
GemStone®

GemStone/S Installation Guide

for AIX on IBM RS/6000

Version 6.7.2

June 2021



INTELLECTUAL PROPERTY OWNERSHIP

This documentation is furnished for informational use only and is subject to change without notice. GemTalk Systems LLC assumes no responsibility or liability for any errors or inaccuracies that may appear in this documentation.

This documentation, or any part of it, may not be reproduced, displayed, photocopied, transmitted, or otherwise copied in any form or by any means now known or later developed, such as electronic, optical, or mechanical means, without express written authorization from GemTalk Systems.

Warning: This computer program and its documentation are protected by copyright law and international treaties. Any unauthorized copying or distribution of this program, its documentation, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted under the maximum extent possible under the law.

The software installed in accordance with this documentation is copyrighted and licensed by GemTalk Systems under separate license agreement. This software may only be used pursuant to the terms and conditions of such license agreement. Any other use may be a violation of law.

Use, duplication, or disclosure by the Government is subject to restrictions set forth in the Commercial Software - Restricted Rights clause at 52.227-19 of the Federal Acquisitions Regulations (48 CFR 52.227-19) except that the government agency shall not have the right to disclose this software to support service contractors or their subcontractors without the prior written consent of GemTalk Systems.

This software is provided by GemTalk Systems LLC and contributors "as is" and any expressed or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall GemTalk Systems LLC or any contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

COPYRIGHTS

This software product, its documentation, and its user interface © 1986-2021 GemTalk Systems LLC. All rights reserved by GemTalk Systems.

PATENTS

GemStone software is covered by U.S. Patent Number 6,256,637 "Transactional virtual machine architecture", Patent Number 6,360,219 "Object queues with concurrent updating", Patent Number 6,567,905 "Generational garbage collector with persistent object cache", and Patent Number 6,681,226 "Selective pessimistic locking for a concurrently updateable database". GemStone software may also be covered by one or more pending United States patent applications.

TRADEMARKS

GemTalk, **GemStone**, **GemBuilder**, **GemConnect**, and the GemStone and GemTalk logos are trademarks or registered trademarks of GemTalk Systems LLC, or of VMware, Inc., previously of GemStone Systems, Inc., in the United States and other countries.

VMware is a registered trademark or trademark of VMware, Inc. in the United States and/or other jurisdictions.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Sun, **Sun Microsystems**, and **Solaris** are trademarks or registered trademarks of Oracle and/or its affiliates. **SPARC** is a registered trademark of SPARC International, Inc.

Intel, **Pentium**, and **Itanium** are registered trademarks of Intel Corporation in the United States and other countries.

Microsoft, **MS**, **Windows**, **Windows 7**, **Windows 2008**, and **Windows 8** are registered trademarks of Microsoft Corporation in the United States and other countries.

Linux is a registered trademark of Linus Torvalds and others.

Red Hat and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc. in the United States and other countries.

Ubuntu is a registered trademark of Canonical Ltd., Inc., in the U.S. and other countries.

SUSE is a registered trademark of Novell, Inc. in the United States and other countries.

AIX, **POWER5**, **POWER6**, and **POWER7** are trademarks or registered trademarks of International Business Machines Corporation.

Apple, **Mac**, **Mac OS**, **Macintosh**, and **Snow Leopard** are trademarks of Apple Inc., in the United States and other countries.

Other company or product names mentioned herein may be trademarks or registered trademarks of their respective owners. Trademark specifications are subject to change without notice. GemTalk Systems cannot attest to the accuracy of all trademark information. Use of a term in this documentation should not be regarded as affecting the validity of any trademark or service mark.

GemTalk Systems
15220 NW Greenbrier Parkway
Suite 240
Beaverton, OR 97006



Preface

About This Documentation

This document explains how to install GemStone/S™ version 6.7.2, and how to upgrade from previous GemStone/S versions.

For information regarding new and modified features in GemStone/S v6.7.2, please refer to the *GemStone/S Release Notes* for version 6.7.2.

These documents are available on the GemTalk website, as described below.

Terminology Conventions

The term “GemStone” is used to refer to the server products GemStone/S 64 Bit and GemStone/S, and the GemStone family of products; the GemStone Smalltalk programming language; and may also be used to refer to the company, now GemTalk Systems, previously GemStone Systems, Inc. and a division of VMware, Inc.

Technical Support

Support Website

gemtalksystems.com

GemTalk’s website provides a variety of resources to help you use GemTalk products:

- ▶ **Documentation** for the current and for previous released versions of all GemTalk products, in PDF form.
- ▶ **Product download** for the current and selected recent versions of GemTalk software.
- ▶ **Bugnotes**, identifying performance issues or error conditions that you may encounter when using a GemTalk product.

- ▶ **TechTips**, providing information and instructions that are not in the documentation.
- ▶ **Compatibility matrices**, listing supported platforms for GemTalk product versions.

This material is updated regularly; we recommend checking this site on a regular basis.

Help Requests

You may need to contact Technical Support directly, if your questions are not answered in the documentation or by other material on the Technical Support site. Technical Support is available to customers with current support contracts.

Requests for technical assistance may be submitted online, by email, or by telephone. We recommend you use telephone contact only for more serious requests that require immediate evaluation, such as a production system down. The support website is the preferred way to contact Technical Support.

Website: techsupport.gemtalksystems.com

Email: techsupport@gemtalksystems.com

Telephone: (800) 243-4772 or (503) 766-4702

When submitting a request, please include the following information:

- ▶ Your name and company name.
- ▶ The versions of GemStone/S and of all related GemTalk products, and of any other related products, such as client Smalltalk products.
- ▶ The operating system and version you are using.
- ▶ A description of the problem or request.
- ▶ Exact error message(s) received, if any, including log files if appropriate.

Technical Support is available from 8am to 5pm Pacific Time, Monday through Friday, excluding GemTalk holidays.

24x7 Emergency Technical Support

GemTalk offers, at an additional charge, 24x7 emergency technical support. This support entitles customers to contact us 24 hours a day, 7 days a week, 365 days a year, for issues impacting a production system. For more details, contact GemTalk Support Renewals.

Training and Consulting

GemTalk Professional Services provide consulting to help you succeed with GemStone products. Training for GemStone/S is available at your location, and training courses are offered periodically at our offices in Beaverton, Oregon. Contact GemTalk Professional Services for more details or to obtain consulting services.



Table of Contents

Chapter 1. Installing GemStone/S Version 6.7.2

Review the Installation Procedure	7
Check the System Requirements	8
Platform	8
Operating system.	8
Prepare for Installation	10
Set the Environment	12
Create the GemStone Key File	12
Verify TCP/IP	13
Define the NetLDI Service	13
Run the Installation Script.	15
Decisions to Make During Installation.	15
Install the default TimeZone	17
Change System Passwords and Add Users	17
Have Users Execute gemsetup	18
What Next?	19

Chapter 2. Upgrading from Previous GemStone/S Versions

Overview of the Upgrade Strategy.	20
Pilot Upgrade.	20
Production Upgrade	21
Perform the Upgrade	21
Prepare for the Upgrade.	21
Perform the Upgrade.	23
Restore Your Site-Specific Settings and Back Up the Repository	23

Chapter 3. Configuring GBS for GemStone/S

Installing GemStone/S Version 6.7.2

This chapter describes the procedure for installing GemStone/S version 6.7.2 on a single machine. If you have enough disk space on a single machine, we recommend that you set up GemStone this way initially to ensure that all the pieces work together. At the end of this chapter, we suggest refinements you might want to make, such running GemStone in a network configuration.

NOTE

If you are upgrading to GemStone/S 6.7.2 from an earlier release, follow the instructions in Chapter 2 of this installation guide.

Adjust the installation to meet your specific needs. The topic “What Next?” on page 19 provides references to procedures and related information in the *System Administration Guide for GemStone/S*.

Review the Installation Procedure

The following list summarizes the steps to install GemStone.

- ▶ Check the System Requirements 8
- ▶ Prepare for Installation 10
- ▶ Set the Environment 12
- ▶ Create the GemStone Key File 12
- ▶ Verify TCP/IP 13
- ▶ Define the NetLDI Service 13
- ▶ Run the Installation Script 15
- ▶ Install the default TimeZone 17
- ▶ Change System Passwords and Add Users 17
- ▶ Have Users Execute gemsetup. 18

Check the System Requirements

Before you install GemStone, ensure that the following system requirements are satisfied. Systems meeting these requirements are suitable for installing GemStone and beginning development, but additional system resources may be necessary to support large applications.

Platform

- ▶ IBM RS/6000 workstation running a POWER7, POWER8, or POWER9 processor.

RAM

- ▶ At least 128 MB, but most configurations will want more RAM in order to take advantage of a larger shared page cache.
- ▶ 3 MB for each Gem session process beyond the first two

Page space

- ▶ In addition to other system needs, page space should be configured to be larger than the intended shared page cache size. In general, the page space should be at least equal to the RAM installed; it is recommended to have twice as much page space as RAM.

Disk space

- ▶ Space for the installed distribution files – you need approximately 45 MB for GemStone, and additional space for each product listed on the label of your distribution media.
- ▶ Additional disk space as required for your repository.
- ▶ The repository files should be located on a disk drive that does not contain page space. Use of multiple disk drives is advisable for servers.

NOTE

*You should also allow space in your filesystem for at least one core file. For each core file, ensure that enough disk space is available for the size of the shared page cache **plus** the size of private page cache **plus** an additional 10-50 MB.*

Operating system

- ▶ AIX version 7.1 or 7.2
- ▶ POSIX Asynchronous I/O (AIO) must be enabled.

To ensure that POSIX AIO is enabled:

- Invoke `smi t`, and select **Devices**, then select **Asynchronous I/O**, then select **Posix Asynchronous I/O**.
- Select **Configure Defined Asynchronous I/O**, and press Enter.
- Select **Change/Show Characteristics of Asynchronous I/O**.

- d. If you want to place GemStone transaction logs on more than one disk drive (spindle), at **Maximum number of servers**, specify the value as at least 10 times the number of spindles to be used for transaction logs.

GemStone uses asynchronous I/O for accessing transaction logs. Because each AIO request is handled by a separate kernel server process, this setting increases performance when transaction logs are located on more than one drive.

- e. Select **STATE to be configured at system restart**, choose “available,” and press OK.
- f. Exit `smit`, and reboot the system.
- g. After rebooting, ensure that the POSIX AIO device driver is available:

```
% lsdev -c posix_aio
```

You should see a message similar to:

```
posix_aio0 Available Posix Asynchronous I/O
```

- ▶ To use extents in the file system larger than 2 GB or to increase the number of file descriptors available, make these changes in `/etc/security/limits`:

```
Fsize = -1  
nofiles = 2000
```

You must also have the Large File System enabled when creating a jfs file system using `smit`.

We recommend that you pregrow such extents to a size greater than 2 GB so any configuration difficulty is detected when the server is first started.

The default file descriptor limit of 1024 is adequate for up to about 500 GemStone users. Each user session requires two file descriptors, and others are needed for extents, transaction logs, and overhead. *Use caution and increase the default setting only when necessary because doing so can have system side effects.*

- ▶ The configuration option `SHR_PAGE_CACHE_SIZE_KB` defines the size (in KBytes) of extent page space in the shared page cache. The maximum acceptable value for this configuration option is limited by system memory, kernel configurations, and cache space allocated by `SHR_PAGE_CACHE_NUM_PROCS`. As a general guideline, the maximum limit for `SHR_PAGE_CACHE_SIZE_KB` on is approximately 1.9 GB on AIX 5.1, approximately 2.75 GB on AIX 5.2.

For more general information about these and other configuration options, see Appendix A of the *System Administration Guide for GemStone/S*.

System clock

- ▶ The system clock must be set to the correct time. When GemStone opens the repository at startup, it compares the current system time with the recorded checkpoint times as part of a consistency check. A system time earlier than the time at which the last checkpoint was written may be taken as an indication of corrupted data and prevent GemStone from starting. The time comparisons use GMT.

TCP keepalive option

- ▶ GemStone processes ordinarily use the TCP *keepalive* option to determine how long they will wait after communications activity ceases unexpectedly. This setting can be useful for reaping stale RPC Gems, but the operating system default may not be

appropriate for this purpose. For further information, refer to your operating system documentation.

C/C++ Compiler

- ▶ IBM XL C/C++ for AIX, V11.1

GemStone requires a C/C++ compiler only if you are developing C or C++ code for user actions or for a C or C++ application. This compiler is required only for development work, not for execution.

Debugger

- ▶ dbx

A C debugger can be useful to allow problem analysis by GemStone consulting or Technical Support. It also may allow you to debug your C user actions. It is not required for GemStone execution.

Prepare for Installation

Perform the following steps to prepare the machine to receive the GemStone software. Although most steps require root login, we recommend that you perform the initial step as the GemStone administrator.

Table 1.1 shows the portions of the system that are affected by the installation of GemStone, in addition to the GemStone installation itself.

Table 1.1 Parts of System Affected by GemStone Installation

Location	Use
/dev/rdisk/	Optional raw partitions for repository extents and transaction logs
/etc/services	Internet services database
/opt/gemstone	Default location for server lock files and log files for GemStone network servers (NetLDIs)
/usr/gemstone	Alternative location for lock and log files, for compatibility with previous releases; /opt/gemstone is created unless /usr/gemstone already exists

1. As the GemStone administrator, log in to a machine with adequate resources to run GemStone and that owns the disk on which you are going to install the GemStone files.

NOTE

Do not copy the files as root, because the ownerships that were in effect when the distribution media was created are maintained, which might result in file permission errors for users at your site.

2. Determine that adequate page space is available.

We recommend that you allow at least 10 LPs of page for running GemStone and an additional 10 LPs if you will be developing GemStone applications.

To determine the current size of the paging device(s), which is usually found on the root volume group, `rootvg`:

```
% /etc/lsvg rootvg -l
```

Paging devices are of TYPE `paging`, and the LPs column shows the size of each device. An LP is 4 MB.

Page space can be expanded dynamically (without rebooting) using SMIT.

3. Check the free disk space and determine the disk drive and partition on which you will install the GemStone software.

To list all disk partitions, along with the amount of free space in each partition:

```
% df -k
```

We recommend that you avoid choosing either an NFS-mounted partition or one containing UNIX page space for the initial installation. NFS-mounted partitions can result in executables running on the wrong machine and in file permission problems. Existence of page space on the same drive can dramatically slow GemStone disk accesses.

4. Select an installation directory, *InstallDir*, and make this directory the current working directory. For example,

```
% mkdir InstallDir
```

```
% cd InstallDir
```

This directory is referred to as *InstallDir* in these instructions; it is the parent directory of `$GEMSTONE`.

5. GemStone/S is provided as a zipped archive file with a name similar to `GemStone6.7.2-RISC6000.AIX`. Move this distribution file to the directory location in which GemStone will be installed, *InstallDir*, then unzip the distribution file using `unzip`. For example:

```
% unzip GemStone6.7.2-RISC6000.AIX.zip
```

6. The *InstallDir* now contains a GemStone directory with a name similar to `GemStone6.7.2-RISC6000.AIX`.

In addition to several subdirectories, this directory also contains two text files: `PACKING`, which lists all of the GemStone files, and `version.txt`, which identifies this particular product and release of GemStone.

7. Log in as root.

Although you can complete the installation as a non-root user, some setup operations require root access. If you install as a non-root user, refer to Chapter 1 of the *System Administration Guide for GemStone/S*, which explains GemStone server file permissions, NetLDI security modes, and how to change these to fit your security requirements.

Set the Environment

Perform the following steps to properly configure the operating environment.

1. Add, or update GemStone environment variables from previous installation:
 - a. Check for existing GemStone environment variables:


```
% env | grep GEM
```

All GemStone environment variables are displayed.
 - b. If any environment variables exist, you must specifically unset each one.

C shell:

```
% unsetenv GEMSTONE GEMSTONE_SYS_CONF \
  GEMSTONE_EXE_CONF GEMSTONE_LOG GEMSTONE_LANG
```

Bash, Bourne or Korn shell:

```
$ unset GEMSTONE GEMSTONE_SYS_CONF GEMSTONE_EXE_CONF \
  GEMSTONE_LOG GEMSTONE_LANG
```
2. Set the environment variable GEMSTONE to the *full pathname* (starting with a slash) of your new GemStone installation directory

C shell:

```
% setenv GEMSTONE
  InstallDir/GemStone6.7.2-RISC6000.AIXx86_64.Linux
```

Bash, Bourne or Korn shell:

```
$ GEMSTONE=InstallDir/GemStone6.7.2-RISC6000.AIXx86_64.Linux
$ export GEMSTONE
```

Create the GemStone Key File

To run GemStone, you must have a key file. The keyfile contents are provided by your GemStone sales; contact keyfiles@gemstone.com for assistance.

You may either create the keyfile with the default name in the default location, or put the keyfile in a different location, or use a different name, and set the GemStone configuration parameter KEYFILE to this path and filename.

These instructions describe using the default name and location.

1. Change the permissions on the directory `$GEMSTONE/sys` so that you can create the file. This is a default location for the GemStone key; another location may be specified in the GemStone configuration file.


```
% cd $GEMSTONE/sys
% chmod 755 .
```
2. Using a text editor, create the key file `$GEMSTONE/sys/gemstone.key`.
3. GemStone keys are provided in text email. Paste the contents of this email into the keyfile and save.

4. Change the file and directory permissions so that they are no longer writable:

```
% chmod 555 gemstone.key
% chmod 555 .
```

Verify TCP/IP

To run GemStone, TCP/IP must be functioning, even if your machine is not connected to a network.

1. Verify that TCP/IP networking software is functioning (1 is the number one):

```
% /etc/ping hostname 8 1
```

where *hostname* is the name of your machine. If ping responds with statistics, TCP/IP is functioning.

Define the NetLDI Service

The appropriate NetLDI service must be defined in your TCP/IP network database. By default, GemStone/S 6.7.2 will use `netldi67`. You may use another name, although this may require further configuration to allow remote caches to connect.

NOTE

You might need the help of your UNIX system administrator to complete this procedure.

1. Determine whether the `netldi67` service is already defined:

```
% ypcat services | grep netldi67
```

If it is defined, skip the rest of this procedure and continue with the installation at “Run the Installation Script” on page 15. If it is not defined, continue performing this procedure.

The `netldi67` service must be available on all nodes that communicate with the GemStone server.

2. Determine which TCP/IP network database (local or NIS) is in use:

```
% ypwhich
```

If the program is missing or you see an error message when you run it, you can assume that your machine is using a local copy of the TCP/IP network database instead of a copy provided by NIS. Perform the following step on your local copy of the network database (the file `/etc/services`).

If NIS is running, have your UNIX system administrator perform the following steps.

3. Add an entry similar to the following to the network database:

```
netldi67 50383/tcp #GemStone 6.7.2
```

Choose a port number that is not being used by another service. The port number should be in the range 49152 <= port <= 65535, to conform to IANA standards (<http://www.iana.org/assignments/port-numbers>).

NOTE

If you are upgrading from a previous version, you might need to keep the NetLDI for that version running. You may need to define a new netldi service name with a different port number, or assign a different port number to netldi67.

4. If NIS is running, propagate the change to the network database to the rest of the network.
5. If NIS is not running, but several machines will be running GemStone, have the UNIX system administrator update the network database for each machine. The port number must be the same on every machine.

Run the Installation Script

Invoke the installation script from the `install` subdirectory:

```
% cd $GEMSTONE/install
% ./installgs
```

`installgs` is an interactive script that analyzes your system configuration and makes suggestions to guide you through installing GemStone on your machine.

NOTE

You can usually terminate execution of the installation script with Ctrl-C without risk to your files. When it is not safe to do so, the message `Please do not interrupt` appears on the screen. If this happens, wait for the message `now it is OK to interrupt` before you interrupt the script. You can run the script again from the beginning as many times as necessary.

Decisions to Make During Installation

During installation, you are asked several questions. The entire installation dialog is not reproduced here, but the main points are addressed. Some questions may not be asked, depending on answers to previous questions.

Whenever you are asked to answer “yes” or “no,” answer with **y** or **n**. If the script offers a default answer in square brackets (such as “[y]”), you may press Enter to accept the default.

Verify the Release Tree?

Do you want the installation script to verify your GemStone release tree?

This process takes a few minutes, but it’s a good idea to ensure that the files were transferred from your distribution media without error.

Default: Verify the installation tree.

The GemStone installer will attempt to verify some system requirements on your system. Some of the verifications may issue warnings of the form:

```
./installgs[52]: test: Specify a parameter with this command.
./installgs[52]: -q: not found.
./installgs[260]: test: Specify a parameter with this command.
```

Unless an explicit installation failure is returned, the installation will complete successfully, and the above warnings may be ignored.

Do you want the installation script to set up directories for server lock files and NetLDI logs?

The default location for server lock files and NetLDI log files is `/opt/gemstone`, although for compatibility with earlier releases `/usr/gemstone` is used if it exists. If neither directory exists, the installation script offers to create `/opt/gemstone` and the subdirectories `locks` and `log`. Then, the script offers to grant world access (777) to these directories.

If you answer **no** to creating the directories, you must create them (or provide a symbolic link) before starting the server.

Do you want the installation script to set the owner and group for all the files in the GemStone distribution?

If you answer **yes**, the script will prompt you for the owner and group you want to use. Refer to Chapter 1 of the *System Administration Guide for GemStone/S* for more information about setting owner and group permissions.

If you answer **no**, the permissions will remain the same as when the files were extracted from the distribution media.

Do you want the installation script to protect the repository file?

The default, which we recommend, gives only the owner read and write access (600) through ordinary UNIX commands. Other users can read and write the repository through a GemStone session. If you choose not to protect the repository, the setuid bit is cleared from all executables, which causes them to run under ownership of the user who invokes them.

Default: Set the repository permission to 600, and leave the setuid bit applied.

Allow NetLDI to Run as Root?

Do you want the installation script to allow non-root users to start a NetLDI that runs as root?

The NetLDI is a network server that permits remote processes to interact with the repository. There are two ways to set up a NetLDI so that it can provide services to all GemStone users: it can run as root, or it can run in guest mode with a captive account.

- ▶ To run NetLDIs as root, accept the default “yes” response. Ownership of the NetLDI executable is changed to root, and the setuid bit is set. Any GemStone user will be able to start a NetLDI process that is accessible to all GemStone users because it will always run as root. For certain services, users will need to authenticate themselves by supplying a password. Alternatively, answer “no” but log in as root before starting the NetLDI.

If the NetLDI uses a port number less than 1024, it must run as root.

- ▶ To run NetLDIs in guest mode with a captive account, answer “no” to the prompt, because those modes are not permitted if the NetLDI runs as root. “Guest mode” means that GemStone users do not have to supply a UNIX password to use NetLDI services. The “captive account” is an account that owns all processes the NetLDI starts; typically, it is the GemStone administrative account that owns the files. You must start the NetLDI while logged in as that account.

Default: Change ownership of the `netldi` executable to root, and set its setuid bit.

Set up an Extent?

Do you want the installation script to set up an extent now?

GemStone is distributed with a read-only copy of the initial repository in `$GEMSTONE/bin/extent0.dbf`. Before you can start GemStone, this file must be copied to a suitable location and made writable. The script offers to copy the file to its default location of `$GEMSTONE/data`.

If you are a new GemStone user, we recommend that you answer **y**. If you are an existing GemStone user, you might prefer to answer **n**, then copy the extent to a different location yourself. (If you choose a location other than the default, you must edit your configuration file before starting GemStone. For information, see the *System Administration Guide for GemStone/S*.)

Default: Place a writable copy of `extent0.dbf` in `$GEMSTONE/data`.

Start a NetLDI?

Do you want the installation script to start a NetLDI?

If you prefer, you can start these processes manually at any time.

Almost every host needs a NetLDI. You must start a NetLDI when the Stone repository monitor or Gem session processes will run on this machine.

You can start a NetLDI that runs as root by answering **yes** to this prompt and the confirmation that follows. However, if you want to start the NetLDI in guest mode with a captive account, you must do that after completing the installation. For more information about guest mode with captive account, see Chapter 3 of the *System Administration Guide for GemStone/S*.

Default: Do not start a NetLDI at this time.

Start an Object Server?

As root, you cannot start an object server, but the script offers to start one as another user. You will start the server later in the installation, so answer **no**.

Default: Do not start an object server at this time.

Log out as root

When the installation script has completed, log out as root

Install the default TimeZone

GemStone/S 64 Bit is shipped with a default time zone of US Pacific. If you are in another Time Zone, edit the file `installtimezone.txt` in the GemStone upgrade directory, then file it in as `SystemUser`.

Change System Passwords and Add Users

After installing GemStone 6.7.2, you must change the passwords for the three administrative users: `DataCurator`, `SystemUser`, and `GcUser`. The initial password for each is `swordfish`. The `DataCurator` account is used to perform system administration tasks. The `SystemUser` account ordinarily is used only for performing GemStone system upgrades. The `GcUser` account is used by the garbage collection task, which runs automatically as a separate login. Access to each of these accounts should be restricted.

The *System Administration Guide for GemStone/S* provides information on changing passwords, and how to create new GemStone users.

Have Users Execute gemsetup

The directory `$GEMSTONE/bin` contains two files, `gemsetup.sh` and `gemsetup.csh`, to help set a user's environment. These files define the GemStone environment for users by modifying the `PATH` and `MANPATH` variables to include `$GEMSTONE/bin` and `$GEMSTONE/doc`, respectively.

After GemStone 6.7.2 has been installed, you should notify each GemStone user of the installation and explain how to use the `gemsetup` files.

NOTE

This procedure applies only to users, and each user must perform this procedure before running GemStone. However, users who will only access GemStone using GBS do not need to run `gemsetup`

1. Set the environment variable `GEMSTONE` to the *full pathname* (starting with a slash) of the GemStone 6.7.2 directory.

C shell:

```
% setenv GEMSTONE InstallDir/GemStone6.7.2-RISC6000.AIX
```

Bash, Bourne or Korn shell:

```
$ GEMSTONE=InstallDir/GemStone6.7.2-RISC6000.AIXx86_64.Linux
```

```
$ export GEMSTONE
```

2. Invoke the script `gemsetup`.

C shell:

```
% source $GEMSTONE/bin/gemsetup.csh
```

Bash, Bourne or Korn shell:

```
$ . $GEMSTONE/bin/gemsetup.sh
```

3. If you will use GemStone frequently, consider adding to your login shell's initialization file (`.cshrc` or `.profile`) the environment variable `GEMSTONE` and the command **gemsetup**. This way, the GemStone environment is automatically configured every time you log in or create a login shell. It overrides any other GemStone path settings.

NOTE

If you use the Korn shell or other shell that extends POSIX, and your `.profile` contains commands that are not POSIX-compliant, you might encounter errors when a shell is initialized. To remedy this situation, place the non-compliant commands within a conditional, such as the following:

```
hash -r 2>/dev/null
status=$?
if [ $status -ne 0 ]; then
    # Place Korn-shell-specific initialization here
fi
```

What Next?

This chapter has guided you through installation of GemStone 6.7.2 in an initial configuration that is sufficient to create a basic repository and begin setting up user accounts. The objective was to get a simple, default configuration up and running.

You might consider performing the following tasks:

- ▶ If you will be using a related GemStone product, such as GemConnect, install it by referring to the product's installation guide.
- ▶ To modify the initial object server configuration to one that is more efficient for your particular needs, refer to Chapter 1 of the *System Administration Guide for GemStone/S*.
- ▶ To modify the configuration of Gem session processes and to ensure that users have the necessary permissions to access the shared page cache and the extents, refer to Chapter 2 of the *System Administration Guide for GemStone/S*.
- ▶ If you are going to operate in a network environment, Chapter 3 of the *System Administration Guide for GemStone/S* has additional information about the GemStone network object server (NetLDI), how to handle user authentication, how to share software over the network, and how to set up some common configurations.
- ▶ To start and stop the GemStone object server, refer to instructions in Chapter 4 of the *System Administration Guide for GemStone/S*.

Upgrading from Previous GemStone/S Versions

This chapter describes how to upgrade an existing GemStone/S installation to GemStone/S version 6.7.2.

GemStone/S version 6.7.2 supports upgrade from GemStone/S version 6.6 and later. If you are upgrading from a version prior to 6.6, you must first upgrade to v6.6 or later, then perform a second upgrade to 6.7.2. For instructions, see the *Installation Guide for GemStone/S for v6.7*, or whatever intermediary version you wish to use.

If you are using GemBuilder for Smalltalk (GBS), you should also upgrade the client libraries that are used by GBS. The supported versions of GBS for use with GemStone/S 6.7.2 are in the *Release Notes* for v6.7.2. See Chapter 3 for instructions on installing updated client libraries.

For applications using add-on products such as GemConnect or Gembuilder for Java, these products will need to be reinstalled following the upgrade process. For details, see the *Installation Guide* for that product, and contact GemTalk Technical Support for assistance with the correct product libraries.

NOTE

The following instructions use the version number 6.7.1 to represent any of the versions from 6.6 through 6.7.1. The procedure is the same regardless which of these versions you have; exceptions are noted in the instructions.

Overview of the Upgrade Strategy

We recommend that you perform the upgrade twice: first a pilot upgrade and then the production upgrade. With this strategy, you can keep your version 6.7.1 production system running while you familiarize yourself with the upgrade process.

Pilot Upgrade

The purpose of the Pilot upgrade is to familiarize yourself with the upgrade process and to help ease the upgrade of your production system. To help you gain the most information and experience from the Pilot upgrade, you must create a small repository that contains objects that are representative of your production system.

Using the representative repository, complete the upgrade and file out all changes so you can minimize down time when you upgrade your production system. During the Pilot upgrade, you:

- ▶ Modify classes and methods that run in GemStone so they work properly with the version 6.7.2 classes and methods.
- ▶ Modify your application's client code as necessary. This code may be in C, C++, or client Smalltalk.
- ▶ File out the changes so they can be loaded quickly when you perform the Production upgrade.
- ▶ Recompile and relink any C or C++ programs.
- ▶ Reload client Smalltalk images.

Once you complete the Pilot upgrade, you will be able to schedule down time of your production system based on what you learned during the Pilot upgrade.

Production Upgrade

The purpose of the Production upgrade is to upgrade your production system using the information you gathered during the Pilot upgrade.

Perform the Upgrade

Prepare for the Upgrade

Perform the following steps to prepare for the upgrade.

1. Install GemStone/S 6.7.2 to a new installation directory, separate from the installation directory for version 6.7.1, using the instructions in Chapter 1.
2. Configure version 6.7.2 the way you expect to use it — that is, with the appropriate extent locations and sizes.

Ensure that adequate space is available for extents, transaction logs, and a backup during the upgrade:

```
% df -k
```

Space is needed for the following:

- ▶ Your version 6.7.1 extents and transaction logs.
 - ▶ Your version 6.7.2 extents and transaction logs. You should allow for some growth of the extents during the upgrade (you can reclaim much of the physical space later by performing a full backup and restoration of the converted repository).
3. Log in to the 6.7.1 GemStone system and reset the SystemUser password to 'swordfish':

```
topaz 1> printit
(AllUsers userWithId: #SystemUser) password: 'swordfish' .
System commitTransaction .
%
```

The upgrade scripts log in to GemStone with the SystemUser account and the default password.

4. Halt all user activity on the repository you are going to upgrade:

- a. Log in to Topaz as DataCurator.
- b. Force all other users off the system:

```
topaz 1> printit
System stopOtherSessions.
%
```

CAUTION

You MUST file out any changes you have made to the GemStone kernel classes in order to preserve these changes in version 6.7.2. Also, consider saving important modified files, such as configuration files, that will be overwritten during the upgrade.

5. If this is the Pilot upgrade, file out any modifications or additions you made to GemStone kernel class methods by using Topaz command **fileout**.

6. Shut down the Stone:

```
% stopstone stone671
```

where *stone671* is the name of version 6.7.1 Stone on this machine.

7. Set up the 6.7.2 environment.

Set the environment variables required for the upgrade.

C shell:

```
% setenv GEMSTONE InstallDir/GemStone6.7.2-RISC6000.AIX
% set path = ($GEMSTONE/bin $path)
% setenv upgradeLogDir tempDir
```

Bash, Bourne or Korn shell:

```
$ GEMSTONE=InstallDir/GemStone6.7.2-RISC6000.AIX
$ export GEMSTONE
$ PATH=$GEMSTONE/bin:$PATH
$ upgradeLogDir=tempDir
$ export upgradeLogDir
```

where *tempDir* is a temporary directory for which you have write permission.

8. Copy your version 6.7.1 extent files into the location specified by the GemStone configuration option `DBF_EXTENT_NAMES`:
 - a. Using a text editor, open the file `$GEMSTONE/data/system.conf`, or whichever configuration file your system uses.
 - b. Locate the last occurrence of the option `DBF_EXTENT_NAMES`, and note its value.

- c. Copy each .dbf file to the noted location. For example:

```
% cp InstallDir671/data/extent0.dbf 672location
% cp InstallDir671/data/extent1.dbf 672location
% cp InstallDir671/data/extent2.dbf 672location
```

where *672location* is the location specified by DBF_EXTENT_NAMES in the configuration file that will be used in version 6.7.2. If you are changing platforms, as well as upgrading, use copydbf instead of cp.

Perform the Upgrade

1. Start the 6.7.2 Stone. For example:

```
% startstone stone672
```

You may omit the stone name, in which case gemserver67 will be used. When this step completes, the results will be:

```
startstone[Info]: GemStone server stone672 has been started.
```

2. To upgrade the image, run the upgrade script:

```
% upgradeImage stone672
```

where *stone672* is the name of the version 6.7.2 Stone started in the previous step. You will be prompted to continue the upgradeImage step.

This script invokes several subordinate scripts to complete the upgrade. This will take some time to complete; output is sent only to a log file in the \$upgradeLogDir directory. This process should end with this display:

```
Upgrade completed. No errors detected.
```

If errors were reported during the upgrade, please preserve the contents of \$upgradeLogDir. Contact your internal GemStone support person or GemStone Technical Support.

Restore Your Site-Specific Settings and Back Up the Repository

1. Reinstall any other GemStone products that modify kernel classes.

If you use GemConnect, GemBuilder for Java, or GemEnterprise, you must install them again at this time. Use the procedure in the installation guide for each product. If you have an upgraded product version you may install it at this time. Otherwise, install the same version that was previously installed.

2. Log in to GemStone version 6.7.2 as DataCurator.

Change the password for SystemUser, which you changed to swordfish prior to the conversion, back to its version 6.7.1 value. Also, change the password for GcUser, which was reset by the conversion process, back to its version 6.7.1 value.

For example:

```
topaz 1> printit
(AllUsers userWithId: 'SystemUser') password: '671Password'.
(AllUsers userWithId: 'GcUser') password: '671Password'.
System commitTransaction
%
```

where *671Password* is the account password used in your initial repository version.

3. If you have modified any kernel class methods in the previous version, compare these changes with version 6.7.2 kernel methods to see whether your changes are still necessary or appropriate. This should be done before or during the Pilot upgrade, so a filein can be created containing only the required changes.

File in the application-specific kernel modifications and commit. You may need to log in as SystemUser to do this.

4. If this is the Production upgrade, create a full backup of the upgraded repository now. The upgraded repository is now usable.
5. If you are using GBS clients, configure these to use the version 6.7.2 client libraries. See Chapter 3, 'Configuring GBS for GemStone/S' for details.

Configuring GBS for GemStone/S

Versions of GemBuilder for Smalltalk (GBS) that are compatible with GemStone/S v6.7.2 do not support Smalltalk client applications running on AIX.

GemStone/S v6.7.2 supports client Smalltalk/GBS applications running with VisualWorks on Solaris, Linux, and Windows, and with VA Smalltalk running on Windows. For a table of all supported GBS and client Smalltalk platforms, see the *GemStone/S Release Notes* for v6.7.2.

For instructions for updating GBS clients that are running on Solaris, Linux, or Windows, see the *Installation Guide* for that platform.