Rational. Synergy

IBM

Installation Guide for UNIX

IBM Rational Synergy

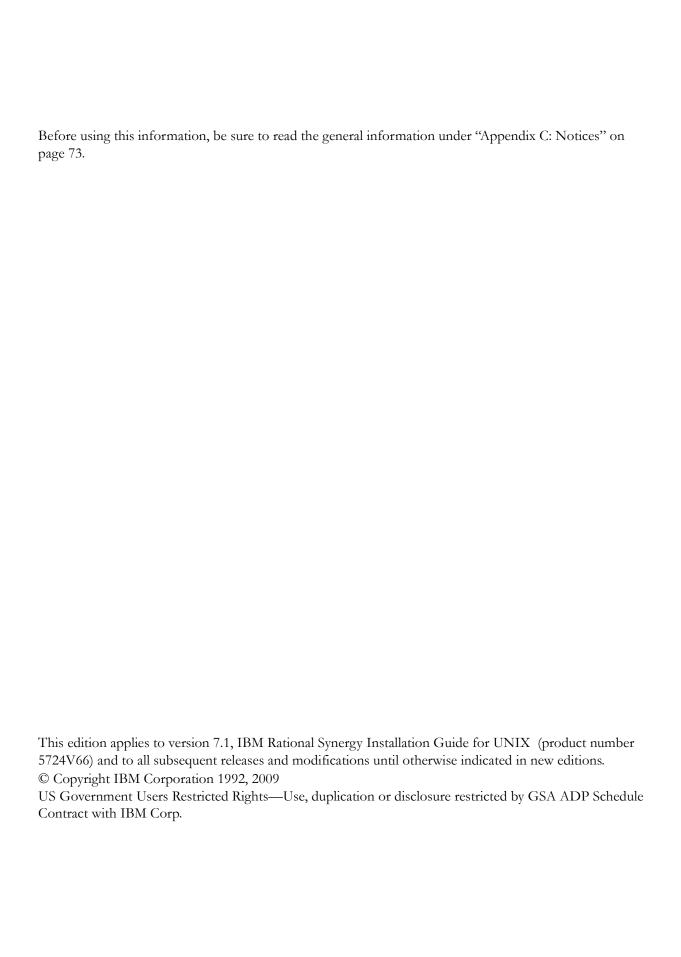*Installation Guide for UNIX*

Release 7.1

Before using this information, be sure to read the general information under "Appendix C: Notices" on page 73.

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1 *Introduction*

This chapter explains what you must know before installing IBM® Rational® Synergy on UNIX®.

The following information is available:

- "Readme" on page 1
- "Upgrading from a previous release" on page 1
- "Release summary" on page 2
- "User prerequisites" on page 3
- "Contacting IBM Rational Software Support" on page 3
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Readme

The IBM Rational Synergy Readme file contains vital information about your Rational Synergy software, including information about new features in this release, and a list of the supported hardware and operating systems. Review this information before installing your software. The Rational Synergy Readme file is available on the Rational Software Information Center site at `http://publib.boulder.ibm.com/infocenter/rsdp/v1r0m0/index.jsp`. For more information about obtaining documents, see "Rational Synergy documentation" on page 8.

> **Note** The Rational Synergy Readme file is revised and reissued, as needed, to provide the most current information. To ensure you have the latest version, download an electronic copy from the Rational Software Information Center.

Upgrading from a previous release

You can upgrade existing Rational Synergy servers and databases to the current release of Rational Synergy. The upgrade process is described in the *IBM Rational Synergy Upgrade Instructions for UNIX*. These instructions are available on the Rational Software Information Center site (`http://publib.boulder.ibm.com/infocenter/rsdp/v1r0m0/index.jsp`).

Release summary

For a synopsis of the new features of Rational Synergy release 7.1, see the Rational Synergy Readme file (`http://publib.boulder.ibm.com/ infocenter/rsdp/v1r0m0/index.jsp`.).

Interfaces installed by Rational Synergy 7.1

Rational Synergy for UNIX offers the following graphical user interfaces.

- **Rational Synergy**

  This interface was formerly called Rational Synergy for Developers. It is for users in the *developer* or *build_manager* role. It contains functionality for daily development and build management activities.

- **Synergy Classic**

  This interface is also called the Original client and contains functionality for build managers and CM administrators.

Release compatibility

The following are important characteristics of this release:

- To start Rational Synergy, the client, engine, and database must all be from the same release and service pack; you cannot mix components from different Rational Synergy releases or service packs.

- To start Rational Synergy, you must install and run the Rational License server.

- To run Rational Synergy, you must install the IBM® Rational® Directory Server.

- Windows clients may be used with both UNIX and Windows servers.

- UNIX clients and servers can share a single installation if the install directory is accessible across the network.

Rational Synergy 7.1 is compatible with IBM® Rational® Change 5.1 or later. If you are already using Rational Change, you must upgrade to Rational Change 5.1 or later at the same time as you upgrade to Rational Synergy 7.1.

User prerequisites

This guide is for Change Management (CM) Administrators who need to install Rational Synergy. You must have experience installing software onto a UNIX system and setting up UNIX system files. For deployment planning, read the *CM Live* document.

In addition, you must have:

- *root* access on each machine where Rational Synergy will be installed, and database server and engine server machines.

- knowledge of your company's hardware infrastructure and network topology.

- a working knowledge of how your company will use Rational Synergy. For example, will you want to configure your installations for remote builds?

Contacting IBM Rational Software Support

If the self-help resources have not provided a resolution to your problem, you can contact IBM® Rational® Software Support for assistance in resolving product issues.

Note If you are a heritage Telelogic customer, a single reference site
for all support resources is located at <u>http://www.ibm.com/
software/rational/support/telelogic/</u>

Prerequisites

To submit your problem to IBM Rational Software Support, you must have an
active Passport Advantage® software maintenance agreement. Passport
Advantage is the IBM comprehensive software licensing and software
maintenance (product upgrades and technical support) offering. You can enroll
online in Passport Advantage from <u>http://www.ibm.com/software/lotus/
passportadvantage/howtoenroll.html</u>

- To learn more about Passport Advantage, visit the Passport Advantage FAQs
  at <u>http://www.ibm.com/software/lotus/passportadvantage/
  brochures_faqs_quickguides.html</u>.

- For further assistance, contact your IBM representative.

To submit your problem online (from the IBM Web site) to IBM Rational
Software Support, you must additionally:

- Be a registered user on the IBM Rational Software Support Web site. For
  details about registering, go to <u>http://www.ibm.com/software/support/</u>.

- Be listed as an authorized caller in the service request tool.

Submitting problems

To submit your problem to IBM Rational Software Support:

1. Determine the business impact of your problem. When you report a
   problem to IBM, you are asked to supply a severity level. Therefore, you
   need to understand and assess the business impact of the problem that you
   are reporting.

   Use the following table to determine the severity level.

Severity	Description
1	The problem has a *critical* business impact: You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.
2	This problem has a *significant* business impact: The program is usable, but it is severely limited.

Severity	Description
3	The problem has *some* business impact: The program is usable, but less significant features (not critical to operations) are unavailable.
4	The problem has *minimal* business impact: The problem causes little impact on operations or a reasonable circumvention to the problem was implemented.

2. Describe your problem and gather background information, When describing a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Rational Software Support specialists can help you solve the problem efficiently. To save time, know the answers to these questions:

   • What software versions were you running when the problem occurred?

     To determine the exact product name and version, use the option applicable to you:

     - Start the IBM Installation Manager and select **File** > **View Installed Packages**. Expand a package group and select a package to see the package name and version number.

     - Start your product, and click **Help** > **About** to see the offering name and version number.

   • What is your operating system and version number (including any service packs or patches)?

   • Do you have logs, traces, and messages that are related to the problem symptoms?

   • Can you recreate the problem? If so, what steps do you perform to recreate the problem?

   • Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, or other system components?

   • Are you currently using a workaround for the problem? If so, be prepared to describe the workaround when you report the problem.

3. Submit your problem to IBM Rational Software Support. You can submit your problem to IBM Rational Software Support in the following ways:

   • **Online**: Go to the IBM Rational Software Support Web site at https://www.ibm.com/software/rational/support/ and in the Rational support

task navigator, click **Open Service Request.** Select the electronic problem reporting tool, and open a Problem Management Record (PMR), describing the problem accurately in your own words.

For more information about opening a service request, go to http://www.ibm.com/software/support/help.html

You can also open an online service request using the IBM Support Assistant. For more information, go to http://www.ibm.com/software/support/isa/faq.html.

- **By phone**: For the phone number to call in your country or region, go to the IBM directory of worldwide contacts at http://www.ibm.com/planetwide/ and click the name of your country or geographic region.
- **Through your IBM Representative**: If you cannot access IBM Rational Software Support online or by phone, contact your IBM Representative. If necessary, your IBM Representative can open a service request for you. You can find complete contact information for each country at http://www.ibm.com/planetwide/.

Other information

For Rational software product news, events, and other information, visit the IBM Rational Software Web site (http://www.ibm.com/software/rational/).

Conventions used in this guide

The conventions used in this guide are described in the following sections.

Shell conventions

All command-line instructions and examples are shown for the standard Bourne shell, /bin/sh. If you use another shell, such as the C shell, you must modify your commands accordingly.

For example, add /usr/local/ccm71 to the path using the sh shell as follows:

```
$ PATH=/usr/local/ccm71/bin:$PATH; export PATH
```

Add /usr/local/ccm71 to the path using the csh shell as follows:

```
% setenv PATH /usr/local/ccm71/bin:$PATH
```

Command line interface

The command line interface (CLI) is supported on all UNIX platforms. You can execute any Rational Synergy command from the command prompt.

Prompt

>This guide uses the dollar-sign prompt ($).

Options delimiter

>Rational Synergy supports the dash option delimiter (-) for all UNIX platforms.

Location of $CCM_HOME

>$CCM_HOME is the Rational Synergy product installation directory. This guide sometimes uses the *ccm_home* variable to represent $CCM_HOME.

Default text editor

>The default Rational Synergy UNIX text editor is vi. You can change the default text editor as described in "Default Settings" in the Rational Synergy CLI help. For more information about online help, visit the Rational Software Information Center site at `http://publib.boulder.ibm.com/infocenter/rsdp/v1r0m0/index.jsp`.

Fonts and symbols

>The table below describes the typeface and symbol conventions used in this guide.

Typeface	Description
Italic	Used for book titles and terminology. Also designates names of roles (*developer*), states (*working*), groups (*ccm_root*), and users (*john*).
Bold	Used for items that you can select and menu paths, also used for emphasis.
Courier	Used for commands, filenames, and directory paths. Represents command syntax to be entered verbatim. Signifies computer output that displays on-screen. Also used for the names of attributes (modify_time), commands (ccm start), functions (remote_type), and types (csrc).
Courier Italic	Represents values in a command string that you supply. For example, (*database_path/username/commands*)

>This document also uses the following conventions:

>**Note** Contains information that should not be overlooked.

Caution Contains critical information that must be observed or
damage to the database or system could result.

Rational Synergy documentation

Unless otherwise noted, Rational Synergy documents are available on the
Rational Software Information Center site (`http://
publib.boulder.ibm.com/infocenter/rsdp/v1r0m0/index.jsp`),
and in the Documentation shipped with Rational Synergy.

2 *Terms and concepts*

To perform the operations described in this guide, it is helpful to understand the following terms and concepts.

Rational Synergy client A *Rational Synergy client* is a user interface process.

Rational Synergy database

A *Rational Synergy database* is an object-oriented repository that stores controlled files, change requests, and their properties. File properties include the source and creation date, and many other properties such as its relationship to other files.

Rational Synergy database server

The *database server* hosts the Rational Synergy databases and chunk files.

Rational Synergy CCM server

The *Rational Synergy CCM server* hosts the Web-based Rational Synergy help, the Windows client installation image, . For details on the Rational Synergy CCM Server, see "CCM Server Administration" in the *IBM Rational Synergy Administration Guide for UNIX* .

engine server

An *engine server* hosts the engine processes that communicate between the Rational Synergy client and the Rational Synergy Informix database.

ESD

The *ESD* (Engine Startup Daemon) is an optional secure method for starting a user's Rational Synergy traditional mode session. ESD is not used for Web

mode sessions. If you decide to use ESD, you must run one ESD on each engine host.

installation machine   The *installation machine* hosts the Rational Synergy and Informix executables.

object registrar   The *object registrar* "registers" all changes made to Rational Synergy database objects so that each user's view of the database remains up to date. You must run one object registrar per database host.

router   The *router* manages the communications among Synergy processes. You must run one router per network installation.

Rational license server TL   The *license server* validates users' access to Rational Synergy databases. FLEXnet is used to manage licenses. You must run one license manager per network installation, and only on the machine for which Rational issued the license.

Rational Directory Server   Rational Directory Server is a single enterprise directory solution designed for user authentication and administration for IBM® Rational® Solutions for Enterprise Lifecycle Management tools. The Rational Directory Server allows the users to log on using the same credentials across tools for which they have authorized access.

Traditional mode   Standard network communication for users who need administration. Traditional mode behaves as it did in Synergy 6.5.

Web mode   Web mode Rational Synergy clients communicate to a Web-based Rational Synergy server using the HTTP protocol. This architecture reduces the dependency on network latency by using parallel, asynchronous

network communication between the client and server.

work area   A *work area* is a location in your file system to which Rational Synergy copies files when you check them out. Your work area can reside anywhere in the network file system. As you update files, Rational Synergy synchronizes changes in the work area with the database. If you are using a UNIX work area, the files can be either copies or links. If you are using a Windows work area, the files can only be copies.

3 *Rational Synergy installation worksheet*

Preparing for the installation

Use the following worksheet to organize the information you need to install Rational Synergy.

To make your installation easier, print a copy of the worksheet and enter information for all possible items before starting. You will enter other items during the installation.

Save the worksheet after completing the installation; this is valuable reference information.

1. **Rational Synergy installation machine** (`ccm_install_server`)

   This is the machine onto which the Rational Synergy executables will be installed. For more information, see "Installation machine requirements" on page 20 and "Preparing the Rational Synergy installation machine" on page 29.

   Default: None
   Actual: _____

2. **Rational Synergy database server** (`ccmdb_server`)

   This is the machine on which the Rational Synergy databases will reside. For more information, see "Database server and engine machine requirements" on page 21 and "Preparing the database server" on page 34. This machine might be the same as the installation machine (`ccm_install_server`, item 1). Also see "Starting a Rational Synergy session" on page 51 for information on daemons.

   Default: None
   Actual: _____

3. ***ccm_root* home directory** (`ccm_root_home`)

   This is the *ccm_root* home directory path on the installation machine. For more information, see "Setting up ccm_root and informix users and groups" on page 29.

Use Default: None
Use Path: _____

4. ***informix* home directory** (`informix_home`)

   This is the *informix* home directory path on the installation machine. For more information, see "Setting up ccm_root and informix users and groups" on page 29.

   Default Path: None
   Actual: _____

5. **Rational Synergy installation directory or** `$CCM_HOME` (`ccm_home`)

   This is the directory into which Rational Synergy will be installed. For more information, see "ccm_home" on page 23, and step 3 on page 38. This should **not** be the same as or under the`ccm_root` home directory (`ccm_root_home`, item 3). For information on using a release-specific directory, see "Creating an installation directory" on page 31.

   Default Path: None
   Actual: _____

6. **Media device name** *(`media`)*

   This is the path to the mount point of the media drive on the installation machine, or a temporary directory set up by you for downloadable installations. For more information, see "Identifying the media drive" on page 33, and step 2 on page 38.

   Default Path: None
   Actual: _____

7. **Chunk files directory path or raw device name**
   (`informix_chunkfiles`)

   This is the path to the Informix chunk files. For more information, see "informix_chunkfiles" on page 23, step 3 on page 42, and "Creating Informix chunk files" on page 53.

   Default Path: /data/informix_dbs
   Actual: _____

8. **Database path** (`ccmdb`)

   This is the path to the Rational Synergy database. For more information, see "ccmdb" on page 24. This should **not** be the same as or under either the `ccm_root` home directory (`ccm_root_home`, item 3) or `ccm_home`, item 5.

   Default Path: None
   Actual: _____

9. **Router service host name** (`router_host`)

   This is the name used for the Rational Synergy router host. Install Rational Synergy on this machine first. For more information, see "Setting up the router service" on page 32, and the end of "Setting up the Rational Synergy environment" on page 40.

   Default: *system name*
   Actual: _____

10. **Router service name** (`router_service`)

    This is the name used for the Rational Synergy router service. For more information, see "Setting up the router service" on page 32.

    Default: ccm7.1_router
    Actual: _____

11. **Router service port number** (`router_port`)

    This is the router port used for the `router_service`. For more information, see "Setting up the router service" on page 32.

    Default: 5412 (reserved)
    Actual: _____

12. **ESD port number** (`esd_port`)

    This is the port used for the Engine Startup Daemon. The port number must be a value that is not already in the system `services` file.

    Default: 8830
    Actual: _____

13. Rational Synergy primary ccm server host (`primary_server_host`)

This machine on which the primary server will run. This must be the same as the router server host name (number 9 in this worksheet).

Default: `system name`
Actual: _____

14. Rational Synergy primary ccm server port number
(`primary_server_port`)

This is the port used for the default server and for accessing the Web-based product help. It is also the default port used for CCM servers on other machines. The ccm server will use this port, and this port + 100. The port numbers must be values that are not already in use.

Default: `8400` (and thus `8500`)
Actual: _____

15. **Rational license service host** (`license_serverhostname`)

    This is the name of the host where the license server is installed. For more information, see the section "Setting up your server license" in the *IBM Rational License Server TL Licensing Guide.*

    Default: None
    Actual: _____

16. **Rational license service port number** (`license_server_port`)

    This is the port number used by the license server host. For more information, see the section "Setting up your server license" in the *IBM Rational License Server TL Licensing Guide.*

    Default: None
    Actual: _____

17. **Informix service name** (`servername_serverhostname`)

    This is the Informix® database server service name. For more information, see "Adding Informix services" on page 34.

    Default: None
    Actual: _____

18. **Rational Directory Server host** (`directory_server_host`)

    This is the name of the host where the Rational Directory Server is installed.

    Default: None
    Actual: _____

19. **Rational Directory Server port number** (`directory_server_port`)

    This is the port number used by the Rational Directory Server.

    Default: None
    Actual: _____

20. Informix service port number (`informix_port`)

This is the Informix port used for the Informix database server service. For more information, see "Adding Informix services" on page 34.

Default: None
Actual: _____

21. Informix server number (`server_number`)

This is the number of an Informix server that you will be creating. Only use `server_num` values from 1 to 255. By default, the server number is 1. If you install multiple Informix servers on the same machine, you must use a different number for each server. For more information, see step 5 on page 43. If appropriate, also see "Installing onto a machine running Informix" on page 66.

Default: 1
Actual: _____

22. Informix server name (`servername`)

This is the name of an Informix server that you will be creating. By default, the Server Name is the name of the machine on which the Informix server is installed. If you install multiple Informix servers on the same machine, you must give each server a different name. For more information, see step 5 on page 43. If appropriate, also see "Installing onto a machine running Informix" on page 66.

Default: Name of the machine on which the Informix server is installed
Actual: _____

4   *Pre-installation*

This chapter describes how to prepare your system for Rational Synergy software installation. Work through this chapter carefully. It will help you make decisions during your installation.

Checklist

Use the following checklist, in the sequence shown, to work through this chapter:

- "Planning the installation" on page 19
- "Preparing the Rational Synergy installation machine" on page 29
- "Preparing the database server" on page 34
- "Installing the Rational license server" on page 35
- "Installing the Rational Directory Server" on page 35
- "Alternative installations" on page 35 (This is an optional step.)

Before proceeding, print the *Rational Synergy installation worksheet*. Fill in the worksheet as you work though this chapter. Your answers will be needed during the installation process, and the written worksheet will form a valuable record of your installation decisions.

Planning the installation

Read these installation instructions carefully, and review the Rational Synergy Readme file. For information about accessing the latest version of the Rational Synergy Readme file, see page 1. If you are upgrading from a previous release, read the *IBM Rational Synergy Upgrade Instructions*.

If you are installing Rational Synergy on multiple machines or platforms (for example, on both UNIX and Windows), install it first on the machine where you will run the Rational Synergy router.

Plan your UNIX installations as directed in the sections that follow.

Installation machine requirements

The installation machine hosts the Rational Synergy and Informix executables. The table below shows the disk space requirements of this device when installed.

Note You must have three times as much disk space available during installation to allow for extraction of files.

Make sure that your machine characteristics are compatible with those in this table.

Machine Characteristics	Minimum Configuration
Hardware and Operating System	See the Rational Synergy Readme file for the list of supported systems
Disk Space	For Solaris: 550 MB For AIX: 500 MB For Linux: 500 MB

Linux® installations must have the `compat-libstdc++` package installed. If you receive errors while running `ccmsrv create`, you are probably missing this file. You can find it on the Red Hat installation CD. The error will be similar to:

```
WARNING: unable to initialize the database server
 see logfile_location.log for details
/database_path/informix/bin/oninit:error while loading shared
libraries: libstdc++:cannot open shared object file: No such
file or directory
```

Database server and engine machine requirements

Database server machines host the Informix chunk files (see "informix_chunkfiles" on page 23). The engine machine hosts the engine processes that access the Informix and file system portions of your system. Run the engine processes on the database server machine unless your site is running so many sessions that the engine sessions slow down the server unacceptably. The following table shows the minimum requirements for the server and engine machine. Your installation may require more than the amounts shown in these tables, depending on the number of simultaneous users you have.

Note For the latest information on server resource requirements, see the Rational Synergy Readme file. For details about Informix database server requirements, see "Appendix B: Informix Setup" in the *IBM Rational Synergy Administration Guide for UNIX*.

Machine Characteristics	Minimum Configuration
Hardware and Operating System	See the Rational Synergy Readme file for the list of supported systems
CPU	2 GHz quad CPU or better
Memory (per machine)	2 GB and 25 MB per concurrent session.
Swap Space (per machine)	3 times physical RAM per database server
Repository DB Space	2 GB raw partition
Kernel Parameters	See "Check Shared Memory and Semaphore Kernel Parameters" in the *IBM Rational Synergy Administration Guide for UNIX*.
Required Additional Software	The `tsort` command must be in the path

Client machine requirements

Each user must run a Rational Synergy interface, and must have access to one or more file systems to use for the user's work area(s). The table below shows the minimum requirements for client machines. Your installation may require more than the amounts shown in this table.

Note Each user's work area must be a directory owned and writable by the user. By default, this directory is placed under $HOME for each user. The directory must be visible to all build and compile servers.

Machine Characteristics	Minimum Configuration
Hardware and Operating System	See the Rational Synergy Readme file for the list of supported systems
CPU	1.5 GHz dual CPU or better
Memory (per machine)	2 GB
Swap Space (per machine)	3 times physical RAM
Browser	See the Rational Synergy Readme file for the current list of supported browsers.
Windowing System	X11R4 or better

Note An alternative to installing a UNIX client is to install a Windows client. See the *IBM Rational Synergy Installation Guide for Windows.*

Installation directories

This section describes the directories used to install Rational Synergy (that is, *ccm_home*, *informix_chunkfiles*, and *ccmdb*).

- *ccm_home*

    In this guide, the *ccm_home* variable represents the path to the Rational Synergy installation. The default installation directory is /user/local/ccm. The installation includes both Rational Synergy and Informix executables. The Informix executables are in the informix directory, under $CCM_HOME.

    Note This guide sometimes uses the $CCM_HOME variable to represent *ccm_home*.

    You must be able to write to *ccm_home* as user *root*. If the file system is on a local disk, you should be able to install the Rational Synergy software without changing your mount options.

    For more information, refer to "Installation machine requirements" on page 20, specifically for disk space requirements for this directory.

    Write your value for *ccm_home* in item 5 on the worksheet on page 14.

- *informix_chunkfiles*

    In this guide, the *informix_chunkfiles* variable represents the path to the Informix chunk files (dbspace) on the server.

    The chunk file directory must be on the Informix server and must be a local file system. Your chunk file paths must be fewer than 66 characters. Use raw disks for chunk files (for more information, see "Creating Informix chunk files" on page 53.

    Note You can use NFS file systems for databases and work areas, but not for chunk files. If you use NFS file systems for databases and work areas, NFS attribute caching must be turned OFF. For an explanation of the root access issues related to installing Rational Synergy, see "Installing onto a remote file system" on page 65.

    Write your value of *informix_chunkfiles* in item 7 on the worksheet on page 14.

- *ccmdb*

     In this guide, the *ccmdb* variable represents the path to the Rational
     Synergy database directory on the server. Individual databases reside in
     this directory.

     The databases in the *ccmdb* directory must be visible to all engine hosts
     that will access those databases and must, therefore, be either local or
     mounted across the network. The databases must also be visible (that is,
     use the same logical path) on machines running Rational Synergy
     processes.

     Note Separate programs and data as follows: Install Rational
     Synergy software into one directory, install the database
     server chunk files into a different directory, then create
     the Rational Synergy databases into another directory
     when you unpack a database.

     Write your value for *ccmdb* in item 8 on the worksheet on page 15.

Disk space requirements

The following table shows how to allocate disk space on your server.

The Informix server limits the size and offset of each chunk file to 2 GB. To work around this, break up your raw device into many partitions of 2 gigabytes.

Database Directories	Space Required
ccm_home (installation)	750 MB See "Installation machine requirements" on page 20.
informix_chunkfiles (data files) Be sure to allow for growth when you allocate disk space for this directory. This is where all metadata is stored. For more information, see "Create Informix Chunk Files" in the *IBM Rational Synergy Installation Guide for UNIX*.	40 users (default) 220 MB
ccmdb Starting size per database: 3 x the total size of all objects to be controlled. **Note** Be sure to allocate generous disk space for the *ccmdb* directory. This is where all controlled file content is stored and where the database typically grows the most. This space might grow much larger, depending on the number of versions maintained, particularly if the versions are binaries.	3 x _____ MB = _____ MB
Total Minimum Disk Space Needed (*ccm_home*+*informix_chunkfiles* + *ccmdb*)	_____ MB

Note On some UNIX systems, NFS caches are not updated even as a result of local activity. This can cause problems if you run an interface and engine on some UNIX systems with the

file system part of the Rational Synergy database NFS-mounted from another system. To solve this problem, mount the *ccmdb* database file system with NFS caching disabled.

Routing, services, hosts, passwords, and groups

The following table shows the routing, services, hosts, passwords, and groups files used to run Rational Synergy.

Purpose	Product	Using NIS	Not Using NIS
Services	Informix	master `services` file on the NIS server entries: `servername_serverhostname` for each dbserver	`/etc/services` on each dbserver and engine host using that dbserver entries: `servername_serverhostname` for each dbserver engine host
Routing	Rational Synergy	master `services` file on the NIS server for each network entry: `ccm7.1_router`	`/etc/services` on every Rational Synergy machine for each network entry: `ccm7.1_router`
Passwords	Rational Synergy	master `passwd` file on the NIS server	`/etc/passwd` (and `/etc/shadow`) file on each dbserver
Groups	Rational Synergy	master `group` file on the NIS server	`/etc/group` (and `/etc/shadow`) file on each dbserver

Purpose	Product	Using NIS	Not Using NIS
Hosts	Rational Synergy	master `hosts` file on the NIS or DNS server entries: the dbserver and each engine host	`/etc/hosts` on every machine running Rational Synergy entries: the dbserver and each engine host
		master `hosts.equiv` on the NIS server, or the *ccm_root* `.rhosts` file entries: dbserver and each engine host for users *ccm_root* and *informix*	`/etc/hosts.equiv` on each dbserver, or the *ccm_root* and *informix* `.rhosts` files entries: dbserver and each Informix engine host for users *ccm_root* and *informix*
	Informix	`ccm_home`/informix/etc/`sqlhosts` on the installation machine (For more information, see "ccm_home" on page 23.) entries: `servername` and `servername_net` for each dbserver host	same as using NIS
	DCM (and Rational Synergy `platform` attribute)	`ccm_home`/etc/om_hosts.cfg `ccm_home`/etc/remexec.cfg (For more information, see "Set Up for Remote Command Execution" in the *IBM Rational Synergy Administration Guide*.)	same as using NIS

Preparing the Rational Synergy installation machine

Use this information to prepare your Rational Synergy installation machine.

Setting up ccm_root and informix users and groups

User *ccm_root* and user *informix* are the two administrative users. User *ccm_root* owns most of the files and directories, and is the user with permissions to run the administrative commands for Rational Synergy. User *informix* is used by the Informix software to perform administrative tasks governing the database server activities. You must have these users and groups defined to install Rational Synergy.

Note If you are not using NIS, set up *ccm_root* and *informix* users and groups on each engine host, using the same numeric user and group IDs on every machine.

Place the `ccm_root` and `informix` home directories wherever appropriate for your site.

Note Do not install the software into the *ccm_root* home directory.

Perform the user and group setup as user *root*.

1. Create the *ccm_root* and *informix* users.

2. Create the *ccm_root* and *informix* groups.

   Make *ccm_root* a member of group *ccm_root*, and user *informix* a member of group *informix*. Group *informix* must be the primary group for the user *informix*.

   To the *ccm_root* group, add the names of any users who will have the *build_mgr* (build manager) role.

3. If you are running Rational Synergy on an Linux platform, link `/etc/logingroup` to the `/etc/group` file.

4. Create `ccm_root` and `informix` home directories. Write the value for `ccm_root_home` in item 3, and write the value of `informix_home` in item 4, on the worksheet on page 13.

   Note Be sure that the `informix_home` home directory is not the same as the `informix_chunkfiles` directory.

The following examples include `/users/ccm_root` and `/users/informix`:

```
root# mkdir /users/ccm_root
root# chown ccm_root /users/ccm_root
```

```
root# chgrp ccm_root /users/ccm_root
root# chmod 755 /users/ccm_root
root# mkdir /users/informix
root# chown informix /users/informix
root# chgrp informix /users/informix
root# chmod 755 /users/informix
```

Creating an installation directory

You must create an installation directory to install Rational Synergy. The installation directory path is *ccm_home*, as described in "ccm_home" on page 23.

The installation directory can be anywhere, and have any name. However, install each Rational Synergy release into a release-specific directory (such as `/usr/local/ccm71`), then link `/usr/local/ccm` to your current default release. This allows more than one installation of Rational Synergy on a machine, which may be necessary if you are upgrading to a new release.

For example, if you have a previous Rational Synergy installation in the `/usr/local/ccm71` directory, install the new version into `/usr/local/ccm71`, then link `/usr/local/ccm` to `/usr/local/ccm71`.

Note For more information about multiple installations, see "Creating multiple installations of Rational Synergy" on page 61.

Record the path to this directory in item 5 on the worksheet on page 14.

To create an installation directory, do the following:

1. Log on to the installation machine as user *root*.

2. Create the installation directory.

```
root# mkdir ccm_home
root# chown ccm_root ccm_home
root# chgrp ccm_root ccm_home
root# chmod 755 ccm_home
root# ln -s ccm_home /usr/local/ccm
```

Note The installation directory must be visible from the client machine, or a local client must be installed, as discussed in "Setting up a UNIX client" on page 68.

Setting up the router service

Rational Synergy requires a dedicated TCP port for its router service. To reserve this port, add a Rational Synergy router service entry to the `/etc/services` file or its NIS equivalent (for more information, see "Routing" in the table on page 27). You must edit the `services` file as user *root*.

The router service entry in the `/etc/services` file has the following syntax:

```
router_service router_port/tcp  # comment
```

The following is the optimal `/etc/services` router service entry:

```
ccm7.1_router    5412/tcp   # Rational Synergy router port
```

The first column is the service name, which should be `ccm7.1_router`. The second column starts with the port number, which can be any unallocated, unreserved port. On most systems, port numbers in the range of 0 to 1023 are reserved (privileged). If port 5412 is not in use, use it because it is reserved for Rational Synergy by the Internet Assigned Number Authority (IANA).

Write the following on the worksheet on page 13:

* Router service host name in item 9 (the default is your *system_name*)

* Unique router service name in item 10

* Unique router service port number in item 11

You will need this information during installation. If you do not have a dedicated port defined when you install Rational Synergy, the installation program will prompt you to choose one.

Note For heterogeneous installations, you need only one Rational Synergy router process if the *ccm_home*/etc directory is linked to a single location. Even so, you must have separate Rational Synergy router processes for separate releases and for separate networks. For more information, refer to "Creating multiple installations of Rational Synergy" on page 61.

You can also run the router on a Windows machine. For more information, see the *IBM Rational Synergy Installation Guide for Windows.*

Identifying the media drive

Determine the device name of the media drive on the installation machine, and enter the name in item 6 on the worksheet on page 14. You must know the drive location to install Rational Synergy.

Note On some systems, the media device may be mounted automatically when you insert the media. On such systems, you need not issue a mount command. However, you must know the directory in which the media is mounted (that is, `media`).

If you are downloading the software, see "Downloading the software" on page 37 for more information.

Preparing the database server

Use this information to prepare your Informix database server.

Note The server machine can be the same as the installation machine.

Checking the kernel parameters for Informix

For each database server, be sure that the shared memory and semaphore kernel parameters meet the current Rational Synergy requirements (see "Check shared memory and semaphore kernel parameters" on page 55 for the minimum parameter values). Consult your system administrator if you need help setting these values.

Adding Informix services

Before creating a database server, you must define the service of the database server in the /etc/services file or its NIS equivalent (for more information, see "Routing, services, hosts, passwords, and groups" in the table on page 27). You must edit the services file as user root.

The services entry for the database server has the following syntax:

```
servername_serverhostname informix_port/tcp  # comment
```

The first column is the Informix database server service name; write this name in item 17 on the worksheet on page 17. The second column starts with the informix service port number; write this number in item item 20 on the worksheet on page 18.

Allowing access by Windows clients (optional)

For Windows traditional mode clients to be able to connect to a UNIX database server without using ESD, you must verify that the rexec daemon is enabled in the inetd configuration file on each UNIX database server or engine machine that will be accessed by Windows clients. **The location of this configuration file may vary depending on the platform on which you are running**. If you are using Web mode or a secure engine connection with ESD, it does not matter whether the rexec daemon is enabled.

Installing the Rational license server

Rational Synergy uses the Rational License Server. The Rational License Server is a FLEXnet-based license server used to manage licenses. You must install the Rational License Server separately from the product installation process documented here in order to run Rational Synergy, even if you are not running other Rational products. Install the Rational License Server before you perform the Rational Synergy product installation.

For complete information about installing the license, see the *IBM Rational License Server TL Licensing Guide*. Download this document from the IBM Rational Software Information Center site at (`http://publib.boulder.ibm.com/infocenter/rsdp/v1r0m0/index.jsp`).

Installing the Rational Directory Server

You must install Rational Directory Server (RDS) to run Rational Synergy. RDS is a powerful solution for the centralized database that can be used by the enterprise to store and retrieve the large volume of data. RDS is a separate installation. For complete information on installing RDS, see the Rational Software Information Center at http://publib.boulder.ibm.com/infocenter/rsdp/v1r0m0/index.jsp.

Alternative installations

For information on setting up alternative installations, see "Appendix B: Alternative installations" on page 61.

5 *Installation*

This chapter explains how to install Rational Synergy on a UNIX platform.

Note To install Rational Synergy, you will need the "Rational Synergy installation worksheet" on page 13 that you completed during pre-installation.

Checklist

Use the following checklist, in the sequence shown, to install Rational Synergy:

- "Downloading the software" as described below
- "Installing the software" on page 38
- "Completing the installation" on page 40
- "Creating an Informix database server" on page 41
- "Starting the Rational Synergy daemons" on page 47

Downloading the software

Use the following procedure to extract and install download images from the Rational Synergy Web site.

1. Create a temporary directory on a file system with at least 750 MB of disk space; this is in addition to the space required for the installed software as documented in this guide.

   ```
   mkdir /tmp/synergy_image
   ```

2. On the Rational Synergy support site, find the Rational Synergy 7.1 downloads page (for support information, see "Contacting IBM Rational Software Support" on page 3). You will see a single file for each platform; each file is a gzipped tar archive of the Rational Synergy installation image for that platform. Download the file or files you need into your temporary directory.

   Extract the installation image:

   ```
   cd /tmp/synergy_image
   cat download.tar.gz | gzip -d | tar xf -
   ```

3. Proceed with the installation as directed in "Installing the software", as if the temporary directory was your DVD mount point. Add any other flags required by the installation or upgrade procedure you are following.

   ```
   /tmp/synergy_image/ccm/unix/bin/ccm_install -x -d
   ccm_home
   ```

4. After installation is complete, remove the temporary directory and its contents.

   ```
   rm -rf /tmp/synergy_image
   ```

Installing the software

Install the Rational Synergy software as follows:

Note If you are installing Rational Synergy on a non-local file system, read "Installing onto a remote file system" on page 65 before proceeding.

1. Log on to the installation machine as user *root*.

2. Mount the installation media. Your system may auto-mount the DVD, if not, use the appropriate mount command shown in the following table.

Platform	Command
Solaris	`mount -r -F hsfs /dev/sr0 /cdrom`
AIX	`mount /cdrom`
Linux	`mount /media/cdrom`

Note If your DVD is mounted automatically, you need to know the directory in which the media is mounted (that is, *media*, which is item 6 on the worksheet on page 14).

3. Run the installation program (`ccm_install`).

Note When running `ccm_install`, you must set the environment variable ccm_home. Set ccm_home to the path of the directory that is about to be installed if this is your primary installation.Otherwise, set ccm_home to the directory already installed for the current platform when installing secondary platform binaries into installation directories with the -p and -d options.

You must run `ccm_install` either on the same machine type as the binaries you are installing, or on a different machine type using the `-p[latform]` flag to designate the type of binary. If you are using the `-p` flag, you must use one of the arguments shown in the following table for the flag.

Platform	Attribute Value
Sun	`solaris`
AIX	`ibm` or `aix`
Linux	`linux`

The `ccm_install` program installs into either `$CCM_HOME` or the directory specified with the `-d` (destination directory) option. For more information about the `-d` option, see "Installing onto a remote file system" on page 65.

If you are using the Bourne shell, the commands for setting the environment variables and executing the install command are as follows:

```
root# CCM_HOME=ccm_home; export CCM_HOME
root# PATH=$CCM_HOME/bin:$PATH; export PATH
root# /media/ccm/unix/bin/ccm_install -x
```

Use the values for *ccm_home* and *media* that you entered in items 5 and 6 on the worksheet on page 14.

Note You will be prompted to accept the software license agreement. If you do not agree, the installation will be terminated. You must agree in order to complete the installation.

Caution You must set CCM_HOME to your Rational Synergy 7.1 installation directory. Do not leave CCM_HOME set to a previous 7.0 or 6.5 installation, or that installation might be overwritten by Rational Synergy 7.1.

The `ccm_install` program will prompt you for the router service host name, router service name, router service port number, ESD (engine startup daemon) port number, CCM server port number, license server host name, license server port number, and Rational Directory Server port number. To answer these prompts, refer to items 9 to 16 on the worksheet on page 15.

Completing the installation

After you successfully run the `ccm_install` program, the following message displays:

```
ccm_install: Rational Synergy installation succeeded
```

Do the following, in the sequence shown, to complete the installation:

- "Setting up the Rational Synergy environment" described below
- "Setting up for remote engine hosts (optional)" on page 44

Setting up the Rational Synergy environment

To set up the Rational Synergy environment for X applications, `CCM_HOME`, and `PATH`, do the following:

1. Copy the X application defaults file for Rational Synergy to the `app-defaults` directory on all machines that run clients (interface processes).

   All Sun Solaris platforms using Open Windows:

   ```
   root# cp $CCM_HOME/etc/Ccm /usr/openwin/lib/app-defaults
   ```

   All other platforms including Sun Solaris using CDE:

   ```
   root# cp $CCM_HOME/etc/Ccm /usr/lib/X11/app-defaults
   ```

   If your environment is mixed, copy the file for both the OpenWindows and the non-OpenWindows platforms.

2. **On Sun OpenWindows only,** check to see if the X11 translation table is already installed. If it is not, copy the X11 translation table.

   ```
   root# cp $CCM_HOME/etc/XKeysymDB /usr/openwin/lib
   ```

3. Set *ccm_root* and *informix* environment variables.

   Some Rational Synergy commands require the `tsort` command in the path. Check your installation to see if you need to modify the path to include `tsort`. For example, on Solaris `tsort` is in /usr/ccs/bin.

   a. Set the command path for user *ccm_root*.

   ```
   $ su - ccm_root
   Password: *****
   $ vi .profile
   ```

   If the `.profile` file is not the correct file for your shell, edit the correct file (for example, `.cshrc or .login`).

   Add the following lines, then exit from user *ccm_root*.

```
CCM_HOME=ccm_home; export CCM_HOME
PATH=$CCM_HOME/bin:$PATH:/usr/ccs/bin; export PATH
exit
```

b. Set the command path for user *informix*.

```
$ su - informix
Password:*****
$ vi .profile
```

If the `.profile` file is not the correct file for your shell, edit the correct file.

Add the following lines, then exit from user *informix*.

```
CCM_HOME=ccm_home; export CCM_HOME
PATH=$CCM_HOME/bin:$CCM_HOME/informix/bin:$PATH:/usr/ccs/bin
export PATH
$ exit
```

Creating an Informix database server

Create at least one Informix database server.

You can create a database server on the installation machine or on a remote host. Installers often create a database server on the installation machine; however, you are not required to do so. You can make any host a database server if the machine meets the system requirements and a valid installation directory for that platform is visible (for example, local or NFS-mounted).

For example, if the installation directory for Solaris is `/usr/local/ccm71` on the *solaris1* machine and you want to create a database server on *solaris2*, you can NFS-mount the installation directory on *solaris2*, then create a database server on *solaris2*. Creating the database server automatically adds an entry for *solaris2* to the `sqlhosts` file in the `$CCM_HOME/informix/etc` directory.

You can also have a database server run server processes for a different type of platform. For more information, see "Adding machines and protocols to the sqlhosts files" on page 57.

Note If you create the database server on a different machine than the installation machine, be sure that the database server is correctly configured. For more information, see "Routing, services, hosts, passwords, and groups" on page 27.

1. Log on to the database server machine as user *root*.

If your database server machine is the same as your installation machine, you are already logged on as *root*.

2. If your database server machine is not the same as your install machine, you must run `ccm install -l`.

3. Create a directory for the Informix dbspace (`chunk files`). See item 7 on the worksheet on page 14.

When you create chunk files, keep the following in mind:

- The Informix server limits the size and offset of each chunk file to 2 GB. To work around this, break up your raw device into many partitions of 2 gigabytes.
- Place the chunk files where no one will remove them. If chunk files are moved, the database server will no longer work, and it might lose data.
- Create the chunk file directory (for example, `/data/informix_chunkfiles`) on the machine where the Informix server will run. Chunk files must not be on network file systems.
- For the best performance and reliability, use raw partitions for Informix chunk files. (See "Raw Partitions" in the *IBM Rational Synergy Administration Guide for UNIX*.) In the event of file system corruption, cooked files are affected but raw files are not.
- The names of your chunk files' paths must be fewer than 66 characters.

Caution Do not put the Informix chunk files directory under the installation directory (that is, *ccm_home*), or under the *ccm_root* or *informix* home directory, because these Informix data files should not be backed up as normal UNIX files.

For more information about creating chunk files, see "Create Informix Chunk Files" in the *IBM Rational Synergy Administration Guide for UNIX*.

```
root# mkdir informix_chunkfiles
root# chown informix informix_chunkfiles
root# chgrp informix informix_chunkfiles
root# chmod 770 informix_chunkfiles
```

4. Create a directory for the Rational Synergy databases (for example, `/data/ccmdb`). See item 8 on the worksheet on page 15.

Caution To avoid losing files when you upgrade, do not put the
database directory under the installation directory.

```
root# mkdir ccmdb
root# chown ccm_root ccmdb
root# chgrp ccm_root ccmdb
root# chmod 755 ccmdb
```

5. Create the database server.

    If you have already planned specific partitions and sizes, use these paths and
    sizes to respond to the prompts. For more information, see the *IBM Rational
    Synergy Administration Guide for UNIX*.

    If you have not planned specific partitions and sizes, use the directory
    created in step 3 on page 42 (*informix_chunkfiles*) when prompted
    for the primary chunk path for the `root` dbspace. Use the defaults for
    everything else except the number of users; set this to the expected number
    of simultaneous users of all databases on this server, rounded up to the
    nearest 10. Typically, the minimum space required is as follows:

    *   `log` and `temp` dbspaces are each approximately 1.0 MB per user.
    *   `root` dbspace must be at least 60 MB.
    *   `ccm` dbspace is approximately 2 MB per user.

    For the default of 40 users, the total is approximately 220 MB. This is only a
    rough estimate for the initial database chunk. In general, generously allocate
    dbspace to allow for future growth. For more information about allocating
    disk space, see "Disk space requirements" on page 25, and "Creating
    Informix chunk files" on page 53.

    The directory holding chunk files must be owned by *informix*, group *informix*,
    and mode `770`. For more information, see "Creating Informix chunk files"
    on page 53.

    When prompted, enter the values for your number of CPUs, number of
    users, and server number (item 21 on the worksheet on page 18).

> **Note** If you have other Informix installations, either active or inactive, the default server number that `ccmsrv create` attempts to use might already be in use and an error like the following will appear in the log file:

```
11:13:05  shmget: [EEXIST][17]: key 52574801: shared
memory already exists
11:13:05  mt_shm_init: can't create resident segment
```

Correct this problem by using a different server number (item 21 on the worksheet on page 18).

If you need to increase the size of your shared memory kernel parameters, you might also see an error like the following in the log file:

```
16:53:12  shmat: [EMFILE][24]: out of shared memory
segments, check system SHMSEG
16:53:12  mt_shm_init: can't create resident segment
```

To learn more about shared memory kernel parameter values, see "Check shared memory and semaphore kernel parameters" on page 55.

Answer "Y" when you are prompted to create the database server. Use the UNIX commands appropriate for your shell.

> **Note** If you have set up raw partitions, you will be prompted for a raw partition path when you execute the `ccmsrv create` command. In such cases, type the path to the device file for that partition. Be sure to reference the correct partition and offset.

```
root# su - informix
Password:*****
$ CCM_HOME=ccm_home; export CCM_HOME
$ PATH=$CCM_HOME/bin:$PATH; export PATH
$ ccmsrv create -s servername
$ exit
```

where:

servername is item 17 on the worksheet on page 17. If you leave out the server name option, the server name will be the same as the host name.

Setting up for remote engine hosts (optional)

If you are running Rational Synergy engines and the database server on the same machine, you do not need to set up remote engine hosts. However, if you plan to

run engine processes on machines other than the database server, you must define the engine hosts in the following network system files:

- `hosts` (or DNS)

- `hosts.equiv` (or `.rhosts`)

Ensure that your host IP addresses are unique and consistent, and be sure to check access to each host. Additionally, you must run `ccm_install -l` on the engine hosts.

If you do not intend to use the Engine Startup Daemon (ESD) for traditional mode sessions, you must enable the `rsh` and `rexec` daemons by editing the appropriate `inetd` or `xinetd.d` files. On some systems these daemons are disabled by default. For Web mode sessions, ESD, `rsh`, or `rexec` daemons are not needed.

For VPN clients, you must add the VPN IP address to `/etc/hosts` or the DNS equivalent. You can give the VPN IP address any name as long as it has a name. An example of the type of entry you can make in your `hosts` file is:

```
192.168.45.10 vpnclient1
192.168.45.11 vpnclient2
192.168.45.12 vpnclient3
```

Alternatively, instruct your DNS server to construct host names spontaneously for reverse lookups of IP addresses in the subnet used for your VPN.

By default, Linux does not interpret the plus sign (+) in either the `.rhosts` file or the `/etc/hosts.equiv` file. If you need to allow the use of +, you must add the argument `promiscuous` at the end of the `.rhosts` auth line in `/etc/pam.d/rsh`.

For Linux users, you must also set permissions in the `/etc/hosts.allow` file. Using the setting `ALL:ALL`, which allows any client to use any service, is optimal. However, this setting might raise network security concerns.

For more information, see "Set Up for Remote Command Execution" in the *IBM Rational Synergy Administration Guide for UNIX*.

> **Note** You must run the object registrar on your Informix database server if the database server and installation machines are not the same. Also, if the database server is not the same as the installation machine, you must run `ccm_install -l` on the engine hosts.
>
> For more information, see the `ccm_objreg` command in the *IBM Rational Synergy Administration Guide for UNIX*.

Note You must run `ccm_server` on each machine on which
you intend to run Web mode sessions.

Starting the Rational Synergy daemons

The Rational Synergy daemons must be running before you can start a Rational Synergy session. The `ccm_start_daemons` command starts all daemons on the same machine.

Note If you do not want to run all daemons on one machine, or if you want to run additional daemons on other machines, see the *IBM Rational Synergy Administration Guide for UNIX*.

Also, you will need to start these daemons and the primary CCM server each time the server machine is rebooted. For your convenience, create boot scripts for this purpose, as described in the *IBM Rational Synergy Administration Guide for UNIX*.

Note You must run CCM server on each machine supporing a Web mode session.

1. Set user to *ccm_root*.

   ```
   $ su - ccm_root
   Password: *****
   $ CCM_HOME=ccm_home; export CCM_HOME
   $ PATH=$CCM_HOME/bin:$PATH; export PATH
   ```

2. Start the daemons.

   ```
   $ ccm_start_daemons
   ```

   If all the daemons do not start, use the `ccm_stop_daemons` command to stop all daemons before attempting to start them again.

3. Exit from user *ccm_root*.

   ```
   $ exit
   ```

   Note You must run the object registrar on your Informix database server if the database server and installation machines are not the same. Also, if the database server is not the same as the installation machine, you must run `ccm_install -l` on the engine hosts.

   For more information, see the `ccm_objreg` command in the *IBM Rational Synergy Administration Guide for UNIX*.

6 *Post-installation*

This section explains how to verify correct installation by unpacking a test database into the directory and setting up for Rational Synergy databases (`ccmdb`) on the database server. If any of the steps in this section fail, contact Rational technical support as explained in "Contacting IBM Rational Software Support" on page 3.

The ability to perform Web-based installations for Windows clients running on UNIX servers is also described. See "Downloading Windows client installations" on page 52.

Checklist

Use the following checklist, in the sequence shown, to verify your Rational Synergy installation:

- "Configuring for remote processes (optional)" described below
- "Unpacking a test database" described below
- "Starting a Rational Synergy session" on page 51

Configuring for remote processes (optional)

To use Rational Synergy Distributed (also referred to as DCM), you must set up hosts for distributed builds and DCM. For more information, see "Set Up for Remote Command Execution" in the *IBM Rational Synergy Administration Guide for UNIX*.

Unpacking a test database

Unpack a database from the installation directory, `$CCM_HOME/packfiles`.

For example, on the database server machine, unpack a base model database (`base.cpk`) to a new database, `/data/ccmdb/testdb`.

Note If you are not using the default server name, you must use the `-s servername` option on the `ccmdb unpack` command.

1. Log in as *ccm_root* and set the environment variables.

```
$ su - ccm_root
Password: *****
$ CCM_HOME=ccm_home; export CCM_HOME
$ PATH=$CCM_HOME/bin:$PATH; export PATH
```

2. Unpack the database.

```
$ ccmdb unpack $CCM_HOME/packfiles/base.cpk -t /data/ccmdb/
testdb
```

Note For more information about the `ccmdb unpack` command and database naming conventions, see the *IBM Rational Synergy Administration Guide for UNIX*.

Starting a Rational Synergy session

To verify that the server is online and that all Rational Synergy daemons are running, start a Rational Synergy session.

For example, to start a session on the `/data/ccmdb/testdb` database, do the following:

1. Start a Web mode session.

```
$ cmsynergy -d/data/ccmdb/testdb -s server_url
```

2. Start a traditional mode session.

```
$ cmsynergy -d/data/ccmdb/testdb -h engine_host
```

Note If you are prompted to enter a password, you are starting a secure client session. You must enter your password to continue.

3. Monitor the Rational Synergy daemons.

```
$ ccm monitor
```

If the daemons are running and the session starts, you have successfully completed the Rational Synergy installation.

4. Exit both session.

Downloading Windows client installations

You can now provide a Web-based Windows client installation program for the Windows Client. You must provide a URL that identifies the Rational Synergy CCM Server, as this is where the installation is served. The URL has the format: `http://ccm_server_host:ccm_server_port/install.html`, where

> `primary_ccm_server`   is the hostname of the server where the
>   server is installed, and
>   `primary_ccm_port` is the port number of the server.

These are items 13 and 14 in your installation worksheet on page 16.

The CM administrator must provide the URL to users who will be performing the Client installation via download.

Guidelines for the Web-based installation process

In order for Windows users to successfully complete the installation process, users must provide the information requested. The CM administrator should send mail to all Windows users providing all the necessary information the users need to complete the installation. The user will see the client installation wizard, so the following information will be requested:

- Router host name

- Router port number

- Host name of the main Windows server

- UNIX server installation path

When the user starts any client on UNIX, the user may be notified that an update to the product is required. The client cannot continue, and the update must be installed manually, as the downloadable is not available on UNIX platforms. To start Web mode sessions, you need to know the URL of the CCM server.

Appendix A: Informix setup and tuning

This appendix discusses two important Informix topics: setup and tuning.

- Setup is discussed in the section, "Preparing UNIX database servers" on page 53.

- Tuning is discussed in the section, "Informix tuning guidelines" on page 58.

Preparing UNIX database servers

Use this information to prepare UNIX database servers for Informix Dynamic Server.

Creating Informix chunk files

Informix chunk files can be cooked files or raw partitions. For better performance and reliability on production databases, use raw disk partitions.

Only an experienced system administrator should create chunk files.

Caution Do not create chunk files on an NFS-mounted partition.

The default space required for the **root**, **temp**, and **log** dbspaces is about 1 MB per user; for the **root** dbspace it is at least 60 MB, for the **ccm** dbspace it is about 2 MB per user. For the default 40 users, the total is about 220 MB. This is only a rough estimate for the initial database chunk. Allocate dbspace generously to allow for future growth.

Cooked files

No action is necessary on your part to use cooked files (i.e., set up a file system).

Use the estimates shown below to allocate disk space for cooked chunk files.

> 40 users (default)   220 MB

Raw partitions

This section summarizes how to set up a raw partition on a new, blank disk that has been formatted already. (New disks typically are formatted by their manufacturers.)

1. Partition the disk into the sizes of your choice.

2. Create a symbolic link to the raw device; i.e., make *chunk_name* a symbolic link to the raw device.

```
root# ln -s raw_device_path chunk_name
```

This step is optional> if you perform it, use a symbolic link to the device for the following reasons.

If you will be archiving Informix servers using **ccmsrv archive**, and restoring the servers using **ccmsrv restore**, the restored Informix server configuration must be nearly identical to the archived server's configuration. This means that you must restore to the same chunk file path used to archive the server. Using a symbolic link for the chunk file path is a reliable way to ensure that the archive and restore paths are identical.

Using a symbolic link also facilitates changing the chunk file to a different (but at least same size) partition, or to a larger partition.

Additionally, using symbolic links means you won't have problems if the raw partition name changes, for example, if you upgrade the operating system.

3. Change the ownership, group, and permission of the raw partition path.

```
root# chown informix chunk_name

root# chgrp informix chunk_name

root# chmod 660 chunk_name
```

4. When **ccmsrv create** prompts for a raw partition name, type the path to the symbolic link for that partition.

Be sure to reference the correct partition.

```
chunk_name
```

5. Repeat steps 2-4 for `root`, `temp`, `log`, and `ccm`.

For more information about how to partition a raw disk, see the documentation for your operating system.

Check shared memory and semaphore kernel parameters

Rational requires that the shared memory and semaphore kernel parameters on the database server have at least the minimum values shown, and you might need to increase them if there will be more than 20 users per database server. The values shown are those used by Informix for testing the port to each platform.

Because the optimal values depend on your hardware, network configuration, software, and workload, ask your system administrator for assistance.

Note The `ipcs` command displays the current shared memory that is in use. This command can help you debug shared memory problems.

If you are adding many more users to a database or creating a new server, you might need to increase the shared memory and semaphore kernel parameter values.

Caution Before changing the kernel parameters, be sure to perform a complete backup of the system (e.g., save a copy of the kernel).

Solaris 10

On Solaris 10, all System V inter-process communication (IPC) facilities are either automatically configured or can be controlled by resource controls. The following kernel parameters are either removed or commented out from /etc/system:

```
semsys:seminfo_semmap
semsys:seminfo_semmns
semsys:seminfo_semmnu
semsys:seminfo_semume
shmsys:shminfo_shmmin
shmsys:shminfo_shmseg
```

The following obsolete IPC tunables are replaced by their resource controls with the new default values:

```
semsys:seminfo_semmsl
semsys:seminfo_semmni
shmsys:shminfo_shmmax
shmsys:shminfo_shmmni
```

The default value for the resource control names related to above four IPC tunables on Solaris 10 are:

```
process.max-sem-nsems512
project.max-sem-ids 128
project.max-shm-memory1/4 of physical memory
```

```
project.max-shm-ids128
```

The `project.max-shm-memory` resource control limits the total amount of shared memory of one project, whereas previously, the `shmsys:shminfo_shmmax` parameter limited the size of a single, shared memory segment.

On systems that have zones enabled, zone-wide resource controls are specified in the zone configuration. Refer to the `rctladm(1m)` man page for more information about available resource controls.

If you have problems creating and starting multiple Informix servers on the same Solaris 10 host, and are getting share memory create errors, then it may be necessary to adjust the default project value of the `project.max-shm-memory` kernel parameter.

Examples:

To display the current value of the `project.max-shm-memory` set to the project and system wide, enter the following:

```
# prctl -n project.max-shm-memory -i project default
```

Note IDS is running under the default project.

To display the values of all the resource controls for a specific IDS process, enter the following:

```
# prctl <oninit pid>
```

To change the setting for `project.max-shm-memory` to 64 GB for the project default without a system reboot, enter the following:

```
# prctl -n project.max-shm-memory -r -v 64gb -i project default
```

As an alternative to the examples above, use the `projmod` command to modify the attribute value for `project.max-shm-memory` in `/etc/project` which is a local source of project information file:

```
# projmod -a -K 'project.max-shm-memory=(priv,64GB,deny)'
default
```

RedHat Enterprise Linux 4.0

```
SHMMAX: 33554432
SHMMIN: 1
SHMMNI: 128
SHMSEG: 128
SHMALL: 4194304
SEMMNI: 128
SEMMSL: 250
SEMMNS: 32000
```

```
SEMOPM: 32
```

The value of the kernel parameter `SEMMSL` should be set to at least 100. This is the maximum number of semaphores per set.

Adding machines and protocols to the sqlhosts files

To support both local and remote access to the database server, the `ccmsrv create` command creates the following two database server entries in the `$CCM_HOME/informix/etc/sqlhosts` file:

dbservername   nettype hostname dbservername

dbservername_net nettype hostname servicename

The first type of entry is for a local connection (e.g., a local connection for an engine and a database server in the same machine). The second type of entry is for a remote (_net) connection through sockets using TCP/IP (e.g., for a network connection to an engine on a remote machine).

For example, *marathon* is connected as `marathon` using a shared memory protocol (`onipcshm`), and as *marathon_net* using a Solaris TCP protocol (`ontlitcp`):

```
marathon        onipcshm marathon marathon
marathon_net    ontlitcp marathon marathon_marathon
```

The fourth column contains the database server name for local connections, and the service name (as defined in the `services` file) for network connections.

The following table shows the protocols (*nettypes*) for the supported Rational Synergy platforms.

Platform	Local	Remote (Sockets)
Solaris	`onipcshm`	`ontlitcp`
AIX	`onipcshm`	`onsoctcp`
Linux	`onipcshm`	`onsoctcp`

For AIX and Linux, heterogeneous UNIX installations should share a single copy of the *$CCM_HOME*/informix/etc directory, and therefore a single copy of the *$CCM_HOME*/informix/etc/sqlhosts file. This means that entries added to `sqlhosts` by `ccmsrv create` are visible to all UNIX platforms.

If you did not link the *$CCM_HOME*/`informix/etc` directories, after creating a server on one platform you must copy the entries from the `sqlhosts` file for that platform to the `sqlhosts` files for your other platforms.

In the case of Solaris, the network protocol supported by Informix is different from the AIX or Linux platforms: the `sqlhosts` file for Solaris must be different, and you must add entries manually to the `sqlhosts` files after creating a server if you want that server to be accessible from other platforms.

If you want to access this server from a Solaris platform, which cannot share the `sqlhosts` file, you must add an entry such as the following to the Solaris `sqlhosts` file:

```
mobysrv_net      ontlitcp      moby      mobysrv_moby
```

Similarly, after creating a server on a Solaris machine **stellar**, you would have two entries such as the following in the Solaris `sqlhosts` file:

```
stellarsrv      onipcshm      stellar      stellarsrv
stellarsrv_net ontlitcp      stellar      stellarsrv_stellar
```

To access the `stellarsrv` server from AIX or Linux systems, you must copy the following line to the `sqlhosts` file on each of those other platforms:

```
stellarsrv_net onsoctcp      stellar      stellarsrv_stellar
```

Informix tuning guidelines

This section describes proper configuration and maintenance for the Informix database.

Partitions

For best results:

• Always use raw partitions instead of cooked partitions.

• Create four (4) raw partitions on separate physical disk drives for optimal performance from your UNIX server.

• Place each chunk file (**ccm**, **log**, **rootdbs**, **tempdbs**) on a separate drive.

Dedicated Informix server

For better performance, dedicate your Rational Synergy database server machine to run Rational Synergy. If you have a dedicated Rational Synergy database server machine, make the following change to the RESIDENT parameter in the Informix ONCONFIG file:

```
RESIDENT = 1
```

The default setting is `0`. This parameter specifies whether shared memory remains in operating-system physical memory. If the default setting remains, shared memory will be swapped to disk, which might slow Rational Synergy server performance for large sites and at various usage times.

For more information on the Informix `ONCONFIG` file, see the appropriate Informix administrator's document.

AIX

You can allow a database server to run server processes for a different type of platform. For example, if you want an AIX database server, `aix1`, to be available as a database server for Solaris 10 machines, you can add the `aix1` entry manually to the Solaris 10 installation directory's `sqlhosts` file. For more information, see the *IBM Rational Synergy Administration Guide for UNIX*.

Appendix B: Alternative installations

If required, you can set up alternative installations as described in the following sections:

- "Creating multiple installations of Rational Synergy" described below
- "Running Rational Synergy processes across a network" on page 66
- "Installing onto a remote file system" on page 65
- "Installing onto a machine running Informix" on page 66
- "Setting up a UNIX client" on page 68
- "ESD authentication through PAM" on page 71

Creating multiple installations of Rational Synergy

Rational Synergy supports multiple simultaneous installations of the Rational Synergy software. Multiple installations let you use more than one release of Rational Synergy on the same platform, or run binary-incompatible versions on a network of Rational Synergy-supported machines. For example, you might have a network with both Linux and Solaris machines.

If you are installing onto a heterogeneous network, perform the following consistency checks:

- Ensure that user IDs are consistent throughout the network (with or without NIS).
- Verify that group IDs are consistent throughout the network (with or without NIS).
- Ensure that host names are consistent throughout the network.

Choose a machine for the primary installation. (Installations for all other platforms are considered secondary installations.) The *file server* machine is where the installed Rational Synergy files physically reside. To avoid problems writing these files to the installation directory as *root*, use the same machine for the primary installation machine and the file server, and perform the installation on that machine. Symbolically link `/usr/local/ccm` to the installation directory. This makes it easy to upgrade to a new release by re-linking `ccm`.

In the examples used in this appendix, note the following:

1. A Solaris platform is the primary installation machine.

2. The primary machine is the file server for all (primary and secondary) installations.

3. The machines are assumed to have NFS access to each other.

    Note The installation requires that *root* be able to write to the installation directory. If you are installing onto a remote file system, see "Installing onto a remote file system" on page 65.

Installing onto the primary machine

You must first install onto the primary machine because its installed binaries are used to execute the `ccm_install` command when you create installation areas on other machines.

Follow the steps in "Installing the software" on page 38 to set up the primary installation. Be sure that the `CCM_HOME` directory points to a symbolic link and that the symbolic link (or mount point and its contents) is accessible throughout the network.

You can set up the primary installation much like a normal Rational Synergy installation. However, you may want to choose an installation directory that is named according to the platform.

For example, on a Solaris platform, enter the following commands to use the `/vol/sun/ccm71` directory for the primary installation.

```
root@sol# mkdir /vol/sun/ccm71
root@sol# cd /usr/local
root@sol# ln -s /vol/sun/ccm71 ccm71
root@sol# CCM_HOME=/usr/local/ccm71; export CCM_HOME
root@sol# PATH=$CCM_HOME/bin:$PATH; export PATH
root@sol# cd ccm71
root@sol# /media/ccm/unix/bin/ccm_install -x
```

media is item 6 of the worksheet on page 14.

Installing multiple releases onto the primary machine

You can install multiple releases onto the primary machine using the same procedure for installing on the primary machine for the first time. Select a different installation directory (*ccm_home*), and different port numbers for the router, ESD, CCM server, and Informix database server.

Follow the installation instructions (see "Installing the software" on page 38) for each new Rational Synergy installation directory. The new installation will then have its own $CCM_HOME directory.

For example, suppose the primary installation is ccm71 on a Solaris platform and you want to install a test release onto /vol/sun/ccmtest on the same platform. The commands are as follows:

```
root@sol# mkdir /vol/sun/ccmtest
root@sol# cd /usr/local
root@sol# ln -s /vol/sun/ccmtest ccmtest
root@sol# CCM_HOME=/usr/local/ccmtest; export CCM_HOME
root@sol# PATH=$CCM_HOME/bin:$PATH; export PATH
root@sol# cd ccmtest
root@sol# /media/ccm/unix/bin/ccm_install -x
```

media is item 6 of the worksheet on page 14.

Users can then set CCM_HOME to /usr/local/ccm71 for the primary installation, or set CCM_HOME to /usr/local/ccmtest for the test installation.

For example, to run using the primary installation, set user to *ccm_root* and execute the following commands:

```
$ su - ccm_root
Password: *****
$ CCM_HOME=/usr/local/ccm71; export CCM_HOME
$ PATH=$CCM_HOME/bin:$PATH; export PATH
```

To run using the secondary installation, set user to *ccm_root* and execute the following commands:

```
$ su - ccm_root
Password: *****
$ CCM_HOME=/usr/local/ccmtest; export CCM_HOME
$ PATH=$CCM_HOME/bin:$PATH; export PATH
```

Installing binary-incompatible versions onto the primary machine

You can install a binary-incompatible version onto the primary machine using the same procedure for installing on the primary machine for the first time, but specifying the new platform type.

Follow the installation instructions (see "Installing the software" on page 38) for each new Rational Synergy installation directory. Select a different installation directory (*ccm_home*), but use the **same** port numbers for the router, ESD, CCM server, and Informix database server as you used for the primary installation.

For example, suppose the primary installation is `ccm71` on a Solaris file server and you want to install a Linux version onto `/vol/linux/ccm71` on the same machine. The steps are as follows:

1. Create the secondary, binary-incompatible installation.

   ```
   root@sol# mkdir /vol/linux/ccm71
   root@sol# CCM_HOME=/usr/local/ccm71; export CCM_HOME
   root@sol# PATH=$CCM_HOME/bin:$PATH; export PATH
   root@sol# cd /vol/linux/ccm71
   root@sol# /media/ccm/unix/bin/ccm_install -x -d /vol/linux/ccm71
   -p linux
   ```

   media is item 6 of the worksheet on page 14.

   `CCM_HOME` and `PATH` must point to the installation executables on the local machine, **not** to the destination directory for the new Linux installation. The Linux installation destination is specified using the `-d` option, and the new installation type is specified using the `-p` option.

   Note When you perform a secondary installation, you receive a message about library links. This message reminds you to log on to the secondary platform and run the `ccm_install -l` command after you successfully execute the `ccm_install -x` command on the primary platform.

2. Set up mounts and links so that users access the correct installation for their platforms.

   Set up all machines of the **same platform** so that the `cd /usr/local/ccm71` command will take users to the appropriate directory (for example, `/vol/sun/ccm71` or `/vol/linux/ccm71`).

3. Share the primary installation configuration files among all platforms.

Create a symbolic link for Rational Synergy configuration files from the secondary installation to the primary platform.

```
root@sol# cd /vol/linux/ccm71
root@sol# mv etc etc_linux
root@sol# ln -s /vol/sun/ccm71/etc etc
```

4. Set up the secondary machine.

    a. Log on to the secondary machine (for example, Linux) as *root*.

    b. Set up the environment.

```
# CCM_HOME=/usr/local/ccm71; export CCM_HOME
# PATH=$CCM_HOME/bin:$PATH; export PATH
# ccm_install -l
```

    c. If necessary, create a database server, set up engines hosts, and start daemons. For more information, see "Running Rational Synergy processes across a network" on page 66.

    Note If you have trouble starting Rational Synergy after a heterogeneous installation, check that the path of `local.ccm.home` is correct in the `$CCM_HOME/etc/ccm.server.properties` file. It may need to be reset to point to the correct directory structure, as it may be using an incorrect path.

Installing onto a remote file system

To install onto a remote file system, you need to be logged on as user *root* and be able to write to the installation directory. If *root* access is **not** allowed, then either run the `ccm_install` program on the NFS server, or temporarily allow *root* access across NFS.

Running Rational Synergy processes across a network

To run Rational Synergy processes across network installations, all machines share one set of Rational Synergy daemons. However, you might want to run your daemons on different machines, and these machines need not be the same platform. For example, you could manage your databases using a Sun server, but run the Rational Synergy software on a Linux workstation.

The following sections describe where you can run Rational Synergy daemons when you have multiple installations.

Rational Synergy daemon processes

- Router

  You must run one router process for the network Rational Synergy installation. You can run this process on any machine where Rational Synergy is installed. You must choose this machine during the primary installation.

- Object Registrar

  You can run multiple object registrars per CCM_HOME location. The object registrar typically runs on each machine that has an Informix server.

- Engine Startup Daemon

  You must run one ESD process on any machine where you will run Rational Synergy engines with secure connections.

- Rational Synergy primary Server

  You must run one primary server for the network Rational Synergy installation. By default, the primary server runs on the same machine as the router. You may run additional CCM servers on other machines. Typically, you would run one CCM server on each database server.

Rational Synergy databases

You can create Rational Synergy databases on any database server.

Installing onto a machine running Informix

When you install Rational Synergy on a machine running Informix (regardless of the software versions it supports, and whether Informix is running for earlier releases of Rational Synergy or for third-party software), you must use the following guidelines to avoid potential problems:

- When running Rational Synergy, ensure that no one, including regular users such as user *joe*, user *john*, and so on) and administrative users (that is, users *ccm_root*, *informix*, and *root*), sets the ONCONFIG, INFORMIXDIR, and INFORMIXSERVER environment variables. Setting these variables can cause commands to be run on the wrong servers.

- User *informix* and group *informix* can be shared among multiple installations of Informix; you need not change any user or group settings.

- Ensure that each server name, on a given machine, is unique.

    Note If the Rational Synergy Informix server does not use the default server name, you must use the -s option and appropriate *servername* whenever you use the ccmsrv and ccmdb commands.

- Verify that the SERVERNUM configuration parameter is unique among all Informix database servers on the same machine. SERVERNUM must be unique on the machine. Otherwise, the servers will interfere with each other.

- Ensure that the SERVERNUM configuration parameter for all existing Informix database servers has a value from 1 to 255, inclusive. (The valid numbers are from 0 to 255; 0 is the default. However, you should only use values from 1 to 255 because 0 does not allow multiple servers to co-exist.)

    Perform the following steps to check the server number for a database server:

    1. Set user to *informix*.

        ```
        $ su - informix
        ```

    2. Set the environment variables.

        ```
        $ CCM_HOME=ccm_home; export CCM_HOME
        $ PATH=$CCM_HOME/bin:$PATH; export PATH
        ```

    3. Edit a file that resides under the $INFORMIXDIR/etc subdirectory (for Rational Synergy, this subdirectory is $CCM_HOME/informix/etc).

        The file name is the same as the server name in Rational Synergy, but might be different if it was not created by Rational Synergy. A typical name is onconfig. Search this file for SERVERNUM to see its value.

Setting up a UNIX client

You can install Rational Synergy onto a UNIX client regardless of whether NFS is used. The following paragraphs explain what you need to do to set up each of these installations.

On UNIX, you need only one installation of Rational Synergy. However, all UNIX clients must be able to access the installation directory.

Setting up a UNIX client that uses NFS

To set up a client that uses NFS, do the following:

1. If you have multiple installations, or if you do not have any installation below or linked from /usr/local/ccm, set CCM_HOME and PATH. Otherwise, skip this step.

   ```
   $ CCM_HOME=ccm_home
   $ PATH=$CCM_HOME/bin:$PATH
   $ export CCM_HOME PATH
   ```

   ccm_home is the directory into which Rational Synergy is installed.

2. Be sure that the following requirements are met:

   • For traditional mode sessions, you must enable either rsh or ESD on the server to allow remote UNIX clients.

   If ESD is not in use, engine hosts must trust the users and machines. To enable this, configure your .rhosts or hosts.equiv file accordingly. (Both files are discussed in the *IBM Rational Synergy Administration Guide*.)

   • For traditional mode sessions, you must enable either rexec or ESD on the server for Windows clients.

   • The database server must trust *ccm_root* on the engine machines.

   To enable this, configure the *ccm_root* .rhosts or hosts.equiv file accordingly. (Both files are discussed in the *IBM Rational Synergy Administration Guide*.)

   • The client must be able to resolve the name or IP address of the server.

   • On the client, the *ccm_root* user ID (UID) and group ID (GID) must match the server.

   • The router service must be listed in the /etc/services directory on the client.

   For more information, contact your system administrator.

   • $CCM_HOME must be the same on the client and server.

Do this by mounting the installation on the server so it appears on the client in the same path.

- The `$CCM_HOME/etc/.router.adr` file must point to the correct location. Typically, the router is running on the server.

3. Start a Rational Synergy session.

```
$ ccm start -d ccmdb
```

ccmdb is the path to the Rational Synergy database.

Setting up a UNIX client that does not use NFS

To set up a client that does not use NFS, do the following:

1. If you have multiple installations, or if you do not have any installation below, or linked from,
   `/usr/local/ccm`, set CCM_HOME and PATH. Otherwise, skip this step.

```
$ CCM_HOME=ccm_home
$ PATH=$CCM_HOME/bin:$PATH
$ export CCM_HOME PATH
```

ccm_home is the directory into which Rational Synergy is installed.

2. Be sure that the following requirements are met:

- For traditional mode sessions, you must enable either `rsh` or ESD on the server to allow remote UNIX clients.

  If ESD is not in use, engine hosts must trust the users and machines. To enable this, configure your `.rhosts` or `hosts.equiv` file accordingly. (Both files are discussed in the *IBM Rational Synergy Administration Guide*.)

- For traditional mode sessions, you must enable either `rexec` or ESD on the server for Windows clients.

- The database server must trust *ccm_root* on the engine machines, regardless of whether ESD is in use.

  To enable this, configure the *ccm_root* `.rhosts` or `hosts.equiv` file accordingly. (Both files are discussed in the *IBM Rational Synergy Administration Guide*.)

- The client must be able to resolve the name or IP address of the server.

- On the client, the `ccm_root` user id (UID) and group id (GID) must match the server.

- `$CCM_HOME` must be the same on the client and server.

Do this by creating a copy of the installation on the server so it will appear on the client in the same path.

- The `$CCM_HOME/etc/.router.adr` file on the client must point to the correct host and port on the server.

3. Load the software by performing steps 1 through 3 in "Installing the software" on page 38.

4. Start a Rational Synergy session.

- Enter the following for a Web mode session:

  `$ cmsynergy -h engine_host_name -d ccmdb`

Note Web mode sessions only support copy-based work areas.

- Enter the following for a traditional mode session:

  `$ cmsynergy -s server_url -d ccmdb`

To set Rational Synergy to start in copy-based mode, you must change an entry either in the `$CCM_HOME/etc/ccm.properties` file or the `$HOME/.ccm.user.properties` file.
Enter the following setting in the file:

  `user.allow.link.based.workareas=false`

Setting this value to anything other than `false` will cause Synergy to start in link-based mode. The value is case-insensitive.

- Or, to start a Synergy Classic session, enter the following:

  `$ ccm start -h engine_host_name -rc -d ccmdb`

  ccmdb is the path to the database.

Users on distributed UNIX installations not using NFS must start sessions using the `ccm start -rc` remote client option. This ensures that necessary libraries located under the database path are visible to the UI process.

ESD authentication through PAM

On computers that run on Solaris and Linux operating systems, the engine startup daemon (ESD) will use PAM to authenticate users. The PAM service name is "cmsynergy". To allow the ESD to authenticate users, the PAM configuration must be updated to specify the authentication methods to use for the "cmsynergy." service unless a reasonable default already exists.

example additions to Solaris `/etc/pam.conf` file:
```
cmsynergy auth required /usr/lib/security/$ISA/pam_unix.so.1
cmsynergy account required /usr/lib/security/$ISA/pam_unix.so.1
```

example `/etc/pam.d/cmsynergy` file for Linux:
```
auth required /lib/security/pam_stack.so service=system-auth
auth required /lib/security/pam_nologin.so
account required /lib/security/pam_stack.so service=system-auth
```

For additional information about how to configure PAM, refer to your system documentation.

Setting up the esd client

You must tell the client to connect to `esd` rather than use the normal engine startup procedure. This is done by editing the `ccm.ini` file in the Synergy client installation `etc` directory to specify how the engine is started. You must add the following line to the first section of the `ccm.ini` file:

```
engine_daemon = TRUE
```

Change the `$CCM_HOME/etc/ccm.ini` file, not your own `ccm.ini` file.

Appendix C: Notices

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