CISCO™

MATE Server Installation Guide

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CONTENTS

Overview

This guide explains how to install the MATE server with licensed features and the FlexNet Publisher license server.

- Before You Start—Terminology and prerequisites for the installation.
- MATE Server Installation—Procedure for installing the MATE software for use with a server and installing the license.
- MATE Live Datastore—Procedure for installing a MATE Live datastore, as well as upgrading, backing up, and restoring a datastore.
- License Server Setup—Procedure for installing and setting up the FlexNet Publisher license server, when needed.
- MATE Files—Reference of MATE files created when MATE is installed.

For More Information

A comprehensive set of CLI tools and a complete set of documentation are provided with each MATE package download.

- All documentation can be accessed in the `$CARIDEN_HOME/docs` directory, including the complete set of MATE documentation, the MATE table schema reference, and FlexNet Publisher license documentation. Documentation can also be accessed through the application interfaces.
- All MATE CLI tools are in the `$CARIDEN_HOME/bin` directory.

For More Information ...	See ...
Find the relevant guides to assist you	*MATE Quick Reference*
Discover the network and collect data from MATE Collector server	*MATE Collector Guide*
Discover the network and collect data using augmented or manual snapshots	*Advanced MATE Collector Configuration Guide*
Modify visualization of plan files and templates using MATE GUI, including how to retrieve and save them remotely	*MATE GUI Visualization Guide*
Create traffic reports and import them into MATE Design for use in forecasting	*MATE Integration and Development Guide*

For More Information ...	See ...
Manage the web server	*MATE System Administration Guide*
CLI tools	*MATE Table Schema and CLI Reference* and `$CARIDEN_HOME/bin`
Table schema	*MATE Table Schema and CLI Reference* and `$CARIDEN_HOME/docs/table_schema.html`

C H A P T E R 2

Before You Start

This chapter describes key information required for installing the MATE server or a FlexNet Publisher license server.

- Terminology
- MATE Licenses
- Prerequisite: Server User and Directory Setup
- Best Practices

Terminology

Plan File

A plan file is the data file created by MATE. It describes the network topology, configuration, operational state, and MATE-specific information, such as visual layout. The MATE software package includes a set of sample plan files, which are useful when learning to use the MATE GUI, for example, when learning to create templates for use in the web applications.

Installer

The Linux MATE software package is an executable that runs a script to install the MATE software in the proper location. This is called the *installer*, and it automates the installation process by asking you a series of questions. Similarly, the FlexNet Publisher license server has its own installer.

If you accept all the defaults by answering yes to all questions, the installer performs the following tasks.

- MATE: Verifies the following. If the installer encounters an issue, it prompts you whether to continue.
    - Whether the device has the appropriate system requirements, including proper operating system, disk space, total memory, and required MATE software package.
    - Previous package installations
- MATE: Creates a standard directory structure.
- MATE: Installs the MATE software under `/opt/cariden/software/mate`.

- FlexNet Publisher: Installs the FlexNet Publisher license server under
  `/opt/cariden/software/flexlm`.
- MATE: Creates `/opt/cariden/software/mate/current` symbolic link to the installed MATE
  software.
- FlexNet Publisher: Creates `/opt/cariden/software/flexlm/current` symbolic link to the installed
  license server software.
- Creates an `etc/profile` file under the installed package that has environment variable definitions.

Software Directories

Many steps in this guide explicitly identify directories in which the software is installed. Otherwise,
references to where the software resides are as follows.

- `$CARIDEN_ROOT`—Location of the MATE installation and of the FlexNet Publisher license server
  installation.

  If you use the installer defaults, then `$CARIDEN_ROOT` is the same as `/opt/cariden`.

- `$CARIDEN_HOME`—Sub-directory of `$CARIDEN_ROOT` that contains the actual MATE software package.

  If you use the installer defaults, then `$CARIDEN_HOME` is the same as
  `/opt/cariden/software/mate/current`.

MATE Licenses

A license determines which MATE features are available to use. A license is required for all products
and features except for sample plan file usage in the MATE GUI. If you have questions about obtaining
a license, contact your support representative or MATE administrator.

Before you start the installation process, copy the license to a convenient location.

There are two license types.

- Dedicated license—Device-specific license.
- Floating licence—A shared license among multiple MATE Design users. An administrator must set
  up the Flexnet Publisher License server, copy the floating license to the license directory of this
  same server, and distribute the license to MATE Design users. Users then copy the license to the
  devices where the MATE Design application is being installed. To configure the Flexnet Publisher
  License server, see the License Server Setup chapter.

Server User and Directory Setup

Prior to setting up the MATE server or license server, create a username and password for executing the
procedures.

Step 1   Log into the server as root or a user with administrative capabilities.

Step 2   Create a MATE username.

```
/usr/sbin/useradd <username>
```

Step 3   Set a password.

```
passwd <username>
```

Step 4   Create the installation directory.

```
cd ~/
mkdir -p /opt/cariden
```

You will have the option later to install the software in a different directory.

Step 5   Change the owner of the installation directory to the newly created user.

```
chown <username> /opt/cariden
```

Best Practices

- The MATE server's SSL certificate for a domain is customer specific. The web server installation is tied to a preferred Certification Authority (CA) provider, which in turn issues valid certificates to web clients. To prevent users from seeing messages for untrusted certificates, configure the certificate to be signed by one of the client's trusted CAs. The fully-qualified domain name (FQDN) of the MATE server should match the FQDN of the certificate issued by the CA.

- **BIOS setting** (if applicable)—To improve collection performance, set the BIOS power saving setting to Max.

- **/etc/host requirements**—Various web services require the server's hostname to be present in the /etc/hosts file. This is standard configuration practice, but some Linux systems do not have it. Both the unqualified and fully-qualified hostnames must be present. Make sure that the following line is present in /etc/hosts.

  ```
  <server IP address> <hostname> <fully-qualified hostname>
  ```

  Example: `192.168.0.15 mate-server mate-server.my.company.com`

- **Server time synchronization**—All servers used in the collection process must have their times synchronized. This time should be no more than 60 seconds different from the time on any given router in the network. Failure to synchronize these clocks can produce one of the following issues.

- Certain tools, such as `sam_getplan` and `flow_get`, might produce inaccurate traffic tables.
- Collection tools will produce an inaccurate NetIntHistory table.
- All lines in the collection logs will have incorrect timestamps.

For these reasons, we strongly recommend that NTP (Network Time Protocol) be used for synchronizing times on all routers and all servers used in the collection process.

MATE Server Installation

MATE Server Installation

Step 1   These instructions assume you have done the following. For instructions, see the Before You Start chapter.

- Created a new user with the correct permissions.
- Created the installation directory.

Step 2   Log into the server using the newly created username and password.

Step 3   Download the MATE software package. In a web browser, go to `http://software.cisco.com/download/navigator.html`.

Step 4   Go to the directory where you downloaded MATE software, and execute the installer using a `bash` command. The MATE software package is, itself, the installer. By default, MATE software is installed in `/opt/cariden` unless `$CARIDEN_ROOT` has been defined otherwise.

Enter	To
`bash <MATE package>.bin`	Be prompted through the installation process.
`bash <MATE package>.bin -d <custom_installation_directory>`	Specify a different installation directory. You will still be prompted through the remainder of the installation process.
`bash <MATE package>.bin -y`	Automatically respond "yes" to all questions without being prompted.

Post-Installation Steps

Step 1   Modify path and environment variables by adding the following line to the user's `.profile` or `.bash_profile` file. These settings are applicable if your shell is sh, ksh, or bash. If your shell is csh or tcsh, translate the commands to the equivalent. This properly sets the `CARIDEN_HOME`, `PATH`, and `CARIDEN_ROOT` environment variables.

```
source /opt/cariden/software/mate/current/etc/profile
```

If you installed the software in a directory other than the default, use your customized directory path instead of /opt/cariden.

```
source /<custom_installation_directory>/software/mate/current/etc/profile
```

Step 2   Either log out and log in again, or enter this command, using the appropriate profile filename.

```
source ~/.<profile name>
```

Example: source ~/.profile

Step 3   If using MATE Live, install the MATE Live datastore. See the MATE Live Datastore chapter.

Step 4   Start the embedded web server.

```
embedded_web_server -action start
```

Step 5   Open the MATE home page in a browser.

```
https://<server_IP>:8443
```

The default login credentials are as follows.

- Username: admin
- Password: cariden

Step 6   Install the license.

    a.   MATE opens to the System->Licenses page.

    b.   Click Upload Licenses.

    c.   Click Select Licenses.

        1.   Browse to the location or enter the name of the license file (.lic extension), and click Open.
        2.   If there is already a license installed, the default is to replace the existing license. To merge the two licenses instead, select the merge option. If you are uncertain whether you have a complete set of desired features in the new license, we recommend that you merge the licenses.
        3.   Click Upload License.

    d.   Verify the license installed correctly by locating it on the System->Licenses page.

Further Configurations

Step 1   Configure the system-wide parameters. For information, see the *MATE System Administration Guide*.

- Configure users and their roles.

- If applicable, configure access to an LDAP server and mappings between LDAP groups and MATE roles.

- Configure access to the SMTP server used for emailing MATE Live reports.

Step 2   Configure MATE Collector to collect network data and traffic.

- To configure the MATE Collector server through the MATE Collector UI, which is accessed through the MATE home page, see the *MATE Collector Guide*.

- To configure MATE Collector through configuration files, see the *Advanced MATE Collector Configuration Guide*.

Note   To assist in choosing which collection method to use, both of the above guides have an overview that explains the differences in the collection methods.

Step 3   If applicable, configure the MATE Live application. For information, see the *MATE Live Administration Guide*.

- Configure MATE Live to get the data from MATE Collector.

- Customize the MATE Live application. For example, configure default layouts and how health panels appear in the MATE Live Map.

Step 4   If applicable, configure and customize the MATE Design Archive application. For information, see the *MATE Design Archive User and Administration Guide*.

CHAPTER 4

MATE Live Datastore

This chapter describes how to install a new MATE Live datastore, how to back up a datastore, and how to restore it. If you need to migrate a MATE Live datastore from 5.4 or a prior release, or if you need to upgrade a 5.5 MATE Live datastore, contact your support representative.

New Datastore Installation

From the `$CARIDEN_HOME/bin` directory, use the *mld* tool to install a new MATE Live datastore. This tool installs both the mld server and an empty datastore directory.

- The `-size` option is required. The values are D (demo), S (small), M (medium), and L (large). For assistance in which value to use, contact your Cisco support representative.

- The best-practice recommendation is to use the `-backup` option to change the default backup directory to one that is on a different physical disk.

The following command uses default directories that are listed in Table 4-1. To change any of the defaults, use the options as described in this table.

Minimal requirement: `mld -action install -size <D,S,M,L>`

Best practice: `mld -action install -size <D,S,M,L> -backup <backup_directory>`

mld Options

Table 4-1   mld Options

Options	Description	Default
-version	Display the datastore version	
-action	start —Start the mld server stop —Stop the mld server status —Show the status of the mld server restart —Stop and then restart the mld server upgrade —Update an existing mld server install —Install a new mld server and datastore, and start the mld server uninstall —Remove the mld server and datastore installation files	
Use only with -action install		
-size=[DSML]	Size of the datastore. Required if using -action install.	
-mldata <directory>	Directory where all application data is stored. This includes the datastore, report output, and other application data.	$CARIDEN_ROOT/data/mldata
-datastore <directory>	Directory where the datastore is initialized.	$CARIDEN_ROOT/data/mldata/datastore
-cpus <#>	Number of CPUs reserved for the datastore and the mld server.	Half of the total CPUs
Use only with -action install or -action upgrade		
-mld <directory>	Directory where the mld server is installed.	$CARIDEN_ROOT/software/mld
-backup <directory>	Directory for saving datastore backups. You can override this for a single backup. See the Backups section.	$CARIDEN_ROOT/data/mldata/backup

Backups

Back Up a Datastore

MATE Live backs up the time-series derived data from plan files. It does not back up transaction logs or other MATE Live data, such as application data and report data.

Backups require approximately 1 TB of space.

Best Practices

- Perform the backup to a different disk drive, or copy the backup to a different physical device once you finish the backup.

- Perform backups outside of peak traffic hours.

- Use a backup directory that is on a different physical disk, and set this when you first install the mld server and datastore. Doing so sets the default backup directory for all backups.

  ```
  mld -action install -backup <backup_directory>
  ```

- The backup process makes a copy of the datastore, but it does not back up other MATE Live data, such as application data and report data. Therefore, with some regularity, copy this other data to a safe location, such as to a different physical disk.

- Perform a full backup at least weekly or monthly, with numerous incremental backups in between them.

- Rather than running manual backups, call `ml_backup` from a cron job.

Backup Steps

> **Note**   Keep both `mld` and the `embedded_web_server` running.

You can execute `ml_backup` to run a manual backup at any time.

The default backup directory is `$CARIDEN_ROOT/data/mldata/backup` unless this was changed when installing the datastore.

The `ml_backup` tool enables you to perform multiple levels of backups to save disk space, though the first time using these levels, you must perform backups in this sequence.

Sequence	Enter	Description

1	`ml_backup`
	or
	`ml_backup -L 0`
		Back up everything.

2	`ml_backup -L 1`	Back up everything since the most recent level 0 backup was performed.
3	`ml_backup -L 2`	Back up everything since the most recent level 1 backup was performed.

To run a backup using all defaults, you need only enter the following. This uses the default backup directory, and creates a full backup.

```
ml_backup
```

- To override the default backup directory, use the `-directory` option.
- To set a different backup level, use the `-L` option.

Example: This example sets the backup directory to `$CARIDEN_ROOT/data/matelive/backups` and backs up only data that is new since the last level 0 backup was run. This assumes that you have run `ml_backup` one time using the default level of 0.

```
ml_backup -directory /data/matelive/backups -L 1
```

Additional Backups

A best practice is to back up the following directories by making copies of them. By default, these are located in `$CARIDEN_ROOT/data/mldata`. Otherwise, they are stored in the directory specified upon installation (`mld -mldata <directory>`).

> **Note**   Before copying, stop the mld server using `mld -action stop`. Remember to immediately restart the mld server when you are finished copying using `mld-action start`.

- archive—Stores the template (template.pln) and plan files used in the Map. Note that files sizes can be quite large, depending on the size of the network and how long the collection has been running.
- appdata—Application data, such as report definitions, user parameters, and report history.
- datastore—MATE Live datastore, which contains network measurements accumulated over time.
- jobs—Error log files for plan file insertions.
- plans—Queue of plan files waiting to be inserted.
- reports—Every report that can be run caches its output in this directory for quick retrieval.

Additionally, it is a best practice to make copies of the following.

- config.xml file, which is located in one of these three places: `~/.cariden/etc/config`, `$CARIDEN_ROOT/etc/config`, or `$CARIDEN_HOME/etc/config`
- `$CARIDEN_HOME/etc/user_manager`, which is the directory in which users are defined

Restore a Datastore

> **Note**   This section references collection methods. For information on collecting data from the MATE Collector Server, see the *MATE Collector Guide*. For information on collecting data from augmented or manual snapshots, as well as definitions of what these are, see the *Advanced MATE Collector Configuration Guide*.

Prerequisites

- To restore a datastore, you must have a backup of it. See the Backups section.
- Ensure you have a proper disk and disk space. For example, if your data was corrupted, you would need a new disk. If the restoration is due to a space issue, add more space to the existing disk.
- Assuming you have a single-device configuration, the collection of data will be interrupted during the restoration of a MATE Live datastore. Note that this affects the MATE Design Archive application if you are running it in addition to MATE Live.

Restoration Steps

Step 1   Stop the collection of data.

- If the MATE Collector server is collecting data, open the MATE Collector UI. On the Collection->Schedule page, click Stop. The Collection State changes to "Idle" to show that it is not running.

- If collecting data through augmented or manual snapshots and after the most recent snapshot has finished, stop further snapshots from running by disabling the cron job (using comments #). To determine if a snapshot has finished, check the system process table or check the log file, which by default is in `$CARIDEN_ROOT/logs`.

Step 2   If you have deleted the mld server, then install the mld server. This action also starts the mld server.

```
mld -action install -size <D,S,M,L>
```

Step 3   Stop the mld server.

```
mld -action stop
```

Step 4   Stop the embedded web server.

```
embedded_web_server -action stop
```

Step 5   Restore the datastore data. If you used the default backup directory when setting up the backups, you do not need to give `-directory` a value. If you did not use the default backup directory, the `-directory` value must be the same as configured when installing the datastore or the same as configured in the config.xml file (in `$CARIDEN_ROOT/etc/configs`).

```
ml_restore -directory <backup_datastore_directory>
```

Step 6   Start the mld server.

```
mld -action start
```

Step 7   Start the embedded web server.

```
embedded_web_server -action start
```

Step 8   Restart the collection of data.

- If collecting using the MATE Collector server, open the MATE Collector UI. On the Collection->Schedule page, click Start. Once a collection process has finished, the Last Snapshot Status section shows the results. For further status information, go to the Collection->Status page.

- If collecting data through augmented or manual snapshots, test the snapshot process by running it as a single instance.

  ```
  cd /opt/cariden/software/mate/current/bin
  ```

  Augmented: `snapshot -config-file /opt/cariden/etc/snapshot_augment_collector.txt`

  Manual: `snapshot -config-file /opt/cariden/etc/snapshot.txt`

  If you are satisfied that the data is valid, restart the cron job. To determine if a snapshot has finished, check the system process table or check the log file, which by default is in `$CARIDEN_ROOT/logs`.

For More Information

For More Information ...	See ...
Discover the network and collect data from MATE Collector server	*MATE Collector Guide*
Discover the network and collect data using augmented or manual snapshots	*Advanced MATE Collector Configuration Guide*
Set up MATE Live	*MATE Live Administration Guide*
Modify visualization of plan files and templates using MATE GUI, including how to retrieve and save them remotely	*MATE GUI Visualization Guide*

License Server Setup

MATE uses the FlexNet Publisher license server for floating licenses used by MATE Design users. If you have a license file that enables floating licenses, you must set up the license server. Using this server, you can control access to the licenses, monitor who has them checked out, and check log activity.

Note These instructions are for setting up the MATE server and the FlexNet Publisher license server on the same machine. To set them up on different machines, contact your support representative.

For information about FlexNet Publisher, refer to the *FlexNet Publisher License Administration Guide* (`FlexLM_EndUser_LicAdmin.pdf`), which is located in `/opt/cariden/software/mate/current/docs`.

Step 1 These instructions assume you have done the following. For instructions, see the Before You Start chapter.

- Created a new user with the correct permissions.
- Created the installation directory.

Step 2 Download the License Server package from `http://software.cisco.com/download/ navigator.html` in the same way that you downloaded the MATE software package (see the MATE Server Installation chapter). This file, however, ends with an .sh extension.

Step 3 Go to the directory where you installed FlexNet Publisher license server package, and execute the installer. The package is, itself, the installer.

```
chmod 755 ./<License server package>.sh;./<License server package>.sh
```

By default, the software is installed in `/opt/cariden`.

Once you start the installation process, you are asked a series of questions. You have the option to install the software in a different directory, which you may choose to do or not. Otherwise, answer "yes" to the questions asked during the installation process.

If this installation fails, ensure you are running it as a user who has appropriate permissions. If it still does not work, contact your support representative.

Step 4   Copy the MATE floating license file (.lic extension) the directory of your choice. When the FlexNet Publisher license server is running on the same device as MATE Collector, they can share the same license folder: `~/.cariden/etc`, `$CARIDEN_ROOT/etc`, or `$CARIDEN_HOME/etc`.

Step 5   Start the FlexNet Publisher license server daemon from `/opt/cariden/software/flexlm/current/bin`. The first option specifies the directory that contains the license file and the second option specifies the log filename.

```
./lmgrd -c <License Directory> -l flexlm.log
```

Step 6   Distribute the floating .lic file to all MATE Design users of this floating license. They must install this same license file. Thereafter, the license is automatically validated from the server each time the user opens the MATE GUI or runs the CLI tools.

MATE Files

Table 6-1 describes the downloaded contents in the `$CARIDEN_ROOT` directory. If you used the installer defaults on Linux, then `$CARIDEN_ROOT` is the same as `/opt/cariden`.

Table 6-2 describes the downloaded MATE contents in the `$CARIDEN_HOME` directory. If you used the installer defaults for Linux, then `$CARIDEN_HOME` is the same as `/opt/cariden/software/mate/current`.

Table 6-1 $CARIDEN_ROOT Contents

Directory	Contents
archives	Contains all archive repositories of plan file used in the augmented and manual collection processes. For more information, see the *Advanced MATE Collector Configuration Guide*.
bin	Contains out-of-product executable applications and scripts.
data	Contains supporting data files, such as templates or SRLG configs and ignore lists. `data/config`—Contains router configuration files downloaded from the network for use in the augmented and manual collection processes.
etc	Contains the MATE license and other data used by MATE, such as files used in the discovery process, geographic location codes, and AS numbers. Licenses installed through the System UI are stored in `$CARIDEN_ROOT/etc`. For licenses installed through the MATE GUI or `license_install`, MATE looks for these files in the following locations and sequence. • `~/.cariden/etc` • `$CARIDEN_ROOT/etc` (recommended for customized configuration files) • `$CARIDEN_HOME/etc` Regardless of the installation method, MATE checks for configuration files in the above order.
logs	Contains any log files created during the discovery process. `logs/debug`—Contains copies of the intermediate plan files created during the augmented and manual collection processes.

Directory	Contents
software	Directory into which the installer unpacks the software. `software/mate/current`—Contains MATE files. `software/flexlm/current`—Contains FlexNet Publisher license server files.
work	Contains output files as they are generated and processed during the augmented and manual collection processes.

Table 6-2 $CARIDEN_HOME Contents

Directory	Contents
`mate`	MATE GUI desktop executable.
`docs`	Contains documentation in PDF format for all MATE products, the MATE table schema, and FlexNet Publisher documentation for setting up the FlexNet Publisher license server. `docs/licensing`—Contains all external software licenses used by MATE.
`bin`	Contains the MATE command-line executables that can be called directly from scripts to automate MATE processes.
`samples`	Contains sample plan files for experimenting with and learning how to use the MATE GUI. `samples/training`—Contains files used for training purposes.
`etc`	Contains the default data used by MATE, such as snapshot files used in the augmented and manual discovery processes, geographic location codes, and AS numbers. We recommend that you put all customized configuration files in `$CARIDEN_ROOT/etc`.
`lib`	Contains software libraries used by MATE.
`addons`	Contains user add-on scripts that are accessible from the MATE GUI, and includes sample add-ons.