CA Server Automation

Rapid Server Imaging Server Installation Guide

12.6

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The following terms are used interchangeably and refer to the same things in the documentation:

- *Rapid Server Imaging (RSI) server* and *DynaCenter server*
- *RSI agent* and *DynaCenter Provisioning Agent* (*DPAD*)
- *RSI* and *Management Workstation* (*MWS*)

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Preface

Overview

The Racemi DynaCenter-OEM provides an API that third-party software can integrate with to perform image-based provisioning. Image-based provisioning is possible through the server and image management capabilities of DynaCenter.

DynaCenter captures server images and networking information and stores the configurations in a depot. Prior to provisioning target servers, image configurations can be customized according to the environment. For example, new binaries can be added to captured images using software components and new networking information can be added to captured images when provisioning to dissimilar hardware. After images are captured and modified, DynaCenter can deploy the images and provision new servers.

DynaCenter supports a wide range of Operating Systems and hardware. Review Appendix A: Support Matrices, which starts on page 99 for compatible Operating Systems, virtualization technologies, and hardware platforms.

About This Guide

This guide describes the hardware, networking, and storage requirements for installing DynaCenter and the optional cloud API for working in cloud environments. DynaCenter runs on the Management Workstation (MWS), which requires hardware configuration and an installed Operating System.

For the latest version of this Guide, contact CA Support.

Audience

This document is intended for system and network administrators who are installing DynaCenter.

What's New in this Guide

DynaCenter Version 4.1

This Guide was updated for the 4.1 release and includes the following new or revised information:

- Added instructions for upgrading from DynaCenter 4.0 to DynaCenter 4.1. See Chapter 1: Upgrade DynaCenter, which starts on page 15.
- Updated the hardware requirements for the MWS system. See Hardware Requirements for the Management Workstation (MWS) on page 32.
- Removed the requirement for the Windows File Server optional package in the Red Hat operating system installation on the Management Workstation server. See Package selection on page 35.

- Added a requirement for the openssl-devel package when installing RedHat on the MWS. See Package selection on page 35.
- Added a requirement for the popt package when installing RedHat on the MWS. See Package selection on page 35.
- Added information about the software requirements for the Management Workstation (MWS). See Software Requirements for the Management Workstation (MWS) on page 32.
- Added information about DynaCenter log files. See DynaCenter Logging on page 73.
- Added information about installing a DynaCenter agent on a target server. See Chapter 8: Install DynaCenter Agents on Target Servers, which starts on page 77.
- Updated information on the oem.ini file. See OEM Configuration File Sections and Options on page 67.
- Added information about setting the ipxe priority code when using multiple DHCP servers. See Option 2: External PXE server and an external DHCP server on page 87 and External Networks on page 91.
- Updated the support matrices. See Appendix A: Support Matrices, which starts on page 99.

DynaCenter Cloud Version 2.1

This Guide was updated for the 2.1 release of the Cloud API and includes the following new or revised information:

- Added information about the new `dccmd cloud list vendors` command.

DynaCenter Version 4.0

This Guide was updated for the 4.0 release and includes the following new or revised information:

- Revised installation instructions for installations that use external storage for the image depot. See Section C: Advanced Installation with External Storage for Depot (Recommended), which starts on page 53.
- Revised information for registering the Depot when using a non-root location for the captured image depot. See Section B: Advanced Installation with Non-Root Location for Depot, Task 4: Register the Depot on page 51.
- Revised network port information. See Chapter 5: Configure Networking on the MWS, which starts on page 39.
- Revised Scope Option string value for configuring external PXE server and an external DHCP server on Windows DHCP. See Windows DHCP on page 88.
- Added new information about configuring an external DHCP server for use with external networks. See External Networks on page 91.
- Added new information about using the Command Line Interface. See Working with the Command Line on page 11.

DynaCenter Cloud Version 2.0

This Guide was updated for the 2.0 release of the Cloud API and includes the following new or revised information:

- Revised instructions for installations that will manage servers in cloud environments.

Supplemental Documentation

- *Rapid Server Imaging Server Administration Guide*
- *Rapid Server Imaging Server Release Notes*
- *Rapid Server Imaging for AppLogic Installation and User Guide*

Need Help?

Contact CA Support with questions or comments.

Working with the Command Line

This guide provides procedures for working in your DynaCenter environment using the Command Line Interface (CLI). This section provides information that can help you as you work with the CLI.

Note: The CA Server Automation user interface provides equivalent operations to the CLI. See the *CA Server Automation Reference Guide,* RSI CLI section, for command and parameter details.

CLI Authentication

Certain commands issued from the CLI require authentication. If authorization is required, the command will prompt for a username and password. You can avoid passing the username and password as clear text on the command line by creating an authenticated session.

Set up an authenticated session

At any point when you are using the CLI, you can begin an authenticated session to eliminate the need to authenticate each command as you issue it.

1. On the MWS, type the following command:

   ```
   racelogin --use-auth-cache
   ```

   The system will prompt you for the username and password to use for this session.

2. On the MWS, run the DynaCenter CLI commands you need.

   DynaCenter will execute the commands without requesting your username and password.

3. On the MWS, type the following command:

   ```
   racelogout
   ```

DynaCenter ends the authenticated session and log in security is restored to the system.

Important: Logging out of Linux does not end the authenticated session.

CLI Help

The dccmd program drives DynaCenter from the command line.

- To see a list of supported dccmd commands, on the MWS type:

  ```
  dccmd --help
  ```

- To see help for a specific command, on the MWS type:

  ```
  dccmd <command_name> --help
  ```

DynaCenter Installation Components

A DynaCenter installation includes:

- Interfaces to access DynaCenter operations: Command Line Interface (CLI) and SOAP and JSON Web Service interfaces.
- Database Server: Backing store for DynaCenter objects.
- Captured Image Depot (depot): Repository for the system images captured and managed by DynaCenter.

  By default, the DynaCenter installation places the CLI, the Database, and the depot on the same physical system. For larger installations, consider using a high capacity and high bandwidth storage resource for the captured image depot.

Chapter 1: Upgrade DynaCenter (4.0 to 4.1)

If you have DynaCenter Version 4.0 installed, you can upgrade to DynaCenter Version 4.1.

Note: If you are running a version of DynaCenter earlier than Version 4.0, first upgrade to 4.0. See Upgrade DynaCenter (3.4 to 4.0) which starts on page 21.

Upgrade Options

DynaCenter Version 4.1 is a 64-bit application that must be installed on a system running the 64-bit RHEL operating system. Because DynaCenter Version 4.0 was a 32-bit application that was installed on a system running the 32-bit RHEL operating system, upgrading to DynaCenter Version 4.1 might require a hardware upgrade.

When upgrading from DynaCenter Version 4.0 to DynaCenter Version 4.1, you have the following options:

- **Option 1:** Allocate a new 64-bit server as the DynaCenter Version 4.1 MWS server.

  This option leaves the DynaCenter Version 4.0 MWS intact, which provides a fall back option in the event that the upgrade does not complete successfully.
- **Option 2:** Repurpose your existing DynaCenter Version 4.0 MWS server.

  If your DynaCenter Version 4.0 installation is running on 64-bit hardware, you can repurpose the hardware for DynaCenter Version 4.1.

  Note: As a new operating system must be installed as part of the upgrade process, this option makes it impossible to fall back to the DynaCenter Version 4.0 installation if the upgrade does not complete successfully.

Unless otherwise stated, all of the upgrade steps in the following sections are required regardless of the upgrade option you choose.

Prerequisites to Upgrade

Confirm your current DynaCenter version

To upgrade to DynaCenter Version 4.1, you must be running DynaCenter Version 4.0.

To determine which version of DynaCenter you are currently running, run the `rpm -qi racemi-mws` command from the root directory on the MWS.

Establish a maintenance window

Establish a maintenance window for the MWS that is running DynaCenter Version 4.0 and ensure that no one is attempting a capture or deploy operation during that maintenance window.

Delete any unused images

The size of the database and the repositories determines how long the upgrade process will take to complete. If your image Depot is located on the MWS, you can reduce the time needed to upgrade to DynaCenter 4.1 by deleting any unused images from your Depot before you begin the upgrade.

Backup the DynaCenter 4.0 MWS (Option 2 only)

If you plan to install DynaCenter Version 4.1 on the same hardware where DynaCenter Version 4.0 is installed, it is strongly recommended that you make a full system backup before you begin the upgrade process.

Release any running or assigned Agent Images

Before you can upgrade your DynaCenter environment, you must release any agent images that are assigned to or running on servers in your environment.

Procedure

1. On the MWS that is running DynaCenter 4.0, type the following command:

   ```
   racelogin --use-auth-cache
   ```

   The system will prompt you for the username and password to use for this session.

2. On the MWS that is running DynaCenter 4.0, run the following command:

   ```
   dccmd list servers -F long | grep ProvisionMgr
   ```

   The output from this command is a list of servers that have an Agent Image assigned or running.

   Example:

   Xen5-VM1-32, arch="i686", hypervisor="Xen5", id="Xen5-VM1-32", image="ProvisionMgr-CentOS5-i686[6]", ipaddr="10.6.3.54", macaddress="51:D7:0E:E6:DF:27", networks="default", shutdowntimeout="300", slotid="Xen5:04", status="OK", substatus="Running", uuid="a83919b5-c945-4ab2-8cd1-40797bee0e93"

3. For each server in the output, do the following:

   - Record the `server_id` , which is the text that precedes the first comma.
   - Run the following command to release the Agent Image from the server:

     ```
     dccmd release image --shutdown-mode shutdown \
     <server_id>
     ```

     Example:

     ```
     dccmd release image --shutdown-mode shutdown \
     Xen5-VM1-32
     ```

4. Re-run the following command to confirm that you have released all assigned or running Agent Images:

   ```
   dccmd list servers -F long | grep ProvisionMgr
   ```

   There should be no servers listed in the output from this command.

5. When you have released all assigned or running Agent Images, type the following command:

   ```
   racelogout
   ```

   DynaCenter ends the authenticated session and log in security is restored to the system.

   Important: Logging out of Linux does not end the authenticated DynaCenter session.

Identify a storage location for the 4.0 data

The temporary storage space required for the data exported from the DynaCenter 4.0 MWS will be approximately equal to the space consumed by the `/repo/I` and `/repo/R` directories plus the space consumed by any depots located on the MWS (`/repo/images` is the default local depot directory).

- On the DynaCenter 4.0 MWS, type the following command to approximate the size of these directories:

  ```
  du -shc /repo/I /repo/R /repo/images \
  <path_to_any_additional_local_depot>
  ```

Upgrade

The following table outlines the process for upgrading your environment:

Task	Description	Reference
1	Run the DynaCenter export script to archive DynaCenter files from your 4.0 MWS	Task 1: Run the export script on page 17.
2	Archive files that contain networking information from your 4.0 MWS	Task 2: Record the 4.0 MWS networking information on page 18.
3	Decommission the DynaCenter 4.0 MWS	Task 3: Shutdown the 4.0 MWS (Option 1 only) on page 18.
4	Install the 64-bit operating system for DynaCenter 4.1	Task 4: Install the RHEL 64-bit Operating System on page 18.
5	Configure networking information on the DynaCenter 4.1 MWS	Task 5: Configure the 4.1 MWS networking information on page 18.
6	Install DynaCenter 4.1	Task 6: Install DynaCenter 4.1 on page 19.
7	Manually update customized configuration files	Task 7: Update DynaCenter Configuration Files on page 19.

Task 1: Run the export script

The DynaCenter export script captures all of the DynaCenter configuration and system files that are needed to upgrade a DynaCenter 4.0 installation to a DynaCenter 4.1 installation.

6. Log on to the DynaCenter 4.0 MWS as a user with root privileges.
7. Mount the DynaCenter 4.1 installation media.
8. Change to the `bin` directory of the DynaCenter 4.1 installation media.
9. Type the following command:

   ```
   dc-export <archive-dir>
   ```

   Where `<archive-dir>` is a remote directory where you want to archive the DynaCenter 4.0 files.

   Option 1 Note: The DynaCenter 4.0 MWS must be able to access the storage location during the export operation and the DynaCenter 4.1 MWS must be able to access the storage location during the import operation.

Task 2: Record the 4.0 MWS networking information

The networking information is needed to configure the new OS installation on the 4.1 MWS.

- Copy the following files from the 4.0 MWS to a remote storage location:
  - /etc/hosts
  - /etc/sysconfig/network
  - /etc/sysconf/network-scripts/ifcfg*
  - /etc/sysconfig/network-scripts/route-*

Task 3: Shutdown the 4.0 MWS (Option 1 only)

If you are using different hardware for the DynaCenter 4.1 MWS, you must shutdown the system or disable the network interfaces on the system where DynaCenter 4.0 was installed.

The upgrade process duplicates your original MWS configuration, including using the same IP address for the MWS; therefore, the 4.0 MWS must be disabled before the new 4.1 MWS is configured.

Note: If you shut down the 4.0 MWS and then reboot it later for any reason, you must reboot the system in single user mode as the 4.0 MWS and the 4.1 MWS will be configured with the same IP address(es).

Task 4: Install the RHEL 64-bit Operating System

Install the 64-bit RHEL operating system on the server that will serve as the 4.1 MWS.

Reference: See Chapter 4: Install the Operating System on the MWS, which starts on page 35.

Task 5: Configure the 4.1 MWS networking information

Use the networking information from the 4.0 MWS to configure the new OS installation on the 4.1 MWS.

- Copy the information contained in the following files from the 4.0 MWS into the file of the same name on the 4.1 MWS:
  - /etc/hosts
  - /etc/sysconfig/network
  - /etc/sysconf/network-scripts/ifcfg*
  - /etc/sysconfig/network-scripts/route-*

  Note: These are the files you saved in Task 2: Record the 4.0 MWS networking information on page 18.

Task 6: Install DynaCenter 4.1

10. Log on to the 4.1 MWS system.
11. Mount the storage location where you archived the data from the 4.0 MWS.
12. Insert the DynaCenter DVD into the 4.1 MWS.

    Note: Manually mount the media if the operating system does not mount it automatically.
13. Open a system terminal and change to the root directory of the installation media.
14. Type the following command:

    ```
    dc-install --import-source <archive-dir>
    ```

    Where `<archive-dir>` is the directory where you archived the DynaCenter 4.0 files in Task 1: Run the export script on page 17.
15. Accept the default settings when prompted by the DynaCenter installation program.

    The DynaCenter installation program upgrades the imported data as necessary.

    After the upgrade completes and all services have come online, any servers that were being managed by DynaCenter 4.0 will start communicating with DynaCenter 4.1 and they will receive a command to update the agent software to the version 4.1 agent.

Task 7: Update DynaCenter Configuration Files

When you upgrade DynaCenter, some configuration files are not overwritten because they contain customized settings. Instead of overwriting the files and erasing your custom settings, new versions of the file are created and you can copy any new options to your original file. The new files append '.rpmnew' to the original file name. Perform the following procedure for each of the following files:

- `/opt/race/share/conf/logserver.ini`

- `/opt/race/share/conf/logclient.ini`

Note: If the `/opt/race/share/conf/` directory does not contain .rpmnew versions of these files, the files did not contain any customizations and you do not need to perform this task.

Procedure

16. Identify any changes between the old file and the new file by running a command such as the following:

    ```
    cd /opt/race/share/conf
    diff <old_file_name> <new_file_name>
    ```

    Example:

    ```
    cd /opt/race/share/conf
    diff logserver.ini logserver.ini.rpmnew
    ```

    The output lists any differences between the two files including any options that have been added to the new file.

17. Copy any new options to your original file and then save the file.
18. Type the following command to restart the daemons and load the revised files:

    ```
    dcctl restart
    ```

Chapter 2: Upgrade DynaCenter (3.4 to 4.0)

This section describes general DynaCenter upgrade procedures, and how to upgrade from past versions.

Note: You can upgrade from DynaCenter Version 3.4 to DynaCenter Version 4.0.

Note: You must have a valid license before starting to upgrade.

Note: You must uninstall the DPAD agents on the managed servers, then install DynaCenter 4.0.

Use the following checklist to ensure that your environment is updated correctly.

✓	Description	Reference
☐	Review the prerequisites to upgrading and complete any of the tasks that are applicable in your environment	Prerequisites to Upgrade on page 21
☐	Upgrade DynaCenter	Upgrade DynaCenter on page 22
☐	Manually edit DynaCenter configuration files	Edit DynaCenter Configuration Files on page 23
☐	Configure the storage server (only if using external storage)	Set up the Storage Server and the Depot on page 24

Prerequisites to Upgrade

It is absolutely necessary to properly prepare the system before you upgrade DynaCenter. Preparing the system correctly allows the upgrade to run more smoothly and more quickly.

Before you upgrade an existing DynaCenter installation, you must prepare the system as follows:

- All operations must be completed before the upgrade begins.
- Delete any unused images to minimize processing time.

  The size of the database and the repositories determines how long the upgrade process will take to complete.
- Backup the DynaCenter database.

  Reference: See Backup the database on page 22.
- Backup the following files by saving them to another directory:

  `/opt/race/share/conf/buildout.conf`
  `/opt/race/share/conf/oem.ini`
- Preserve images for use with earlier versions of DynaCenter (optional).

By default, the upgrade process converts any images stored in registered depots for use with the new version of DynaCenter. If you need to retain the earlier version of any images, do one of the following:

- To preserve the entire Depot and not convert any images, unregister the Depot using the `dccmd remove depot <depot_name>` command.

  Example: You want to create new images for use with DynaCenter 4.0.

- To preserve a copy of the Depot but also have the images converted for use with the newer version of DynaCenter, make a copy of the Depot.

  Example: You want to preserve the images for use with the earlier version of DynaCenter but you also want to convert the images for use with DynaCenter 4.0.

Backup the database

DynaCenter includes a command line tool that simplifies the database backup process. Running the tool will temporarily shut down DynaCenter services on the MWS, so do not run it while systems are trying to boot or while the MWS is committing changes to the database.

1. Open a command terminal on the MWS.
2. Use the following command to shut down the DynaCenter daemons and back up the database non-interactively:

   `/opt/race/share/conf/dbbacker.sh –y`

   The backup location is:

   `/opt/race/share/conf/dynacenter_database.${datestamp}.sql`

   Note: Run `dbbacker.sh -h` to obtain a full list of arguments and options for the script.

Upgrade DynaCenter

The DynaCenter upgrade process uses the DynaCenter installation program.

1. Insert the DynaCenter DVD into the MWS server.

   Note: Manually mount the media if the operating system does not mount it automatically.

2. Open a system terminal and change to the root directory of the installation media.
3. To upgrade DynaCenter non-interactively, type the following command:

   `python ./dc-install --non-interactive`

   Note: A non-interactive upgrade will use settings specified during the initial DynaCenter installation and will not prompt you for any input.

   After the upgrade is complete, continue with Edit DynaCenter Configuration Files on page 23.

4. To upgrade DynaCenter interactively, type the following command:

   `python ./dc-install`

The installation program displays the following screen:

```
DynaCenter Package Installation

------------------------------

Welcome to the DynaCenter Package Manager. This program
will guide you through the installation/upgrade process.
```

5. Do one of the following:

   - Accept the default settings for each prompt.

     Note: The defaults provided by the upgrade program are the options that were used for your previous installation of DynaCenter.

   - Change the default settings.

     Note: While you can increase or decrease the number of client networks, the upgrade will not remove a client network from the DynaCenter configuration if DynaCenter is already managing servers on that network.

   The upgrade begins.

Edit DynaCenter Configuration Files

When you upgrade DynaCenter, certain configuration files are not overwritten because they contain customized settings. Instead of overwriting the files and erasing your custom settings, new versions of the file are created and you can copy any new options to your original file. The new files append '.rpmnew' to the original file name. Perform the following procedure for each of the following files:

- `/opt/race/share/conf/oem.ini`
- `/opt/race/share/conf/logserver.ini`
- `/opt/race/share/conf/logclient.ini`

Procedure

1. Identify any changes between the old file and the new file by running a command such as the following:

   ```
   cd /opt/race/share/conf
   diff <old_file_name> <new_file_name>
   ```

   Example:

   ```
   cd /opt/race/share/conf
   diff oem.ini oem.ini.rpmnew
   ```

   The output lists any differences between the two files including any options that have been added to the new file.

2. Copy any new options to your original file and then save the file.
3. Type the following command to restart the daemons and load the revised files:

   ```
   dcctl restart
   ```

Set up the Storage Server and the Depot

DynaCenter Version 4.0 uses non-NFS storage solutions for captured images. If your existing DynaCenter installation uses storage that is external to the MWS for your captured image depot, you must set up the storage server and the depot as part of the upgrade to 4.0.

Note: If your current DynaCenter installation uses the MWS as the location for your captured image depot, the upgrade process automatically configures the MWS to support DAV; you do not have to set up the server. You can go to Before You Install section to complete the upgrade process.

Set up the storage server

You must do one of the following:

- Set up your storage server that runs the Apache web server and is capable of supporting DAV (Distributed Authoring and Versioning)—Recommended

  Reference: Storage Server with Apache and DAV support on page 25.

- Set up your storage server that does not have DAV support

  Reference: Storage server with NFS/CIFS support (NAS without DAV support) on page 26.

Storage Server with Apache and DAV support

Storage on an external device must meet the following criteria:

- Be a properly configured device that is IP routable to and from the MWS and the managed server(s) that will use it
- Have the correct time set or have NTP configured.

To configure the storage server:

1. Log into the storage server as the root user.
2. Locate or create the directory to be used as depot storage.
3. Set the directory and file ownership to the httpd user (normally apache:apache).

   Example: On a Red Hat system type, `chown apache:apache /path/to/depot`
4. Set the directory permissions to read/write for any user or group that will use the httpd process.

   Example: Type, `chmod 755 /path/to/depot`
5. On the storage server, create a new file in the conf.d directory of the webserver, with the following settings:

   Tip: You can name the file anything, but a name such as `depot.conf` will be descriptive of the file function.

```
Alias </my_depot_alias/>  </path/to/depot/>
<Directory </path/to/depot>>
    DAV On
    AuthType Basic
    AuthName "DAV Restricted"
    AuthUserFile /path/to/password/file/<password_file>
    <LimitExcept GET HEAD OPTIONS>
        Require user <username>
    </LimitExcept>
</Directory>
```

   Where:

Value	Description
`my_depot_alias`	A user-friendly alias for the depot **Note:** This can be the path to the depot if a user-friendly name is not important to you.
`/path/to/depot`	The location of the depot on the storage server
`/path/to/password/file`	The location of the apache password file where the user's password can be verified
`password_file`	The apache password file where the user's password can be verified
`username`	The username of the user authorized to access

	the depot directory

Example

On a Red Hat system, create a new file called depot.conf in `/etc/httpd/conf.d` with the following settings:

```
Alias /my_depot/ /repo/images/
<Directory /repo/images>
    DAV On
    AuthType Basic
    AuthName "DAV Restricted"
    AuthUserFile /etc/httpd/repo.pwd
    <LimitExcept GET HEAD OPTIONS>
        Require user someuser
    </LimitExcept>
</Directory>
```

6. Type the following command to create or update the file used to store the authentication information for users authorized to access the depot:

   `htpasswd –bc /path/to/password/file/<password_file> <username> <password>`

   Example: `htpasswd –bc /etc/httpd/repo.pwd someuser somepassword`

7. Type the following command to restart the apache server:

   `service httpd restart`

Storage server with NFS/CIFS support (NAS without DAV support)

When the external storage server supports NFS/CIFS and cannot be DAV enabled, the MWS can function as the DAV frontend to the storage server.

Storage on an external device must meet the following criteria:

- Be a properly configured device that is IP routable to and from the MWS and the managed server(s) that will use it
- Have the correct time set or have NTP configured.

Note: DynaCenter does not support Windows operating systems in non-DAV environments.

To configure the storage server:

1. Log into the NAS as the root user.
2. Locate or create the directory to be used as depot storage.
3. Set the directory permissions to read/write for any user or group that will use the httpd process.
4. On the NAS, add the following line to the /etc/exports file:

```
/<mount point> <hostname or IP address of NAS>\
(rw,sync,hide,insecure,no_root_squash,secure_locks)
```

5. On the NAS, run the following command to reload the list of exported file systems:

   ```
   exportfs -a
   ```

6. On the MWS, type the following command to create a mount point:

   mkdir /depot

7. On the MWS, update /etc/fstab to include the following:

   ```
   <nas_ip_or_hostname>:/<path/to/depot/on/nas> /depot \
   nfs defaults 0 0
   ```

8. On the MWS, type the following command to mount the depot:

   ```
   mount -a
   ```

9. On the MWS, run the following command to confirm that the MWS server can access the share:

   ```
   showmount -e [hostname or IP address of NAS]
   ```

   The output should show the share for the captured image depot.

   Example:

   ```
   showmount -e <IP address of NAS>
   Export list for <IP address of NAS>:
   /depot <IP address of NAS server>
   ```

10. On the MWS, create a new file in /etc/httpd/conf.d, with the following configuration:

    Tip: You can name the file anything, but a name such as `depot.conf` will be descriptive of the file function.

    ```
    Alias </my_depot_alias/>  </path/to/depot/>
    <Directory </path/to/depot>>
        DAV On
        AuthType Basic
        AuthName "DAV Restricted"
        AuthUserFile /etc/httpd/<password_file>
        <LimitExcept GET HEAD OPTIONS>
            Require user <username>
        </LimitExcept>
    </Directory>
    ```

    Where:

Value	Description
`my_depot_alias`	A user-friendly alias for the depot **Note:** This can be the path to the depot if a user-friendly name is not important to you.
`/path/to/depot`	The location of the depot on the storage server

password_file	The apache password file where the user's password can be verified
username	The username of the user authorized to access the depot directory

Example

```
Alias /my_depot/ /repo/images/
<Directory /repo/images>
    DAV On
    AuthType Basic
    AuthName "DAV Restricted"
    AuthUserFile /opt/race/etc/http/auth/depot.pwd
    <LimitExcept GET HEAD OPTIONS>
        Require user someuser
    </LimitExcept>
</Directory>
```

11. On the MWS, type the following command to create or update the file used to store the authentication information for users authorized to access the depot:

    ```
    htpasswd –bc /opt/race/etc/http/auth/repo.pwd someuser
    somepassword
    ```

12. On the MWS, type the following command to restart the apache server:

    ```
    service httpd restart
    ```

Register the Depot

To ensure that the depot on the DAV-enabled server is visible to DynaCenter and any servers that DynaCenter will manage, you must register the depot.

1. On the MWS, type the following command to register the depot with the credentials you previously specified:

   ```
   dccmd register depot \
   [--access-identity=<id_or_user_name>] \
   [--access-secret=<secret_key>] \
   <depotId> <depotURL> \
   <networkId>=<depotURL> [<networkId>=<depotURL>...]
   ```

   Where:

Options	--access-identity	An authorized identity to access this storage server (for example, the username, the account, etc.). **Note:** If you use this option, you must also define --access-secret.
	--access-secret	The password, key, or certificate associated with the authorized identity.
Arguments	depotId	The name of the depot.

	depotURL	The URL of the network storage. **Example:** dav://server-address/path
	networkId= depotURL	Network that contains managed servers and the URL of the depot when accessed from that network.

Example:

```
dccmd register depot mystorage \
--access-identity=someuser \
--access-secret=somepassword \
my_storage_server_hostname_or_IP/my_depot \
192.168.206.0/24=dav://192.168.206.3/repo/images \
192.168.207.0/24=dav://192.168.207.3/repo/images \
192.168.208.0/24=dav://192.168.208.3/repo/images \
192.168.209.0/24=dav://192.168.209.3/repo/images
```

2. Confirm that the depot registered successfully:

   ```
   dccmd show depot <depotId> --format=full
   ```

   Example:

   ```
   dccmd show depot mystorage --format=full
   ```

Edit the oem.ini file

The oem.ini file specifies the location of the depot. If you do not want to have to specify the depot location each time you perform an operation, you must edit the oem.ini file to point to the depot location on the storage server.

1. On the MWS, open the following file:

   ```
   /opt/race/share/conf/oem.ini
   ```

2. Edit the depot section of the oem.ini file as follows:

   ```
   [depot]
   uri = depot://<depot_name_on_storage server>
   ```

Chapter 3: Before You Install

Overview

This chapter describes the decisions and preparations you should make before you begin to set up your DynaCenter environment.

- Hardware requirements for the MWS system
- Multiple NIC/VLAN environments
- Storage options
- Storage sizing guidelines

Installation Checklist

Use the following checklist to ensure that your environment is installed and set up correctly.

✓	Description	Reference
☐	Confirm that the hardware for the Management Workstation (MWS) meets the requirements	Hardware Requirements for the Management Workstation (MWS) on page 32
☐	Understand the software requirements for the Management Workstation (MWS)	Software Requirements for the Management Workstation (MWS) on page 32
☐	Determine which networks configured on the MWS DynaCenter will manage	Multiple NICs and / or VLANs on page 33
☐	Determine where you will store captured images	Storage Options on page 33
☐	Determine the space you will need to store captured images	Storage Sizing Guidelines on page 33
☐	Install Red Hat on the MWS	Chapter 4: Install the Operating System on the MWS, which starts on page 35
☐	Configure networking on the MWS	Chapter 5:Configure Networking on the MWS, which starts on page 39
☐	Determine which installation option is best for your environment	DynaCenter Installation Options on page 41
☐	Install DynaCenter (choose one installation option)	Basic Installation, which starts on page 43
		Advanced Installation with Non-Root Location for Depot, which starts on page 47

		Advanced Installation with External Storage for Depot (Recommended), which starts on page 53
		Silent Installation, which starts on page 61
☐	Configure DynaCenter	Chapter 7: Configure DynaCenter, which starts on page 67
☐	Enable network boot on target servers	Chapter 9: Enable Network Boot on Target Servers, which starts on page 80
☐	Configure DHCP servers	Chapter 10: Configure DynaCenter Coexistence with External DHCP/PXE Servers, which starts on page 85

Hardware Requirements for the Management Workstation (MWS)

The system you will use for the Management Workstation should meet the following minimum requirements:

- x86 Intel or AMD-based system (64-bit capable)
- CPU Dual Core 2.0 GHz
- RAM 4GB minimum
- Networking 1 Gbps NIC
- Local Storage 72GB redundant EG RAID 5

  Disk space requirements vary widely depending on how you plan to configure and use DynaCenter. The minimum disk space requirement for a functional MWS is 72 GB.

  Note: The amount of storage you have available determines the number of agent images you can store, which in turn determines the number of simultaneous operations DynaCenter can perform.
- All hardware components supported out of the box by Red Hat Enterprise Linux 5

Important: In a production environment, the Management Workstation should be a dedicated physical system.

Reference: See Chapter 4: Install the Operating System on the MWS, which starts on page 35

Software Requirements for the Management Workstation (MWS)

The system you will use for the Management Workstation has the following software requirements:

- No anti-virus software should be installed on the system

  During capture operations, anti-virus software might quarantine packets associated with the capture. This leaves the captured image incomplete and causes deploys of that image to fail.

- Red Hat Enterprise Linux version 5.6, 64-bit

Multiple NICs and / or VLANs

If your MWS has multiple network interface cards (NICs) or VLANs configured, you can specify, as part of the installation, which networks DynaCenter should manage.

Before you begin the DynaCenter installation, understand which networks are configured on the MWS system and whether those networks contain servers that you want DynaCenter to manage.

Note: If you want to manage servers that are on networks separated from the MWS by a router or a firewall, you can register those networks after the installation completes.

Storage Options

DynaCenter needs a storage location for the server images you will capture. By default the captured image depot is located on the MWS on the root filesystem (DynaCenter Basic Installation); however, you should consider using an alternate storage location to ensure that there is enough storage space to accommodate all of your data (DynaCenter Advanced Installation).

Before you install DynaCenter, understand which installation option is best suited to your environment.

Reference: DynaCenter Installation Options on page 41 explains the various installation options.

Storage Sizing Guidelines

The amount of space you need to allocate for storage depends entirely on how many images you will need to store and how large those images will be. DynaCenter compresses system images before it stores them, so you do not need a one-to-one data to storage ratio; however, increasing disk space upfront is inexpensive relative to running out of storage later. You can prepare a storage environment that is guaranteed to accommodate all your data with plenty of space by calculating the total disk usage of all the systems you will protect with DynaCenter. Or, if it makes sense for your environment, you might calculate your average data usage per system, and then use a storage device with N x A available space - where “N” is the number of systems you will need to capture and “A” is the average data requirement. Of course storage space can be added later if you need to capture additional systems.

Chapter 4: Install the Operating System on the MWS

Firewall Configuration

If a firewall will filter traffic between the MWS and any of the devices connected to it (servers, storage devices, etc.), then the firewall must be configured to allow the MWS to communicate on the DynaCenter Network Ports.

Reference: See DynaCenter Network Ports on page 39.

Install RHEL

The MWS installation requires the 64-bit version of RedHat Enterprise Linux 5.6.

Installation media

Use the 64-bit RHEL installation media. Boot your MWS system using CD 1 or DVD 1 of the Linux distribution. Follow the procedures as prompted by the installer, and only deviate from the defaults as noted in the following section.

Changes from the default configuration

Certain settings in the default configuration of the RedHat installation must be changed so that DynaCenter can perform as designed.

Network configuration

The MWS must always have the same IP address. Use a static hostname and IP address configured in the operating system, or use DHCP with a reserved IP.

1. Select the network interface (e.g. eth1) where managed servers reside, and then click **Edit**.
2. Enter the following properties:
   - IP Address
   - Netmask

Reference: http://www.topbits.com/dhcp-reservation.html

Package selection

You must customize the package set that is installed with the OS.

1. On the Package Installation Defaults screen, clear the **Virtualization** check box.
2. Towards the bottom of the Package Installation Defaults screen, select **Customize now**, and then click **Next**.
3. On the Package Group Selection screen, confirm that the following options are set as listed:

Package Group	Confirm
Desktop Environments	▪ **GNOME Desktop Environment** is selected.
Applications	▪ **Editors** is selected. ▪ **Graphical Internet** is selected.

Development	▪ Select **Development Libraries**, click **Optional packages**, and then:
	  ▪ confirm **perl-Crypt-SSLeay** is selected
	  ▪ confirm **openssl-devel** is selected, and then click **Close**.
	▪ Select **Development Tools**, click **Optional packages**, confirm **expect** is selected, and then click **Close**.

Servers	▪ Select **Legacy Network Server**, click **Optional packages**, and then:
	  ▪ confirm **rusers** is not selected
	  ▪ confirm **rwho** is not selected
	  ▪ confirm **tftp-server** is selected, and then click **Close**.
	▪ Select **Network Servers**, click **Optional packages**, confirm **DHCP** (not DHCPv6) is selected, and then click **Close**.
	▪ Select **PostgreSQL Database**, click **Optional packages**, confirm **postgresql-server** is selected, and then click **Close**.
	▪ **Web Server** is selected.

4. Continue with the installation, changing CDs when prompted.
5. After the installation completes, type the following command to install the popt package:

   ```
   yum install popt
   ```

   Note: You must be logged in as the root/administrator to install the package.

First Boot Configuration

After the installation completes, reboot the system. The installer will provide a few more configuration options. Set the following options and then reboot the system for the changes to take effect:

- Set the Firewall to disabled.
- Set the SELinux setting to disabled.
- Set the correct time or configure for NTP.

- Register with RedHat Network. This will allow you to easily update the operating system on your MWS.
- It is not necessary to create additional user accounts; the DynaCenter MWS installation will create a restricted account for DynaCenter administration.

Update the Operating System

The operating system needs to be updated with the latest patches and security fixes. Follow the update procedure provided by RedHat to ensure these updates are installed as they become available.

Verify Correct Network Installation and Configuration

To verify that you have correctly configured the network interface that connects to your internal network, do the following:

1. Log in to the MWS system with the username root and the password you entered during the installation of the OS.
2. Bring up a command window by right-clicking on the desktop and selecting Open Terminal.
3. Using the command window, verify connectivity to a known host on your internal network by issuing the following command:

   ```
   ping <hostname>
   ```

4. If the command succeeds (responds with a series of lines that begin with “64 bytes from <hostname>”), your network is correct. If the command fails (e.g., reports “ping: unknown host”), troubleshoot the network issue and try the ping again.

Chapter 5: Configure Networking on the MWS

DynaCenter uses certain ports and services to communicate across the network. This topic identifies the ports and services DynaCenter uses to communicate.

Summary of Network Requirements

- Minimum 1Gbps network speed
- All network cards configured for Full Duplex
- For Cisco network switches, enable PortFast (except for trunk ports) to communicate with DynaCenter agents
- Firewall must permit DHCP and multi-casting
- The network should permit traffic over the ports listed in the following section

DynaCenter Network Ports

The following table lists the DynaCenter services and assigned ports each service uses to communicate over the network.

Service	Port	Host
DynaCenter Remote Object Services	7766-8765	MWS
DynaCenter Remote Object Nameserver	9090	MWS
Provisioning agent (dpad)	443	Server to depot

Common Network Services

DynaCenter uses the following common services on standard ports: NFS (Solaris only), TFTP, DHCP, BOOTP, PXE, SSH, HTTP, and HTTPS.

Chapter 6: Install the DynaCenter Software on the MWS

DynaCenter is a server imaging and rapid provisioning technology that captures server images from physical or virtual systems and deploys those images to any compatible resource without the limitation of requiring identical hardware. This chapter describes how to install DynaCenter on the Management Workstation.

DynaCenter Installation Options

You can install DynaCenter using any of the following methods:

- Basic installation
- Advanced installation with non-root location for depot
- Advanced installation with external storage for depot (recommended)
- Silent installation

Use the information in this section to help you decided which installation method is best for your environment.

Basic installation

The basic installation places all DynaCenter components on the root filesystem on the MWS.

When to use

Use this installation method for non-production environments or for environments where only a small number of servers will be managed.

Reference: See Section A: Basic Installation on page 43.

Advanced installation

The advanced installation method provides two options:

- **Option 1:** Install all components on the MWS but place the captured image depot in a partition or in a logical volume on a non-root filesystem.
- **Option 2:** Install all components except the captured image depot on the MWS and place the captured image depot on a separate storage server (recommended).

When to use

Option 1: Use this installation option in production environments only when an external storage server is not available.

Reference: See Section B: Advanced Installation with Non-Root Location for Depot on page 47.

Option 2: Use this option for production environments when an external storage server is available. This is the recommended installation method.

Reference: See Section C: Advanced Installation with External Storage for Depot (Recommended) on page 53.

Silent installation

The silent installation method provides a way to install DynaCenter with limited interaction with the installation program.

When to use

Use this installation method when you need to perform an automated installation or when you want to suppress the display of the installation prompts as DynaCenter is installed.

Reference: See Section D: Silent Installation on page 61.

Section A: Basic Installation

DynaCenter needs a storage location for the server images you will capture. The basic installation places the captured image depot on the root filesystem of the MWS.

Install DynaCenter

1. Insert the DynaCenter DVD into the MWS server.

   Note: Manually mount the media if the operating system does not mount it automatically.

2. Open a system terminal and change to the root directory of the installation media.

3. Type the following command:

   ```
   python ./dc-install
   ```

   The installation program displays the following screen:

   ```
   DynaCenter Package Installation
   -------------------------------
   Welcome to the DynaCenter Package Manager. This program
   will guide you through the installation/upgrade process.
   ```

4. Choose and confirm the operating systems that you want DynaCenter to support.

   Each operating system that will be captured or provisioned needs a corresponding agent image. Agent images for Red Hat Linux, SUSE Linux, and Windows are provided by default; agent images for other operating systems are optional.

   ```
   Client Operating System Support
   -------------------------------
   DynaCenter supports capture and deploy of a variety of
   operating systems.  Support for Windows, RHEL, and SLES are
   included by default.  Select the additional operating
   systems that should be supported by this installation.
   Install support for Solaris-sun4u? (Y) [Y, N]
   Install support for Solaris-i86pc? (Y) [Y, N]
   The following operating systems have been selected:
   Solaris-sun4u, Solaris-i86pc.
   Continue with these selections? (Y) [Y, N]
   ```

5. Review and confirm the list of RPM packages that will be installed or upgraded. These packages include DynaCenter binaries as well as other files that DynaCenter needs to operate.

   ```
   Searching for installed packages.
   The following packages will be upgraded/installed:
   vmware-viperl-4.1.0-254719.rpm
   racemi-dynacenter-4.1.0-0.rpm
   ```

```
racemi-mws-4.1.0-0.rpm
racemi-help-4.1.0-0.rpm
racemi-comp-solaris-i86pc-3.2.0-0.rpm
racemi-python-2.7.1-12.rpm
ntfsprogs-2.0.0-1.i386.rpm
racemi-comp-solaris-sun4u-4.1.0-0.rpm
.
.
Continue with installation? (Y) [Y, N]
```

6. Choose and confirm the network interface for the management network.

   The management network is used for communication between the DynaCenter daemons. For a standalone MWS server, the interface for the Management Address should be on localhost (loopback). More complex DynaCenter configurations can include MWS servers that work in concert, in which case the Management Address would be on an interface other than localhost.

   ```
   Management Address
   ------------------
   The MWS requires an address for accessing its management
   services as well as remote access on the network. For
   security, it is recommended, however not required, that
   this address be on a network that is not exposed to managed
   clients. The following list of addresses are configured on
   this system and available for use.
   0. 127.0.0.1 on loopback
   1. 192.168.10.20 on eth0
   2. 10.100.1.10 on eth1
   Select management address (0) [0, 1, 2] 0
   Selected: 127.0.0.1 on loopback
   Accept and continue? (Y) [Y, N]
   ```

7. Choose and confirm the client networks that contain servers that will be managed by the MWS.

   A Client Network is a network interface card (NIC) or VLAN configured on the MWS server that is connected to the same network(s) as the managed servers. Managed servers are the systems that DynaCenter will be capturing and provisioning. The DynaCenter installer will scan the operating system for its network configuration and present each detected NIC or VLAN as an option in the "Client Networks" section. Note that more than one network can be specified during installation.

   ```
   Client Networks
   ---------------
   The MWS must be configured to manage servers on each of the
   networks configured on its interfaces. For security, it is
   recommended, however not required, that the interface used
   for management is not included in the set of client
   networks. The following list of networks are configured on
   this system and available for use.
   ```

```
0. 192.168.0.0/17 on eth0
1. 10.100.1.0/24 on eth1
Select client network(s) (0, 1) [0, 1] 1
Selected: 10.100.1.0/24 on eth1
Accept and continue? (Y) [Y, N]
```

8. Specify and confirm the Agent Image Addresses on the client network that will be used by agent images during capture, provision, and driver capture operations.

   Agent Image Addresses are dedicated IP addresses on the Client Network that DynaCenter assigns to agent images during capture, provision, and driver capture operations. The number of IP addresses specified should be equal to or greater than the number of concurrent operations that will be performed.

   Example: If the user needs to run five captures and three provisions simultaneously, there should be at least eight IP addresses available in the Agent Image Address space.

   ```
   Agent Image Addresses
   ---------------------
   The MWS uses diskless agent images for offline capture and
   deploy of managed servers. These agent images need an
   address pool on each client network. By default, agent
   images will use the first unused address available on a
   given client network, however specifying a limited set of
   addresses minimizes the potential for collision with other
   servers which might become active while an agent image is
   in use. Addresses may be specified as a comma or space
   separated list of addresses or address ranges, such as:
   10.10.20.2, 10.10.20.50-10.10.20.100, 10.10.20.200
   Enter addresses for network 10.100.1.0/24
   Current [10.100.1.0-10.100.1.255] 10.100.1.100-10.100.1.150
   Using addresses: 10.100.1.100-10.100.1.150
   Accept and continue? (Y) [Y, N]
   ```

9. The installation begins.

   An ‘Installation complete’ message is displayed when the installation completes.

Section B: Advanced Installation with Non-Root Location for Depot

DynaCenter needs a storage location for the server images you will capture. This section describes how to use a non-root location on the MWS for the depot storage.

The following table outlines the process to install DynaCenter with a non-root location for the captured image depot:

Task	Description	Reference
1	Set up disk configuration	Task 1: Set Up Disk Configuration using one of the following options: ▪ Partitioned disk without LVM on page 47 ▪ Partitioned disk with LVM on page 48 ▪ Non-partitioned disk with LVM on page 50
2	Install DynaCenter	Task 2: Install DynaCenter on page 50
3	Edit the /etc/exports file	Task 3: Edit the /etc/exports file on page 50
4	Register the depot	Task 4: Register the Depot on page 51
5	Edit the oem.ini file	Task 5: Edit the oem.ini file on page 51

Task 1: Set Up Disk Configuration

If you want to use a non-root location on the MWS for the captured image depot, you have the following options:

- Partition the disk but do not use Logical Volume Manager (LVM) to manage the disk
- Partition the disk and use Logical Volume Manager (LVM) to manage the disk
- Do not partition the disk (use the entire disk), but use Logical Volume Manager (LVM) to manage the disk

Tip: LVM provides a way to allocate space on mass-storage devices that is more flexible than conventional partitioning schemes. Using LVM can be more complicated but it will easily allow you add more disk space later if that is a concern.

Partitioned disk without LVM

Hard disks can be divided into one or more logical disks called partitions. This division is described in the partition table found in sector 0 of the disk.

⚠ **Caution:** If you partition a hard disk that is not empty, all of the data on that hard disk is permanently deleted.

Create a partition

1. Type /sbin/fdisk -l to list the partition table and then confirm that the disk is not already partitioned.
2. Start fdisk:

   ```
   /sbin/fdisk /dev/sdb
   ```

3. At the prompt, type ‘n’ for a new partition.
4. Type ‘p’ for primary partition, and then follow the prompts.

   Note: By default, all disk space is allocated to the first partition.

5. Type ‘w’ to write the partition table and exit.

   Generally the partition will be visible and working. Occasionally you might have to reboot the system for the kernel to recognize the partition table.

6. Type /sbin/fdisk -l /dev/sdb to display the table.
7. Make the filesystem, /sbin/mkfs -t ext3 /dev/sdb1 (sdb1 is the name of the partition you just created).
8. Add the following entry to /etc/fstab:

   ```
   /dev/sdb1 /repo ext3 defaults 1 1
   ```

9. Make the repo directory:

   ```
   mkdir /repo
   ```

10. Mount the repo directory:

    ```
    mount /repo
    ```

11. Use the mount command to verify that the new filesystem is present.
12. Make the depot subdirectory:

    ```
    mkdir /repo/depot
    ```

Partitioned disk with LVM

Hard disks can be divided into one or more logical disks called partitions. This division is described in the partition table found in sector 0 of the disk.

⚠ **Caution:** If you partition a hard disk that is not empty, all of the data on that hard disk is permanently deleted.

Create a partition

1. Type /sbin/fdisk -l to list the partition table and then confirm that the disk is not already partitioned.
2. Start fdisk:

   ```
   /sbin/fdisk /dev/sdb
   ```

3. At the prompt, type ‘n’ for a new partition.
4. Type ‘p’ for primary partition, and then follow the prompts.

   Note: By default, all disk space is allocated to the first partition.

5. Type 'w' to write the partition table and exit.

   Generally the partition will be visible and working. Occasionally you might have to reboot the system for the kernel to recognize the partition table.

6. Type `/sbin/fdisk -l /dev/sdb` to display the table.

Set up LVM using the GUI

If you have a graphical user interface on the MWS system, you can set up LVM through the GUI.

1. Open the GUI in one of the following ways:
   - From the Desktop, select **System→Administration→Logical Volume Management**
   - From the command line, type `system-config-lvm`
2. Select **Tools→Initialize Block Device**, and then type the name of your device/partition, for example `/dev/sdb1`.
3. The new physical volume should be selected for you, click **Create new Volume Group**. Type the volume group, `repo_vg`, and then click **OK**.
4. Select **repo_vg Logical View**, and click **Create New Logical Volume**.
5. Type the new volume name.
6. In the **Size** box, click **Use remaining** to allocate all the space.
7. For the Filesystem, select **ext3**, check the **Mount** and **Mount when rebooted** boxes, and then type `/repo` in the **Mount point** box.
8. Click **OK**.

Set up LVM using the CLI

If you do not have a graphical user interface on the MWS system, you can set up LVM through the command line interface.

1. Type `pvcreate /dev/sdb1` to initialize a disk or partition for use by LVM.
2. Type `vgcreate repo_vg /dev/sdb1` to create a new volume group.
3. Type `lvcreate -n repo_lv -l 100%FREE repo_vg` to create a logical volume in the volume group, where:

Option	Description
-n repo_lv	Names the new logical volume 'repo_lv'.
-l 100%FREE repo_vg	Specifies the amount of space in the volume group. **Note:** If you don't want all of the space in the volume group in this volume, you must change the -l value, or use –L to specify the size of the volume. **Reference:** See man lvcreate for more details.

4. Make the filesystem `/sbin/mkfs -t ext3 /dev/repo_vg/repo_lv`.

5. Add the following entry to /etc/fstab:

   ```
   /dev/repo_vg/repo_lv /repo ext3 defaults 1 1
   ```

6. Make the repo directory:

   ```
   mkdir /repo
   ```

7. Mount the repo directory:

   ```
   mount /repo
   ```

8. Use the mount command to verify that the new filesystem is present.
9. Use `df -h /repo` to verify the amount of space that you created.
10. Make the depot subdirectory:

    ```
    mkdir /repo/depot
    ```

Non-partitioned disk with LVM

If you want to use the entire disk, you do not need to create a partition.

Use the procedure Set up LVM using the GUI on page 49 or Set up LVM using the CLI on page 49 to set up LVM, but use the device name without a partition number, for example, use `/dev/sdb` instead of `/dev/sdb1`.

Task 2: Install DynaCenter

After you have set up your non-root location for storing the depot, install DynaCenter using the instructions provided in Basic Installation on page 43.

Task 3: Edit the /etc/exports file

Edit the /etc/exports file, which controls the file systems that are exported from the partition.

1. On the MWS, add the following line to the /etc/exports file:

   ```
   /<mount point> <hostname or IP address of NAS> \
   (rw,sync,hide,insecure,no_root_squash,secure_locks)
   ```

2. Run the following command to reload the list of exported file systems:

   ```
   exportfs -a
   ```

3. Run the following command to confirm that DynaCenter can access the share:

   ```
   showmount -e [hostname or IP address of NAS]
   ```

   The output should show the share for the captured image depot.

   Example:

   ```
   showmount -e <IP address of NAS>
   Export list for <IP address of NAS>:
   /depot <IP address of NAS server>
   ```

Task 4: Register the Depot

To ensure that the depot is visible to DynaCenter and any servers that DynaCenter will manage, you must register the depot.

1. On the MWS, type the following command to register the depot:

```
dccmd register depot \
[--access-identity=<id_or_user_name>] \
[--access-secret=<secret_key>] \
<depotId> <depotURL> \
<networkId>=<depotURL> [<networkId>=<depotURL>...]
```

Where:

Options	`--access-identity`	An authorized identity to access this storage server (for example, the username, the account, etc.). **Note:** If you use this option, you must also define the `--access-secret`.
	`--access-secret`	The password, key, or certificate associated with the authorized identity.
Arguments	`depotId`	The name of the depot.
	`depotURL`	The URL of the network storage. **Format:** dav://server-address/path
	`networkId= depotURL`	Network that contains managed servers and the URL of the depot when accessed from that network

Example:

```
dccmd register depot my_image_depot \
dav://192.168.32.131/shares/depot \
192.168.207.0/24=dav://192.168.207.3/shares/depot \
192.168.208.0/24=dav://192.168.208.3/shares/depot \
192.168.209.0/24=dav://192.168.209.3/shares/depot
```

2. Confirm that the depot registered successfully:

```
dccmd show depot <depotId> --format=full >
```

Example:

```
dccmd show depot my_image_depot --format=full
```

Note: The CA Server Automation user interface provides equivalent operations to the CLI. See the *CA Server Automation Reference Guide*, RSI CLI section, for command and parameter details.

Task 5: Edit the oem.ini file

The oem.ini file specifies the location of the depot. If you do not want to have to specify the depot location each time you perform an operation, you must edit the oem.ini file to point to the depot in the non-root location.

1. On the MWS, open the following file:

   ```
   /opt/race/share/conf/oem.ini
   ```

2. Edit the depot section of the oem.ini file as follows:

   ```
   [depot]
   uri = depot://<depot_name>
   ```

Section C: Advanced Installation with External Storage for Depot (Recommended)

DynaCenter needs a storage location for the server images you will capture. This section describes how to install DynaCenter when you want to use an external storage server for the image depot. This is the recommended DynaCenter installation option.

The following table outlines the process for installing DynaCenter when using an external storage server for the captured image depot:

Task	Description	Reference
1	Install DynaCenter	Task 1: Install DynaCenter on page 53
2	Set up the storage server	Task 2: Set up the Storage Server using one of the following options: ▪ Storage Server with Apache and DAV support on page 53 ▪ Storage Server with NFS/CIFS support (NAS without DAV support) on page 55
3	Register the depot	Task 3: Register the Depot on page 57
4	Edit the oem.ini file	Task 4: Edit the oem.ini file on page 58

Task 1: Install DynaCenter

Install DynaCenter using the instructions provided in Basic Installation on page 43.

Task 2: Set up the Storage Server

When you use external storage for the captured image depot (recommended), you have the following options:

- Using a storage server that runs the Apache web server and is capable of supporting DAV (Distributed Authoring and Versioning)—Recommended
- Using a storage server that does not have DAV support

Storage Server with Apache and DAV support

Storage on an external device must meet the following criteria:

- Be a properly configured device that is IP routable to and from the MWS and the managed server(s) that will use it
- Have the correct time set or have NTP configured.

Configure the storage server

1. Log into the storage server as the root user.

2. Locate or create the directory that is to be used as depot storage.
3. Set the directory and file ownership to the httpd user (normally apache:apache).

   Example: On a Red Hat system type, `chown apache:apache /path/to/depot`
4. Set the directory permissions to read/write for any user or group that will use the httpd process.

   Example: Type, `chmod 755 /path/to/depot`
5. On the storage server, create a new file in the conf.d directory of the webserver with the following settings:

   Tip: You can name the file anything, but a name such as `depot.conf` will be descriptive of the file function.

```
Alias </my_depot_alias/>  </path/to/depot/>
<Directory </path/to/depot>>
    DAV On
    AuthType Basic
    AuthName "DAV Restricted"
    AuthUserFile /path/to/password/file/<password_file>
    <LimitExcept GET HEAD OPTIONS>
        Require user <username>
    </LimitExcept>
</Directory>
```

   Where:

Value	Description
`my_depot_alias`	A user-friendly alias for the depot **Note:** This can be the path to the depot if a user-friendly name is not important to you.
`path/to/depot`	The location of the depot on the storage server
`path/to/password/file`	The location of the apache password file where the user's password can be verified
`password_file`	The apache password file where the user's password can be verified
`username`	The username of the user authorized to access the depot directory

Example

On a Red Hat system, create a new file called depot.conf in `/etc/httpd/conf.d` with the following settings:

```
Alias /my_depot/ /repo/images/
<Directory /repo/images>
    DAV On
```

```
    AuthType Basic
    AuthName "DAV Restricted"
    AuthUserFile /etc/httpd/repo.pwd
    <LimitExcept GET HEAD OPTIONS>
        Require user someuser
    </LimitExcept>
</Directory>
```

6. Type the following command to create or update the file used to store the authentication information for users authorized to access the depot:

   ```
   htpasswd -bc /path/to/password/file/<password_file>
   <username> <password>
   ```

   Example: `htpasswd -bc /etc/httpd/repo.pwd someuser somepassword`

7. As a root user, type the following command to restart the apache server:

   ```
   service httpd restart
   ```

Storage Server with NFS/CIFS support (NAS without DAV support)

When the external storage server supports NFS/CIFS and cannot be DAV enabled, the MWS can function as the DAV frontend to the storage server.

Storage on an external device must meet the following criteria:

- Be a properly configured device that is IP routable to and from the MWS and the managed server(s) that will use it
- Have the correct time set or have NTP configured.

Note: DynaCenter does not support Windows operating systems in non-DAV environments.

Configure the storage server

1. Log into the NAS as the root user.
2. Locate or create the directory that is to be used as depot storage.
3. Set the directory permissions to read/write for any user or group that will use the httpd process.
4. On the NAS, add the following line to the /etc/exports file:

   ```
   /<mount point> <hostname or IP address of NAS> \
   (rw,sync,hide,insecure,no_root_squash,secure_locks)
   ```

5. On the NAS, run the following command to reload the list of exported file systems:

   ```
   exportfs -a
   ```

6. On the MWS, type the following command to create a mount point:

   ```
   mkdir /depot
   ```

7. On the MWS, update /etc/fstab to include the following:

```
<hostname or IP of nas>:/<path/to/depot/on/nas> \
/depot nfs defaults 0 0
```

8. On the MWS, type the following command to mount the depot:

   ```
   mount -a
   ```

9. On the MWS, run the following command to confirm that the MWS server can access the share:

   ```
   showmount -e [hostname or IP address of NAS]
   ```

   The output should show the share for the captured image depot.

   Example:

   ```
   showmount -e <IP address of NAS>
   Export list for <IP address of NAS>:
   /depot <IP address of NAS server>
   ```

10. On the MWS, create a new file in /etc/httpd/conf.d with the following configuration:

    Tip: You can name the file anything, but a name such as `depot.conf` will be descriptive of the file function.

    ```
    Alias </my_depot_alias/>  </path/to/depot/>
    <Directory </path/to/depot>>
        DAV On
        AuthType Basic
        AuthName "DAV Restricted"
        AuthUserFile /etc/httpd/<password_file>
        <LimitExcept GET HEAD OPTIONS>
            Require user <username>
        </LimitExcept>
    </Directory>
    ```

    Where:

Value	Description
`my_depot_alias`	A user-friendly alias for the depot **Note:** This can be the path to the depot if a user-friendly name is not important to you.
`path/to/depot`	The location of the depot on the storage server
`password_file`	The apache password file where the user's password can be verified
`username`	The username of the user authorized to access the depot directory

    Example

    ```
    Alias /my_depot/ /repo/images/
    <Directory /repo/images>
    ```

```
    DAV On
    AuthType Basic
    AuthName "DAV Restricted"
    AuthUserFile /opt/race/etc/http/auth/depot.pwd
    <LimitExcept GET HEAD OPTIONS>
        Require user someuser
    </LimitExcept>
</Directory>
```

11. On the MWS, type the following command to create or update the file used to store the authentication information for users authorized to access the depot:

    ```
    htpasswd –bc /opt/race/etc/http/auth/repo.pwd someuser
    somepassword
    ```

12. On the MWS, as a root user, type the following command to restart the apache server:

    ```
    service httpd restart
    ```

Task 3: Register the Depot

To ensure that the external depot is visible to DynaCenter and any servers that DynaCenter will manage, you must register the depot.

1. On the MWS, type the following command to register the depot with the credentials you previously specified:

    ```
    dccmd register depot \
    [--access-identity=<id_or_user_name>] \
    [--access-secret=<secret_key>] \
    <depotId> <depotURL> \
    <networkId>=<depotURL> [<networkId>=<depotURL>...]
    ```

    Where:

Options	`--access-identity`	An authorized identity to access this storage server (for example, the username, the account, etc.). **Note:** If you use this option, you must also define `--access-secret`. **WebDAV storage:** This is a username of a user authorized to access the server.
	`--access-secret`	The password, key, or certificate associated with the authorized identity. **WebDAV storage:** This is the password associated with the username specified for `--access-identity`.
Arguments	`depotId`	The name of the depot.

	depotURL	The URL of the network storage. ▪ **WebDAV storage:** dav://server-address/path
	networkId=depotURL	Network that contains managed servers and the URL of the depot when accessed from that network

Example:

```
dccmd register depot mystorage \
--access-identity=someuser \
--access-secret=somepassword \
dav://my_storage_server_hostname_or_IP/my_depot \
192.168.206.0/24=dav://192.168.206.3/repo/images \
192.168.207.0/24=dav://192.168.207.3/repo/images \
192.168.208.0/24=dav://192.168.208.3/repo/images \
192.168.209.0/24=dav://192.168.209.3/repo/images
```

2. Confirm that the depot registered successfully:

   ```
   dccmd show depot <depotId> --format=full>
   ```

   Example:

   ```
   dccmd show depot mystorage --format=full
   ```

Note: The CA Server Automation user interface provides equivalent operations to the CLI. See the *CA Server Automation Reference Guide*, RSI CLI section, for command and parameter details.

Task 4: Edit the oem.ini file

The oem.ini file specifies the location of the depot. If you do not want to have to specify the depot location each time you perform an operation, you must edit the oem.ini file to point to the depot location on the storage server.

1. On the MWS, open the following file:

   ```
   /opt/race/share/conf/oem.ini
   ```

2. Edit the depot section of the oem.ini file as follows:

   ```
   [depot]
   uri = depot://<depot_name_on_storage server>
   ```

Section D: Silent Installation

A silent installation suppresses the display of the installation prompts when you install DynaCenter. With this option, you predefine the responses to installation questions in a configuration file and reference that configuration file when you run the installation program. As the software is installed, the installation program uses the settings in the configuration file as the responses to installation questions.

Task	Description	Reference
1	Install DynaCenter on "working" system	Task 1: Install DynaCenter on a "Working" System on page 61
2	Edit the config.ini file	Task 2: Edit the config.ini File on page 61
3	Set up custom depot storage location	Task 3: Set Up Custom Depot Storage Location (optional) on page 64
4	Silently install DynaCenter	Task 4: Silently Install DynaCenter on page 64
5	Edit the /etc/exports file	Task 5: Edit the /etc/exports File on page 64

Task 1: Install DynaCenter on a "Working" System

Before you can silently install DynaCenter on a target system, you must install DynaCenter on a "working" system. When you install DynaCenter on the "working" system, your responses to the installation program prompts are stored and you can then customize those responses to use when you silently install DynaCenter on other systems.

- Install DynaCenter using the instructions provided in Basic Installation on page 43.

  The installation creates a config.ini file in `/opt/race/etc`.

  Tip: Copy the config.ini file to a safe location so that you can use it as a template each time you need to silently install DynaCenter. If you do this, you can skip this task for subsequent silent installations of DynaCenter.

Task 2: Edit the config.ini File

The config.ini file contains the responses to the installation program prompts. If the settings you specified in Task 1: Install DynaCenter on a "Working" System are not appropriate for the environment where you want to silently install DynaCenter, you must edit the file with the appropriate settings.

1. Copy the config.ini file created in Task 1: Install DynaCenter on a "Working" System.

   Note: By copying the file, you leave the original file intact for subsequent silent installations.

2. Open the config.ini file in a text editor such as vi.
3. Use the information in the following table to edit any settings that are not appropriate for the silent installation:

Section	Setting	Description
general	oem_configuration	Default setting. DO NOT EDIT
	os_support	The operating systems that you want DynaCenter to support. Red Hat Linux, SUSE Linux, and Windows are provided by default. Valid values are: ▪ Solaris-sun4u ▪ Solaris-i86pc **Reference:** See Step 4 on page 43 for more information.
	mws_address	Management network for DynaCenter communication. If your environment has: ▪ a single MWS, use the loopback IP 127.0.0.1 ▪ multiple MWSs that work in concert, use a network IP accessible to all MWSs
	database_address	Storage for DynaCenter objects. Use the same IP address as used for mws_address.
client_networks	[[...]]	Network of a NIC or VLAN on the MWS that is connected to the same network(s) as managed servers.
	gateway	IP of a gateway controlling access to this network.
	addresses	Dedicated IP addresses on the Client Network used for DynaCenter operations.
	mws_interface	Name of the NIC/VLAN
	mws_ip	IP this NIC/VLAN uses to communicate with DynaCenter **Note:** If you do not specify an IP, the installation program will automatically assign an address.
	Note: You can either include these five lines for each	

	client network on the MWS or you can specify the default boot network here and use the `dccmd register network` command to register the other networks after the installation completes.	
storage	[[default]]	Section that defines where components are stored. DO NOT EDIT
	path	Path to the component storage location. DO NOT EDIT
	server_address	IP address of the default boot LAN. This is typically the mws_ip of the first Client Network.
	type	Type of storage. DO NOT EDIT
	[[instance]]	Section that defines where agent images and image metadata are stored. DO NOT EDIT
	path	Path to the agent images and image metadata storage location DO NOT EDIT
	server_address	IP address of the default boot LAN. This is typically the mws_ip of the first Client Network.
	type	Type of storage. DO NOT EDIT
	[[image]]	Section that defines where captured images are stored. DO NOT EDIT
	path	Path to the captured image depot.
	server_address	IP of the server where the captured image depot is located.
	type	Type of storage. DO NOT EDIT

4. Place the edited config.ini file anywhere on the system where you want to silently install DynaCenter.

Task 3: Set Up Custom Depot Storage Location (optional)

If you are using a custom storage location for your captured image depot, you must set up that storage.

Note: If you plan to store captured images on the MWS (not recommended), you can skip this task.

- Do one of the following:
  - If you are using a non-root storage location on the MWS, perform Task 1 from Section B: Advanced Installation with Non-Root Location for Depot on page 47.
  - If you are using an external storage server (recommended), perform Task 2 from Section C: Advanced Installation with External Storage for Depot (Recommended) on page 53.

Task 4: Silently Install DynaCenter

1. Insert the DynaCenter DVD into the MWS server.

   Note: Manually mount the media if the operating system does not mount it automatically.

2. Open a system terminal and change to the root directory of the installation media.
3. Type the following command:

   ```
   python ./dc-install --config-file=/path/config.ini \
   --non-interactive --quiet
   ```

   Note: The config.ini file referenced here is the file you created in Task 2: Edit the config.ini File on page 61.

   The installation program begins to silently install DynaCenter.
4. Check the install logs to ensure the installation was successful.

Note: The DynaCenter can also be installed as software delivery package from available ITCM server.

Task 5: Edit the /etc/exports File

Edit the /etc/exports file, which controls which file systems are exported from the external storage server.

1. On the MWS, add the following line to the /etc/exports file:

   ```
   /<mount point> <hostname or IP address of storage server> \
   (rw,sync,hide,insecure,no_root_squash,secure_locks)
   ```

2. On the system where the depot is located, run the following command to reload the list of exported file systems:

   ```
   exportfs -a
   ```

3. On the MWS, run the following command to confirm that the MWS server can access the share:

   ```
   showmount -e [hostname or IP address of storage server]
   ```

   The output should show the share for the captured image depot.

   Example:

   ```
   showmount -e <IP address of storage server>
   Export list for <IP address of storage server>:
   /depot <IP address of storage server>
   ```

Chapter 7: Configure DynaCenter

You can customize certain default DynaCenter settings that control the behavior for specific API commands, task options, and logging levels. This chapter describes DynaCenter files that you might want to customize for your environment.

OEM Configuration File

The OEM configuration file defines the default behavior for specific API command and task options. This section describes how to edit the file to set the values that are appropriate for your DynaCenter environment.

OEM Configuration File Sections and Options

The sections in the OEM configuration file relate to a specific OEM API command or task:

- chassis
- server_group
- depot
- repository
- image
- error_handling
- deploy
- agent
- capture

Each section specifies the values that define the default behavior for the OEM API command or task. Certain values should not be edited, but they are listed here for completeness. If any of the editable values listed below are not appropriate for your environment, edit the file. The file is located on the MWS in `/opt/race/share/conf/oem.ini`.

chassis

A chassis is a representation of a physical collection of servers. The chassis option affects the defaults used when target servers are registered through the OEM API commands.

Value	Description	Default
`id`	The name of the chassis to use for newly created servers. Target servers can belong to any chassis, but servers that are manually registered are added to this chassis.	OEM

server_group

A server group is used to organize servers and is used to control which combinations of software and hardware resources can communicate.

Value	Description	Default
`name`	The name of the server group for managed servers. All servers are added to this group during provisioning. **Note:** Do not edit this option.	OEM

depot

The depot options describe where and how captured images are stored on network attached storage devices.

Value	Description	Default
`uri`	The URI for the captured images depot, for example, depot://images. The value is used as a default if no value is given on the command line. **Important:** If your depot is not in the default location (in the root directory on the MWS), you must edit this setting.	

repository

The repository options control where meta-data data is written in the DynaCenter repositories.

Value	Description	Default
`drivers`	The name of the repository where Driversets should be saved. **Note:** Do not edit this option.	default
`image`	The name of the repository where captured and deployed images should be saved by default. **Note:** Do not edit this option.	instance
`template`	The name of the repository where templates for captured and deployed images should be saved. **Note:** Do not edit this option.	default

image

The image options provide defaults for image handling operations.

Value	Description	Default
`remove_empty_template`	A Boolean value that controls whether an empty template is removed after the last deployed image that is using it is removed.	True

error_handling

The error handling section of the configuration file controls how some classes of errors are handled by default.

Value	Description	Default
`ignore_missing`	Delete/remove operations will not produce an error message if the specified item has already been deleted or does not exist.	True
`overwrite_existing`	Overwrite existing captured image if one with the same name exists.	False
`remove_failed_captures`	When true, partial images are removed from the depot if the full capture fails for any reason. When false, images are only removed if the capture is canceled.	True

Note: CA Server Automation prechecks for existing image and doesn't allow overwriting exisiting image.

deploy

The deploy options set the defaults for the deploy operation.

Value	Description	Default
`scale_images`	A Boolean value that globally controls image scaling. When true, captured images are resized as needed to fit onto servers and consume all available space.	True
`remove_agent`	A Boolean value that controls whether the DPAD is removed after the image has been deployed. When true, the DPAD agent is removed from the target server.	False

agent

The agent options control the management of agent images.

Value	Description	Default
`retain_images`	The number of agent images to cache in the depot so that they are available for deploy and capture operations. If all of the cached images are in use at the same time, DynaCenter will create new agent images as needed, but that increases the amount of time needed to complete the operation.	5
`heartbeat_interval`	The frequency (in seconds) with which the DPAD communicates with DynaCenter. **Tip:** When working with slower networks or cloud	30

	networks, consider increasing the heartbeat interval to avoid missed heartbeats during capture and deploy operations. **Note:** A longer heartbeat interval means that commands from the MWS will take longer to reach the DPAD.	
pm_heartbeat_interval	The frequency (in seconds) with which the agent image communicates with DynaCenter. **Tip:** When working with slower networks or cloud networks, consider increasing the heartbeat interval to avoid missed heartbeats during capture and deploy operations. **Note:** A longer heartbeat interval means that commands from the MWS will take longer to reach the DPAD.	10
mws_url	The url base used to access the MWS. **Note:** Do not edit this option.	
register_url	The communication path used by the DPAD to communicate with DynaCenter when the DPAD first starts. **Note:** Do not edit this option.	
heartbeat_url	The communication path used by the DPAD to let DynaCenter know that it is running and to check if there are any pending tasks. **Note:** Do not edit this option.	
time_url	The communication path used by the DPAD to get the current time from DynaCenter. **Note:** Do not edit this option.	
taskstatus_url	The communication path used by the DPAD to send information to DynaCenter about the status of any tasks the DPAD is performing. **Note:** Do not edit this option.	
log_url	The communication path used by the DPAD to send log messages to DynaCenter. **Note:** Do not edit this option.	
event_url	The communication path used by the DPAD to send information to DynaCenter about any actions or tasks the DPAD is performing. **Note:** Do not edit this option.	
request_url	The communication path used by the DPAD to request the next provisioning task.	

	Note: Do not edit this option.	
`command_url`	The communication path used by the DPAD to send information about the status of the provisioning task that is currently running. **Note:** Do not edit this option.	
`set_clock`	A Boolean value that determines whether the DPAD asks DynaCenter for the current time. When set to True, the DPAD changes the system time on the server when the daemon starts.	False

capture

The capture option sets the defaults for the deploy operation.

Value	Description	Default
compress_image	A Boolean value that globally controls image compression. When true, captured images are compressed.	True

Sample OEM Configuration File

This sample configuration file represents the default configuration of DynaCenter.

```
[chassis]
id = OEM

[server_group]
name = OEM

[depot]
uri = depot://image

[repository]
drivers = default
image = instance
template = default

[image]
remove_empty_template = True

[error_handling]
ignore_missing = True
overwrite_existing = False
remove_failed_captures = True

[deploy]
scale_images = True
remove_agent = False

[agent]
retain_images = 5
heartbeat_interval = 30
pm_heartbeat_interval = 10
mws_url = https://localhost
register_url = %(mws_url)s/agent/register/
heartbeat_url = %(mws_url)s/agent/heartbeat
time_url = %(mws_url)s/agent/get_current_time
taskstatus_url = %(mws_url)s/agent/taskstatus
log_url = %(mws_url)s/agent/log
event_url = %(mws_url)s/agent/event
```

```
command_url = %(mws_url)s/agent/mark_command
request_url = %(mws_url)s/agent/next_request
set_clock = False


[capture]
compress_image = True
```

Retaining customizations

When you upgrade DynaCenter, you do not lose the customizations you have made to the oem.ini file. During an upgrade, DynaCenter rewrites the oem.ini file with your custom settings and any new configuration settings introduced as part of the upgrade.

DynaCenter Logging

DynaCenter logs all of its operations to files on the Management Workstation (MWS).

The default logging configuration should meet your needs; however, if you need to change the logging behavior, use the information in this section to reconfigure the settings.

Log levels

The log level specifies the severity and threshold of a log message. The log levels listed below are in order from the most severe to the least severe; lower log levels include the higher ones, for example, the level INFO includes all levels up to SYSMESG.

Log Level	Description	Log Volume
SYSMESG	System messages, usually with information about server startup and shutdown	Lowest ↓ Highest
CRITICAL	Messages that show critical or fatal errors	
ERROR	Error messages about failed operations, for example, the cause of a failed capture or provision	
WARNING	Messages about errors other than those that caused an operation to fail or abort	
USER	High-level messages that show the progress of a current operation	
INFO	Specific messages that show the progress of a current operation	
DEBUG	Verbose messages used by Support to troubleshoot issues	

Configure log levels

There are various loggers that send their log messages to the DynaCenter Logging Daemon (DLAD). The loggers determine which messages are sent to the DLAD based

on the threshold specified in the logclient.ini file. By default, the loggers log all messages at level DEBUG and higher so that all messages are sent to the DLAD. The DLAD determines which messages are written to the log files based on the threshold specified in the logserver.ini file.

Configure logging in the following ways:

- To specify which log messages the loggers send to the DLAD, edit the log level in the logclient.ini configuration file.

  Important: Racemi does not recommend changing the default setting unless the default DEBUG log level is so verbose that it is causing performance issues.

  Reference: See Configure the logging level for a logger on page 74.

- To specify which log messages the DLAD writes to the log files, edit the log level in the logserver.ini configuration file.

  Reference: See Configure the logging level for the DLAD on page 74.

Configure the logging level for a logger

⚠ **Caution:** Changing the logger logging level from the default DEBUG setting can result in the loss of important information.

1. On the MWS, open the logclient.ini file with an editor such as vi from the following location:

   `/opt/race/share/conf/logclient.ini`

2. Locate the section for the logger that you want to change the log level for.

   Example: To change the log level for the task logger, locate the [logger_task] section.

3. Change the `level=` line to reflect the new log level.

   Example: To change the task logger level from DEBUG to USER, edit the line `level=DEBUG` to `level=USER`.

4. Save and close the file.
5. Type the following command to restart DynaCenter services:

   `dcctl restart`

Configure the logging level for the DLAD

1. On the MWS, open the logserver.ini file with an editor such as vi from the following location:

   `/opt/race/share/conf/logserver.ini`

2. Locate the section for the logger that you want to change the log level for.

   Example: To change the log level for the task logger, locate the [logger_task] section.

3. Change the `level=` line to reflect the new log level.

Example: To change the task logger level from INFO to USER, edit the line `level=INFO` to `level=USER`.

4. Save and close the file.
5. Type the following command to restart DynaCenter services:

   ```
   dcctl restart
   ```

Log files

DynaCenter generates several log files that you might need to reference. The log files are written in `/var/log/dynacenter`.

Task log

DynaCenter writes logs that are related to tasks (such as capture and provision tasks) to `/var/log/dynacenter/task.log`. Each task-related log message contains the task ID of the operation.

Command line programs that start tasks print the task ID to stdout when run with the `--no-wait` or `-v` options.

Other log files

DynaCenter creates several other log files in `/var/log/dynacenter` that you might need to reference for troubleshooting purposes:

Log File	Description
configure.log	Contains information related to the DynaCenter installation process
daemon.log	Contains messages from the various daemons about non-task-related processes
dc-install.log	Contains information related to the DynaCenter installation process
install.log	Contains information related to the DynaCenter installation process
handler.log	Failsafe log if there is a problem with the log system
Pyro_log	Contains debugging information related to the internal communication mechanism
userlogs	Directory that contains logs from user-run command line programs such as dccmd

Log file backups

DynaCenter automatically backs up log files in one of the following ways:

- install.log—this log file is backed up every time you install DynaCenter. A timestamp is appended to the file name of the older log file to prevent older files from being overwritten.

- All other log files (except Pyro_log)—these log files are rotated when they reach 100MB. When the file reaches 100MB, it is renamed to <name>.log.1 and any existing log files of the same type are incremented by one. DynaCenter stores a maximum of ten backups, so, when the log files are rotated, <name>.log.10 is deleted and <name>.log.9 becomes <name>.log.10.

Retaining customizations

When you upgrade DynaCenter, you do not lose the customizations you have made to the logserver.ini or logclient.ini files as these files are not overwritten during the upgrade process. Instead of overwriting the files and erasing your custom settings, DynaCenter creates new versions of the files by appending '.rpmnew' to the original file name. You can then compare your file with the new file created as part of the upgrade and copy any new options in the new file to your original file.

Reference: See Edit DynaCenter Configuration Files on page 23 for details on updating the logserver.ini or logclient.ini files.

Chapter 8: Install DynaCenter Agents on Target Servers

The DynaCenter agent is called DynaCenter Provisioning Agent Daemon (DPAD). It is a management service that communicates with the DynaCenter Management Workstation (MWS). It can perform the following functions:

- Hardware inspection
- Driver capture
- Boot control
- Image provision
- Image capture

Before DynaCenter can manage a server, you must install a DPAD on the server.

Note: When managing a bare-metal system, you cannot install a DPAD so initiating a network boot requires either physical intervention (i.e., a person must push the power-on button) or a smart power strip (a device with power plugs that can receive commands to turn specific power plugs on and off).

Install a DPAD on Target Servers

The DynaCenter Provisioning Agent (DPAD) allows DynaCenter to recognize and collect information about a server. Before you can capture a server image, you must install a DPAD on the server.

The DPAD installation packages are located in the following directory on the MWS: `opt/race/mws/software/packages/agent`.

The available DPAD packages are:

- **Windows:** `dpsetup.exe`
- **Linux:** `racemi-blademgmt-linux-*.rpm`
- **Solaris:** `racemi-blademgmt-solaris-xxx-<version>.pkg`

  Where `xxx` is either `i86pc` or `sun4u`.

Procedure

1. Copy the appropriate package from the MWS to the target server.

   Example:

   On the target server, type the following command:

   ```
   scp user@hostname_of_DynaCenter_MWS:\
   /opt/race/mws/software/packages/agent\
   /racemi-blademgmt-linux-*.rpm \
   /tmp
   ```

Note: The hostname of the MWS must be DNS resolvable.

2. From the directory on the target server where you placed the package, install the package using the appropriate command:

   - **Windows non-interactive:** Open the command prompt as an administrator and then type the following command:

     `dpsetup.exe /S /mwsurl=<"your MWS URL">`

     Example: `dpsetup.exe /S /mwsurl="https://10.54.1.1"`

     The DPAD is installed on the server; go to Step 6.

   - **Windows interactive:** Double-click the `dpsetup.exe` executable file and respond to the installer wizard.

     The DPAD is installed on the server; go to Step 6.

   - **Linux:** Type `rpm -Uvh racemi-blademgmt-linux-*.rpm`

   - **Solaris:** Type `pkgadd –d racemi-blademgmt-solaris-xxx-<version>.pkg`

     Where `xxx` is either `i86pc` or `sun4u`.

3. On non-Windows systems, open the dpad.ini file with an editor such as vi from the following location on the target server:

   `/opt/race/etc/dpad.ini`

4. Edit the mws_url line to point to the MWS that manages the server where you installed the DPAD.

   Example 1: mws_url = https://10.4.1.1

   Example 2: mws_url = https://<your_company>.com:4433

   Note: Do not edit any other settings in the dpad.ini file.

5. Type the following command to restart the DPAD:

   `service dpad.rc restart`

6. Confirm that the DPAD installed correctly by checking that the server registers with DynaCenter:

   `dccmd show server <server_name>`

   The substatus should be Running.

Remove DPAD from Target Server

When you no longer want DynaCenter to manage a server, you can remove the DPAD from the server. If the server was provisioned by DynaCenter, you must manually remove the DPAD as it will not be part of the native OS software packaging/database system.

Windows

If the system **was** provisioned by DynaCenter:

1. Type `cmd /c net stop dpad`

2. Type `cmd /c sc delete dpad`
3. Type `rmdir /Q /S "c:\Program Files\DynaCenter`

If the system **was not** provisioned by DynaCenter:

1. Depending on the version of Windows you are running, go to **Programs→Uninstall a program**.
2. Right-click the DynaCenter dpad and click **Uninstall**.

Linux

If the system **was** provisioned by DynaCenter:

1. Type `/etc/init.d/dpad.rc stop > /dev/null`
2. Type
```
/bin/rm -rf /etc/rc.d/rc6.d/K98dpad \
/etc/rc.d/rc3.d/S25zdpad /etc/rc.d/rc0.d/K98dpad \
/etc/rc.d/rc5.d/S25zdpad /etc/rc.d/rc1.d/K98dpad \
/etc/rc.d/rc4.d/S25zdpad /opt/race \
/var/log/dynacenter /dpad.ini \
/etc/init.d/dpad.rc /.race_network /.raceinfo \
/.raceip /.raceslotid /.race_services
```

If the system **was not** provisioned by DynaCenter:

- Type `rpm -e racemi-servermgmt-linux-*`

Solaris

If the system **was** provisioned by DynaCenter:

1. Type `/etc/init.d/dpad.rc stop > /dev/null`
2. Type
```
/bin/rm -rf /etc/rc2.d/S73zdpad \
/etc/rc2.d/S73racemi_staticroutes /etc/rc0.d/K98dpad \
/etc/rc1.d/K98dpad /etc/rcS.d/K98dpad /opt/race \
/var/log/dynacenter /dpad.ini /etc/init.d/dpad.rc \
/.race_network /.raceinfo /.raceip /.raceslotid \
/.race_services
```

If the system **was not** provisioned by DynaCenter:

- Type `pkgrm RACEdpad`

Chapter 9: Enable Network Boot on Target Servers

DynaCenter requires all of the target servers that it manages to boot from the network. This chapter explains how to enable network boot for supported platforms and how to control a target server's boot sequence using the DHCP, PXE, or OBP protocol. Note that some of these items are functions of the driving application, and are not configurable within the DynaCenter application.

Networking and Storage Prerequisites

Before the driving application invokes DynaCenter, you must ensure that the following network and storage requirements are met for each target server:

- The target server is configured to boot from the network first (PXE), and will fall back to DAS/SAN boot if no response is delivered.

  Reference: See Configuring Network Boot on page 77.
- The target server can connect to the DynaCenter depot via DAV.
- The target server can receive a BOOTP response from DynaCenter, and will not receive any BOOTP responses from any other server.

Configuring Network Boot

Intel/AMD

Most servers will use PXE to boot over the network. All modern Intel/AMD platforms can be configured for PXE boot from the BIOS configuration.

Sun platforms

DynaCenter supports Sun servers that use OpenBoot version 3.10.25, or later, for hardware test and configuration.

Configuring a Sun SPARC server for network boot involves changing some of the environment variables stored in NVRAM that are used by OpenBoot.

Procedure

1. Boot your Sun hardware to the OpenBoot prompt (or issue the printenv command to print out all of the environment variables for your hardware).
2. Record the values for the following variables:
   - boot-command
   - boot-device
   - boot-file
   - auto-boot

   Archive theses values so that you can restore them if you remove the server from the DynaCenter environment.

3. Set the following variables as indicated:
   - `setenv boot-command boot`
   - `set-default boot-file`
   - `setenv auto-boot? true`
4. If your server has only one network interface, or if the net variable that specifies the default network interface is set to the interface that is connected to the DynaCenter Boot LAN, then insert `net:dhcp` at the start of the boot-device definition.

   Example: If the current value for the configured boot device is boot-device=disk, then issue the command:

   ```
   setenv boot-device net:dhcp
   ```

   When your server boots, it will try to boot over the network from DynaCenter. If you want to boot off the disk, issue the following command at the 'ok' prompt:

   ```
   boot disk
   ```

Multiple network cards

On SPARC systems with more than one network interface card, it is very likely that the net alias will point to an interface card that is not the one connected to the DynaCenter boot LAN. In this case, redefine the net alias to the appropriate interface card using the nvalias command:

```
nvalias net /pci@1f,0/pci@1,1/network@3,1
setenv boot-device net:dhcp
```

Boot Sequence Management

After the target servers are configured for network boot, DynaCenter must be able to control the boot sequence of the target servers using the DHCP, PXE, or OBP network boot protocol. While DynaCenter is capturing or deploying images, it might need to boot the target server into an agent image that contains special support software and networking information. Control of the boot sequence allows DynaCenter to reboot the server into the agent image.

If the driving application that integrates with DynaCenter also uses DHCP to control the server, or if there are other management systems within the data center that require control of the DHCP exchange, then DynaCenter and the driving application need to coordinate control of the server's boot sequence. The driving application must be configured to allow DynaCenter control of the target server's boot sequence, which is typically accomplished in one of three ways:

- Configure the DHCP Server
- Disable/Enable DHCP Response
- Switch the Target Server's VLANs

Configure the DHCP server

If the driving application's DHCP server can be configured to not respond to BOOTP requests, it can be left online and no other action needs to be taken.

Disable/enable DHCP response

If the driving application's DHCP response can be disabled to an individual server (other than DynaCenter's), then the target server's DHCP response can be disabled prior to issuing a command to DynaCenter. DHCP can be re-enabled for the server after DynaCenter has completed its operation. This option can be accomplished with or without DynaCenter power control.

Sequences with and without power control

Outlined below is the sequence of events for disabling/enabling the DHCP response. These explanations are provided so that you understand what is happening on the server, but each individual server vendor has already accounted for this in their implementation and, generally, this is not something that can be modified as part of the installation. The following sequences assume that the driving application's DHCP response is disabled to the target server.

If DynaCenter **HAS** power control over the target server:

1. Gracefully shut down the server.
2. Remove power from the server.
3. Disable the driving application's local DHCP control of the server.
4. Issue the OEM command to DynaCenter.
5. DynaCenter powers on the server to initiate the boot sequence.

After DynaCenter completes the operation:

1. DynaCenter gracefully shuts down the server.
2. DynaCenter removes power from the server.
3. DynaCenter returns an operation completion status.
4. Enable the driving application's local DHCP control of the server.
5. Restore power to the server.

If DynaCenter does **NOT** have power control over the target server:

1. Disable the driving application's local DHCP control of the server.
2. Issue the OEM command to DynaCenter.
3. DynaCenter calls back to the driving application, or some other management system, to reboot the server.
4. Issue the assign agent command to DynaCenter.
5. The driving application reboots the server.
6. Issue the OEM command to DynaCenter.

After DynaCenter completes the operation:

1. DynaCenter returns an operation completion status.
2. Enable the driving application's local DHCP control of the server.
3. DynaCenter reboots the server. (The server is currently running the DynaCenter agent image and must be rebooted by DynaCenter).
4. DynaCenter reboots the server.

Switch the target server's VLANs

Note: This option is not supported if power control is not available.

This explanation is provided so that you understand what is happening on the server, but, generally, this is not something that can be easily configured in the installation.

If the driving application can switch the VLANs on which the target server resides, then it can move the server's boot DHCP interface onto a special "imaging" VLAN prior to issuing an OEM command to DynaCenter. The server can be moved back to the production VLAN after DynaCenter has completed its operation.

The driving application must provide control of the server's power state as DynaCenter needs the driving application's API to power the server on and off.

Outlined below is the sequence of events for moving the target server from the production VLAN to the imaging VLAN.

1. Gracefully shut down the server.
2. Remove power from the server.
3. Place the server on the imaging VLAN.
4. Issue the OEM command to DynaCenter.
5. The server is powered on to initiate the boot sequence.

After DynaCenter completes the operation:

1. DynaCenter gracefully shuts down the server.
2. Power is removed from the server.
3. DynaCenter returns an operation completion status.
4. Place the server back on the production VLAN.
5. Restore power to the server.

Chapter 10: Configure DynaCenter Coexistence with External DHCP/PXE Servers

DynaCenter can manage target servers on any directly attached network (any local subnet attached to DynaCenter) and target servers on any external network (any network behind one or more routers or firewalls).

DynaCenter has its own internal DHCP server that it uses to manage PXE boot requests and to assign addresses via DHCP; however, the following network configurations require the DynaCenter DHCP server to coexist with other DHCP servers:

- You have target servers on directly attached networks but you want to use your own DHCP server to assign IP addresses

  Reference: See Directly Attached Networks on page 85.
- You have target servers on directly attached networks but you want to use your own DHCP server to assign IP addresses and to manage PXE boot requests.

  Reference: See Directly Attached Networks on page 85.
- You have target servers on external networks.

  Reference: See External Networks on page 91.

Directly Attached Networks

When you have your own DHCP server and you want the DynaCenter DHCP server to coexist with your existing DHCP infrastructure, you have the following configuration options:

- Use the DynaCenter DHCP server for PXE boots and your existing DHCP server for addressing
- Use your existing DHCP server for both PXE boots and for addressing

Option 1: DynaCenter PXE server with an external DHCP server

In this option, you have an external DHCP server for assigning addresses, but you want DynaCenter to manage PXE boot requests.

In this situation, DynaCenter will only answer PXE requests for servers that are actively configured for a deploy or offline capture operation; however, your existing DHCP server might still respond to the PXE boot requests. Depending on the timing and the implementation of the PXE client, the existing DHCP server might respond first and prevent servers from properly netbooting an agent image. To prevent this situation, you should configure your existing DHCP servers to prevent them from responding to PXE boot requests.

ISC DHCP

ISC DHCPD is the standard DHCP server included with most Linux distributions. To prevent it from responding to PXE boot requests, create a 'class' that is matched if the vendor class identifier contains 'PXEClient'. Then, in the address pool for each subnet definition, mark this class as denied.

To create the class, do the following:

- In the `/etc/dhcpd.conf` file, add the following entry:

```
# PXE clients
class "pxe" {
    match if substring(option vendor-class-identifier, \
 0, 9) = "PXEClient";
}
```

To mark the PXEClient class as denied:

- In each subnet where DynaCenter is answering PXE requests, edit the `dhcpd.conf` file as follows:

```
subnet <subnet IP> netmask <netmask> {
    pool {
            deny members of "pxe";
            range <range of IPs to deny>;
    }
    option routers           <gateway IP address>;
    option subnet-mask       <subnet mask>;
    option broadcast-address <subnet broadcast address>;
    default-lease-time       <default lease time>;
    max-lease-time           <maximum lease time>;
}
```

  Note: Do not include a `range` statement in the main body of the `subnet` declaration as this will bypass the `pool` declaration that ignores PXE requests.

Example:
If 10.100.1.0/24 is a DynaCenter boot subnet:

```
subnet 10.100.1.0 netmask 255.255.255.0 {
    pool {
            deny members of "pxe";
            range 10.100.1.101 10.100.1.254;
    }
    option routers           10.100.1.1;
    option subnet-mask       255.255.255.0;
    option broadcast-address 10.100.1.255;
    default-lease-time       21600;
    max-lease-time           43200;
}
```

Windows DHCP

To prevent Windows DHCP from responding to PXE boot requests, disable scope options 60, 66, and 67.

1. Click **Start→Administrative Tools→DHCP**.
2. Expand the node for the DHCP server.
3. Click **Server Options**.
4. In the right hand pane, do the following:
   - right-click option 60 and click **Delete**
   - right-click option 66 and click **Delete**
   - right-click option 67 and click **Delete**
5. Right-click the DHCP server node, click **All Tasks→Restart**.

Option 2: External PXE server and an external DHCP server

In this option, you have an external DHCP server for assigning addresses, and you also want to use an external DHCP server to manage PXE boot requests.

In this situation, your existing DHCP server will respond to the PXE boot requests but DynaCenter might also attempt to answer any PXE requests from servers that are actively configured for a deploy or offline capture operation. To prevent this situation, you must disable the internal DynaCenter DHCP server to prevent it from responding to PXE boot requests.

Important: It is strongly recommended that only one DHCP server is configured to answer PXE/DHCP requests on each subnet. When multiple DHCP servers are configured to answer PXE/DHCP requests on the same subnet, the agent image boot process can be negatively affected.

ISC DHCP

To use an external PXE server with DynaCenter, use the following procedure:

1. On the MWS, turn off the internal dhcp server:

   ```
   service rdhcpd stop
   ```

2. On the MWS, disable the internal dhcp server so that it does not automatically start:

   ```
   chkconfig rdhcpd off
   ```

3. In the `dhcpd.conf` file on the external DHCP server, configure the `next-server` parameter to point to the IP address of the MWS on the boot network.
4. In the `dhcpd.conf` file on the external DHCP server, change the `filename` parameter to `/tftpboot/racemiboot.kpxe`.
5. If you have more than one DHCP server configured to answer PXE/DHCP requests (not recommended), in the `dhcpd.conf` file on the external DHCP server, add the following lines:

```
option space ipxe;
option ipxe-encap-opts code 175 = encapsulate ipxe;
option ipxe.priority code 1 = signed integer 8;

option ipxe.priority 1;
```

Setting the ipxe.priority setting tells the agent image boot loader to prioritize DHCP responses from this DHCP server; this can mitigate agent image boot issues when there are multiple DHCP servers on the same subnet.

Example:
If the MWS boot network is 10.4.0.0/16, and the IP of the MWS is 10.4.1.1, the relevant section of dhcpd.conf file would look like this:

```
subnet 10.4.0.0 netmask 255.255.0.0 {
  # Set next-server to the IP address of the DynaCenter MWS
    next-server  10.4.1.1;
    filename        "/tftpboot/racemiboot.kpxe";

    range                    10.4.2.100 10.4.2.254;
    option routers           10.4.1.1;
    option subnet-mask       255.255.0.0;
    option broadcast-address 10.4.255.255;
    default-lease-time       21600;
    max-lease-time           43200;
}
```

Windows DHCP

To use an external PXE server with DynaCenter, use the following procedure:

1. On the MWS, turn off the internal dhcp server:

   ```
   service rdhcpd stop
   ```

2. On the MWS, disable the internal dhcp server so that it does not automatically start:

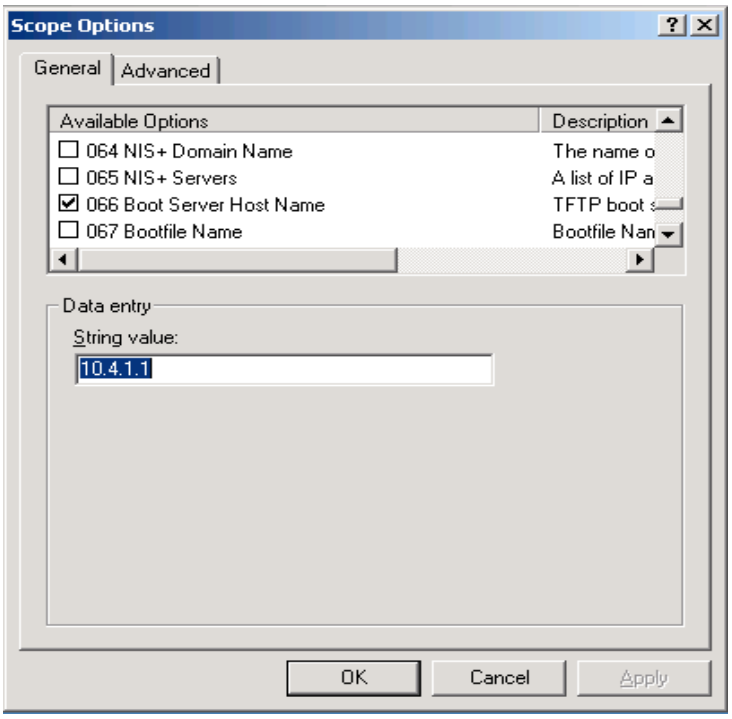
   ```
   chkconfig rdhcpd off
   ```

3. On the Windows DHCP server, open a command window.
4. Type `netsh` and press **Enter**.
5. Type `dhcp server` and press **Enter**.
6. Type `add optiondef 60 PXEClient STRING 0 comment=option added for PXE support` and then press **Enter**.
7. Type `set optionvalue 60 STRING PXEClient` and press **Enter**.
8. Close the command window.
9. Click **Start→Administrative Tools→DHCP**.
10. Expand the node for the DHCP server.

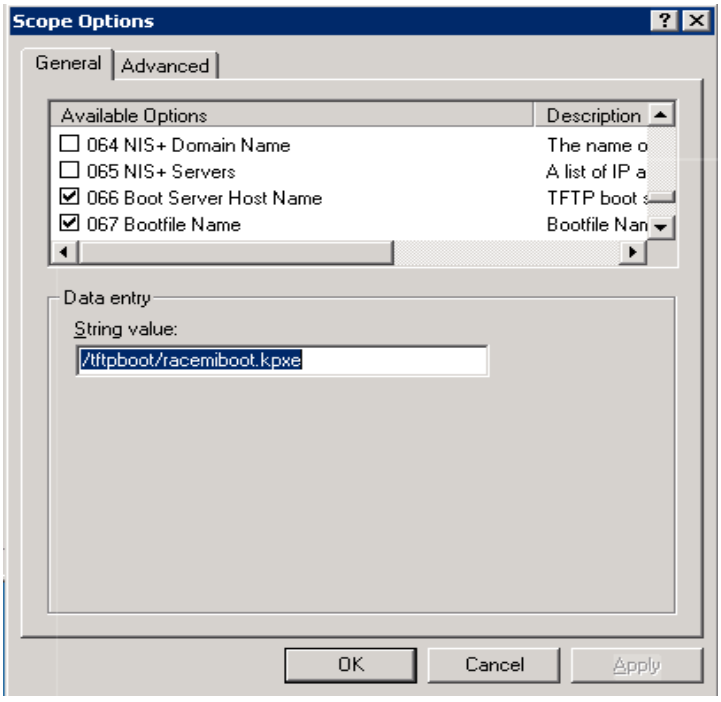
11. Right-click on the **Scope Options** folder for the MWS boot scope, and then click **Configure Options** in the context menu.
12. Select **066 Boot Server Host Name**, and then type the IP address of the MWS in the **String value** field.
13. Select **067 Bootfile Name**, and then type `/tftpboot/racemiboot.kpxe` in the **String value** field.
14. Click **Apply**.
15. Right-click the DHCP server node, click **All Tasks→Restart**.
16. Click **OK**.

Example:
If the MWS boot network is 10.4.0.0/16 and the IP of the MWS is 10.4.1.1:

1. On the Windows DHCP server, open a command window.
2. Type `netsh` and press **Enter**.
3. Type `dhcp server` and press **Enter**.
4. Type `add optiondef 60 PXEClient STRING 0 comment=option added for PXE support` and then press **Enter**.
5. Type `set optionvalue 60 STRING PXEClient` and press **Enter**.
6. Close the command window.
7. Click **Start→Administrative Tools→DHCP**.
8. Expand the node for the DHCP server.
9. Right-click on the **Scope Options** folder for the MWS boot scope, and then click **Configure Options** from the context menu.
10. Select **066 Boot Server Host Name**, type 10.4.1.1 in the **String value** field, and then click **OK**.



11. Select **067 Bootfile Name**, type `/tftpboot/racemiboot.kpxe` in the **String value** field, and then click **OK**.



12. Click **Apply**.
13. Right-click the DHCP server node, click **All Tasks→Restart**.
14. Click **OK**.

External Networks

When you manage servers on an external network, the DynaCenter DHCP server cannot manage the PXE boot requests because the servers are not on the same subnet as the MWS where DynaCenter is installed.

In this situation you must configure an external DHCP server on **each** external network where target servers reside.

Important: It is strongly recommended that only one DHCP server is configured to answer PXE/DHCP requests on each subnet. When multiple DHCP servers are configured to answer PXE/DHCP requests on the same subnet, the agent image boot process can be negatively affected.

ISC DHCP

To use a PXE server on an external network with DynaCenter, use the following procedure:

1. In the `dhcpd.conf` file on the external DHCP server, configure the `next-server` parameter to point to the IP address of the MWS on the boot network.
2. In the `dhcpd.conf` file on the external DHCP server, change the `filename` parameter to `/tftpboot/racemiboot.kpxe`.
3. Ensure that TFTP, HTTP, and HTTPS traffic can pass through all routers and or firewalls between the external network and the MWS.
4. If you have more than one DHCP server configured to answer PXE/DHCP requests (not recommended), in the `dhcpd.conf` file on the external DHCP server, add the following lines:

   ```
   option space ipxe;
   option ipxe-encap-opts code 175 = encapsulate ipxe;
   option ipxe.priority code 1 = signed integer 8;

   option ipxe.priority 1;
   ```

   Setting the ipxe.priority setting tells the agent image boot loader to prioritize DHCP responses from this DHCP server; this can mitigate agent image boot issues when there are multiple DHCP servers on the same subnet.

Example:
If the MWS boot network is 10.4.0.0/16, and the IP of the MWS is 10.4.1.1, the relevant section of dhcpd.conf file would look like this:

```
subnet 10.4.0.0 netmask 255.255.0.0 {
  # Set next-server to the IP address of the DynaCenter MWS
    next-server  10.4.1.1;
    filename        "/tftpboot/racemiboot.kpxe";

    range                   10.4.2.100 10.4.2.254;
    option routers          10.4.1.1;
```

```
    option subnet-mask       255.255.0.0;
    option broadcast-address 10.4.255.255;
    default-lease-time       21600;
    max-lease-time           43200;
}
```

Windows DHCP

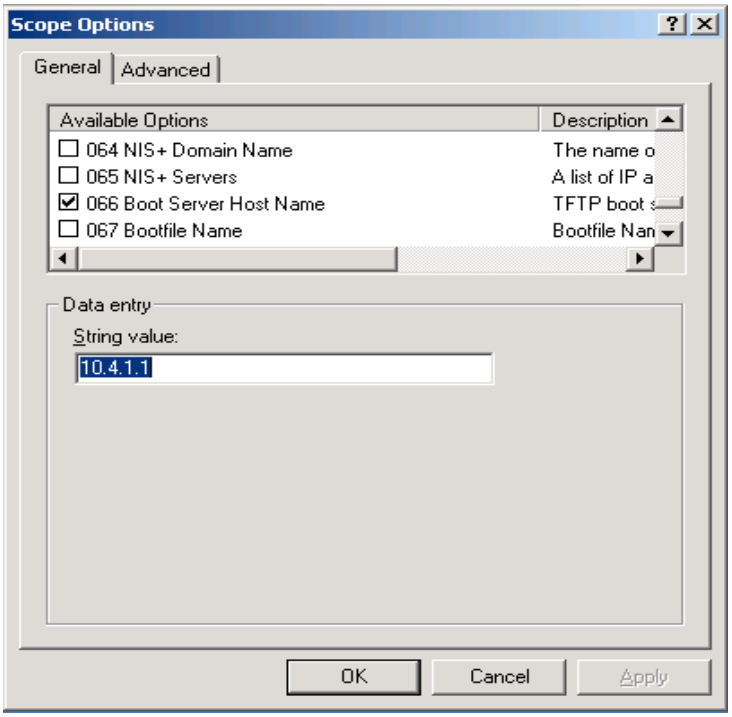
To use a PXE server on an external network with DynaCenter, use the following procedure:

1. On the Windows DHCP server, open a command window.
2. Type `netsh` and press **Enter**.
3. Type `dhcp server` and press **Enter**.
4. Type `add optiondef 60 PXEClient STRING 0 comment=option added for PXE support` and then press **Enter**.
5. Type `set optionvalue 60 STRING PXEClient` and press **Enter**.
6. Close the command window.
7. Click **Start→Administrative Tools→DHCP**.
8. Expand the node for the DHCP server.
9. Right-click on the **Scope Options** folder for the MWS boot scope, and then click **Configure Options** in the context menu.
10. Select **066 Boot Server Host Name** and then type the IP address of the MWS in the **String value** field.
11. Select **067 Bootfile Name** and then type `/tftpboot/racemiboot.kpxe` in the **String value** field.
12. Click **Apply**.
13. Right-click the DHCP server node, click **All Tasks→Restart**.
14. Click **OK**.

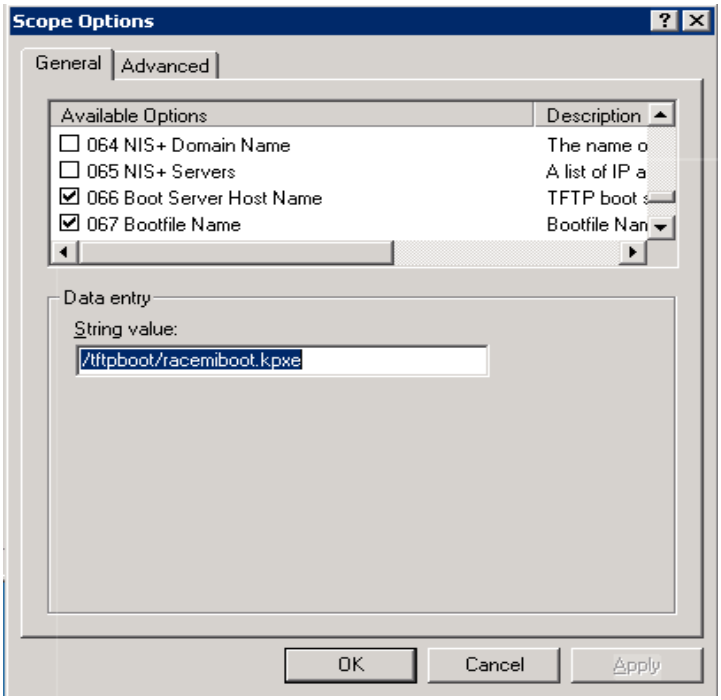
Example:
If the MWS boot network is 10.4.0.0/16 and the IP of the MWS is 10.4.1.1:

1. On the Windows DHCP server, open a command window.
2. Type `netsh` and press **Enter**.
3. Type `dhcp server` and press **Enter**.
4. Type `add optiondef 60 PXEClient STRING 0 comment=option added for PXE support` and then press **Enter**.
5. Type `set optionvalue 60 STRING PXEClient` and press **Enter**.
6. Close the command window.
7. Click **Start→Administrative Tools→DHCP**.
8. Expand the node for the DHCP server.

9. Right-click on the **Scope Options** folder for the MWS boot scope, and then click **Configure Options** from the context menu.
10. Select **066 Boot Server Host Name**, type 10.4.1.1 in the **String value** field, and then click **OK**.



11. Select **067 Bootfile Name**, type `/tftpboot/racemiboot.kpxe` in the **String value** field, and then click **OK**.



12. Click **Apply**.
13. Right-click the DHCP server node, click **All Tasks→Restart**.
14. Click **OK**.

Chapter 11: Troubleshooting

This chapter identifies issues you might encounter as you install your DynaCenter environment.

Installation With RSI Fails

Problem

The installation program stops fails without an indication of the problem.

Solution

If you are installing the RSI component and the installation fails, verify that you have a valid Dynacenter license by running the rshowlicense command on the RSI server. Check to see if Apache Http service and samba daemon service running on the RSI

Reinstallation Fails After an Aborted Installation

Problem

When you try to install DynaCenter after aborting a previous installation attempt, the reinstallation fails.

Background

Even though you aborted the initial installation, certain DynaCenter files might already have been placed on the MWS; these files can cause subsequent installation attempts to fail.

Solution

After a failed installation attempt, ensure that all DynaCenter files are removed from the MWS before you try to run the installation again.

1. Type the following command:

   ```
   rpm -e racemi-mws racemi-dynacenter
   ```

2. Rerun `python ./dc-install`.

Appendix A: Support Matrices

Environmental Support List

Operating System	Microsoft Windows		Linux			Solaris	
Operating System Variant	2003 Server	2008	Red Hat	SUSE	CentOS	SPARC	x86
Supported Versions / Releases	SP2	R2	Enterprise 4.x & 5.x	SLES 10.x & 11.x	4.x & 5.x	10u6	10.x
Migrate into Public Clouds	No		Yes	No	Yes	N/A	
Supported Public Clouds	N/A		Amazon EC2 (limited regions), GoGrid, Rackspace, Terremark			N/A	
Virtualization Support	VMware ESX 3.x, 4.x, and ESXi 4.1 u1; Citrix Xen 5.x; Hyper-V		VMware ESX 3.x, 4.x and ESXi 4.1 u1			N/A	
SupportedLogical Volume Managers	Windows native, excluding GPT and Dynamic Disks		Linux LVM			Solaris Native	
P2P Capture/Deploy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cross-vendor Capture/Deploy (same processor family)	Yes	Yes	Yes	Yes	Yes	N/A	Yes
P2V Capture/Deploy	Yes	Yes	Yes	Yes	Yes	N/A	N/A
V2P Capture/Deploy	Yes	Yes	Yes	Yes	Yes	N/A	N/A
V2V Capture/Deploy	Yes	Yes	Yes	Yes	Yes	N/A	N/A
Heterogeneous V2V	Yes	Yes	No	No	No	N/A	N/A
Supported Storage (for managed servers)	DAS and SAN		DAS and SAN			DAS and SAN	

Supported server families:

HP Proliant Racked servers (DLxxx)
HP Proliant Tower servers (MLxxx)
HP Proliant Blade servers
Sun x86 Racked servers
Sun SPARC Racked servers
IBM X series
IBM
IBM BladeCenter PPC servers
Dell PowerEdge Racked servers
Cisco UCS B200 Blade servers (UCS 5108 Chassis)

Hypervisor Environments

DynaCenter can provision images both between hypervisors of the same type and between hypervisors of different types.

Operating system matrix

DynaCenter supports the following hypervisors and operating systems:

Hypervisor	Operating Systems					
	SLES 10.x, 11.x	CentOS 4.x	CentOS 5.x	RHEL 4.x, 5.x	Windows 2003	Windows 2008 R2
ESX 3.5	Yes	No*	Yes	Yes	Yes	Yes
ESX 4.x	Yes	Yes	Yes	Yes	Yes	Yes
ESXi 4.1u1^	Yes	Yes	Yes	Yes	Yes	Yes
Hyper-V	No	No	No	No	Yes	Yes

*Vendor support issue ^ESXi servers registered with a Virtual Center server

Provisioning matrix

DynaCenter supports provisioning between the following hypervisors:

Source		
	ESX	Hyper-V
ESX	Yes	Yes*
Hyper-V	Yes*	Yes*

*Windows operating systems only

Cloud Environments

Vendor and operating system matrix

DynaCenter supports capture and deploy operations for the following operating systems in an AppLogic Grid:

Cloud	Operating Systems				
	RHEL 4.x	RHEL 5.x	CentOS 4.x	CentOS 5.x	Windows 2008 R2
Amazon	Yes	Yes	Yes	Yes	No
AppLogic	No	5.4 and later	No	5.4 and later	Yes

DynaCenter and cloud API matrix

DynaCenter releases are updated independently from cloud API releases and AppLogic Module releases. The following matrix lists which versions of DynaCenter support certain cloud API versions and AppLogic Module version:

DynaCenter Version	Cloud API Version	AppLogic Module Version
4.0.0-x	2.0.0-x	N/A
4.1.0-x	2.1.0-x	1.0.0-x

Unified Computing System Environments

DynaCenter has limited support for Cisco Unified Computing System (UCS) blade servers.

Supported environment

DynaCenter was tested on a UCS environment with the following configuration:

- B200 M1 Blade Server mounted in a UCS 5108 Blade Server Chassis
- ixgbe – Intel 10Gb PCI Express NIC Driver
- Dual Serial Attached SCSI (SAS) drives in a striped and mirrored RAID configuration as well as non-RAID configurations

Glossary

Agent Image

While DynaCenter is capturing or deploying images, it may boot the server into an image that contains special support software. This image is called an “agent image”. Agent images are created in the repository and managed automatically by DynaCenter. They use network addresses allocated from the boot network for the boot group of the server. You can use an agent image to deploy a captured image to a server with no software installed on it.

Reference: Bare-metal Provisioning in the *DynaCenter OEM Integration Guide*.

Base Component

A captured Operating System that is installed on the MWS as a software component and is used to create an agent image.

Capture

The process of scanning an image already installed on a server and saving the data into an archive format.

Captured Image

An archived form of a standard image. A captured image is identified with a name assigned by DynaCenter.

Chassis

A chassis is a representation of a collection of servers. Chassis have a type that corresponds to a driver for controlling the servers on the chassis. Common types of chassis are VMware and Virtual (for standalone servers).

Deploy

The process of moving a captured image from the depot to a target server for provisioning.

Deployed Image

An image that has already been provisioned onto a server.

Depot

Storage container for captured images. The depot must be routable to the MWS and to servers being managed by DynaCenter. There can be more than one depot.

Directly Attached Network

Any local subnet attached to DynaCenter.

Driving Application

The third-party vendor software that controls DynaCenter.

Driverset

A collection of files captured from a server that is composed of supplemental operating system device drivers and their required installation files specifically tailored to a server's hardware configuration. A Driverset is intended for use with the server from which it was captured and any other server with an identical hardware configuration, or subset thereof.

Reference: Managing Windows Drivers in the *DynaCenter OEM Integration Guide*.

External Network

Any network behind one or more routers or firewalls.

Image

A complete software image (OS, applications, data) that can be booted and run on a server.

Image Scaling

During image capture, the process whereby DynaCenter examines each filesystem to determine how much space is allocated to and used by the files and then computes the filesystem size to hold original contents while increasing the size based on consumption and availability.

Managed Server

A server that is managed by DynaCenter for the purposes of capturing and deploying images.

Note: The terms managed server and target server are used interchangeably.

Master Image

Part of an image template, the master image includes the files which will eventually be copied into the captured image. The master image is used by configure scripts in software components to apply global changes so those changes can propagate efficiently without having to be recomputed each time.

MWS

The Management Work Station (MWS) runs DynaCenter and in some configurations serves as a storage location for the depot.

OSType

DynaCenter uses an ostype string to identify the operating system name, version, and platform. These strings follow a specific syntax with well-known values in certain positions to make parsing easier. The syntax is rigid and the full specifier includes many details. Partner-specific scripts might be needed to convert another notion of operating system and hardware platform to an ostype before it is passed to DynaCenter.

Reference: `rinstallsnapshot --help` for more specific details on the ostype string.

Profile

Settings that can be used to specify the storage to be captured for a server and that can replace the default configuration already in the image for deployment.

Reference: Image Profiles in the *DynaCenter OEM Integration Guide*.

Repository

Storage location known to DynaCenter that holds metadata for images, files that are part of software components, and other data necessary for provisioning and manipulating images.

Server

A real or virtual server capable of running software images.

Server Group

A server group is a container for servers used to control access through permissions and compatibility checks. When using DynaCenter in most OEM configurations, only one server group is needed, however more can be created.

Software Component

A software component is used to manipulate the content and behavior of an image by applying supplemental files, scripts, patches, etc. to the image during deployment. A component can contain one or more files or binaries. One component can be created with all the needed files and binaries or several smaller components can be created to manipulate the image(s).

Storage Server

Any device that contains storage. Storage servers will typically be devices that are large enough to store many captured images. The MWS functions as storage server that contains at least a repository of software components.

Target Server

A server that is managed by DynaCenter for the purposes of capturing and deploying images.

Note: The terms target server and managed server are used interchangeably.

Template

A DynaCenter template controls how images are created using software components and default profile information.

Windows Driver Collection

A collection of supplemental operating system device drivers and their required installation files. The Windows Driver Collection is the central repository for supplemental driver files for all servers in the datacenter and is the default driver source for provisioning of Windows images.

Reference: Managing Windows Drivers in the *DynaCenter OEM Integration Guide*.

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