



***Installing IBM Enterprise Workload
Manager (EWLM) Domain Manager V1
on a Linux (x86) server***

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Abstract

This paper helps solution providers, original equipment manufacturers (OEMs), and systems administrators understand how to install and configure IBM® Enterprise Workload Manager (EWLM), one of several IBM Virtualization Engine™ technologies. With EWLM, it is possible to monitor and manage distributed heterogeneous workloads to achieve user-defined business goals.

Introduction

IBM Virtualization Engine technologies improve IT resource utilization by allowing system administrators to access and manage resources across a heterogeneous environment. These resources are available virtually, as a single pool, rather than by physical location. Virtualization Engine technologies comprise a suite of high-level management software products that enable users to integrate and administer existing resources on demand. These systems services simplify IT resource management by providing a logical rather than a physical view of data, applications, servers, and network resources.

Enterprise Workload Manager (EWLM) is a product in the IBM Virtualization Engine System Services for Servers product suite that monitors and manages distributed heterogeneous workloads to achieve user-defined business goals. With the first release of EWLM, system administrators can use the following performance monitoring functions:

- Dynamically detect server and application topologies to rapidly and efficiently identify the likely origin of performance problems.
- Construct an end-to-end view of business transactions, and the processing segments performed by each participating middleware.
- Define performance goals in policies that are similar to service-level agreements.
- Encourage middleware and software vendors to instrument their applications with The Open Group® Application Response Measurement (ARM) Version 4.0 application programming interfaces (APIs) that EWLM requires for applications to take full advantage of its capabilities.

Only one level of management function is introduced in the first release, but over time, EWLM support will expand to automate management of server and application performance.

For more information about Virtualization Engine technology and EWLM, refer to the IBM eServer™ Software Information Center in the **Additional information** section.

The purpose of this article is to provide an easy-to-follow, step-by-step guide for installing and configuring EWLM. The focus will be on the installation and configuration of EWLM Domain Manager on Linux™ (x86) systems only. The steps are similar for other platforms.

The installation was done on a Novell™ SUSE™ Linux Standard Server 8 system.

Planning

Before installing EWLM, ensure that the system meets the minimum hardware and software requirements, and complete a planning checklist for the platform.

Both tasks can be done by using the IBM eServer Software Information Center Planning topic. (Refer to the Web site listed in the **Additional information** section.) At this site, there is a great deal of detailed information about the hardware and software required to use EWLM. For example, an IBM eServer xSeries® system with a 2-gigahertz processor, 512 megabytes of memory, and 2 gigabytes of available disk space can be the domain manager for a domain of up to 50 managed servers with moderate policy definitions. It is also possible to use the Virtualization Engine planning advisor, which produces customized planning output if specifics are entered about the solution.

Acquiring the installation images

Here are two of the possible ways to acquire the installation images:

- Purchase the product and get the Virtualization Engine installation set of CDs.
- IBM PartnerWorld® for Developers members with IBM software access can go to the online software access catalog referenced in the **Additional information** section. At this catalog Web site, members can download:
 - *IBM Virtualization Engine EWLM Multiplatform Managing Solaris™ Windows® Servers Version 1.x x Linux eAssembly*
 - *IBM Virtualization Engine EWLM Multiplatform Managing AIX®, OS/400® Servers V1.x x Linux eAssembly*

Because the main audience of this paper includes PartnerWorld members, it assumes you are installing from downloaded installation images.

Installing the EWLM domain manager on a Linux (x86) server

To install the EWLM Domain Manager on a Linux server as root user, follow these steps:

1. Log in as **root**.
2. Make sure there is at least 2 gigabytes of disk space.
3. Acquire all image files in one directory (Figure 1). These include the common run time shared by all Virtualization Engine components and the domain manager.

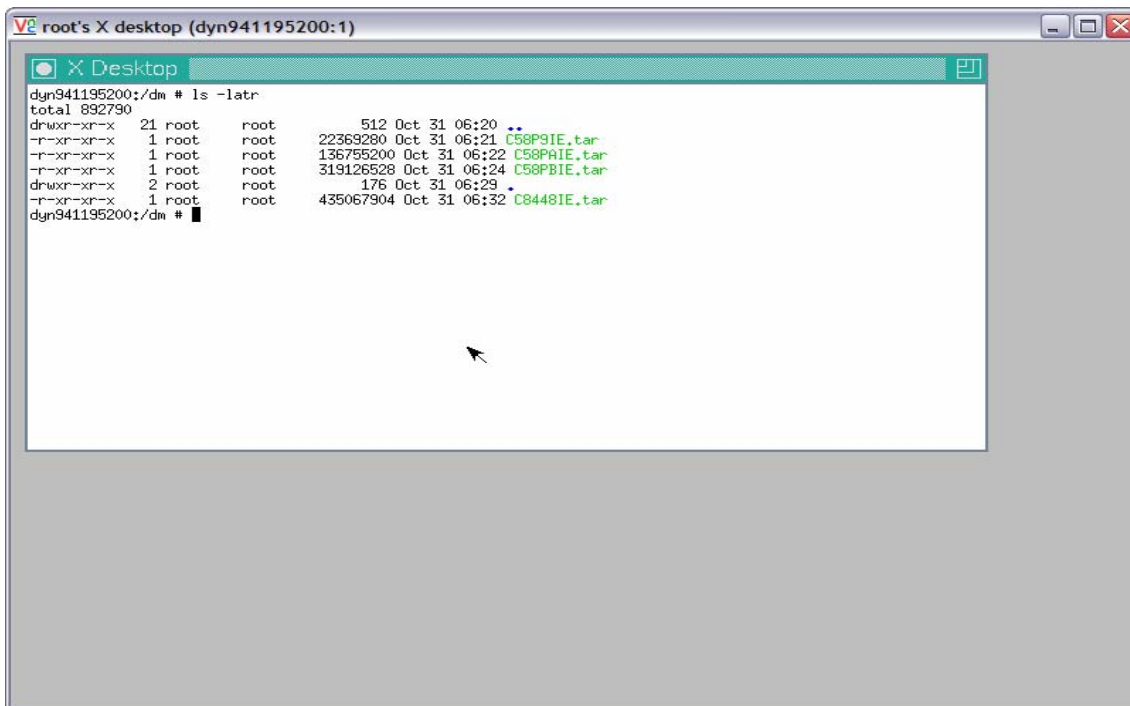


Figure 1: Downloaded EWLM Domain Manager packages

4. Untar all images into the same directory (Figure 2).

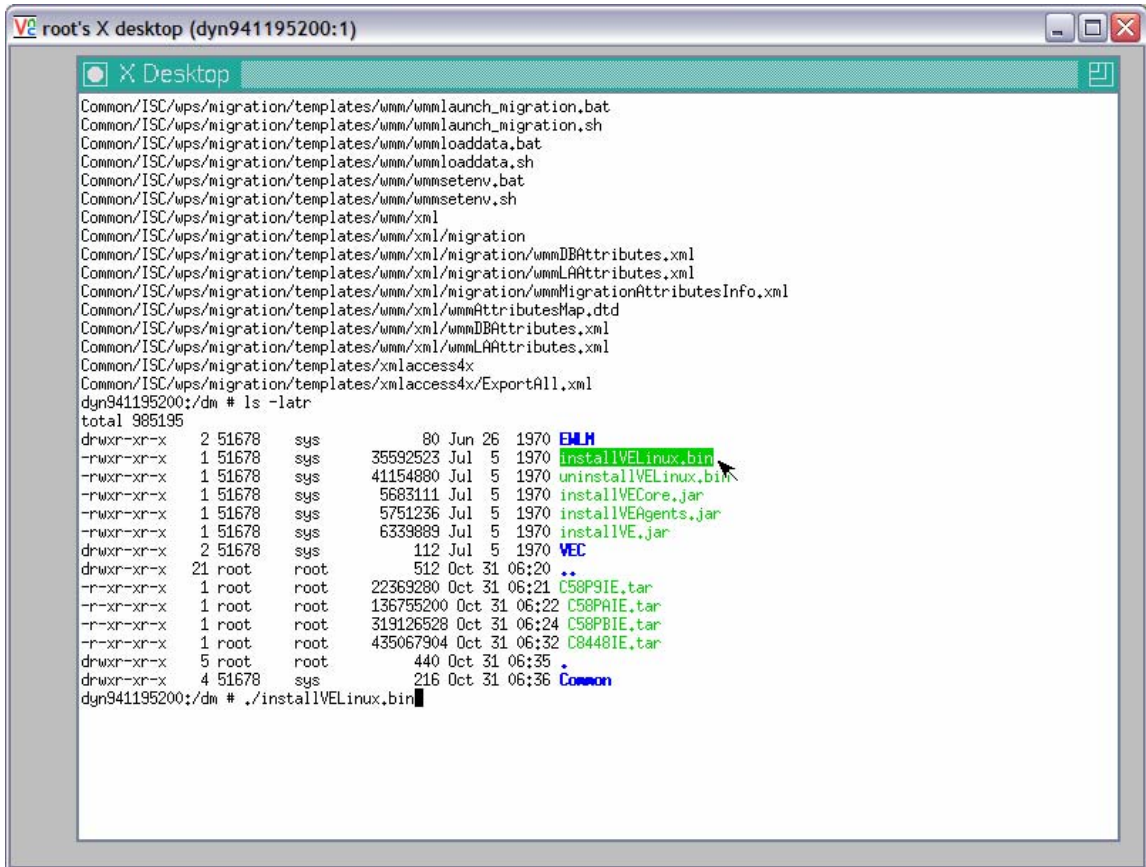


Figure 2: Directory of expanded EWLM Domain Manager package

5. Run **installVELinux.bin** to bring up the installation wizard.

6. Accept the license agreement (Figure 3) and click **Next**.

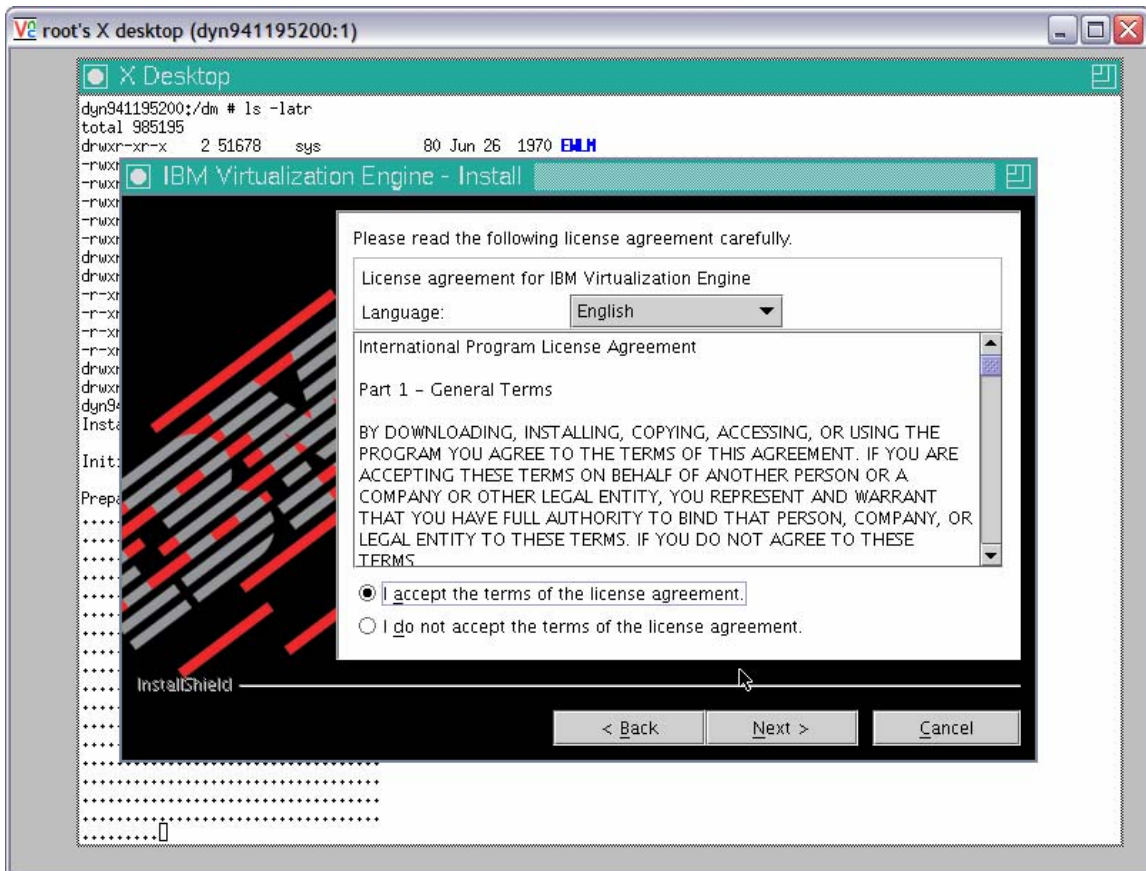


Figure 3: License agreement panel

8. Select **Next**.
9. The installation component confirmation will be displayed (Figure 5).
10. Check the summary and click **Next**.

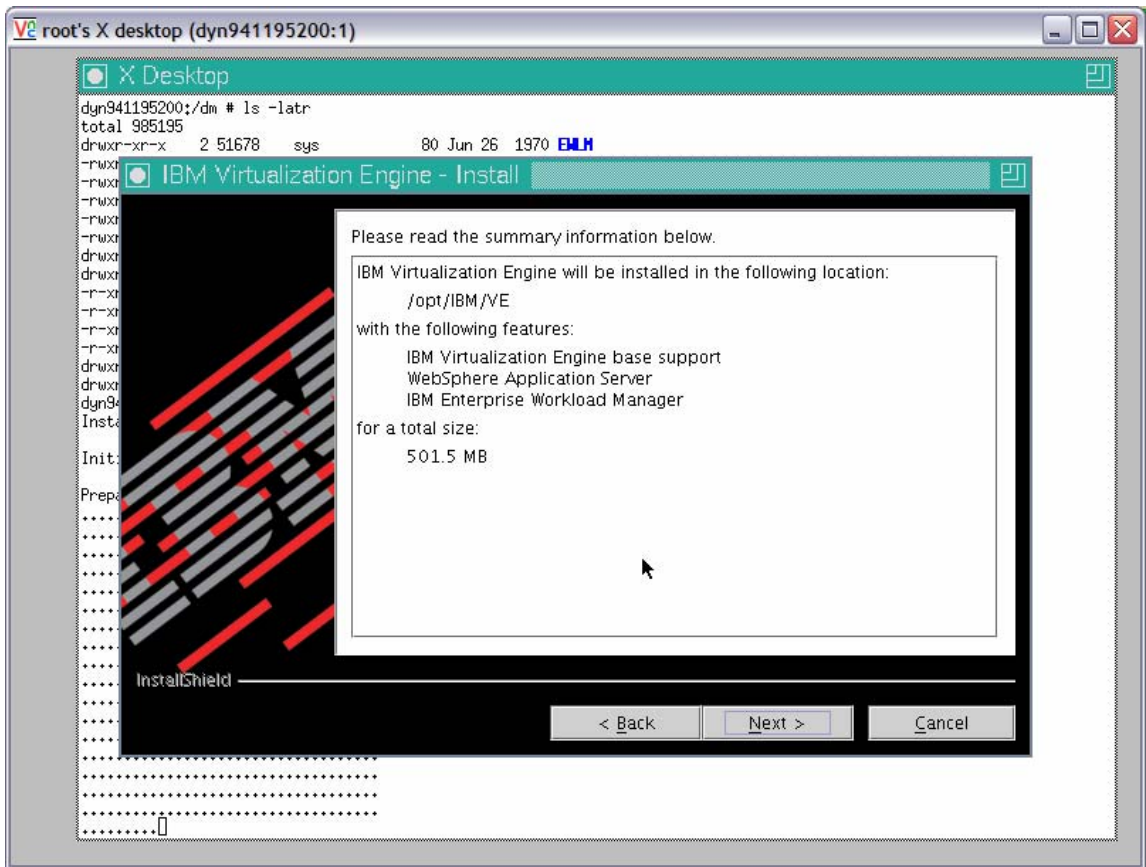


Figure 5: Installation confirmation screen

11. Enter the **Node Name** and **Host Name or IP Address** (Figure 6).
(It is important to give the correct host name or IP address.)

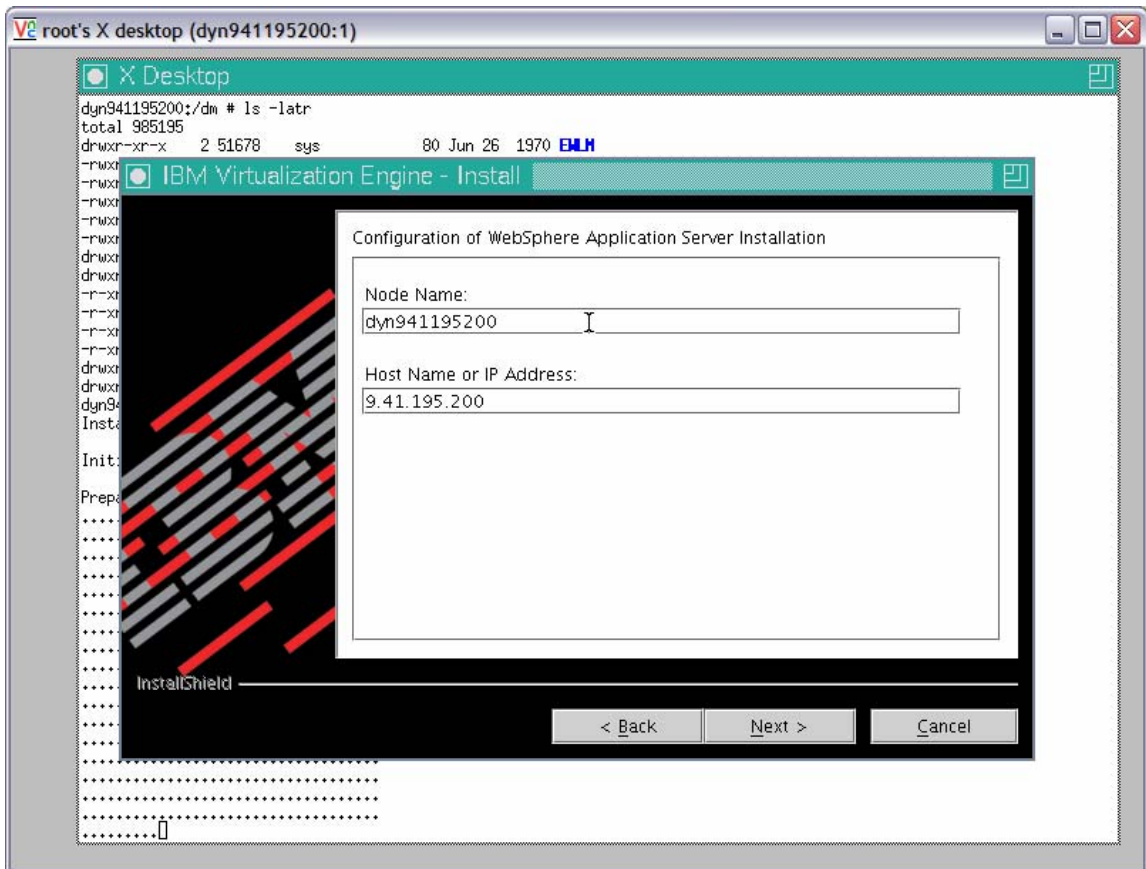


Figure 6: Enter Node Name and Host Name

12. Click **Next**.

13. The wizard will display several screens as it installs (Figure 7):

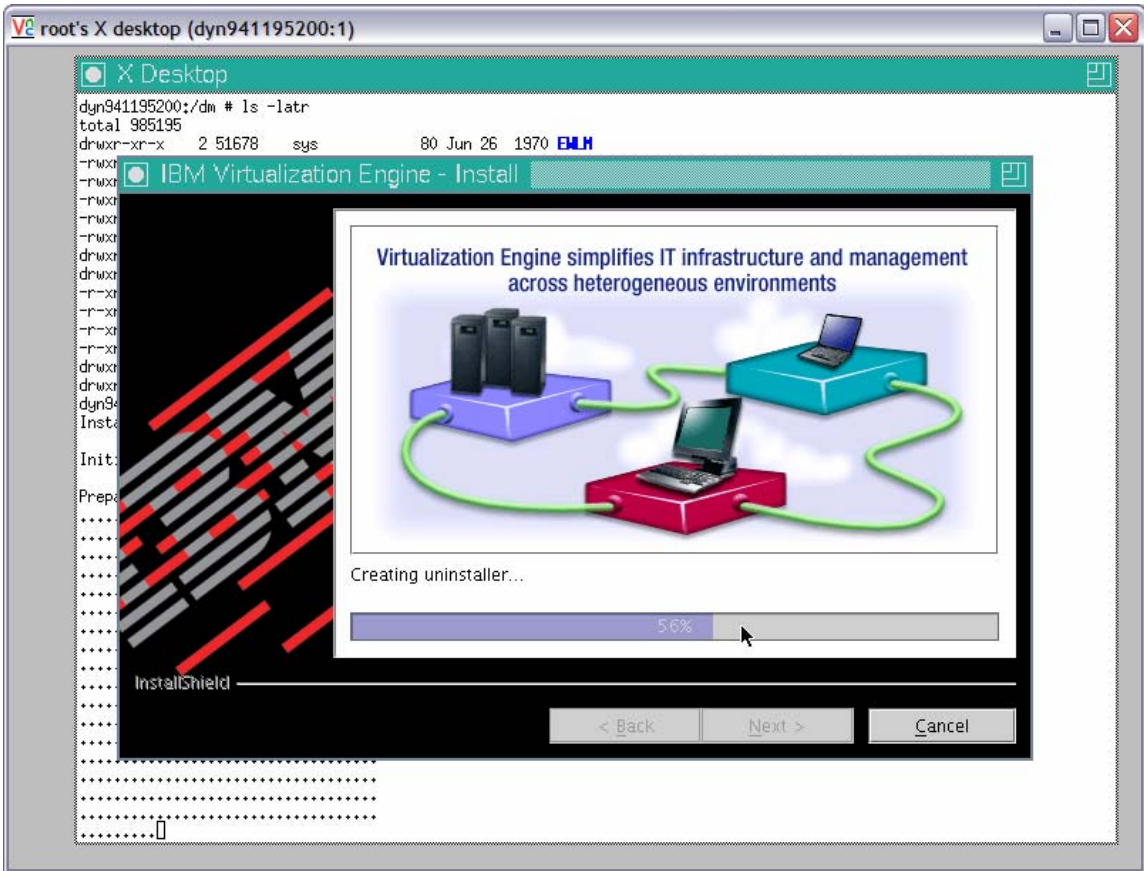


Figure 7: Installing

14. Proceed to the post-installation screen (Figure 8) and follow the directions.

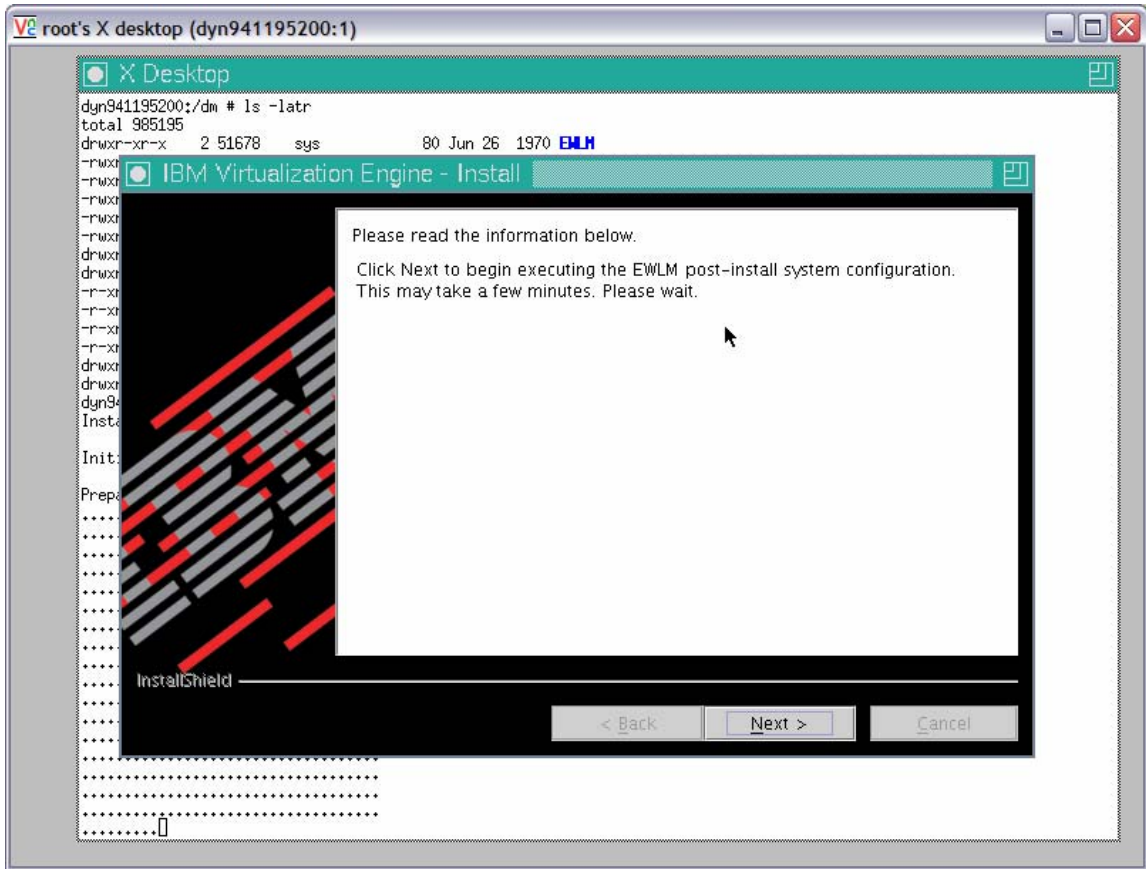


Figure 8: EWLM post-install system configuration screen

15. Read the instructions for the next step (Figure 9).

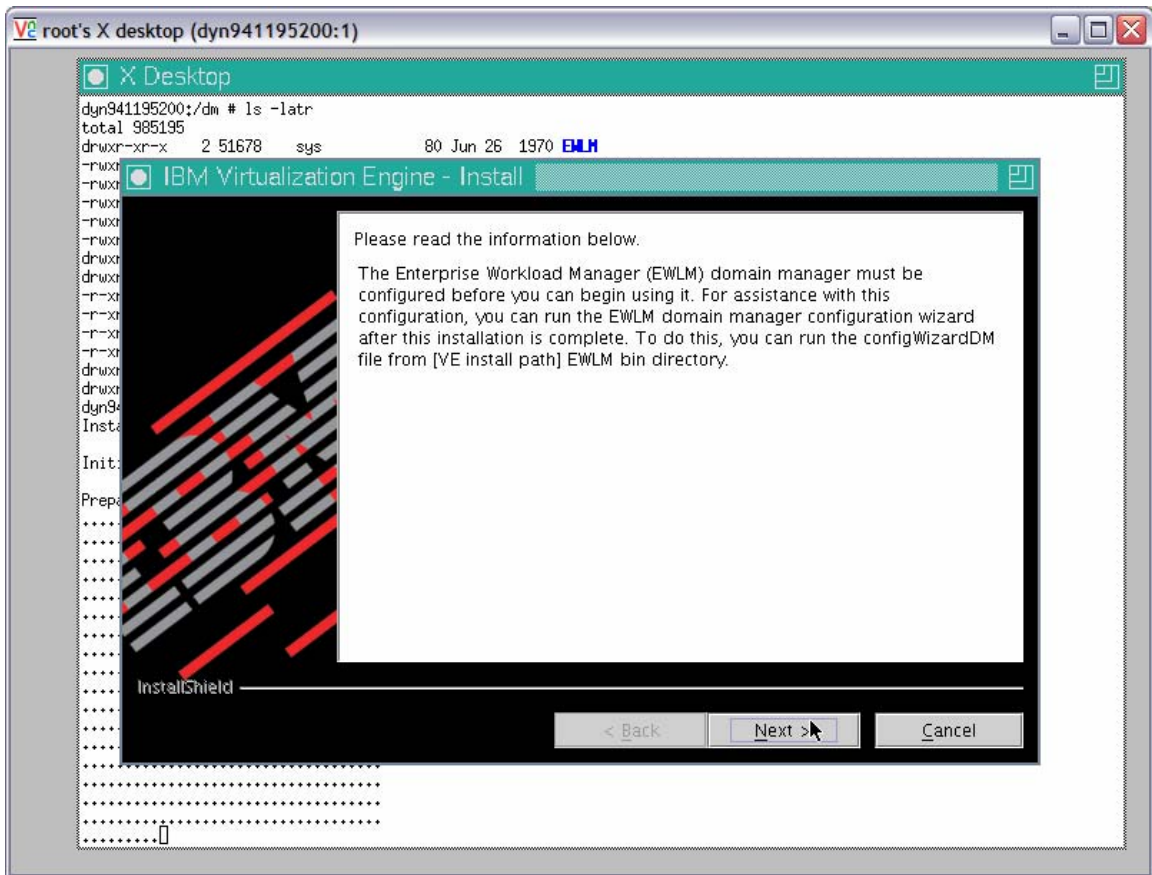


Figure 9: EWLM install directions

16. Confirm that all selected components are installed (Figure 10).

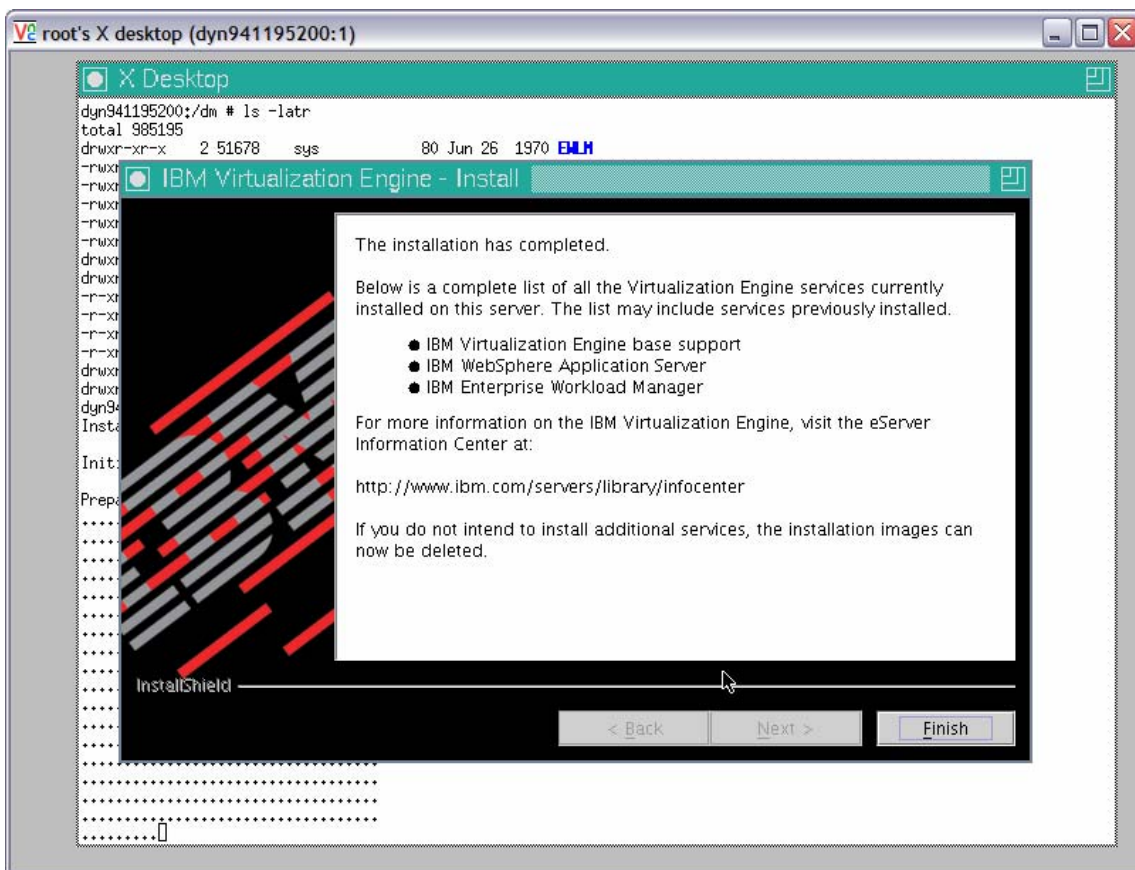


Figure 10: Confirm installation

Configuring the EWLM domain manager on a Linux (x86) server

There are additional steps to follow before using the installed domain manager:

1. Create the domain server with all the preferred properties.
2. Run the EWLM domain manager configuration wizard by typing **./configWizardDM.sh** in the EWLM installation directory. (This also requires a graphical user interface.) If preferred, use the equivalent command, **createDM.sh**. (Figure 11).

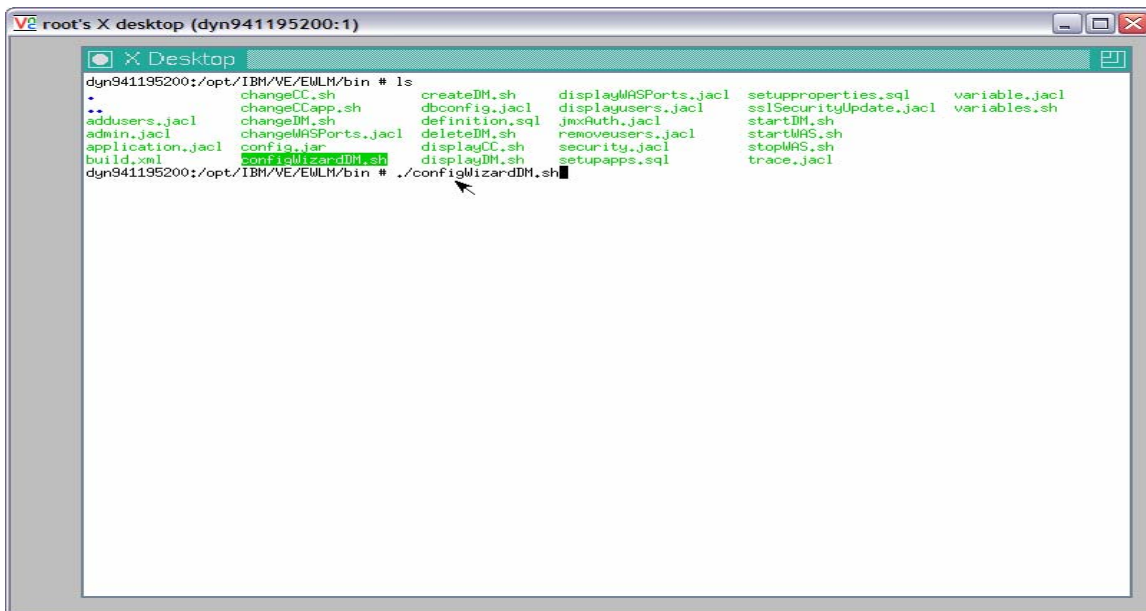


Figure 11: Run the EWLM domain manager configuration wizard

3. The wizard will prompt for several pieces of information. Figure 12 shows the first screen of the wizard.

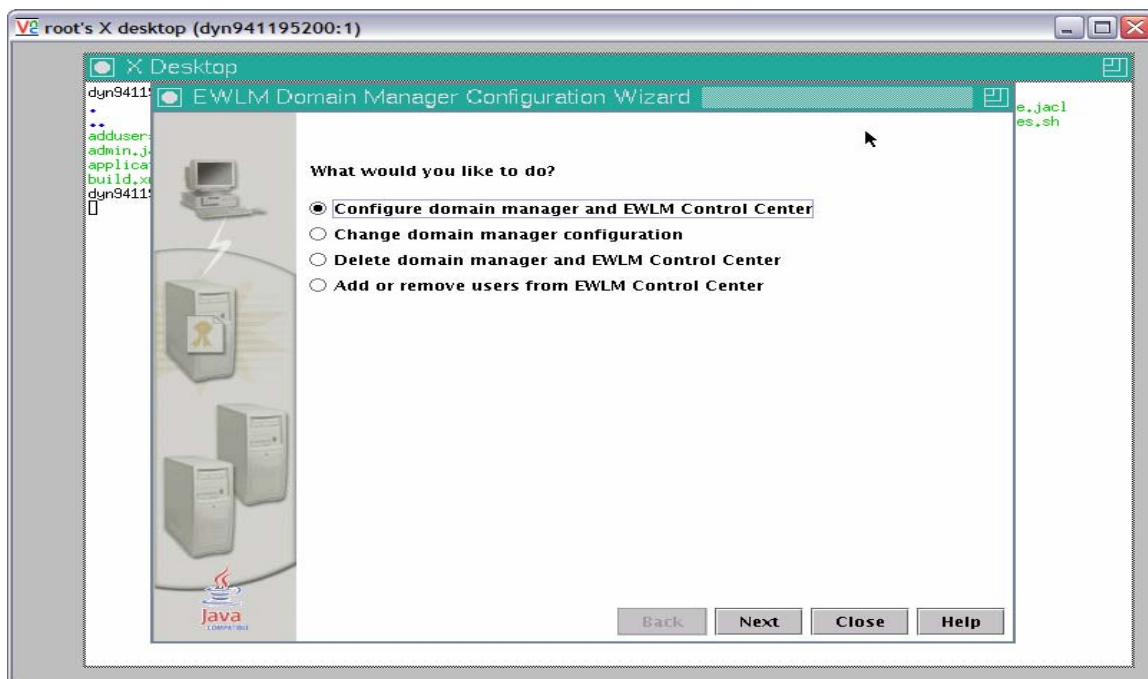


Figure 12: Screen one of EWLM Domain Manager Configuration Wizard

4. Choose **Configure domain manager and EWLM Control Center**.
5. Click **Next**.

The EWLM domain manager configuration wizard will prompt for the values pertinent to this test environment. The values chosen are listed below. (The names of the installation options for the command-line interface are also listed for easy reference.)

- **Working directory - /opt/EWLMDM:** (**Note:** This directory should not exist.) The configWizardDM.sh or createDM.sh command creates the specified directory automatically. This directory will contain all information related to EWLM components, EWLM Control Center, and the WebSphere Application Server instance associated with EWLM.
- **adminUser - root:** This is the administrator for the EWLM domain manager and WebSphere Application Server instance; root was used in this environment. If other administrators will be used, such as ewlmdm, make sure to specify that here.
- **adminPW - <password for toot >:** This is the password for the adminUser user ID, as specified in the preceding option.
- **wasPorts - 20000:** This assigns WebSphere Application Server ports on the domain manager. The number specified is the start of a range of 15 ports used by the EWLM WebSphere Application Server instance. Before doing this, verify that these ports are not being used.

Installing IBM Enterprise Workload Manager (EWLM) Domain Manager on a Linux (x86) server

- **jmxport/jp - 9095:** This is the port number used for any communication between the EWLM Control Center and the EWLM domain manager. Again, verify that this port is not being used.
- **DomainManagerAddress/ma:** This is the domain manager's IP address.
- **DomainManagerPort/mp - 9092:** This port is used for communication between the domain manager and the managed server. Again, verify that this port is not being used.
- **EWLMDomainName/dn - test_ewlm:** This is the name assigned to the EWLM domain name. It can be any name. This has nothing to do with the DNS domain name.
- **auth - none:** This specifies that the basic configuration for security encryption, Secure Sockets Layer (SSL), is not used.

The following screen shots (Figure 13 through Figure 20) demonstrate the steps and values to enter as prompted by the wizard:

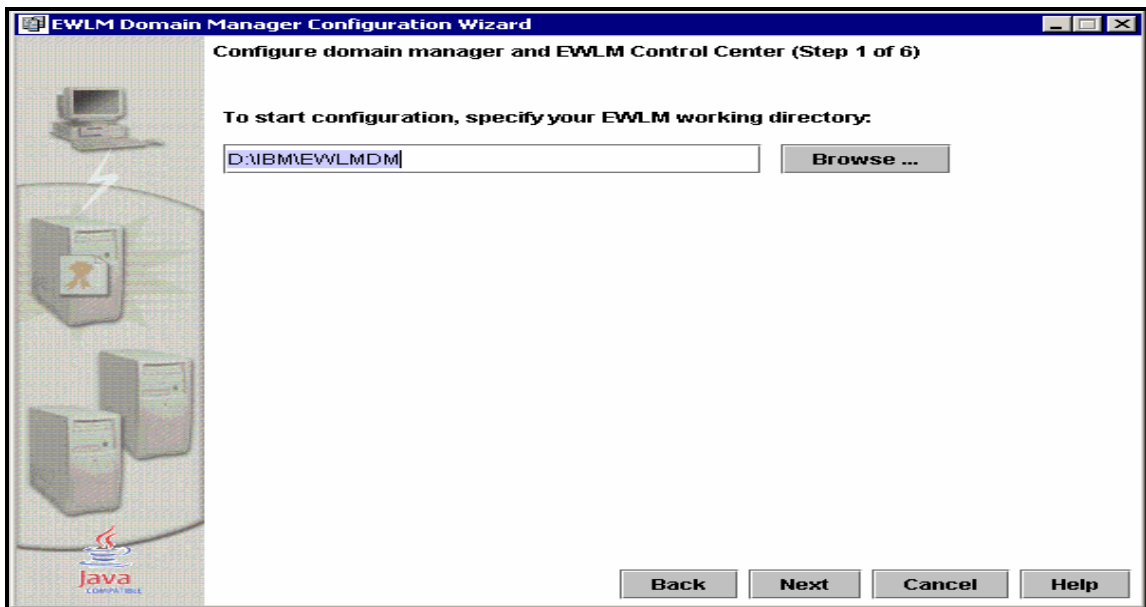


Figure 13: Screen two of EWLM Domain Manager Configuration Wizard

Installing IBM Enterprise Workload Manager (EWLM) Domain Manager on a Linux (x86) server

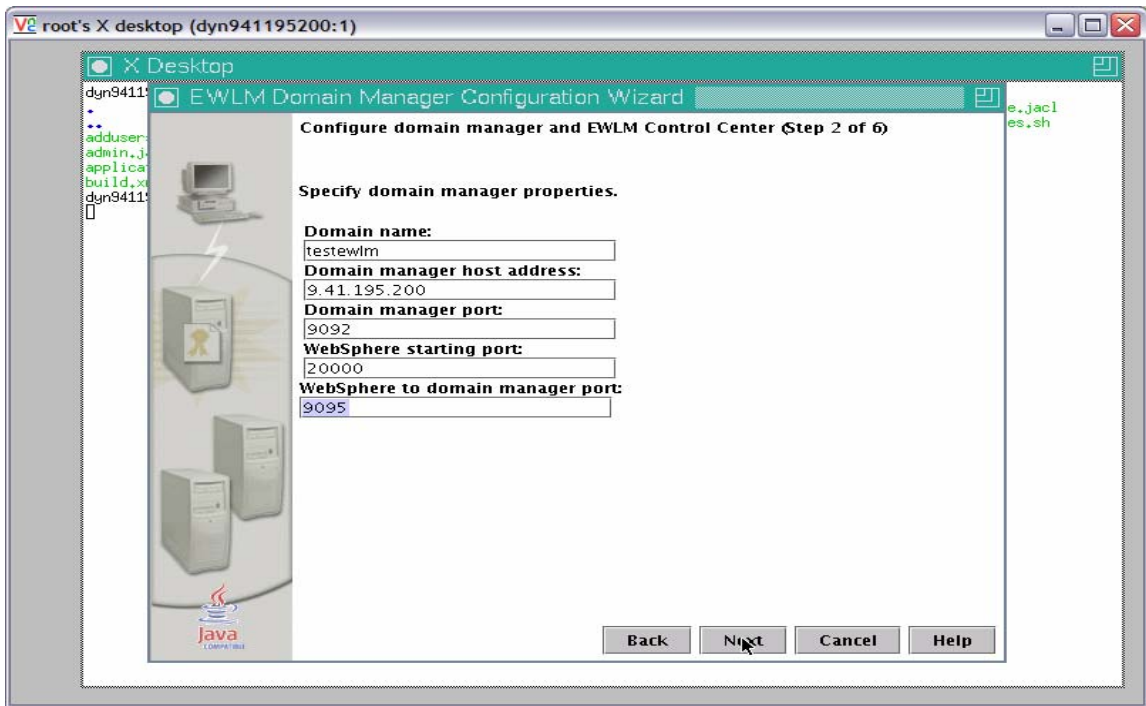


Figure 14: Screen three of EWLM Domain Manager Configuration Wizard

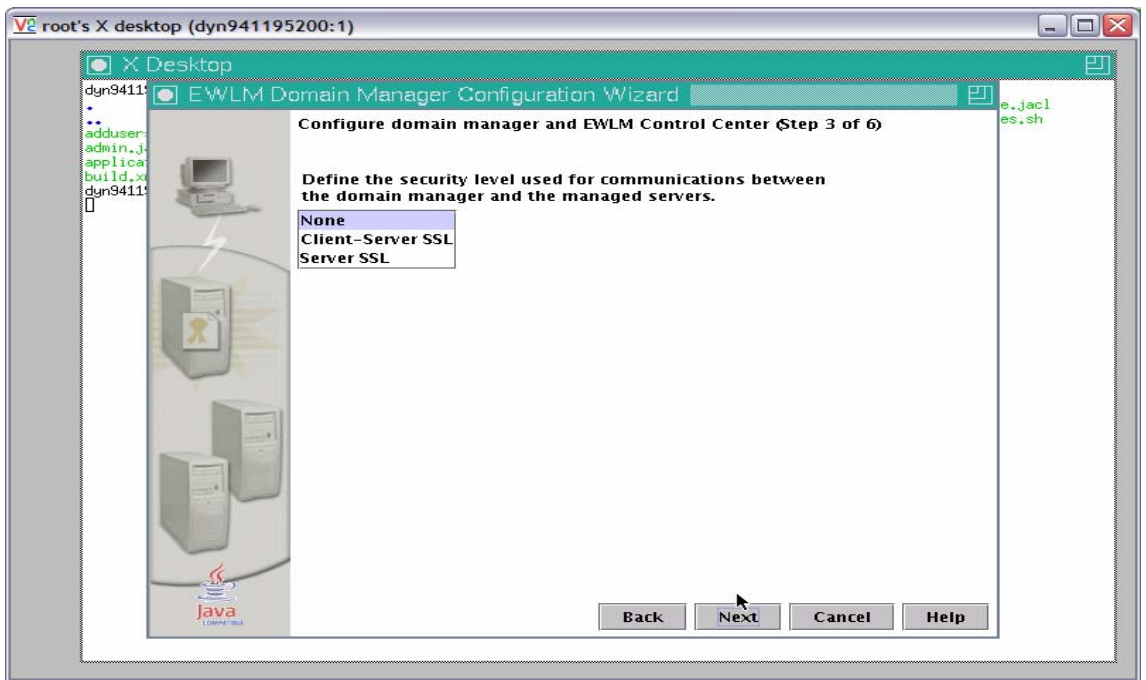


Figure 15: Screen four of EWLM Domain Manager Configuration Wizard

Installing IBM Enterprise Workload Manager (EWLM) Domain Manager on a Linux (x86) server

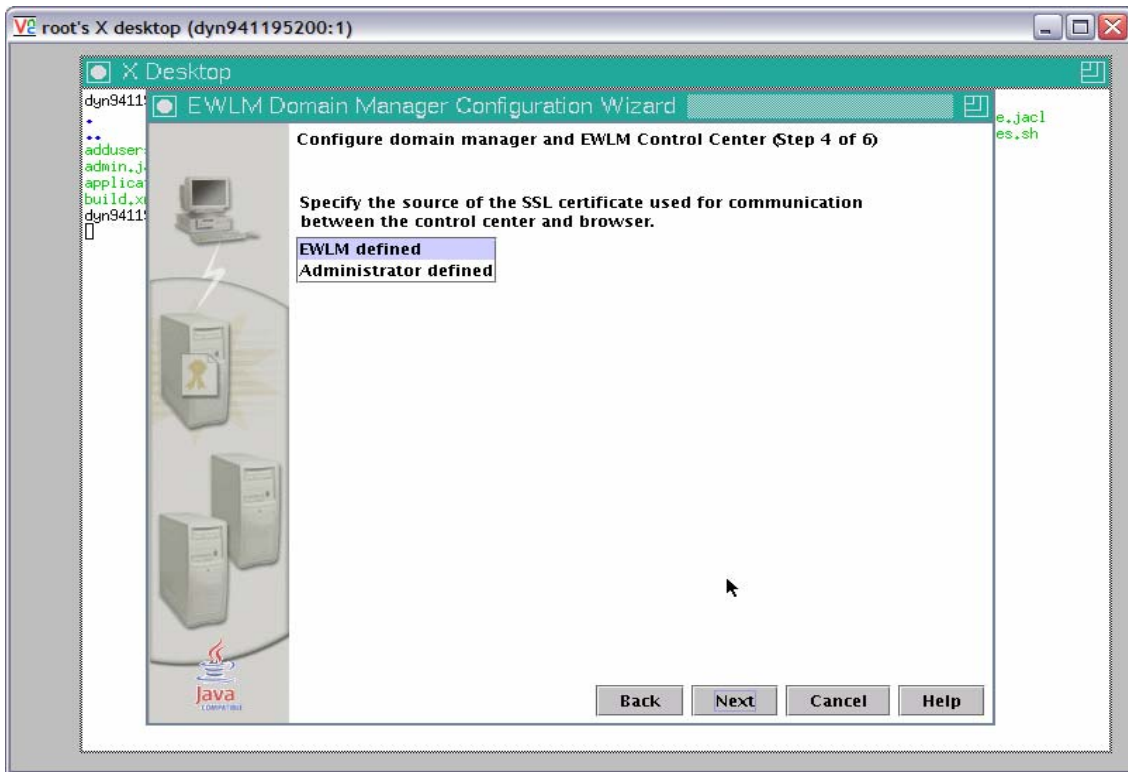


Figure 16: Screen five of EWLM Domain Manager Configuration Wizard

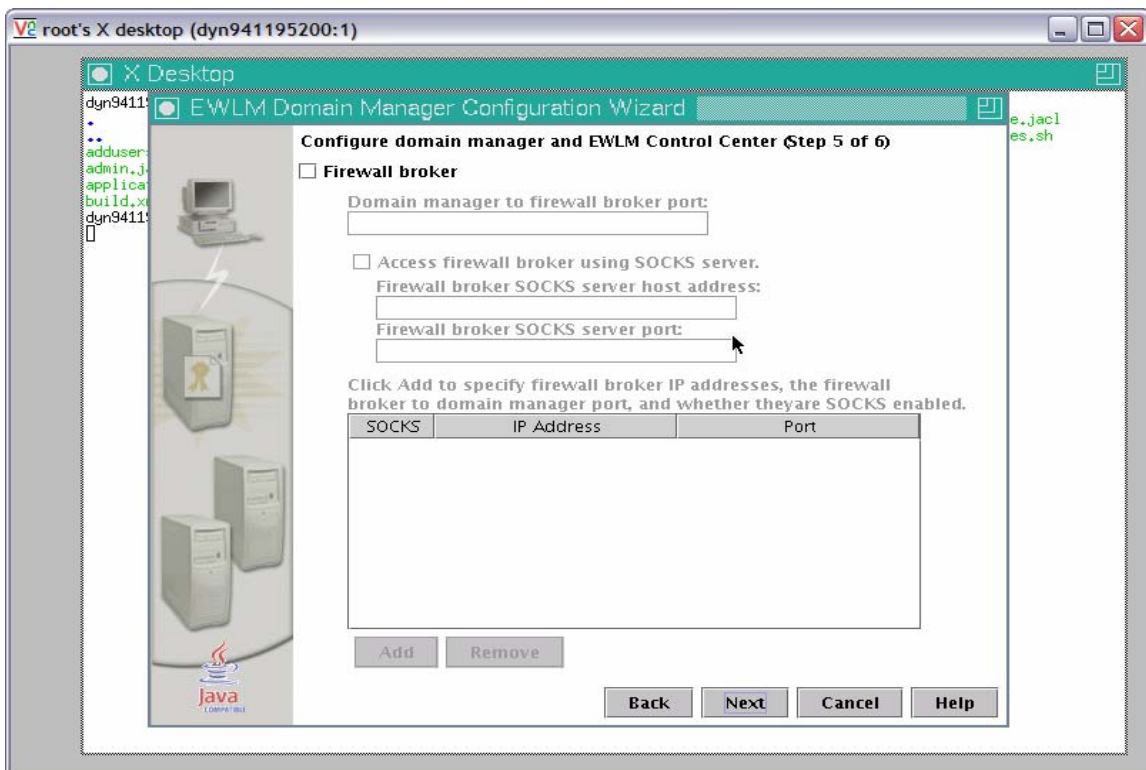


Figure 17: Screen six of EWLM Domain Manager Configuration Wizard

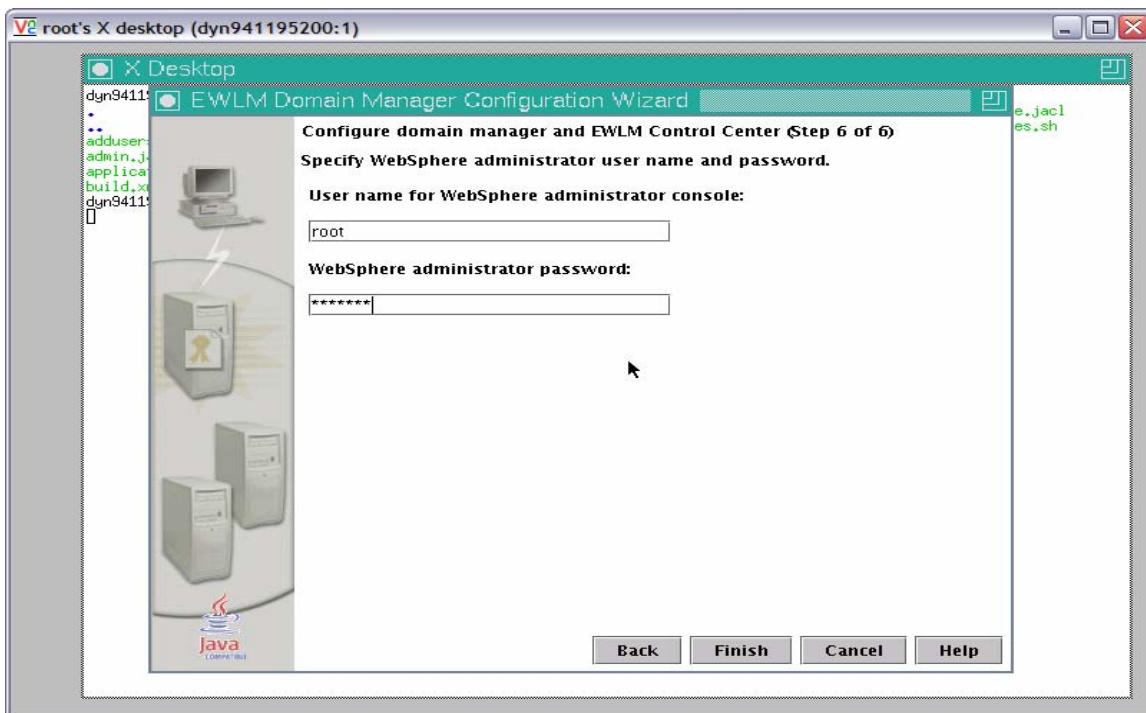


Figure 18: Screen seven of EWLM Domain Manager Configuration Wizard

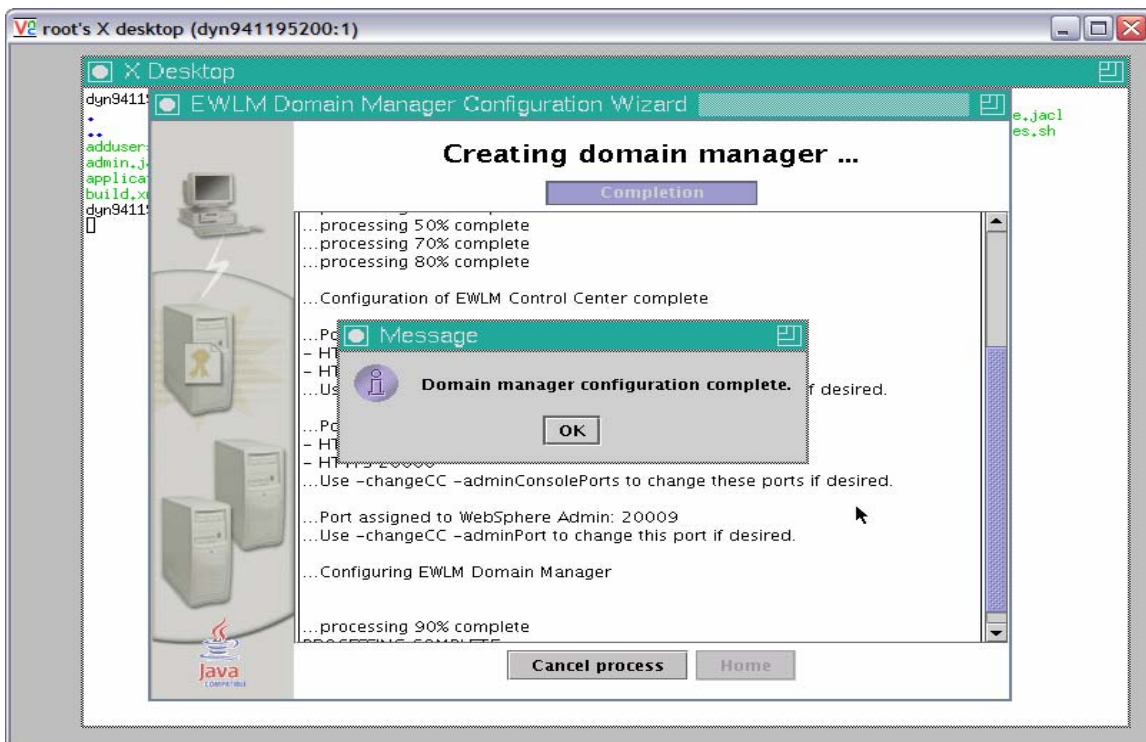
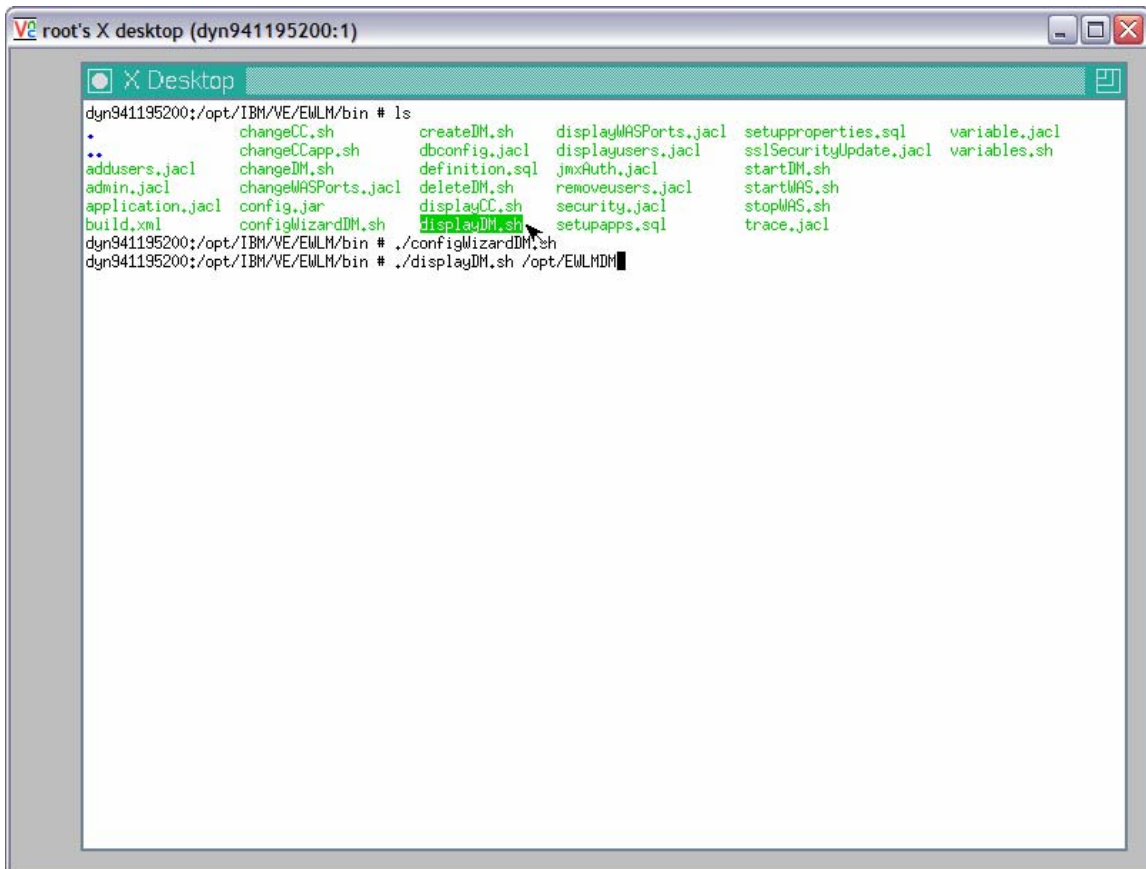


Figure 19: Final screen of EWLM Domain Manager Configuration Wizard

6. As a result of completing the screens in Figure 19, the domain manager working directory is created with the subdirectories listed below:
 - **EWLMDData** contains all the data described in the following directories:
 - **PolicyDB** contains the deployed domain policies.
 - **PropertiesDB** contains the customization settings.
 - **ReportingDB** contains temporary performance statistics. In this release, 60 minutes worth of data is kept.
 - **ServerDB** contains the management domain configurations.
 - **WAS** contains the WebSphere Application Server components.
 - **Interfaces** contains control information for programming interfaces.
7. To verify the domain manager properties, use the **displayDM.sh** command (Figure 20 and 21). Use this command to check the values for the **jp** and **mp** options. Or, use **changeDM.sh** or **deleteDM.sh** to reconfigure the domain manager.



The image shows a terminal window titled "root's X desktop (dyn941195200:1)". The terminal displays the output of a command execution. The first line shows the directory listing for /opt/IBM/VE/EWLM/bin. The second line shows the execution of the ./configWizardDM.sh command. The third line shows the execution of the ./displayDM.sh /opt/EWLMDM command. The terminal output is as follows:

```
dyn941195200:/opt/IBM/VE/EWLM/bin # ls
..
addusers.jacl      changeCC.sh      createDM.sh      displayWASPorts.jacl  setupproperties.sql  variable.jacl
admin.jacl         changeCCapp.sh  dbcconfig.jacl  displayusers.jacl    sslSecurityUpdate.jacl  variables.sh
application.jacl  changeDM.sh     definition.sql   jmxAuth.jacl        startDM.sh
build.xml          changeWASPorts.jacl  deleteDM.sh     removeusers.jacl    startWAS.sh
config.jar         configWizardDM.sh  displayCC.sh    security.jacl        stopWAS.sh
configWizardDM.sh  displayDM.sh     setupapps.sql   trace.jacl
```

```
dyn941195200:/opt/IBM/VE/EWLM/bin # ./configWizardDM.sh
dyn941195200:/opt/IBM/VE/EWLM/bin # ./displayDM.sh /opt/EWLMDM
```

Figure 20: Terminal window showing the processing following the displayDM.sh command

```

root's X desktop (dyn941195200:1)
X Desktop
ViaProxyPort/vp(null)
TracePlugin/tlog(Off)
InterBrokerPort/dp(null)
InterBrokerAddress/da(null)
JmxPort/jp(9095)
FirewallBrokerList/fb(null)
ReportingTrace/rt(250)
ViaProxyHost/va(null)
DomainName/dn(testewlm)
JniTrace/jt(250)
SSLKeystore/sslks(null)
ComponentTrace/ct(250)
DomainManagerPort/mp(9092)
MessageLog/ml(250)
CommunicationTrace/nt(250)
TraceDistHubBroker/tcomm(0)
SocksPort/sp(null)
FirewallBrokerPort/fp(null)
FailureLimit/fl(50)
SSLKeystorePassword/sslpw(password suppressed)
LoadBalancingTrace/lbt(250)
DomainManagerAddress/ma(9.41.195.200)
AuthorityLevel/auth(None)
ProcessMode/mode(DomainManager)
LBPublicPort/lbp(Off)
LBSecurePort/lbs(Off)
EventTrace/et(250)
TraceLevel/tl(Min)
TestComponent/tc(null)
DumpRetentionQuantity/dpq(25)
DumpRetentionAge/dpa(30)
SocksHost/sa(null)
WLMConfig - non-configurable property settings:
ManagedServerFailureTime(null)
ManagedServerIdentity(1929101e8ee32be28544630fc3da4afb)
ManagedServerId(-1)
StatisticsInterval(10)
DomainManagerIdentity(null)
PROCESSING COMPLETE
dyn941195200:/opt/IBM/VE/EWLM/bin #
    
```

Figure 21: Terminal window showing the complete displayDM.sh command processing

Adding users to the operating system and the EWLM Control Center

In EWLM Domain Manager, there are three roles:

- Administrators are responsible for deploying new domain policies.
- Operators are responsible for modifying current policies.
- Monitors are responsible for only viewing data in EWLM.

This step maps operating system users to their EWLM Control Center roles. Without this mapping, it is not possible to log on to the EWLM Control Center.

In this environment, the root user was mapped as the EWLM administrator (with the highest responsibility in the EWLM Control Center). The **changeCC.sh** command is used to map users and to change other Control Center properties.

The **changeCC.sh** command requires that the EWLM working directory, adminUser, and adminPW be specified as they were in **configWizzardDM.sh**. (In this environment, **/opt/EWLMMDM** is our working directory, and the root is the adminUser.)

- Use the following command to give the root user the role of EWLM administrator:
>cd /opt/IBM/VE/EWLM/bin
>./changeCC.sh --addUser D:\IBM\EWLMMDM --adminUser administrator
--adminPW <password> -roleUser Administrator --role Administrator

Installing IBM Enterprise Workload Manager (EWLM) Domain Manager on a Linux (x86) server

- Use the following command to give the root user the role of EWLM operator:
**>./changeCC -addUser D:\IBM\EWLMDM -adminUser administrator
-adminPW <password> -roleUser Adminstrator -role Operator**
- Use the following command to give the root user the role of EWLM monitor:
**>./changeCC -addUser D:\IBM\EWLMDM -adminUser administrator
-adminPW <password> -roleUser Adminstrator -role Monitor**

When each of these commands is entered, the changeCC.sh command will display an **in process** screen.

Figure 22 shows the **changeCC.sh** command process screen:

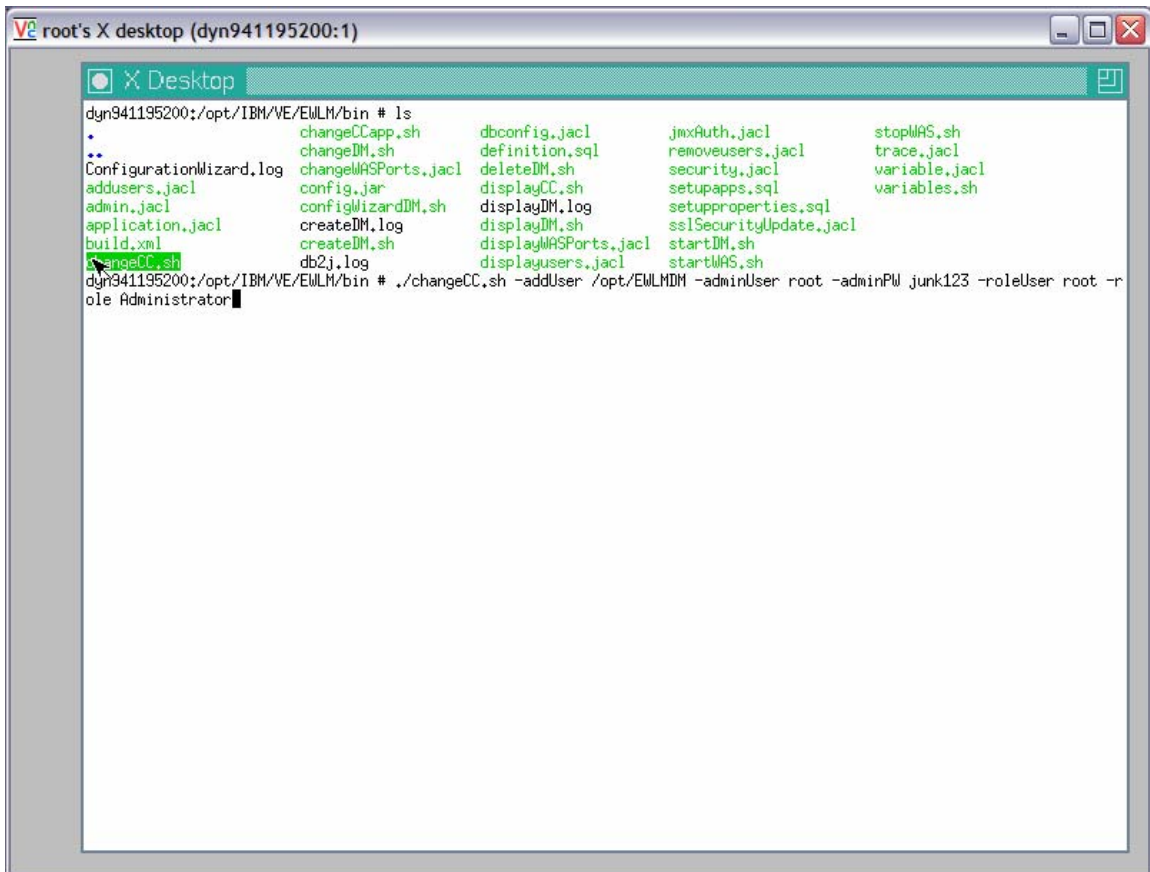
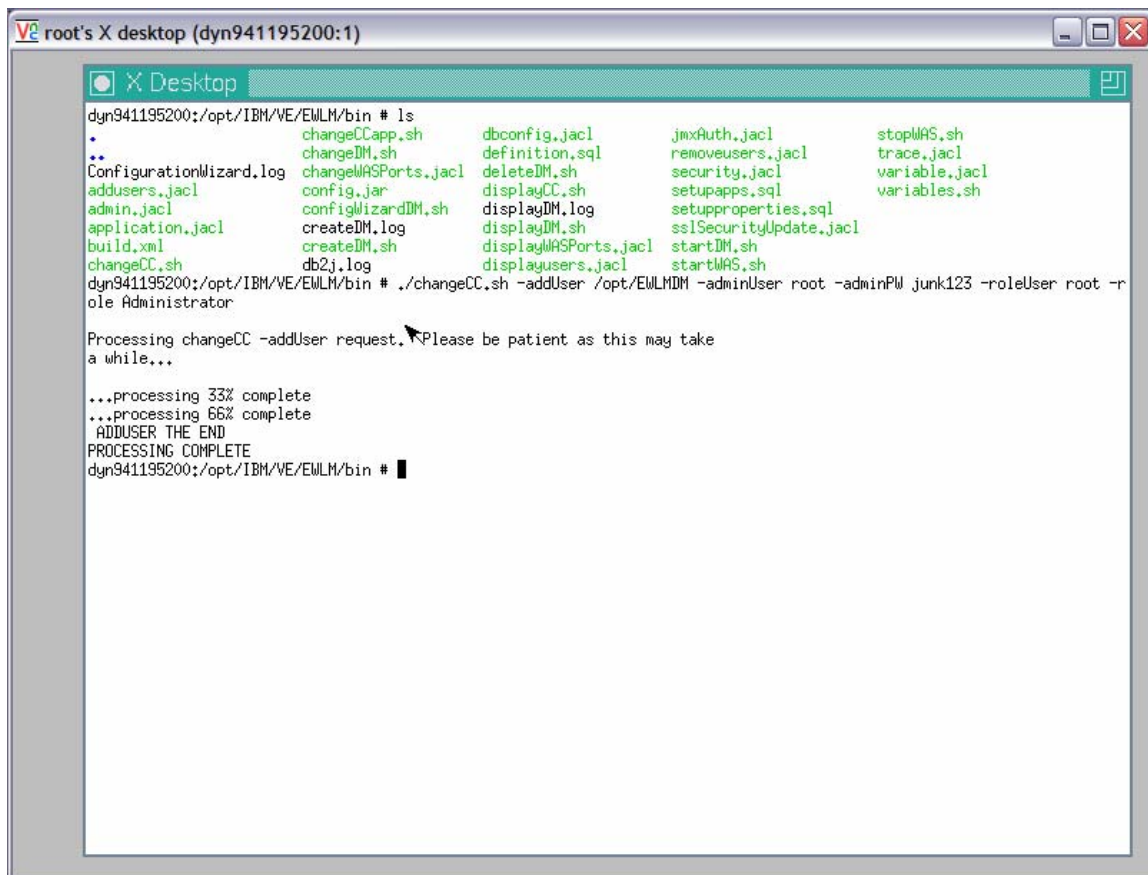


Figure 22: The changeCC.sh command in process screen

Installing IBM Enterprise Workload Manager (EWLM) Domain Manager on a Linux (x86) server

Use **displayCC.sh** to display the defined roles, users, or ports. Again, it is necessary to specify the EWLM working directory, adminUser, and adminPW as they were specified in **configWizzardDM.sh**. Change the directory by running the following (Figure 23):

```
>cd /opt/IBM/VE/EWLM/bin
>./displayCC.sh -users /opt/EWLM -adminUser administrator
-adminPW <password>
```



```
root's X desktop (dyn941195200:1)
X Desktop
dyn941195200:/opt/IBM/VE/EWLM/bin # ls
.
..
ConfigurationWizard.log
addusers.jacl
admin.jacl
application.jacl
build.xml
changeCC.sh
changeCCapp.sh
changeDM.sh
changeWASPorts.jacl
config.jar
configWizzardDM.sh
createDM.log
createDM.sh
db2j.log
dbconfig.jacl
definition.sql
deleteDM.sh
displayCC.sh
displayDM.log
displayDM.sh
displayWASPorts.jacl
displayusers.jacl
jmxAuth.jacl
removeusers.jacl
security.jacl
setupapps.sql
setupproperties.sql
sslSecurityUpdate.jacl
startDM.sh
startWAS.sh
stopWAS.sh
trace.jacl
variable.jacl
variables.sh
dyn941195200:/opt/IBM/VE/EWLM/bin # ./changeCC.sh -addUser /opt/EWLM -adminUser root -adminPW junk123 -roleUser root -role Administrator
Processing changeCC -addUser request. Please be patient as this may take a while...
...processing 33% complete
...processing 66% complete
ADDUSER THE END
PROCESSING COMPLETE
dyn941195200:/opt/IBM/VE/EWLM/bin # █
```

Figure 23: The displayCC.sh command in process screen

To set the port number use to access the control center, run:

```
>./displayCC -ports /opt/EWLM -adminUser administrator
-adminPW <password>
```

Check the ports assigned to the EWLM Control Center. In this environment, it is 20003. This is the port number used to access the Control Center.

Starting the EWLM WebSphere Application Server instance

Log on as the user specified as adminUser when running **configWizzardDM.sh** or **createDM.sh**. Then specify the EWLM working directory using **startWAS.sh**.

Installing IBM Enterprise Workload Manager (EWLM) Domain Manager on a Linux (x86) server

Log on as root and run the following string (as shown in Figure 24):

```
>cd /opt/IBM/VE/EWLM/bin  
>startWAS.sh /opt/EWLMDM
```

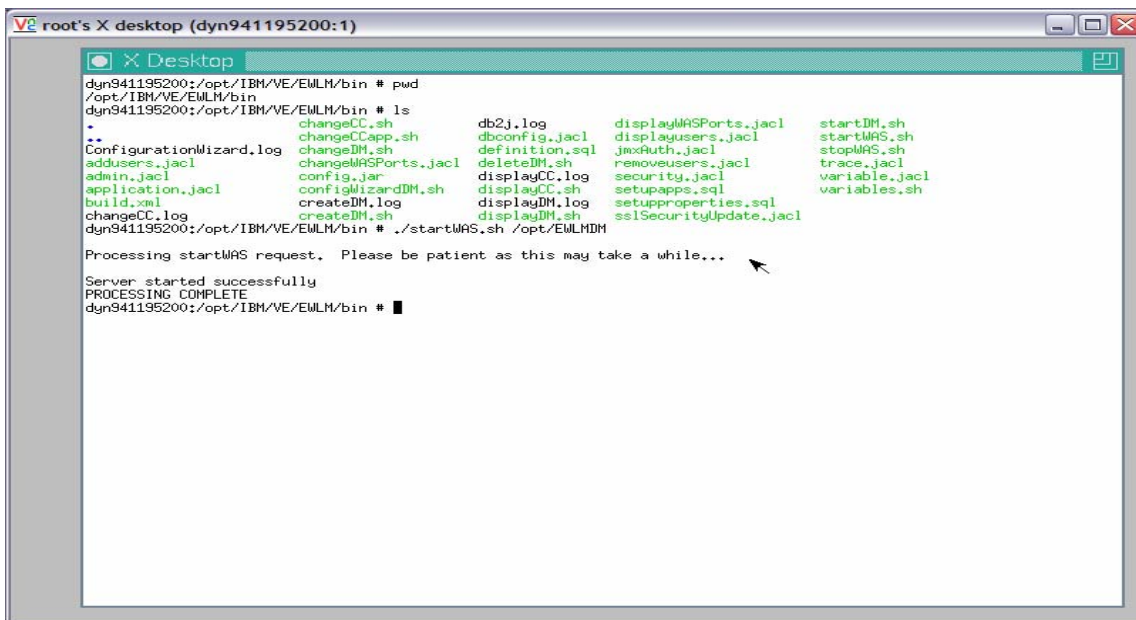


Figure 24: Start EWLM WebSphere Application Server instance screen

Starting the EWLM Domain Manager

Log on as the same user specified as adminUser when previously running configWizzardDM.sh or createDM.sh. Then specify the EWLM working directory using startWAS.sh. This command has to stay in the foreground.

Log on as root and run the following string (as shown in Figure 25):

```
>cd /opt/IBM/VE/EWLM/bin
>./startDM.sh /opt//EWLMDM
```

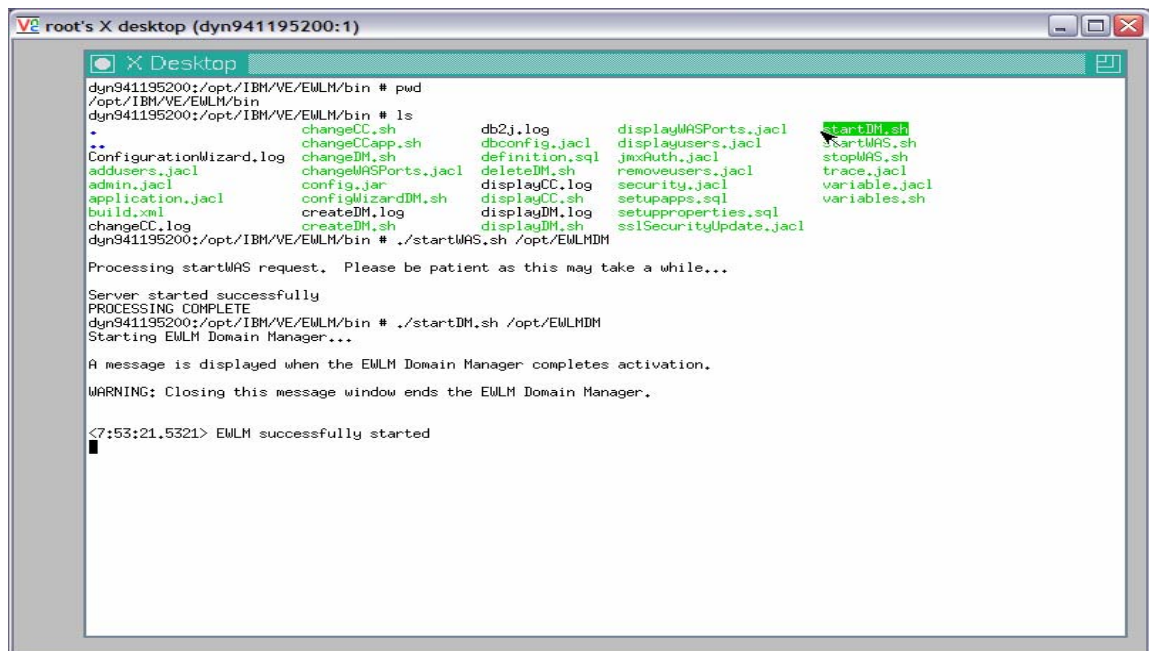


Figure 25: Start EWLM Domain Manager

Verifying that the domain manager and EWLM Control Center are working

Now, it is time to verify that the domain manager is installed and configured correctly:

1. Open a browser anywhere in the network.
2. Specify the URL with the domain manager host name.
3. Specify the port number assigned to the EWLM Control Center in the environment using **http://hostname.austin.ibm.com:20003/webui**.

This will bring up the EWLM Control Center (Figure 26).

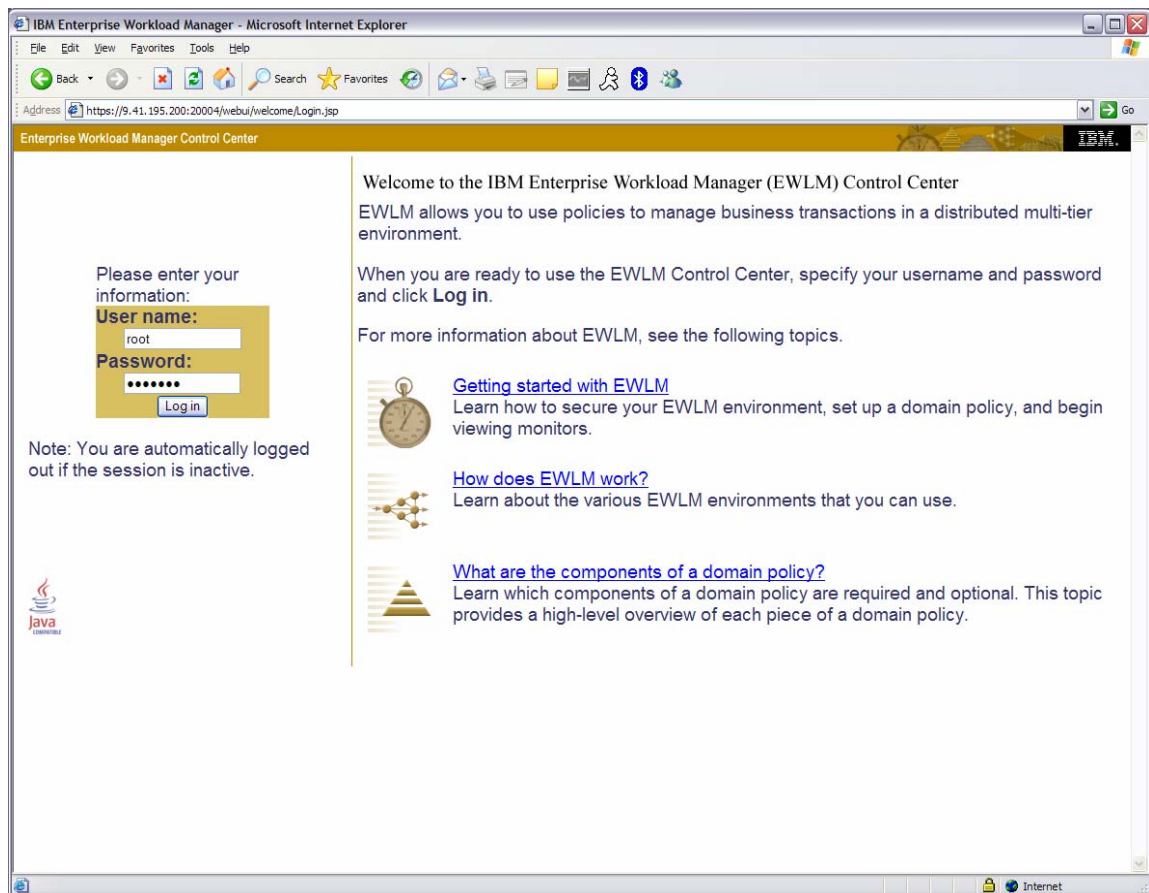


Figure 26: The IBM Enterprise Workload Manager (EWLM) Control Center

Conclusion

After going through the steps described in this paper, EWLM domain manager and managed servers are installed and configured on the system. It is always a good idea to apply the latest fix packs to ensure that EWLM will work correctly. A Web site for the EWLM fix packs can be found in the **Additional information** section.

In order to see interesting data in EWLM, it is necessary to install the IBM HTTP Server, WebSphere Application Server, and the DB2 Universal Database™ (DB2® UDB) server, each of which are already instrumented with the Open Group ARM V4.0 API calls.

Additional information

These Web sites provide useful reference materials to supplement the information contained within this white paper:

- IBM eServer software information center
publib.boulder.ibm.com/infocenter/eserver/v1r1/en_US/index.htm?info/veicinfo/eicarplangeneral.htm
- IBM eServer software information center planning article
publib.boulder.ibm.com/infocenter/eserver/v1r1/en_US/info/veicinfo/eicarplangeneral.htm
- IBM Software Access catalog
www.developer.ibm.com/en_US/welcome/softmall.html
- EWLM fix packages
publib.boulder.ibm.com/infocenter/eserver/v1r1/en_US/index.htm?info/veicinfo/eicarplangeneral.htm
- The Open Group
www.opengroup.org
Application Response Measurement (ARM) Issue 4.0 APIs.
- SUSE Linux Standard Server 8
www.novell.com/products/linuxstandardserve

About the authors

Lee Cheng currently works as a senior technical consultant for solution providers in the IBM Systems group. Her expertise is in the areas of application benchmarks, performance tuning, application porting, and internationalization. Previously, she was a developer for compilers and the IBM AIX system management component. She is currently focusing on Virtualization Engine technology, including Enterprise Workload Management (EWLM). Lee holds an MS degree in Computer Science from the University of Kentucky.

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