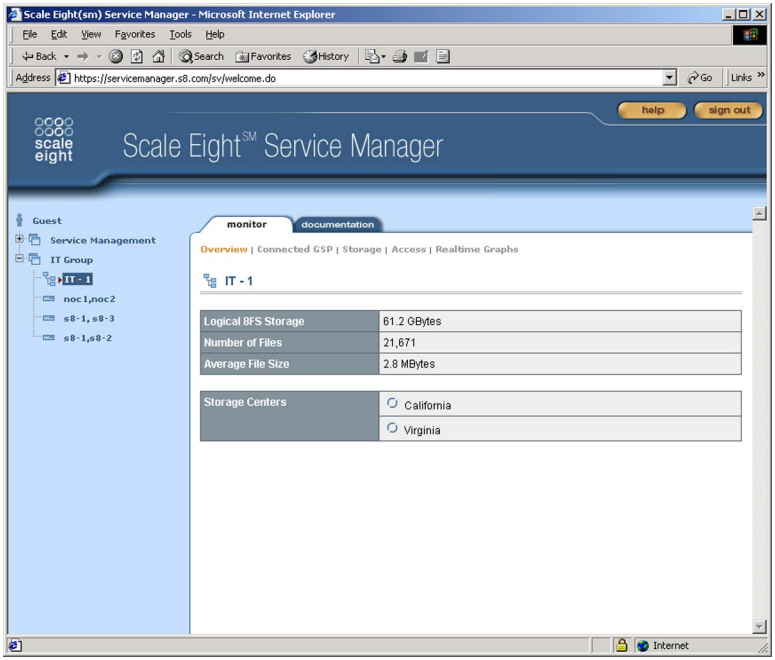
Viewing File System Statistics

Service Manager lets you display usage information for your file systems stored with Scale Eight.

To view file system statistics:

- **In the navigation bar, click the file system that you want to view.**

  When you click a file system, an overview page appears and displays current information.



The overview page contains the following information:

- **Logical 8FS Storage**—representing the customer view of the amount of data stored (as opposed to the physical view maintained by the Storage Center).
- **Number of Files**.
- **Average File Size**.
- **Storage Centers**—lists the Storage Centers that store and serve the file system.

You can view more detailed information by clicking the links along the top of the content area of the Monitor tab. In addition to the overview page, links appear for connected Global Storage Ports, Storage, Access, and Realtime Graphs.

The following sections describe the content of these links.

Viewing Global Storage Ports Associated With File Systems

You can use Service Manager to display the Global Storage Ports that have access to the file system.

To see a list of Global Storage Ports associated with a file system:

1. **Select a file system from the navigation bar.**
2. **In the Monitor tab, click the Connected Global Storage Ports link at the top of the content area.**

   A list of Global Storage Ports associated with the file system appears.

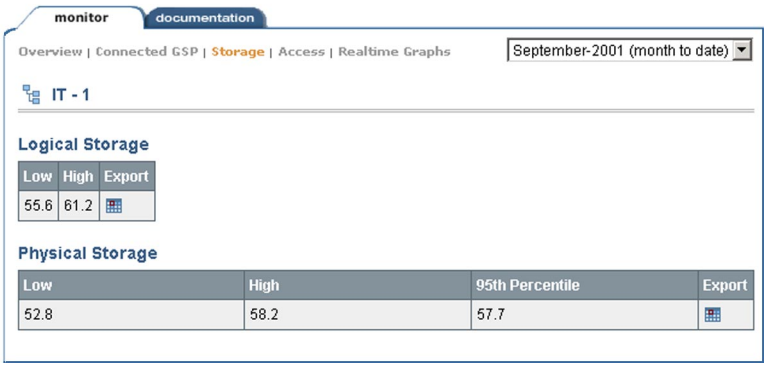
Viewing the Storage Summary for a File System

The Storage summary section shows current storage statistics for the selected file system.

To display the Storage summary for a file system:

1. **Select the file system in the navigation bar.**
2. **In the Monitor tab, click the Storage link.**

For each file system, you can find the minimum and maximum amount of logical and physical data stored. The statistics for physical data also display the 95th percentile value, which serves as the basis for monthly storage fees.



Allow approximately 5 minutes for recent transactions and activity to be visible in Service Manager.

You can export the storage data to a comma separated value (CSV) file. The exported file provides file and storage information for each day of the month. Click the icon in the Export column to download the data file.

You can choose to view data for previous months by selecting a different month from the menu in the upper-right corner.

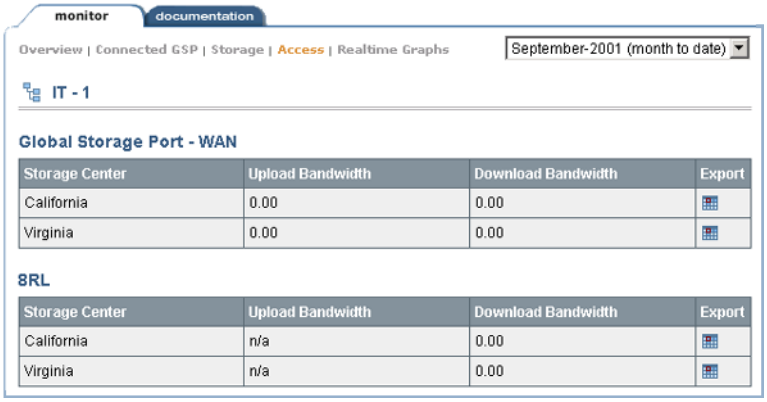
Viewing the Access Summary for a File System

The Access section contains information about bandwidth related to file system bandwidth and data transfers.

To display the Access summary for a file system:

1. **Select the file system in the navigation bar.**
2. **In the Monitor tab, click the Access link.**

For each file system, you can find the upload and download bandwidth statistic for each Storage Center.



You can view bandwidth statistics for the different access methods: Global Storage Port and 8RL.

By default, access information appears for the current month. You can view the access statistics for previous months by selecting a different time period from the menu in the upper-right corner.

You can also download the data for each Storage Center as a CSV file. Click the icon in the Export column to download the file.

Viewing Graphs for File System Activity

Service Manager gives you the option to view graphs of your file system data over time letting you display trends.

To access graphs, select a file system from the navigation bar. The overview page for that component appears. In the Monitor tab, click the Realtime Graphs link at the top of the content area. The View Graph page appears.

You can generate graphs based on the following specifications:

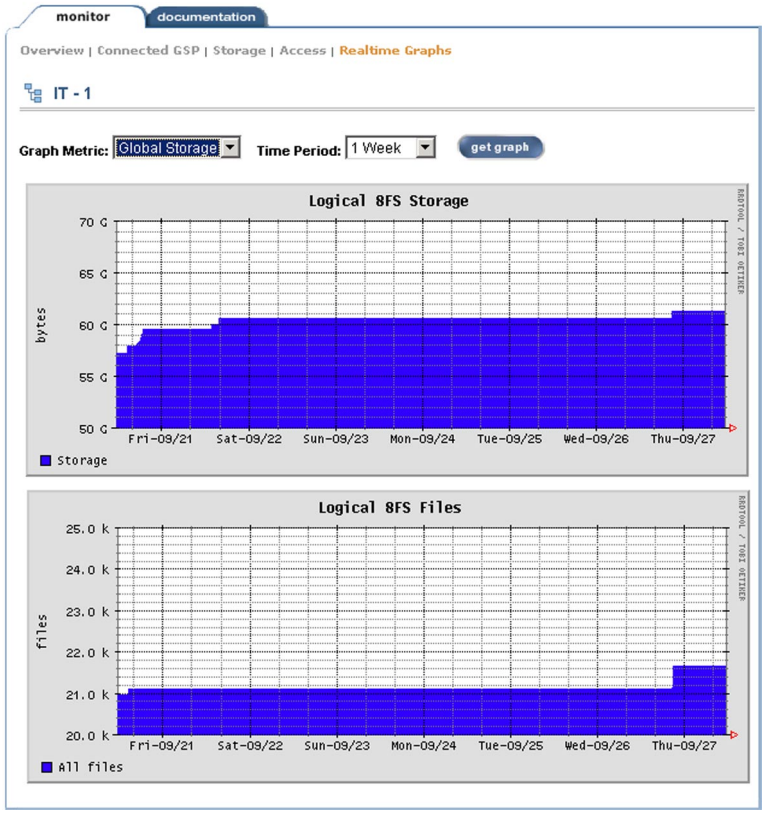
- **Graph Metrics**

  You can choose to display graphs for global storage or bandwidth.

- **Time Period**

  By default, graphs appear for statistics for the current month to date. You can change the time period for the charts, ranging from 1 hour to 1 year.

When you select new graph parameters, click the Get Graph button. Service Manager displays the graphs reflecting the new parameters.

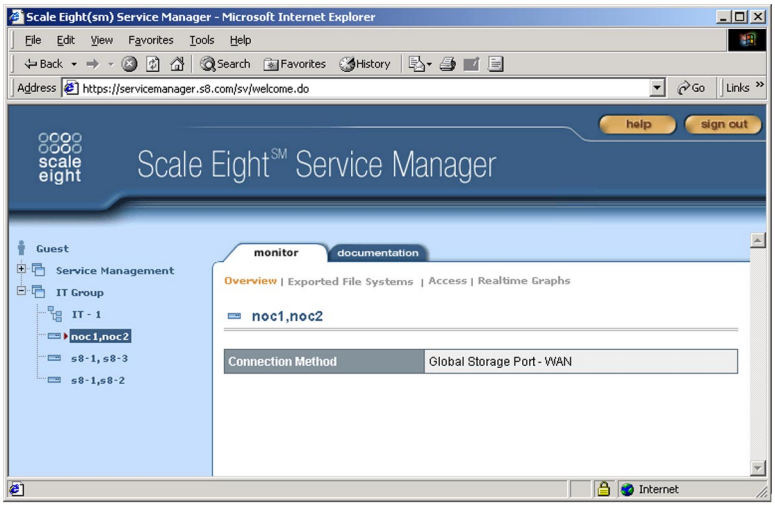


Viewing Global Storage Port Information

Service Manager provides information about the performance of your Global Storage Ports.

To view Global Storage Port statistics:

- **In the navigation bar, click the Global Storage Port you want to view.**
  The Global Storage Port Overview page appears and displays current information.



On this page you can see the following:

- **Global Storage Port Overview**

  This section displays your connection method: either Global Storage Port or WAN or both.

Viewing File Systems of a Global Storage Port

You can easily view file systems associated with Global Storage Ports.

To view exported file systems:

1. **Select the Global Storage Port in the navigation bar.**
2. **In the Monitor tab, click the Exported File Systems link.**

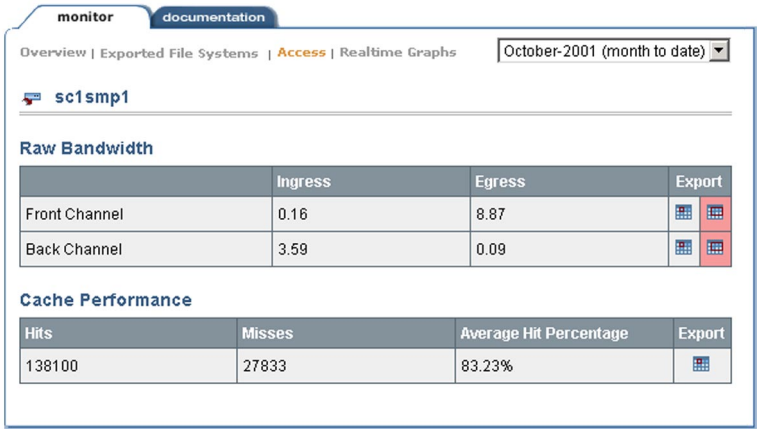
   A page appears that shows the files systems available on the selected Global Storage Port.

Viewing the Access Summary for a Global Storage Port

The Access section contains information about bandwidth related to data transfers in to and out of the Global Storage Port.

To display the Access summary:

1. **Select the Global Storage Port in the navigation bar.**
2. **In the Monitor tab, click the Access link.**



Service Manager displays the following information for the Global Storage Port:

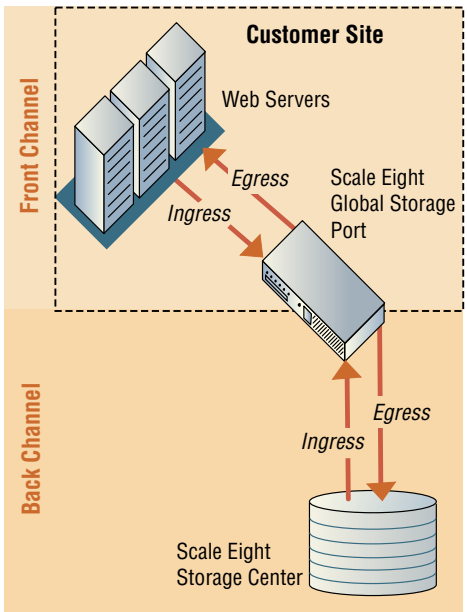
- **Front Channel Bandwidth**

  Front channel network activity occurs between the Global Storage Port and computers in your LAN. Bandwidth statistics appear for ingress (traffic coming in to the Global Storage Port) and egress (traffic going out of the Global Storage Port). Ingress and egress values appear for the total amount of bandwidth.

- **Back Channel Bandwidth**

  Back channel network activity occurs between the Global Storage Port and the Storage Centers. Statistics appear for all the back channel bandwidth for the Global Storage Port as well as bandwidth for each file system associated with the Global Storage Port.

  Bandwidth statistics appear for ingress (traffic coming in to the Global Storage Port) and egress (traffic going out of the Global Storage Port). Ingress and egress values appear for the total amount of bandwidth.



- **Cache Performance**

  Cache hit statistics appear in this section. Statistics show the number of cache hits (files returned directly from the Global Storage Port), misses (files returned from the Storage Centers), and the percentage of hits versus the misses. A higher cache hit percentage indicates faster Global Storage Port performance.

You can choose to view data for previous months by selecting a month from the menu in the upper-right corner.

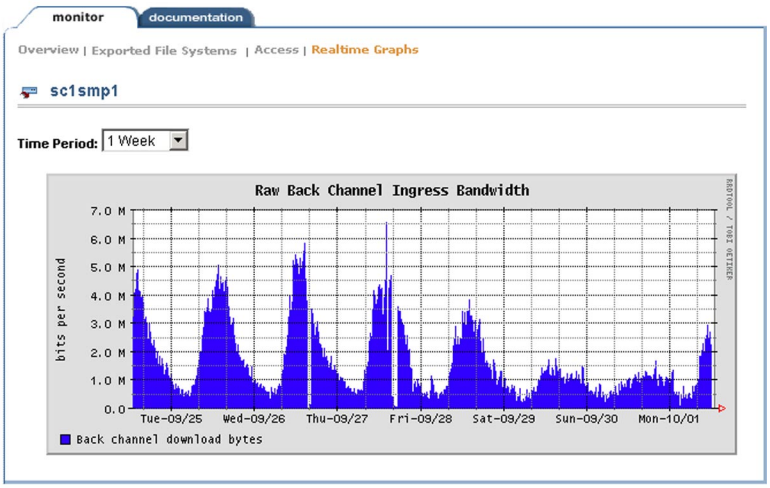
You can also download the data as a CSV file by clicking an icon in the Export column. For standard information, click the icon with the gray background in the Export column; for detailed information, click the icon with the red background. When you click an icon, a file with access information downloads.

You can also view this information in a graph format. Click the Realtime Graphs link at the top of the content area.

Viewing Graphs of Activity for a Global Storage Port

Service Manager gives you the option to view graphs of your Global Storage Port activity over time. You can generate graphs to display statistics and trends for front channel bandwidth, back channel bandwidth, and cache performance.

To access graphs, select a Global Storage Port in the navigation bar and click the Realtime Graphs link in the Monitor tab.



Graphs for following statistics appear (you may need to scroll through the page to view all the graphs):

- **Raw Back Channel Ingress Bandwidth**

  Back channel ingress bandwidth represents traffic in to the Global Storage Port from the Storage Centers.

- **Raw Back Channel Egress Bandwidth**

  Back channel egress bandwidth represents traffic from the Global Storage Port in to the Storage Centers.

- **Raw Front Channel Ingress Bandwidth**

  Front channel ingress bandwidth represents traffic coming in to the Global Storage Port from computers in your LAN.

- **Raw Front Channel Egress Bandwidth**

  Front channel egress bandwidth represents traffic coming out of the Global Storage Port to computers in your LAN.

- **Cache Efficiency**

  This graph displays the percentage of files returned from the Global Storage Port cache. A higher cache hit percentage indicates faster Global Storage Port performance.

- **Cache Hit Rate**

  This graph shows statistics of the number of cache hits (files returned directly from the Global Storage Port) compared to the number of cache misses (files returned from the Storage Centers).

By default, graphs appear for statistics over the past week. You can use the menu in the upper-left corner to change the time period for the charts. You can select a time period ranging from 1 hour to 1 year.

Changing Your Password

You can use Service Manager to change your account password.

To change your password:

1. **In the navigation bar, click your user name.**

   Your user name appears at the top of the list of components, and has a person icon next to it.

2. **Click the Manage tab.**
   The Change Your Password page appears.

3. **Type your old password.**

4. **Type a new password.**

5. **Retype your new password to confirm it.**

6. **Click Submit.**

   A message appears indicating your password has been changed.

Exiting Service Manager

When you are finished with Service Manager, click the Sign Out button. This button appears in the upper-right corner of Service Manager.

You return to the login page.

5

Security and Access Control

The Scale Eight service removes the burden and challenges of storing vast quantities of digital information, allowing you to easily store your digital assets in a safe environment. Through industry-established best practices and state-of-the-art technology, Scale Eight protects your data from damage and loss, keeps it private and confidential, unaltered, and safe from malicious or unintentional damage.

This section describes the specifics of Scale Eight security safeguards, including the following topics:

- an overview of security for the Global Storage Service
- network security
- Storage Center security
- Global Storage Port security
- Service Manager security
- SMC security
- common Internet security concerns

Scale Eight has designed the service to be secure and to provide many safeguards for your information. You can be assured that your data is protected by Scale Eight.

Overview of Global Storage Service Security

Scale Eight has implemented a series of robust security features and operational practices designed to safeguard your assets and infrastructure. Scale Eight's security features provide strict authentication and authorization, as well as end-to-end integrity of assets during both storage and transport to hosts and users.

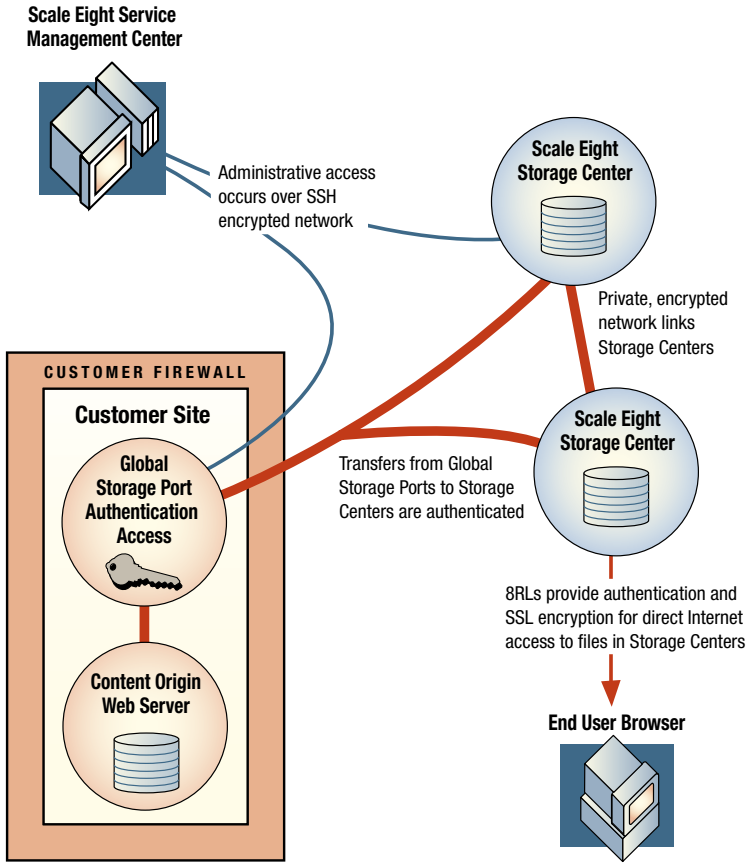
The security features implemented in the Global Storage Service include:

- Authentication and authorization mechanisms verifying user identities and their permissions to view assets at every level of the Global Storage Service.
- Custom Scale Eight URLs (8RLs) authenticate access by remote Internet users.
- Firewalls preventing unauthorized users from accessing Scale Eight's private storage tunnels.
- Physical security of the Scale Eight Service Management Center (SMC) and co-location facilities protects against unidentified persons accessing the equipment responsible for storing and transporting your data.
- Intrusion detection monitors all components of the Global Storage Service, protecting your assets and infrastructure from unauthorized access 24 hours a day, 365 days a year.
- Ongoing threat analysis ensures that Scale Eight maintains the highest standards of security for both its Storage Centers and network infrastructure, ensuring that your assets are always proactively protected.

By implementing these and other security features at every point within the infrastructure, and by following a strict regimen of proven security practices, Scale Eight is able to offer a secure environment to store your digital assets. The following sections describe the security features of each of the primary components of the Global Storage Service.

Scale Eight Network Security

The Scale Eight Global Storage Service encompasses many components: Storage Centers located at secure co-location facilities, Global Storage Ports located at your sites, the SMC located at Scale Eight headquarters, the Service Manager Web-based application, and end-user computers. Together, these components create a secure network architecture providing authentication and authorization of users and hosts; confidential transport of data to and from your site, Storage Centers, end users; and data replication that enables global access and ensures that your data remains available in the event of a natural disaster or other occurrence.



Authentication to a Scale Eight Storage Center

Access to the Global Storage Service is only available from either the Global Storage Port located within your firewall, or directly by users through an 8RL. Both forms of access are authenticated using a message authentication code (MAC). A MAC is an authentication tag (also called a checksum) derived by applying an authentication scheme, together with a secret key, to a message. Unlike digital signatures, MACs are computed and verified with the same key, so that they can only be verified by the intended recipient.

8RL Authentication

When users access your digital assets through an 8RL, an authentication code is embedded within the 8RL, which is generated by a Global Storage Port. This allows Internet users to access your assets using the same secure authentication as the Global Storage Port deployed within your local network.

8RL Expiration Timeout

8RLs are configured with an expiration time, further limiting access to suit your business needs. 8RL expiration timeouts protect against Internet users exchanging 8RLs and providing access to unauthorized users.

Authentication of Administrative Access

Administrative access to all Scale Eight computers occurs only over Secure Shell (SSH) connections. SSH encrypts all functions performed over the network between the SMC, Storage Centers, and Global Storage Ports. This allows Scale Eight to perform remote management of both Global Storage Ports and Storage Centers by encrypting all confidential transmitted data, including passwords, binary files, and administrative commands, and providing authentication of all administrative access. SSH also includes special protections against so-called “man-in-the-middle” attacks.

Secure Replication of Data

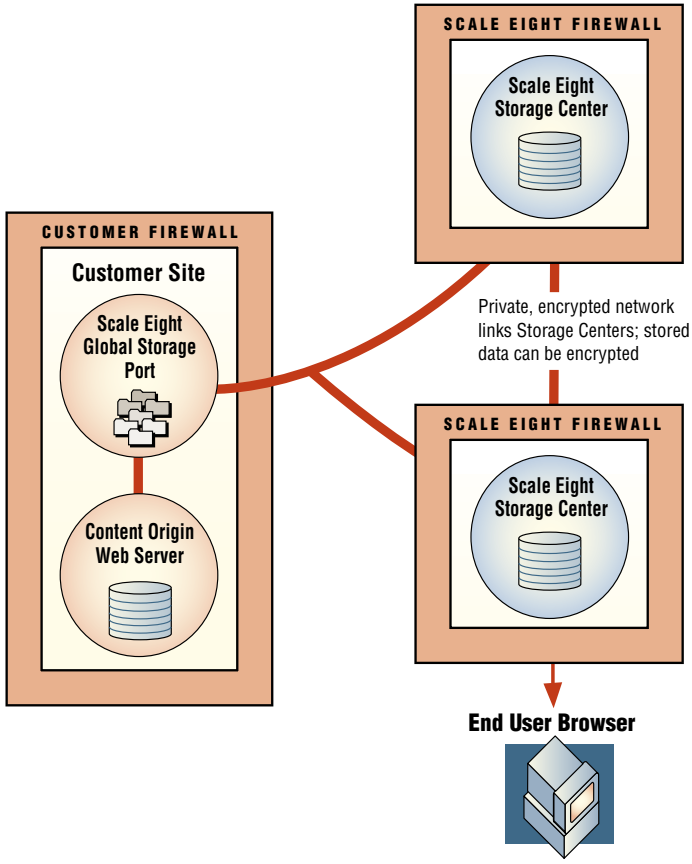
To ensure that replication of data among the Storage Centers is secure, Scale Eight employs the following security features within its storage tunnels:

- Storage tunnels joining Storage Centers are private network connections separate from the public Internet.
- Scale Eight's network operates within the bounds of industry-standard firewalls and network security software, preventing intrusion by malicious entities.
- Storage tunnels use SSL-encrypted and SSH-encrypted communication.

Storage Center Security

The Scale Eight Storage Centers protect your assets by implementing the latest security technologies and through the proactive application of intrusion detection and threat analysis practices. Using strict authentication procedures, Scale Eight protects your assets from access by unauthorized entities. You may further protect the integrity and confidentiality of your assets by encrypting your stored data, adding an additional layer of protection.

In addition to their state-of-the-art security features and practices, the Storage Centers are housed in state-of-the-art co-location facilities providing optimal physical security features and services.



Geographic Mirroring of Files

The Storage Centers are geographically mirrored, meaning files reside in two locations separated by large geographic distances. This ensures that, should a natural disaster or other event disable a Storage Center, your files are both secure and available for immediate access from another storage location.

Robust Firewall Protection of Storage Centers

The Storage Centers are secured behind robust firewalls. Firewalls prevent unauthorized users from accessing private networks connected to the Internet. All network traffic entering or leaving the Storage Centers passes through Scale Eight's firewall, which examines each message and blocks those that do not meet specified security criteria. Scale Eight firewalls use access control lists to provide detailed control over which hosts and services are allowed to access the Storage Center.

Automatic Recovery of Data

Storage Centers further protect your data's integrity by continuously performing checksum operations to verify that data has not been damaged. If the error checking process detects a problem, it rebuilds the failed data from the mirrored Storage Center, ensuring that your data is always available from two geographic locations.

Only Essential Network Services

Storage Centers do not run any network services beyond those required by the Global Storage Service. By eliminating unnecessary services, the number of potential security breaches is limited, making it easier to secure the Storage Center and to detect unwanted intruders.

Intrusion Detection

Scale Eight takes a proactive approach to network intrusion detection. Every component of the system is monitored continuously for unusual behavior, which is automatically reported to the SMC.

Regular integrity checks of system software protect against malicious or inadvertent modification of Scale Eight operating systems and servers. These integrity checks compare cryptographic checksums of all important system files to known reference values. The combination of effective intrusion prevention and intrusion

detection mechanisms makes the Storage Center effectively immune to computer viruses.

Physical Security of Storage Center Facilities

Scale Eight provides physical security of its Storage Centers through both geographic mirroring and secure facilities practices. By geographically mirroring your data, Scale Eight guarantees that your data will always be available even in the event of a natural disaster affecting the location of one Storage Center.

In addition to providing redundant Storage Center infrastructures around the globe, Scale Eight employs the following physical security measures:

- strict entry, exit, and personnel identification procedures
- key-accessed security cages restricting access to network and server hardware
- motion sensors and security breach alarms
- video camera surveillance
- uninterruptable power supplies and backup power generators
- environmental sensors, and fire detection and suppression systems
- on-site security personnel

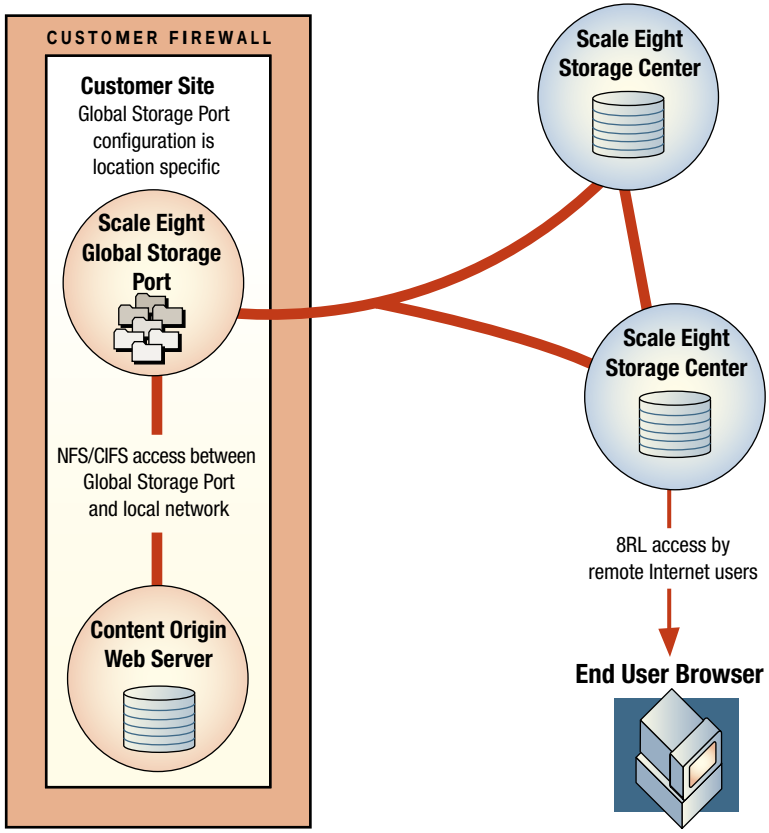
Global Storage Port Security

The Global Storage Port is an appliance that resides within your local network, acting as a gateway between the Storage Centers, end users, and server hosts. The Global Storage Port provides two forms of access to your data:

- NFS or CIFS access to hosts (servers) within your network.
- Direct access for Internet users through an 8RL. Your server obtains 8RLs from the Global Storage Port and distributes these to end users. 8RL security was previously described in greater detail in the section “Scale Eight Network Security.”

The Global Storage Port operates within your network security infrastructure, giving you control over the operation and protection of your

network. Scale Eight requires only that you configure your network firewalls and security software to allow connections between the Global Storage Port and Storage Center for the Global Storage Service protocol and for SSH-secured administrative access.



To further ensure the security of the Global Storage Port within your network, Scale Eight configures each Global Storage Port with the security features described in the following sections.

Global Storage Port Configuration is Location-Specific

In the event that a Global Storage Port is stolen or otherwise removed without authorization, it cannot be successfully reinstalled without Scale Eight's assistance, effectively disabling the Global Storage Port and preventing unauthorized use.

Only Essential Network Services Run on Global Storage Ports

Global Storage Ports do not run any network services beyond those required by the Global Storage Service. By eliminating unnecessary services, the number of potential security breaches are limited, making it easier to secure the Global Storage Port and to detect unwanted intruders.

Global Storage Ports provide network access using a minimal number of open ports. Scale Eight uses these ports for monitoring and administrative access. All open ports are protected using the network authentication and authorization methods discussed earlier in this document.

Dedicated, Private Global Storage Port Network Connection

To add an additional layer of security, you can lease a direct, private network connection between the Global Storage Port and the Storage Centers.

Service Manager Security Features

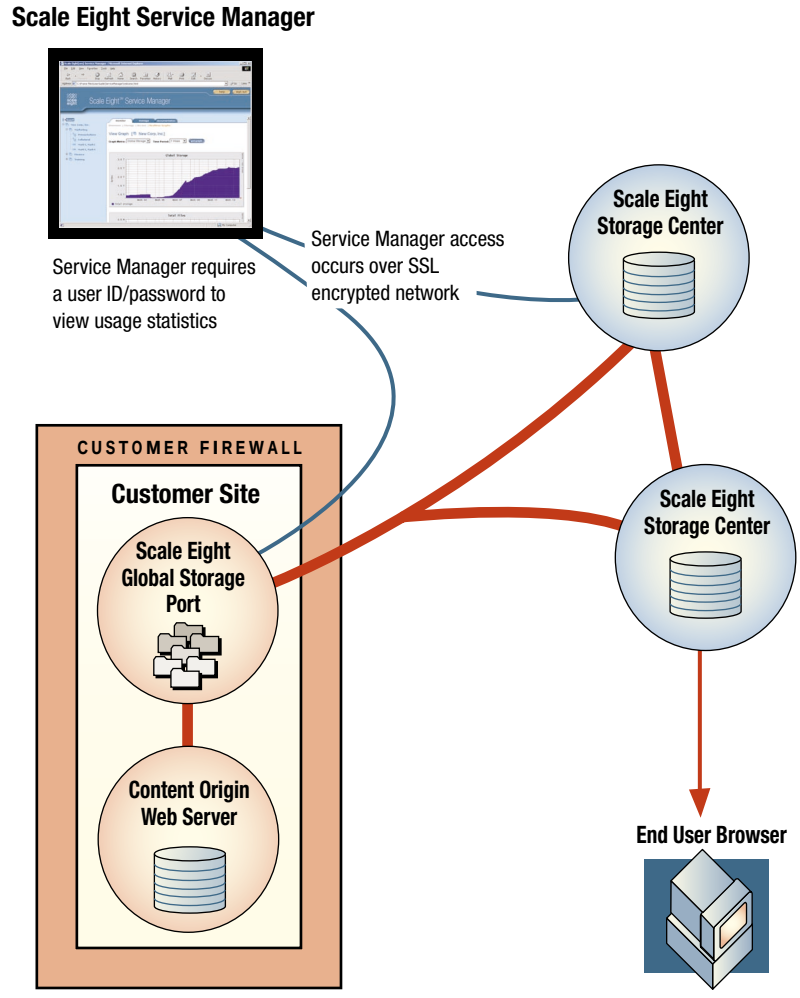
The following sections describe the security features of Service Manager.

Secure Access

Your Service Manager account requires a valid user ID and password to view usage statistics. To prevent password tampering, Service Manager sends the password using SSL encryption, and stores it in encrypted form.

Secure Communication

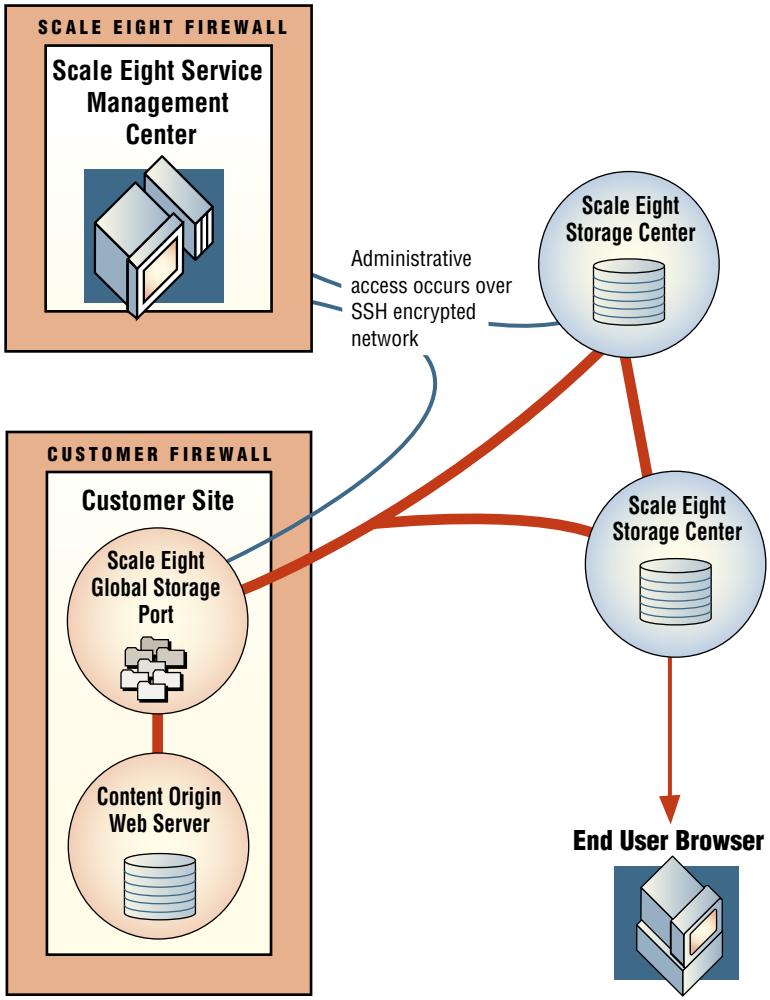
Communication of your usage statistics are kept confidential and secure through the use of SSL. SSL uses private key encryption to protect data that is delivered over SSL connections between Service Manager and the Global Storage Service.



Service Management Center Security

The Service Management Center provides 24 hour-a-day, 365 day-a-year monitoring of the Global Storage Service. SMC employees receive security awareness training, and learn procedures designed to protect your assets. For example, SMC personnel learn to identify, respond to, and report

suspicious inquiries. Employees working with storage resources receive additional training specific to their jobs, whether they are security administrators, operations personnel, or technical staff who deploy new systems in Scale Eight facilities.



Security Checks of Employees

All SMC employees receive industry-standard security checks ensuring their integrity, and preventing unacceptable candidates from working in the secure environment.

Authentication of Customer Calls

When you call the SMC—whether you are requesting information or have a service problem to report—an SMC employee authenticates both your organization and the person calling prior to releasing any information. This ensures that only your organization can make inquiries about your service and its business activities.

Authentication and Authorization of SMC Employees

SMC employees are required to sign in at the SMC monitoring facility. In addition, access to the facility is controlled by key-card access and security-conscious personnel who validate employee identities.

Regular Backups of Monitoring Data

Scale Eight's problem reporting and monitoring software provides a record of system performance, reported problems, and additional administrative data related to your use of the Global Storage Service. All information obtained from these activities is maintained in a secure archival system. Scale Eight system administrators use this information to track your use of the Global Storage Service, and to find ways to improve the quality of service.

Threat Analysis

To maintain the highest levels of protection for your data, the SMC continually performs threat analysis, looking for ways in which security policies could be thwarted. Once a possible gap in security is identified, Scale Eight applies security solutions and takes appropriate steps to eliminate the threat.

Scale Eight's security measures are active responses to specific security threats identified by threat analysis. Threat analysis is an ongoing effort. Specific Scale Eight employees are responsible for continuously surveying the security arena for new threats or vulnerabilities. If a new, potential threat is identified, Scale Eight immediately implements counter measures to improve its systems and protect your data.

Addressing Common Internet Security Concerns

The previous sections of this document illustrate the state-of-the-art security technologies and practices Scale Eight has implemented to protect your assets. This section describes a few common network security concerns, and summarizes Scale Eight's approach to these issues.

Packet Monitoring

The Internet has a number of safeguards to prevent third parties from "tapping" a connection to monitor data transfer, but a determined hacker can circumvent these safeguards. In the worst case, a hacker can seize control of a connection, intercepting and modifying data flowing in either direction. Scale Eight has given these problems careful consideration, and has implemented the following safeguards to protect against such intrusions:

- Scale Eight always uses cryptographically secure integrity checks on all communication between Global Storage Ports and Storage Centers. These integrity checks make it impossible for an interloper to modify a data stream.

- The shared secret-based message authentication codes used by the Global Storage Service protocol provide end-to-end authentication that cannot be spoofed by an intruder without knowledge of the secret.

Password Attacks

Password attacks attempt to discover passwords and use them to break into a system through the "front door." To protect against password attacks, the Global Storage Service does not use transmitted passwords as part of its authentication protocol. Instead, it uses message authentication codes based on a shared secret that is not transmitted across the network.

This secret is randomly generated. Administrative access to Scale Eight hardware uses the strong security measures implemented by the Secure Shell (SSH) protocol, which prevents man-in-the-middle attacks by confirming host identities.

IP Spoofing

Potential intruders may attempt to gain access to a system by forging requests that appear to come from a trusted computer. To protect against such intrusions, Scale Eight protocols do not rely on trust. All communication with a Scale Eight Storage Center is authenticated using cryptographically secure message authentication codes instead of IP address-based authentication. Additionally, the SMC performs integrity checks of system software to protect against malicious or inadvertent modification of system files and configuration.

Denial-of-Service

The goal of a denial-of-service (DoS) attack is to cripple a system or network so that it becomes unavailable or unresponsive. A number of recent DoS attacks have received wide press coverage. These attacks overwhelm a service provider with a large volume of network traffic and sometimes exploit weaknesses in the Internet Protocol (IP) security model, denying service to legitimate users.

Scale Eight employs a number of measures to protect against DoS attacks. These include deployment of sophisticated firewalls and load-balancing routers, and continuous monitoring and analysis of the global network of storage tunnels and Storage Centers by the SMC.

Application-Layer Attacks

Application-layer attacks are usually initiated by exploiting well-known weaknesses in software commonly found on servers such as sendmail and FTP. By exploiting these weaknesses, attackers can gain access to a computer with the permissions of the account running the application, which is usually a privileged system-level account.

Scale Eight utilizes a number of redundant “best-practice” intrusion prevention and detection measures to protect against these types of attacks.

6

Troubleshooting

This chapter describes how to solve problems that you may encounter when using the Global Storage Service. If you encounter a problem that is not described here, contact the Service Management Center.

The topics covered in this chapter include:

- understanding the Global Storage Port failover process
- examining the status of the Global Storage Port device
- correcting common problems and interpreting error messages
- contacting the SMC to get help

Global Storage Port Failover

Global Storage Port devices are installed in pairs. The additional Global Storage Port device is installed for failover purposes and operates in standby mode, monitoring the other Global Storage Port. If there is a problem with the active Global Storage Port hardware or software, or if the file system detects an internal inconsistency, the standby Global Storage Port device initiates a failover to address the problem.

During failover, the standby Global Storage Port automatically replaces the failed Global Storage Port device within seconds of detecting the problem. This design ensures continuous service availability.

Each Global Storage Port monitors the status of the other Global Storage Port with a heartbeat connection through the Ethernet Port 0. If a Global Storage Port fails to respond to the heartbeat, or if its response indicates a failure, the other Global Storage Port initiates the failover process. During the failover, the alternate Global Storage Port takes over and the remote power unit restarts the failed Global Storage Port. The failed Global Storage Port restarts and assumes the role of the standby Global Storage Port and monitors the heartbeat connection.

The standby Global Storage Port has an identical configuration to the original Global Storage Port and assumes the virtual IP address of the Global Storage Port pair and the client list. The standby Global Storage Port assumes the complete configuration and network identity of the failed Global Storage Port and begins to respond to client requests. Once the alternate Global Storage Port takes over, there is no performance difference.

For NFS users, the failover is completely transparent. If an NFS client sends information to a Global Storage Port during the failover transition and does not receive a response, the client continues to send the request until the replacement Global Storage Port is available to receive it.

For CIFS clients, the failover may not be as transparent due to the design of CIFS. CIFS is a connection-based protocol—when a Global Storage Port using CIFS restarts, it breaks the existing connections. The CIFS client attempts to restore the connections, but any activity that was in progress may create an error. The CIFS applications should retry the operation, but an occasional error message might result.

If one Global Storage Port shuts down and the backup Global Storage Port takes over, the Global Storage Port cache clears. This means that any files that were in the cache and waiting to be copied to the Storage Center are deleted. For this reason, it is always good practice to verify that files have been successfully transferred to the Storage Centers. For more information, see "Verifying Transfers Into Storage Centers" on page 29.

The SMC automatically detects and monitors Global Storage Port failovers to ensure proper system operation.

Global Storage Port Status

You can use the status lights to determine which Global Storage Port is currently operating and to see if it is communicating with the network. The Global Storage Port has several LED status lights on its front panel to show basic operating information, such as power, temperature, and network activity.

Consult the Appendix for more information about the Global Storage Port, including a reference to its status lights, connections, and integration with your site.

Solutions to Common Problems

This section describes some common problems and how to solve them.

Access Problems

You cannot mount the Scale Eight file system.

During installation, machines that have access to the Scale Eight file system are defined and included in the Global Storage Port access control list. If a machine is not included in the list, it cannot access the 8FS. Contact the SMC to modify the access list.

You encounter errors mounting the 8RL file system.

For NFS, be sure you have the `/scale8fs/export/` file system mounted. This file system must be mounted before you can mount the 8RL file system.

Also, be sure you signed up for 8RL access during installation. If you did not, you need to contact the SMC to add this feature.

You encounter errors accessing the 8RL file system.

If you cannot access a file through an 8RL, ensure enough time has passed for the file to be copied to the Storage Center. Wait a few minutes, and try again.

Slow Performance

You encounter delays when writing files to the Global Storage Port and the Storage Centers.

Ensure the Global Storage Port input and output connection capabilities are similar. For example, you will encounter problems if you have a 100 Mbps line into the Global Storage Port, but only have a 1.5 Mbps line between the Global Storage Port and the Storage Center.

At the switch, you can also set Ethernet connections to 100 Mbps at full duplex.

To further speed performance, mount NFS file systems with large read/write block size (such as 8192).

If you experience any problems with performance, contact the SMC. Often, the SMC can perform additional optimization related to your specific network environment.

Damaged or Lost Data

To enhance data protection, the Global Storage Service automatically replicates each file for full recoverability and keeps copies in geographically separate locations. If any problem or failure damages one of the copies, a new copy is created automatically to take its place. This design ensures full data protection and optimal availability.

If you have verified that your data was successfully transferred into the Scale Eight Storage Centers and you encounter problems with your files, please contact the SMC. For more information, see "Verifying Transfers Into Storage Centers" on page 29.

Getting Additional Help

The Scale Eight SMC serves as the central monitoring and trouble-shooting facility for the worldwide Global Storage Service. The center is staffed continuously—24 hours a day, 365 days a year—with trained, expert operators who ensure continuous service availability and provide expert customer support.

If you encounter a problem with any part of the service, please contact the SMC at any time. You can reach the SMC through any of the following:

Toll Free Number: 1.866.214.9832

Direct Line: 1.415.348.6880

Email: smc@s8.com

7

Frequently Asked Questions

This chapter helps you find answers to common questions about the service. The chapter addresses the following categories:

- design and architecture
- features
- scalability
- monitoring
- security
- bandwidth
- support

Design and Architecture

How does Scale Eight service compare to Network Attached Storage (NAS)?

Conceptually, the Global Storage Port acts like a NAS device. The difference is that the Global Storage Port provides global access, virtually unlimited capacity, and continuous availability.

Is the Global Storage Service based on storage systems from EMC, IBM, or another storage vendor?

No. The Global Storage Service is based on an advanced storage architecture, developed and operated by Scale Eight. From the customer perspective, the primary differences are that Global Storage Service is easier to deploy, considerably less expensive than a storage system based on enterprise storage products, and relieves the management and planning burden.

Are Scale Eight's Storage Centers based on Fibre Channel?

No. Fibre Channel is an expensive and complex technology better suited to in-house enterprise storage. The Scale Eight parallel systems software architecture performs the necessary internal communications without a requirement for Fibre Channel.

Does the Global Storage Port integrate with enterprise management tools such as CA, HP OpenView, or Tivoli?

Not at this time. All required monitoring of the Global Storage Port is performed remotely by Scale Eight, and Service Manager enables you to monitor and manage service usage.

Does Scale Eight use RAID in the Storage Centers?

Scale Eight uses geographic mirroring, instead of RAID, for its primary service offering.

What differentiates Scale Eight from a Storage Service Provider (SSP)?

Virtually every company generally considered to be an SSP manages enterprise storage. Scale Eight is built around Internet technologies, and not only stores data, but also manages and serves it.

Features

What factors determine whether to use the Global Storage Port access method or the 8RL access method?

In general, if you transfer a large amount of data, you will find that utilizing 8RLs reduces the total cost of ownership for your network infrastructure. Note that 8RLs always enhance the end-user experience, particularly if you want to make content available internationally.

Are there any limitations to the size of a file stored by Scale Eight?

Global Storage Service has a maximum file size of 2 GB. This is sufficient for any known media file (because the large file objects, such as DVD files, consist of multiple files).

Global Storage Ports are deployed in pairs. Are both always active?

At any one time, one Global Storage Port is active, and the other is in stand-by mode, ready to execute a failover and assume operation, if required. The standby Global Storage Port continuously monitors the active Global Storage Port with a heartbeat connection.

When a failover occurs, does the second Global Storage Port have to go back to the Storage Center and recache all the files that were in the failed Global Storage Port?

The Global Storage Port restarts with a clear cache—the cache is loaded only as new files are requested. This prevents unnecessary access to information that was previously in cache but is no longer needed.

Can I use Global Storage Service for a database?

Global Storage Service is optimized for large files and Internet environments. Traditional storage solutions from existing vendors are a better answer for random-access databases and transaction-processing applications.

Can I use Service Manager to copy an existing file system to another Storage Center?

No. When you create a new file system, Service Manager lets you specify the Storage Centers to use. You cannot use Service Manager to copy the file system to a new Storage Centers after the it has been created.

Can I delete file systems using Service Manager?

No. You need to call the SMC to delete a file system.

Scalability

How quickly can I obtain additional storage?

The Global Storage Service operates with an online capacity significantly higher than the total of our existing customer commitments, which means Scale Eight can add incremental storage—and, in most cases, very large increases in storage—for any customer within minutes. Storage is added without disruption to ongoing operations.

How much total storage is available?

The parallel systems technology employed by Scale Eight has no inherent scale limitations. We can scale our offering beyond the petabyte range to match the needs of our customers.

We do ask that customers work with us to establish usage estimates and to plan for significant increases in storage requirements.

Monitoring

How long does it take for account activity to appear in Service Manager?

Allow approximately five minutes for recent transactions and activity to be visible in Service Manager.

Security

Are my files safe with Scale Eight?

Yes. The Scale Eight storage system has been designed with comprehensive, automatic fault tolerance. Every file stored by Scale Eight is automatically replicated, and if any copy becomes unavailable for any reason, a replacement is automatically created. There are no single points of failure in the Scale Eight storage architecture.

Files are also protected from unauthorized use by the most robust security technology available. For more information about security, see "Security and Access Control" in Chapter 5.

What physical security measures have been taken to protect the Storage Centers?

Scale Eight has made every effort to provide safe, secure environments that can protect equipment from human error, intruders, and natural disasters.

Comprehensive security systems include visitation access lists, security cameras, and dedicated Ethernet segments. Security personnel continuously supervise the building lobby. Digital surveillance cameras monitor all sections of the Storage Center and all installed equipment. These measures ensure that only authorized individuals have access to equipment.

The physical storage sites are optimally designed with fire protection, connections to different power grids, and backup generators. Physical security measures include:

- Strict entry, exit, and personnel identification procedures
- Uninterruptible power supplies and backup power generators
- Environmental sensors and state-of-the-art fire detection and suppression systems
- Locked, secure fencing surrounding equipment

Bandwidth

How does Scale Eight calculate monthly bandwidth fees?

Scale Eight calculates usage based on a 95th percentile calculation. Specifically, bandwidth utilizations are sampled every 5 minutes. At the end of the month, the top 5% of the measurements are omitted. The result is the 95th percentile usage measure, which serves as the basis for the monthly fees.

What is Scale Eight doing to minimize Global Storage Port bandwidth charges?

The Global Storage Port utilizes a 60 GB cache to store frequently accessed files. This minimizes traffic over the network to the Storage Centers. Frequently accessed data is held in the Global Storage Port; rarely accessed data incurs a small bandwidth cost. In typical environments, these infrequent accesses to data in the Storage Centers appear to result in only minimal bandwidth fees.

Additionally, Global Storage Ports support external SCSI storage capability, allowing you to connect external disks to increase the available cache size.

Is there any way to avoid paying bandwidth charges on uploads of data to Scale Eight?

Yes. For large amounts of data (for example, transferring all your data to Scale Eight for the first time), you can provide Scale Eight files on tape, and we will manually load the data into our Storage Centers. We request 45 days notice to load data from tape.

Billing

How does Scale Eight calculate charges?

Scale Eight calculates usage based on a 95th percentile calculation. Specifically, storage and bandwidth utilizations are sampled every 5 minutes. At the end of the month, the top 5% of the measurements are omitted. The result is the 95th percentile usage measure, which serves as the basis for the monthly fees.

Does the Global Storage Service technology provide additional cost efficiencies?

Scale Eight eliminates multiple copies of files and provides a single virtual storage repository, so that files can be stored once, and then accessed by any authorized user. Unlike conventional storage systems that may require files to be replicated to enable direct access from geographically dispersed hosts, with Scale Eight a file only needs to be stored once. This can dramatically reduce storage capacity requirements.

Support

Are there any limitations to the number or types of calls my company can make to the Scale Eight SMC?

No, there is not a limit to the number of calls.

What if the Scale Eight SMC facility were disabled?

The data collection and control functions that manage the Global Storage Service are implemented within each Storage Center. Simple client machines at the SMC are the "window" through which the SMC monitors our worldwide infrastructure. This design makes it easy to perform the same SMC functions from another location, if necessary.

A

Global Storage Port Reference

This appendix describes the physical characteristics of the Global Storage Port device including size, status lights, and connections.

This appendix is provided simply as a reference to the physical characteristics of the Global Storage Port device—Scale Eight configures, installs, and maintains this device. You do not need to perform any additional tasks.

Physical Specifications

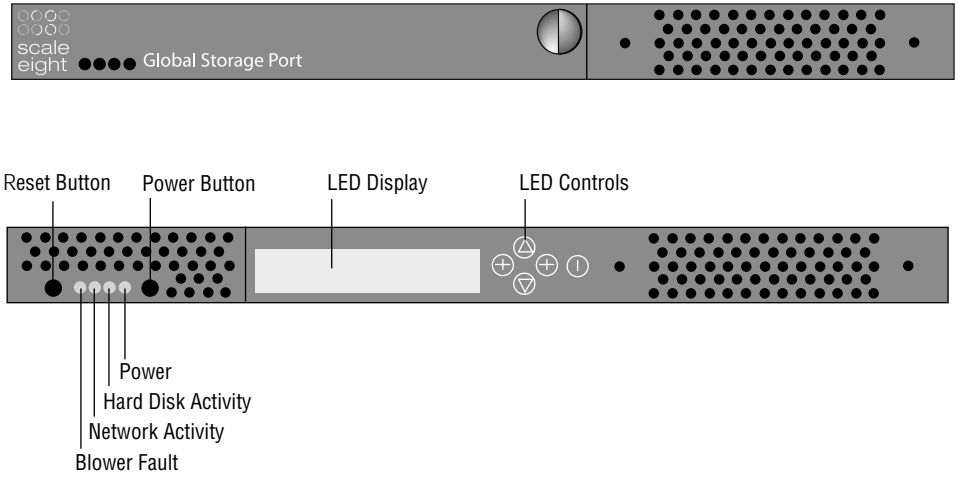
The Global Storage Port is a customized thin server. It is powered by dual Pentium processors with 60 GB of local disk cache for frequently accessed files. Additionally, Global Storage Ports support external SCSI storage capability, allowing you to connect external disks to increase the available cache size.

Each Global Storage Port has three built-in Ethernet cards. One card communicates with your LAN, one communicates with the Scale Eight Storage Centers over the Internet, and one sends a heartbeat to the backup Global Storage Port. The Global Storage Port supports both 1 Gbps cards (Gigabit Ethernet) and 100 Mbps Ethernet cards. During installation, you can specify which card is best for your environment.

Each server is designed to fit in a standard 19" equipment rack and use 1U (or 1.75 inches/4.45 cm) of vertical space.

Front Panel

The following figure shows the buttons and status lights on the front panel of the Global Storage Port server. (The controls appear behind a drop-down panel.)



The front panel contains two system buttons:

- **Reset button**—restarts the system if it does not respond to any other input.
- **Power button**—starts the server.

The front panel also contains status lights. The following table describes these lights as they appear from left to right on the front panel:

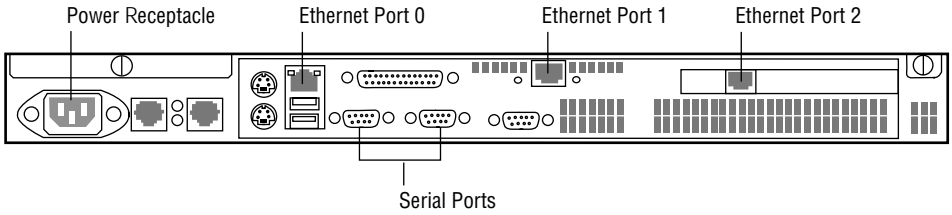
Function and Icon	State/Color	Meaning
Blower Fault	Off	The system fans are operating normally.
	Amber	One of the system fans failed or reduced its speed.
Network Activity	Off	No Ethernet activity on the Ethernet 1 port (Storage Center connection).
	Blinking Amber	Ethernet activity on the Ethernet 1 port.
Hard Disk Activity	Off	No hard disk activity.
	Blinking Green	Hard disk activity.
Power	Off	The system is off.
	Blue	The system has power.

The remaining elements on the front panel include an LED display area and control buttons to display and configure IP addresses for the Global Storage Port.

❖ **IMPORTANT: Scale Eight sets and maintains the addresses—do not change them without consulting with the SMC.**

Power and Connectors

The following figure shows the connectors and other features of the rear panel.



Connectors and switches on the rear panel are described in the following table.

Component	Function
Power Receptacle	Connection for the power cord.
Ethernet Port 0	Crossover port for RJ-45 type connectors for 10/100 BaseT Ethernet. This provides the heartbeat connection for the Global Storage Port device.
Ethernet Port 1	Connects to the Scale Eight Storage Centers with RJ-45 type connectors for 10/100 BaseT Ethernet with link and speed LEDs next to the connectors.
Ethernet Port 2	Connects to your network with RJ-45 type connectors for 10/100 BaseT Ethernet with link and speed LEDs next to the connectors.
Serial Ports	These are connectors for serial cables, capable of speeds up to 115 Kbaud.

Glossary

8FS (Scale Eight File System)

A proprietary file system used throughout the Scale Eight system to create a virtual image of all customer content.

8RL (Scale Eight URL)

A custom URL that provides direct access to files in the Scale Eight Storage Centers.

access control

Refers to mechanisms and policies that restrict access to computer resources. An access control list (ACL), for example, specifies what operations different users can perform on specific files and directories.

access control list

A persistent list that specifies the rights of hosts (such as users and groups of users) to access resources. The Global Storage Port uses an access control list to determine which hosts can mount, view, and modify customer file systems.

access method

The means used to access a physical transmission medium to transmit data. Scale Eight's access methods include the Global Storage Port and 8RLs.

back channel bandwidth

For the Global Storage Service, back channel bandwidth is the amount of data transmitted between the Global Storage Port at your site and the Scale Eight Storage Centers. Two types of back channel bandwidth exist: egress and ingress. Egress represents data transferred out from the Global Storage Port; ingress represents data transferred in to the Global Storage Port.

bandwidth

The amount of data that can be transmitted in a fixed amount of time. For digital devices, the bandwidth is usually expressed in bits per second (bps) or bytes per second.

cache

Temporary storage area for frequently accessed data. When data is found in the cache, it is called a *cache hit*, and the effectiveness of a cache is judged by its *hit rate*.

cache coherency

Management of a cache so data is not lost, corrupted, or overwritten. When dealing with multiple processors that are acting together where each processor has its own cache memory, it is possible to have many copies of a single value, one in main memory and one in each of the cache memories. When one copy of the value is changed, the other copies must also be changed. Cache coherency ensures that changes in these shared values are propagated throughout the system in a timely fashion.

cache hit percentage

This percentage reflects the number of files returned directly from the Global Storage Port cache versus the number of files retrieved from the Storage Centers. A higher cache hit percentage indicates faster performance.

cluster

A cluster is a collection of independent computers working as a single system. In Scale Eight terms, a storage cluster is a group of storage nodes that act as a single storage device. Clusters improve data availability, fault tolerance, system manageability, and performance.

Common Internet File System (CIFS)

A standard file system protocol that supports collaborative applications over the Internet. The Global Storage Service supports this protocol.

Content Delivery Network (CDN)

A network designed to provide caches close to end users (at the edges of a wide area network), as well as routing optimization when the content is not available in the cache.

Customer Account Record (CAR)

A form that new customers complete to provide account information and network addresses.

Customer Defined URL (CRL)

In addition to 8RLs, you can define and use CRLs—customer defined URLs. A CRL is a simple, static URL for end users that provides direct access to your files in the Storage Centers. CRLs contain only the location of the file; they do not contain any security or authentication information. The CRLs use a different port so the Storage Center can identify and appropriately respond to the requests.

Distributed Directory Managers (DDM)

Components within every Storage Center that maintain an overall directory of your files and perform directory operations.

Distributed Object Storage Protocol (DOSP)

Multi-cast protocol that controls communication between the Distributed Storage Managers and the Intelligent Storage Nodes within a Storage Center. This protocol enables the entire system to act as a single mass storage system. This protocol manages communication between clusters, monitors the health and traffic of each node, determines the best access path, and identifies where to write files.

Distributed Storage Managers (DSM)

Components within every Storage Center that control file access and maintain a cache of frequently accessed items.

download bandwidth

The amount of data transmitted from the Storage Centers to the Global Storage Ports or from the Storage Centers to the end user in the case of 8RLs. Typically expressed in Mbits per second.

encryption

The translation of data into a secret code. Encryption is the most effective way to achieve data security. To read an encrypted file, you must have access to a secret key or password that enables you to decrypt it.

front channel bandwidth

For the Global Storage Service, front channel bandwidth is the amount of data transmitted over your LAN between the Global Storage Port and servers at your site. Two types of front channel bandwidth exist: egress and ingress. Egress represents data transferred out from the Global Storage Port; ingress represents data transferred in to the Global Storage Port.

Global Storage Network (GSN)

The Scale Eight network that stores and delivers files for customers and end users.

Global Storage Port

A low-profile device installed at your site and mounted to your server systems over the LAN. This device provides transparent access to the Global Storage Service through an NFS or CIFS interface.

Global Storage Service

An intelligent, global storage system that stores, manages, and serves files. The Global Storage Service provides virtually unlimited storage capacity that is easily accessible, and lets you easily unify your file storage across any number of geographic locations.

Intelligent Storage Nodes (ISN)

Components within every Storage Center that collectively act as storage repository for files.

load balancing

Load balancing distributes processing and communications activity evenly across a computer network so that no single device is overwhelmed. Load balancing is especially important for networks where it is difficult to predict the number of requests that will be issued to a server. Busy Web sites typically employ two or more Web servers in a load balancing scheme. If one server starts to get overloaded, requests are forwarded to another server with more capacity. Load balancing can also refer to the communications channels themselves.

logical storage

Refers to the customer view of the way their data is stored. The opposite of logical is physical, which refers to the real organization of a system. For example, a logical description of a file system stored with Scale Eight might include many copies of the same file in different locations; however,

because the Scale Eight system only stores one copy of a file (identified by file contents), the physical description of the storage system will include only one copy.

Customers are billed on physical storage, not logical storage.

local area network (LAN)

A computer network that spans a relatively small area. Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance. A system of connected LANs is called a wide area network (WAN).

Network File System (NFS)

A standard file system interface supported by Global Storage Service. This file system protocol lets network users access shared files stored on computers of different types. Users can work with shared files as if they were stored on their own hard disk.

n-plication

Replication greater than 2 times. Part of the Scale Eight service enabling customers to replicate globally instead of just once. Used when deploying services globally, or for more redundancy than that which is provided in the SLA.

physical storage

Represents the actual physical disk space used to store a particular file or set of files in the Scale Eight file system. Physical storage is less than, or equal to, logical storage. Customers are billed on physical storage, not logical. See *logical storage*.

replication

Storing the same file in more than one Storage Center. Typically used for global deployment of assets, and failover, replication virtually eliminates the need to back up content put on the system. Scale Eight replicates every file at least once (storing 2 copies).

Remote Power Cycler (RPC)

A device installed with the Global Storage Ports that controls the power supply. The RPC lets the Scale Eight SMC perform remote administration and restart the Global Storage Port devices, if necessary.

scalable

Refers to how well a hardware or software system can adapt to increased demands. For example, a scalable network system would be one that can start with just a few nodes but can easily expand to thousands of nodes. Scalability can be a very important feature because it means that your organization can invest in a system with confidence you won't outgrow it.

Scale Eight File System (8FS)

Worldwide file system spanning all Storage Center locations. Provides automatic geographic load balancing.

Scale Eight URL (8RL)

A custom URL that provides direct access to files in the Scale Eight Storage Centers.

Service Management Center (SMC)

Central command center operated continuously (24 hours a day, 365 days a year) by Scale Eight personnel for monitoring and managing the Global Storage Service for all customers. The SMC also provides expert customer support.

Service Manager

A Web-based application that lets you easily see your Scale Eight usage status and statistics as well as manage your account.

SSH

SSH (secure shell) is a program to log into another computer over a network, to execute commands in a remote machine, and to move files from one machine to another. SSH provides strong authentication and secure communications.

Storage Center

Storage repository at one geographic location that includes both the directory structure and the files.

storage tunnel

A secure pipe Scale Eight uses to transfer files between Storage Centers and Global Storage Ports. This includes transfers between Storage Centers as well as content accessed through a Global Storage Port.

upload bandwidth

The amount of data transmitted from the Global Storage Port to the Storage Centers. Typically expressed in Mbits per second.

wide area network (WAN)

A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local-area networks (LANs).

Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the Internet.

Index

E

F

G

H

I

T

U

V

W