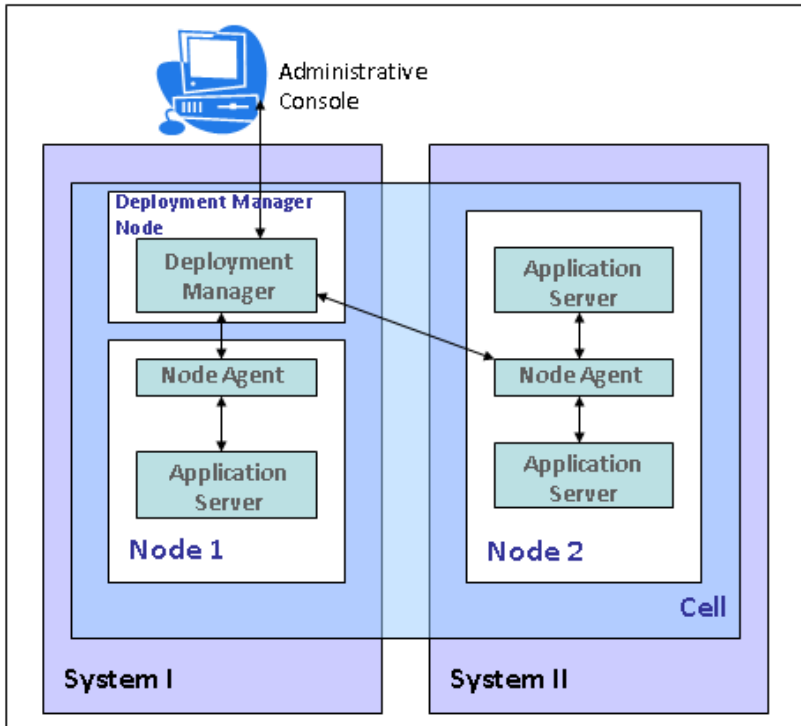


## CHAPTER 2: INSTALLATION

### Theory

WebSphere Application Server Network

Deployment (ND) has three configuration concepts, which are cells, nodes, and servers. These configuration items are managed by deployment managers, administrative agents, and job managers.



Application server is the core of the WebSphere Application Server where you can run your applications. Each application server has its own JVM where you can deploy one or more applications. Application server provides the platform that your application requires such as database and messaging connectivity.

Node is a grouping of application servers in order to configure and manage them. It is possible to have multiple nodes in Network Deployment installation, but nodes cannot cross the limits of the operating system instance of which they are installed on. Administrative console enables you to manage multiple nodes installed on different operating system instances.

Cell contains multiple nodes that are administered by deployment manager. Deployment manager uses node agents within the cell to manage application servers installed on distributed and multiple nodes. Node agent is the administrative

server running on each node to manage application servers. Each node has its own copy of configuration and they are synchronized with the master repository which resides on deployment manager.

IBM Installation Manager is tool for installation and maintenance of Installation Manager based packages such as WebSphere Application Server. You can install and run Installation Manager in graphical, silent, console and command-line mode.

With Installation Manager you can install, update, modify, roll back and uninstall the packages.

*Installation* is the primary task for Installation Manager. From version 8 of Websphere Application Server, you can use this tool for installation and maintenance.

*Update* feature allows you to locate and install the updates for the products that are installed using Installation Manager. You can both install fixpacks and interim fixes available for your application server.

*Modify* allows you to change features used during installation. You can add/remove features such as language packs for Websphere Application Server.

*Roll back* gives you the possibility to remove an update and go back to the previous version of you application server. This feature is really handy when you have problems with the newly installed update. Installation manager keeps earlier versions and uses those files to roll back.

*Uninstall* feature allows you to remove packages that are installed using Installation Manager.

Beside these features, IBM Installation Manager allows you to create response files that can be used in installation of the packages like Websphere Application Server. To do that, use “-skipInstall” option to just simulate installation and “-record target\_response\_file.xml” option and complete all installation steps. At the end, the output file can be used as response file for further installations in silent mode.

## AIM

The aim of the following lab exercise is to install Websphere Application Server both using graphical interface where available and command line interface.

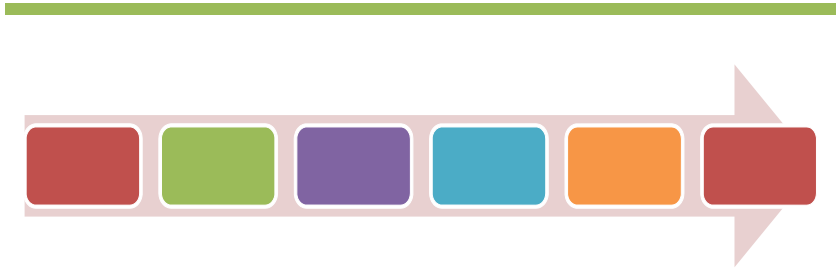
Following steps are required:

- Task 1: Graphical Installation Manager Installation
- Task 2: Graphical WebSphere Application Server Installation
- Task 3: Adding new Profile via GUI
- Task 4: Silent installation of Installation Manager
- Task 5: Silent installation of WebSphere Application Server
- Task 6: Adding new Profile via command line

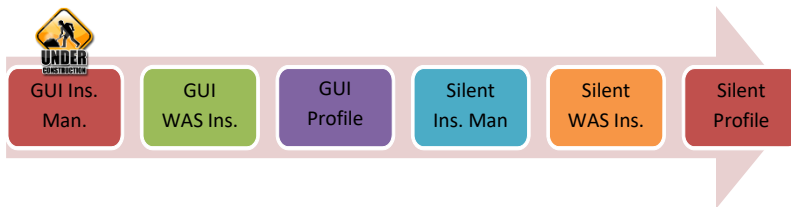
We need following packages to perform the lab exercise:

- IBM Installation Manager  
<http://www-01.ibm.com/support/docview.wss?uid=swg24033586>
- IBM WebSphere Application Server 8.5 Network Deployment Trial  
[https://www14.software.ibm.com/webapp/download/preconfig.jsp?id=2012-06-14+12%3A34%3A36.201813R&S\\_TACT=&S\\_CMP=](https://www14.software.ibm.com/webapp/download/preconfig.jsp?id=2012-06-14+12%3A34%3A36.201813R&S_TACT=&S_CMP=)

## Lab Exercise 2: INSTALLATION



1. **Graphical Installation Manager Installation**
2. **Graphical WebSphere Application Server Installation**
3. **Adding new Profile via GUI**
4. **Silent installation of Installation Manager**
5. **Silent installation of WebSphere Application Server**
6. **Adding new Profile via command line**

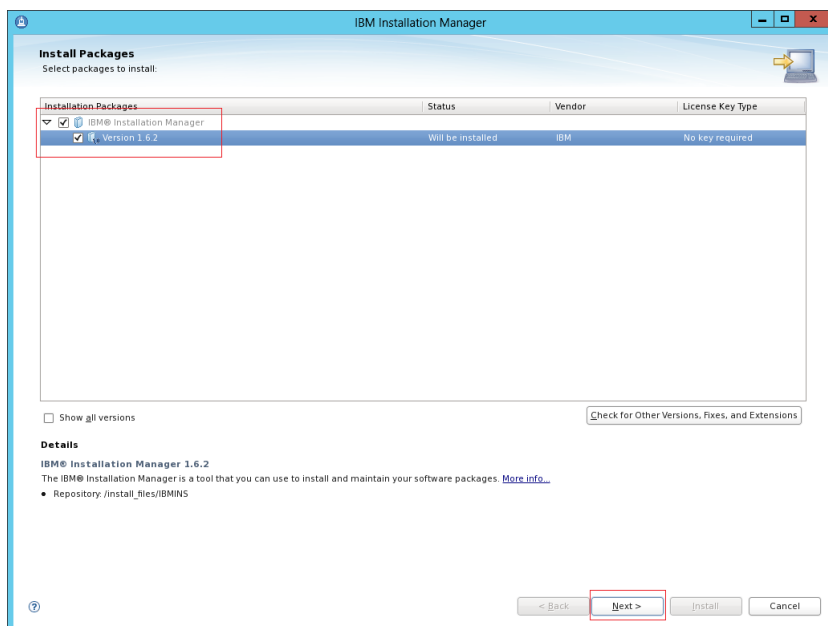


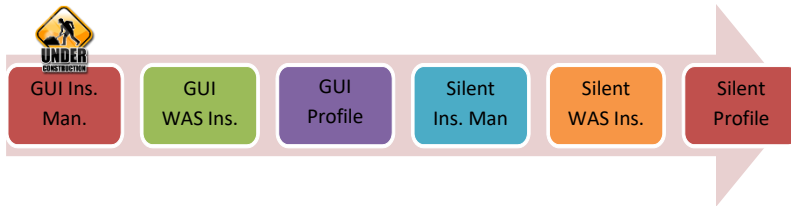
## Task 1: Graphical Installation Manager Installation

**Step 1:** Unzip the installation file of IBM Installation Manager and within that directory run “install” command.

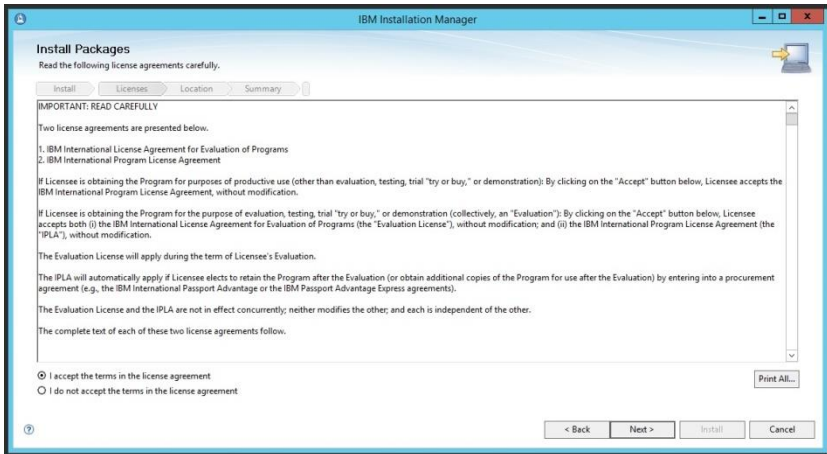
```
[root@localhost ~]#  
[root@localhost imins]#  
[root@localhost imins]#  
[root@localhost imins]# ./install
```

**Step 2:** Select the check marks as below and then click on “Next”.

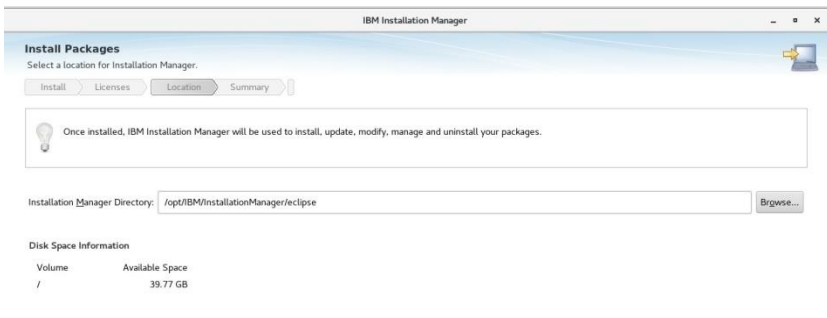


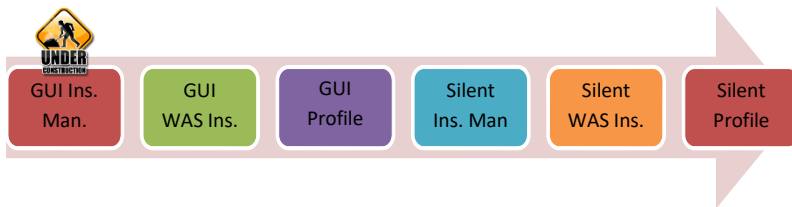


**Step 3:** Accept the license agreement and then click **“Next”**. You can print the agreement for later use by **“Print All”**.



**Step 4:** Choose the installation directory (/opt/IBM/InstallationManager/eclipse) and then click **“Next”**.





**Step 5:** View summary and click “Install” to start installation.

IBM Installation Manager

### Install Packages

Review the summary information.

Install > Licenses > Location > **Summary**

**Target Location**

Package Group Name: IBM Installation Manager

Installation Directory: /opt/IBM/InstallationManager/eclipse

**Packages**

Packages
IBM® Installation Manager 1.8.5

**Environment**

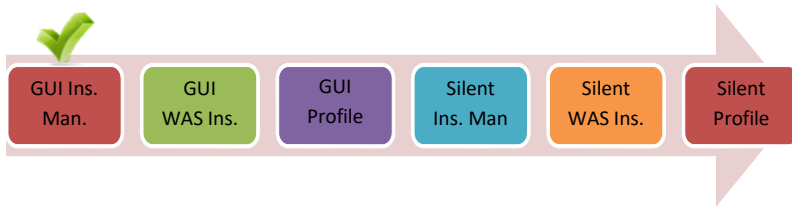
Arabic, Brazilian Portuguese, Croatian, Czech, Danish, Dutch, English, Finnish, French, German, Greek, Hebrew, Hungarian, Italian, Japanese, Korean, Norwegian, Polish, Russian, Simplified Chinese, Slovak, Slovenian, Spanish, Swedish, Thai, Traditional Chinese, Turkish

**Disk Space Information**

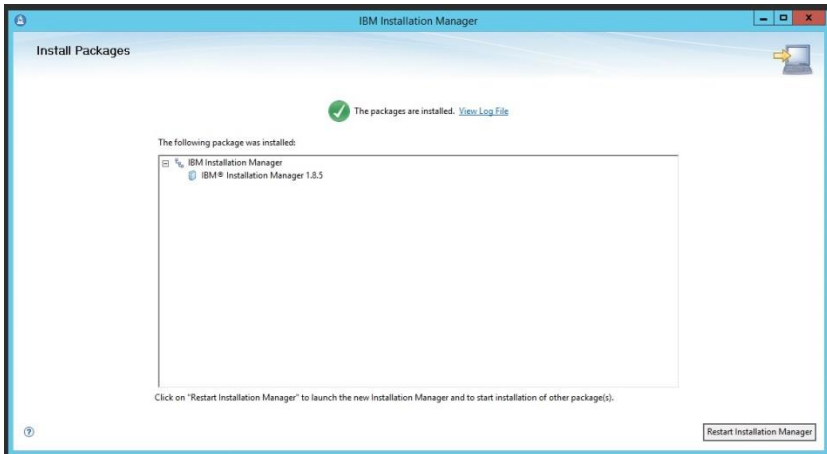
Total Available Space	39.77 GB
Total Download Size:	171.44 MB
Total Installation Size:	328.61 MB

Repository Information

< Back Next > Install Cancel

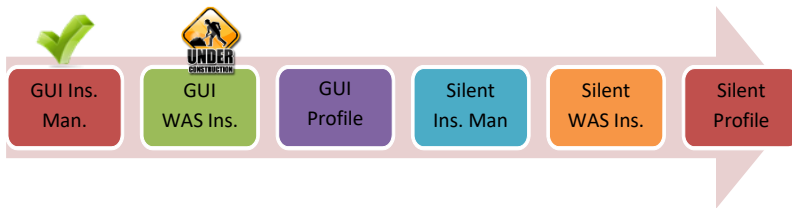


**Task 1 is complete!**

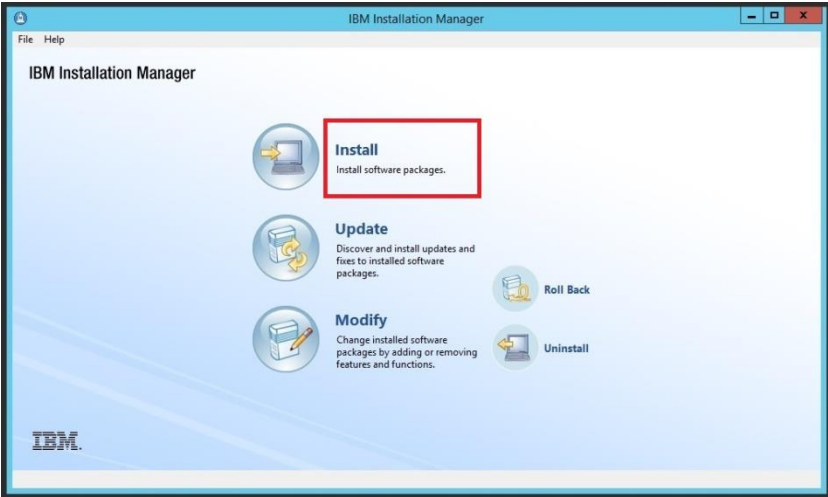


**Step 6:** Click **"Restart Installation Manager"** to run newly installed Installation Manager.

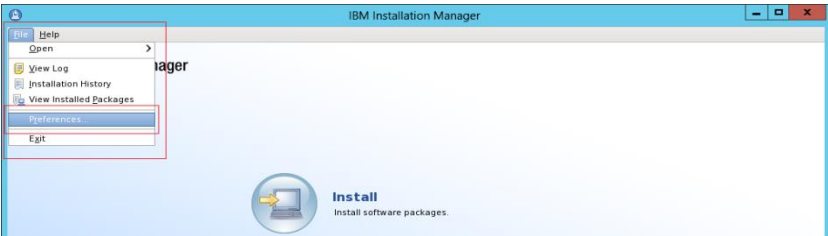


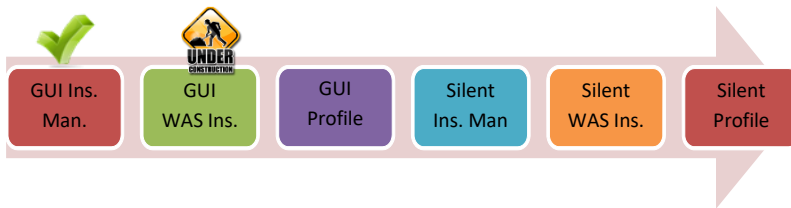


## Task 2: Graphical WebSphere Application Server Installation



**Step 1:** In order to set repositories to install Websphere, click “**File>Preferences**”.



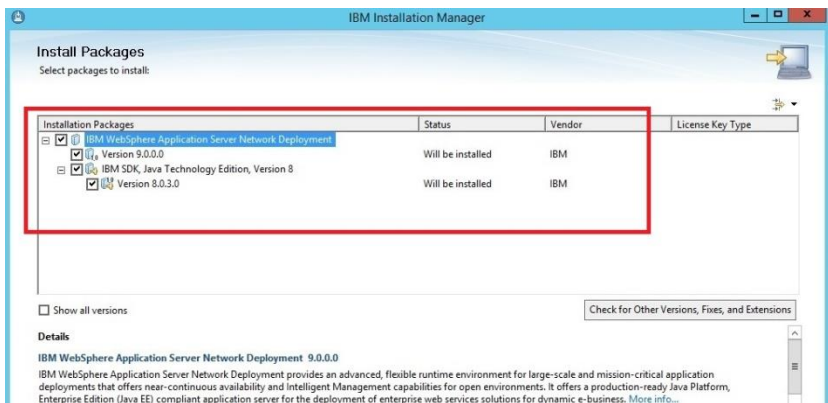


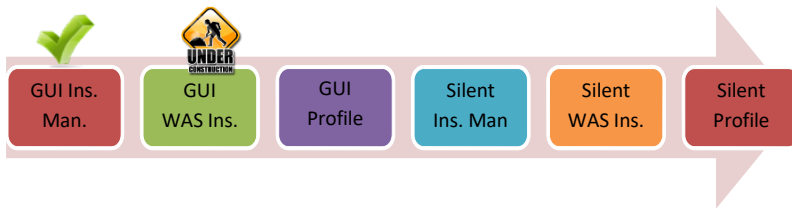
**Step 2:** Click “Add Repository” and change directory to the installation file of Websphere Application Server.

<http://www.ibm.com/software/repositorymanager/com.ibm.websphere.ND.v90>

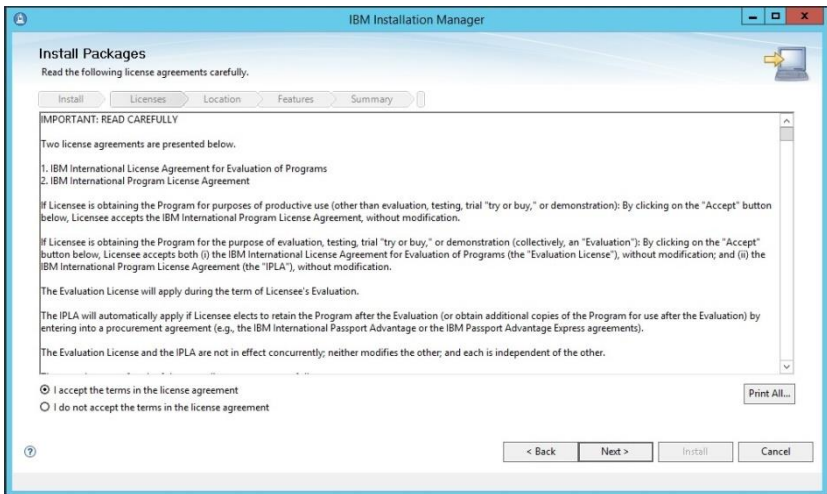
**Step 3:** Click “OK” when you select all the required repositories. For the installation purpose, we will have repositories configured, one for WebSphere and other for IBM SDK required for WebSphere installation.

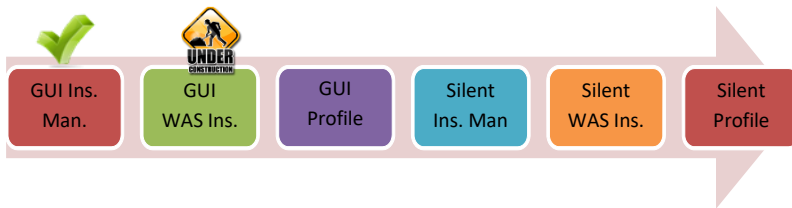
**Step 4:** Select the packages you want to install and then click “Next”.



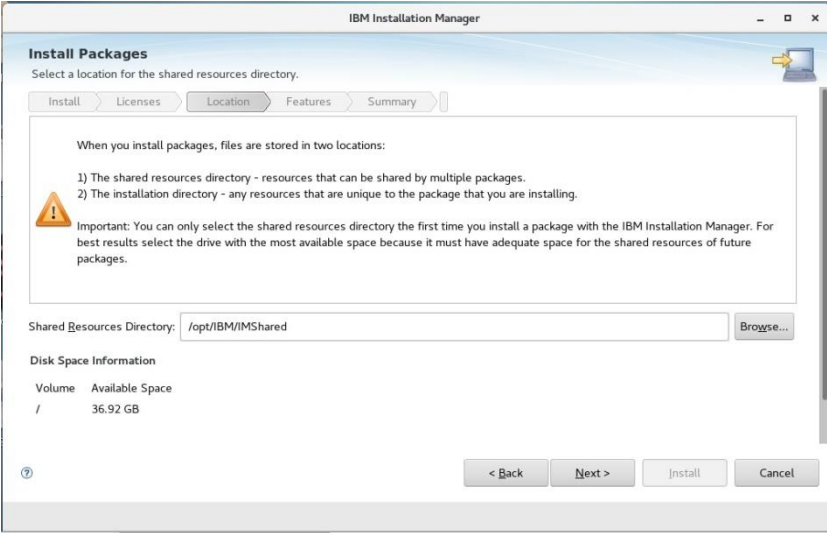


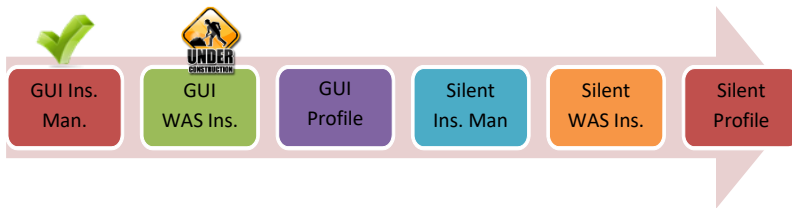
**Step 5:** Accept the license agreement and then click “Next”.



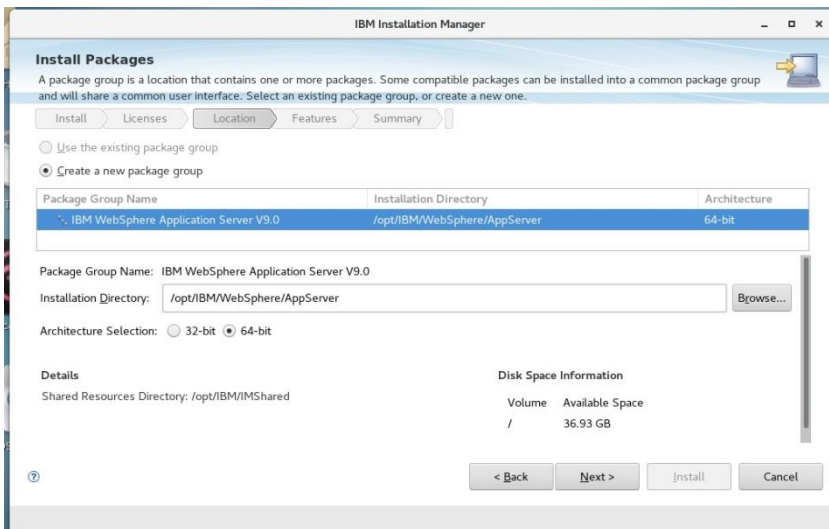


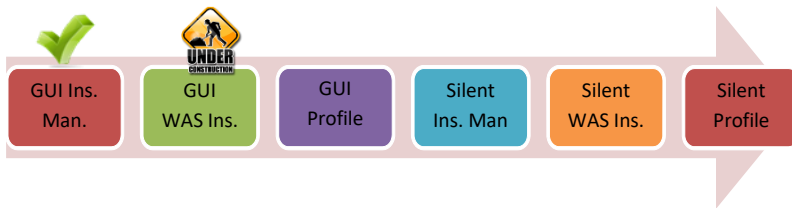
**Step 6:** Select the shared resources directory and then click “Next”. This directory will be shared between different packages that might be installed.



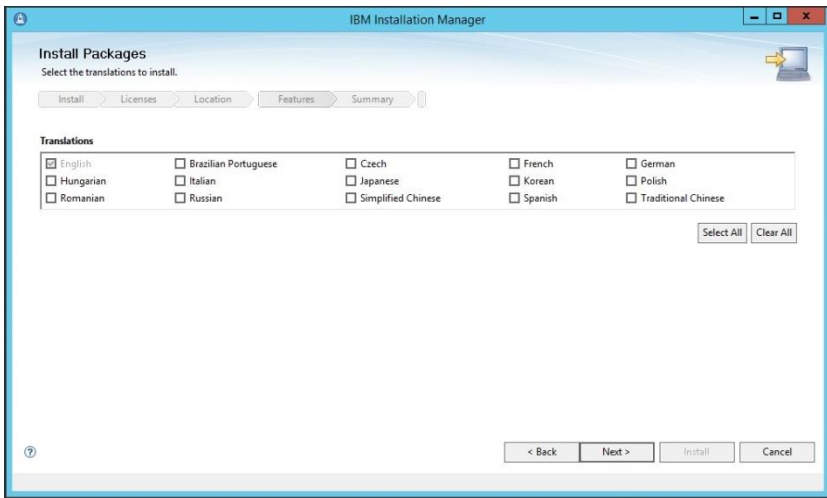


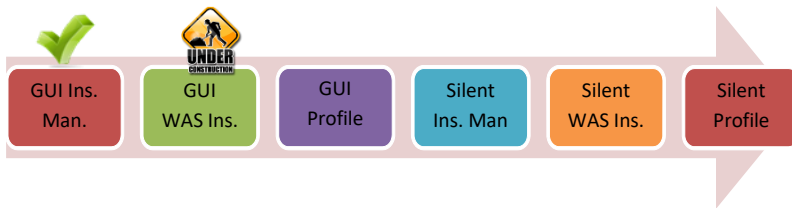
**Step 6:** Select the installation directory. We accept the default value, “/opt/IBM/WebSphere/AppServer” and then click “**Next**”.



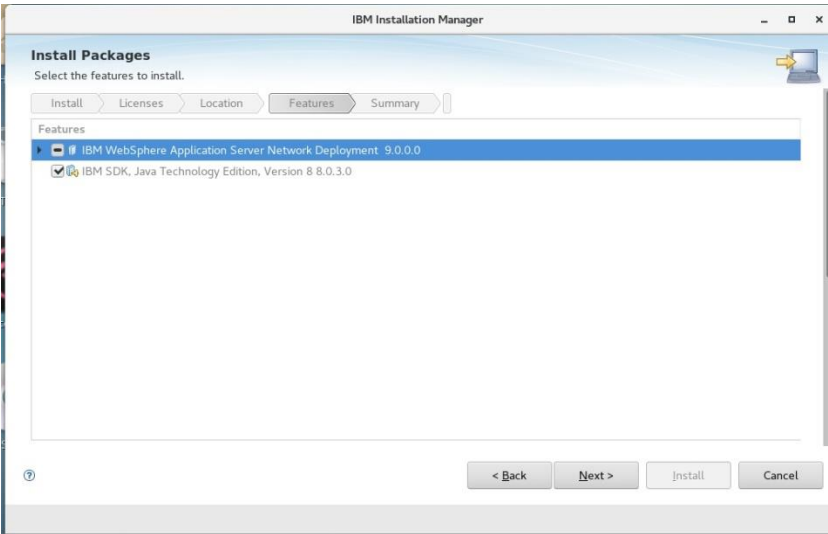


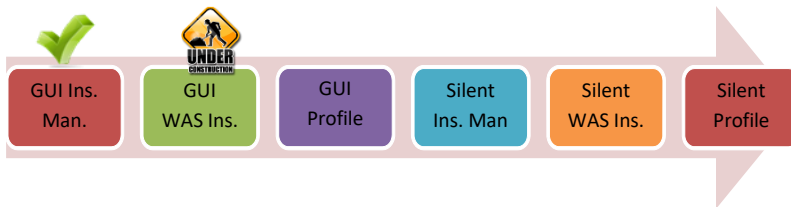
**Step 7:** Select different language translations and then click **“Next”**.



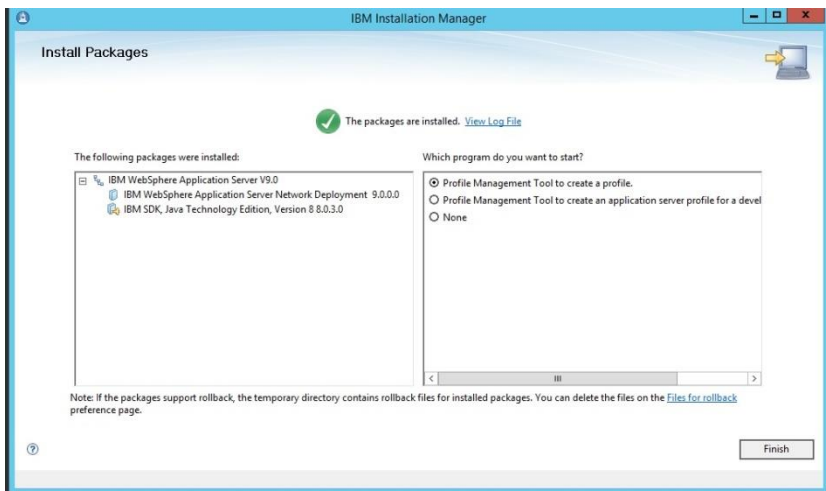
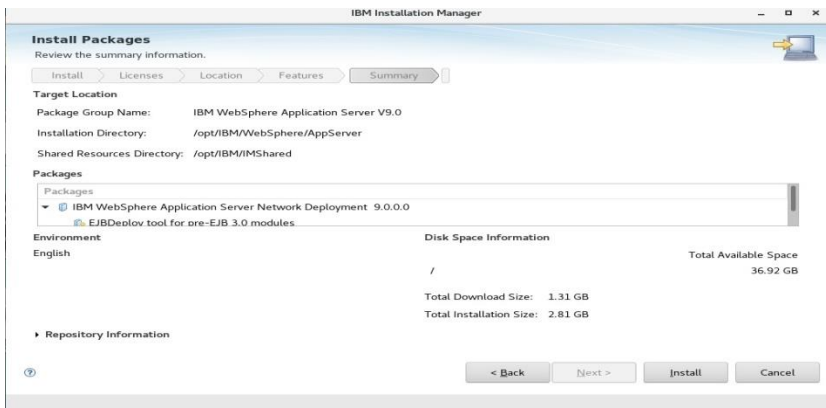


**Step 8:** Select the features you need to install and then click “Next”.

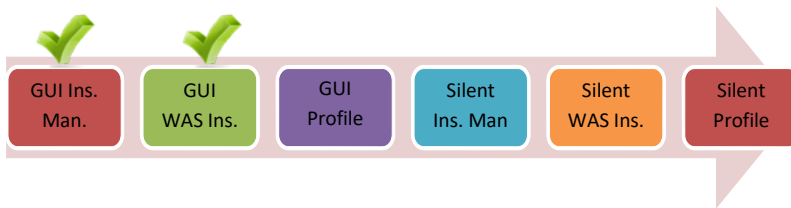




**Step 9:** Review the summary information, and then click “Install” to start installation. If you need to change the options, simply go back and then update.



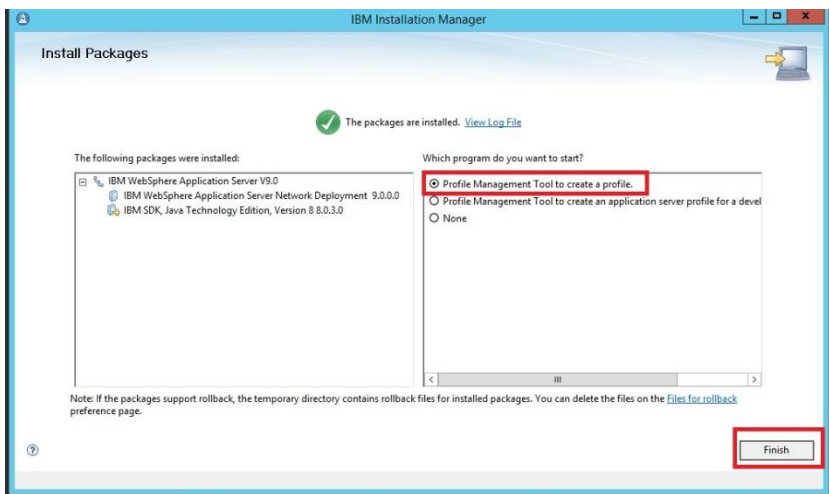




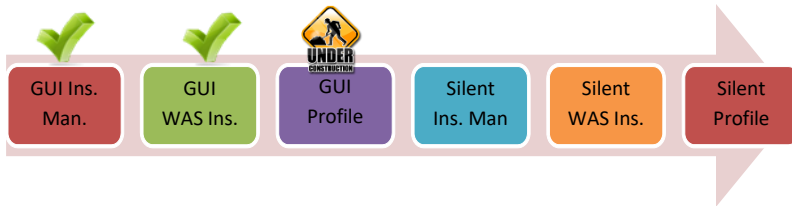
**Task 2 is complete!**

### Task 3: Adding new Profile via GUI

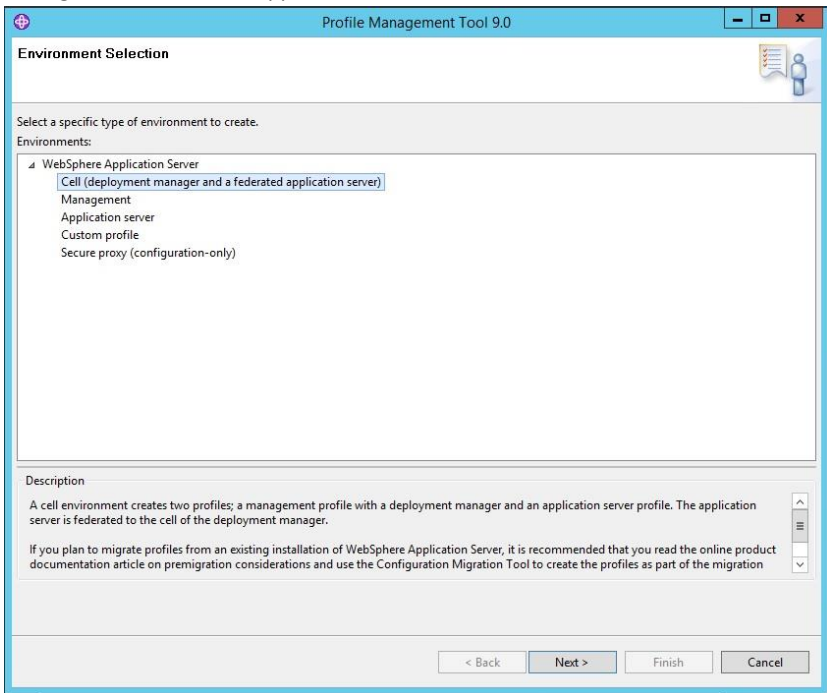
**Step 1:** Select “Profile Management Tool to create a profile” and then click “**Finish**”.

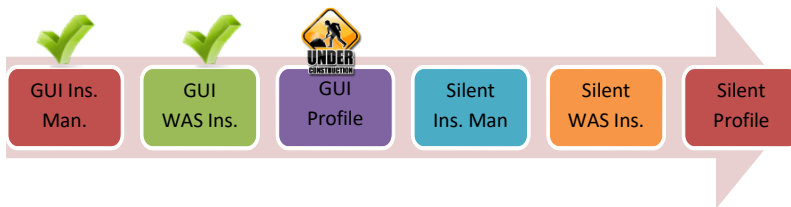




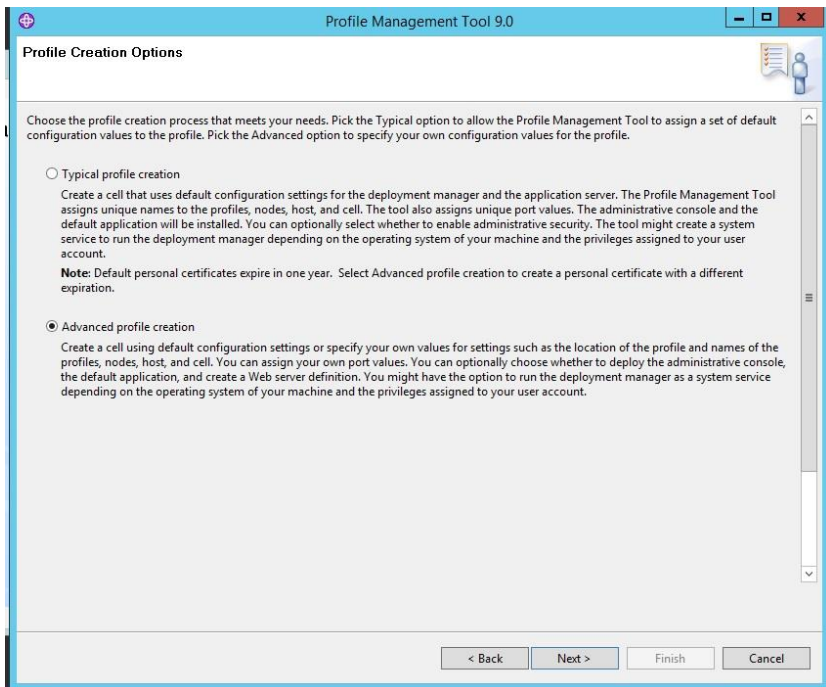


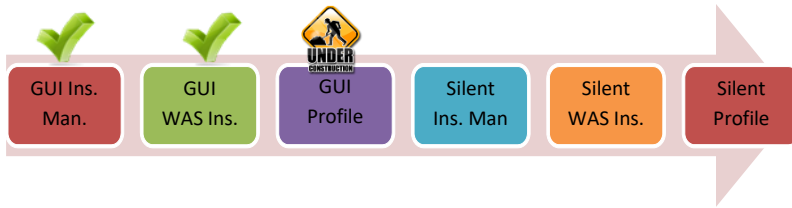
**Step 2:** Choose “Cell” type profile and click “Next”. This will add a deployment manager and a federated application server.





**Step 3:** Select “Advanced profile creation” to configure details and click “Next”.





**Step 4:** Accept the values as below and then click “Next”.

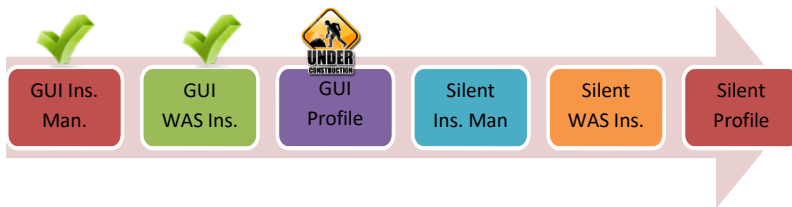
Profile Management Tool 9.0

Optional Application Deployment

Select the applications to deploy to the WebSphere Application Server environment being created.

- ☒ Deploy the administrative console (recommended).  
Install a Web-based administrative console that manages the application server. Deploying the administrative console is recommended, but if you deselect this option, the information center contains detailed steps for deploying it after the profile exists.
- ☒ Deploy the default application.  
Install the default application that contains the Snoop, Hello, and HitCount servlets.

< Back   Next >   Finish   Cancel



**Step 5:** You can set the values for names of Deployment manager and application server profile. It is also possible to set profile directory.

**Profile Name and Location**

Specify a profile name and directory path to contain the files for the run-time environment, such as commands, configuration files, and log files. Click **Browse** to select a different directory.

Deployment manager profile name:

Application server profile name:

Profile directory:

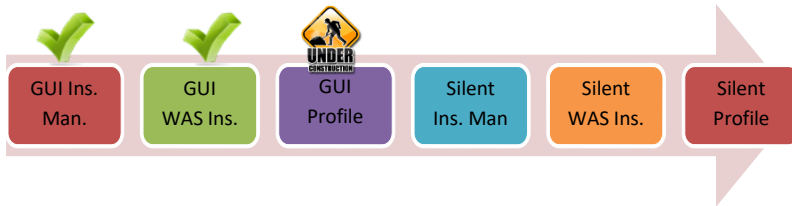
[Browse...](#)

The following naming rules must be used:

- Names must start and end with alphabetic characters (A-Z, a-z), numbers (0-9), and underscores (\_) only.
- Names may contain alphabetic characters (A-Z, a-z), numbers (0-9), periods (.), dashes (-) and underscores (\_) only.
- Names must not contain spaces or these characters: / \ \* . : ; = + ? | < > \_ % ' " [ ] # \$ ^ { } ( )

**Important:** Deleting the directory a profile is in does not completely delete the profile. Use the **manageprofiles** command to completely delete a profile.

< Back    Next >    Cancel    Finish



**Step 6:** In this step, you need to set names for node, host and cell, and then click “Next”.

Profile Management Tool 9.0

**Node, Host, and Cell Names**

Specify a deployment manager node name, an application server node name, a host name, and a cell name for this set of profiles:

Deployment manager node name:  
wasv90CellManager01

Application server node name:  
wasv90Node01

Host name:  
wasv90

Cell name:  
wasv90Cell01

**Node name:** A node name is for administration by the deployment manager. The deployment manager and application server no

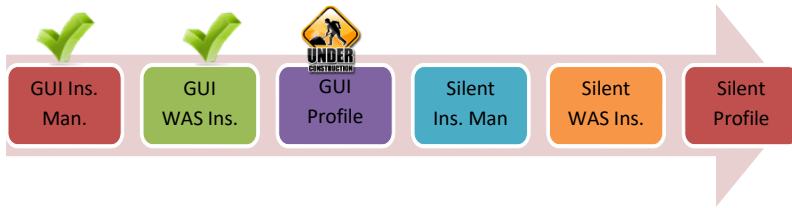
**Host name:** A host name is the domain name system (DNS) name (short or long) or the IP address of this computer and cannot

**Cell name:** A cell name is a logical name for the group of nodes administered by this deployment manager.

The following naming rules must be used:

- Names must start and end with alphabetic characters (A-Z, a-z), numbers (0-9), and underscores (-) only.

< Back   Next >   Cancel   Finish



**Step 7:** Uncheck the box “Enable administrative security” and then click “Next”. We will manage security settings in the next chapters.

Profile Management Tool 9.0

### Administrative Security

Choose whether to enable administrative security. To enable security, supply a user name and password for logging into administrative tools. This administrative user is created in a repository within the application server. After profile creation finishes, you can add more users, groups, or external repositories.

☐ Enable administrative security

User name:

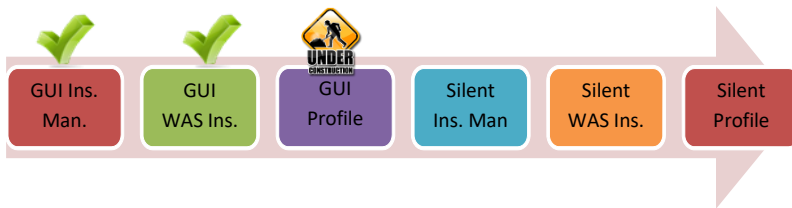
Password:

Confirm password:

See the online product documentation for more information about administrative security.  
[View the online product documentation](#)

< Back   Next >   Finish   Cancel





**Step 7:** You can use your existing certificates in this step. We will create new certificates and to do that click “Next”.

Profile Management Tool 9.0

### Security Certificate (Part 1)

Choose whether to create a default personal certificate and root signing certificate, or import them from keystores. To create new certificates, proceed to Part 2 and provide the certificate information. To import existing certificates from keystores, locate the certificates then proceed to Part 2 and verify the certificate information.

☒ Create a new default personal certificate.  
☐ Import an existing default personal certificate.

**Default personal certificate**

Path:  Browse...

Password:

Keystore type:

Keystore alias:

☒ Create a new root signing certificate.  
☐ Import an existing root signing certificate.

**Root signing certificate**

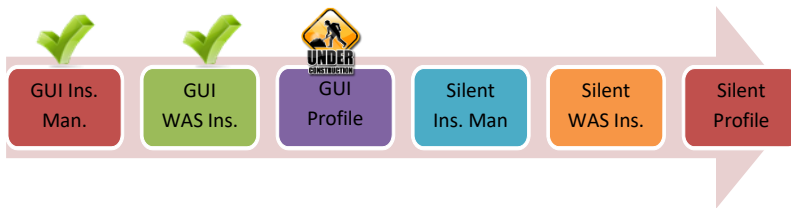
Path:  Browse...

Password:

Keystore type:

Keystore alias:

< Back   Next >   Finish   Cancel



**Step 8:** In this step we will create new certificate. You can provide the values of depending on your organization and then click “Next”.

Profile Management Tool 9.0

### Security Certificate (Part 2)

Modify the certificate information to create new certificates during profile creation. If you are importing existing certificates from keystores, use the information to verify whether the selected certificates contain the appropriate information. If the selected certificates do not, click **Back** to import different certificates.

Default personal certificate (a personal certificate for this profile, public and private key):

Issued to distinguished name:

Issued by distinguished name:

Expiration period in years:

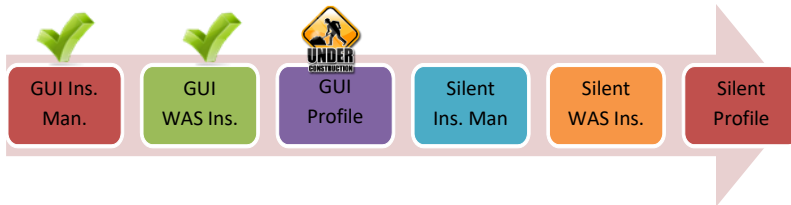
Root signing certificate (personal certificate for signing other certificates, public and private key):

Expiration period in years:

Default keystore password:

Confirm the default keystore password:

< Back   Next >   Finish   Cancel



**Step 9:** In the following 3 steps, you need to configure ports needed for the installation. We accept the default numbers and continue installation by clicking “Next”.

Profile Management Tool 9.0

### Port Values Assignment (Part 1)

The values in the following fields define the ports for the deployment manager. The recommended port values do not conflict with other profiles in this installation. To avoid run-time port conflicts, verify that each port value is unique because another installation of WebSphere Application Server or other programs might use the same ports. Click **Next** to assign the port values for the application server and node agent that will be associated with this deployment manager.

**Deployment manager ports**

Administrative console port (Default 9060):	9060
Administrative console secure port (Default 9043):	9043
Bootstrap port (Default 9809):	9809
SOAP connector port (Default 8879):	8879
Administrative interprocess communication port (Default 9632)(X):	9632
SAS SSL ServerAuth port (Default 9401):	9401
CS/V2 ServerAuth listener port (Default 9403):	9403
CS/V2 MultiAuth listener port (Default 9402):	9402
ORB listener port (Default 9100):	9100
Cell discovery port (Default 7277)(6):	7277
High availability manager communication (DCS) port (Default 9352):	9352
DataPower appliance manager secure inbound port (Default 5555):	5555
Middleware agent RPC port (Default 7060):	7060

< Back   Next >   Finish   Cancel

Profile Management Tool 9.0

### Port Values Assignment (Part 2)

The values in the following fields define the ports for the node agent. The recommended port values do not conflict with other profiles in this installation. To avoid run-time port conflicts, verify that each port value is unique because another installation of WebSphere Application Server or other programs might use the same ports. Click **Back** to assign the port values for the deployment manager. Click **Next** to assign the port values for the application server.

**Node agent ports**

Bootstrap port (Default 2810)(W):	2810
SOAP port (Default 8878) (4):	8878
Node agent interprocess communication port (Default 9636) (7):	9636
SAS SSL ServerAuth port (Default 9901)(6):	9901
CS/V2 ServerAuth listener port (Default 9201):	9201
CS/V2 MultiAuth listener port (Default 9202):	9202
ORB listener port (Default 9101)(5):	9101
Discovery port (Default 7272) (8):	7272
Multicast discovery port (Default 5000)(3):	5000
IPv6 multicast discovery port (Default 5001)(9):	5001
High availability manager communication (DCS) port (Default 9354)(7):	9354
Middleware agent RPC port (Default 7061):	7061
Administration overlay UDP port (Default 11001)(5):	11001

< Back

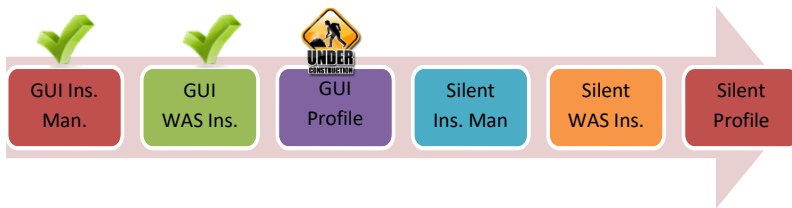
Profile Management Tool 9.0

### Port Values Assignment (Part 3)

The values in the following fields define the ports for the application server. The recommended port values do not conflict with other profiles in this installation. To avoid run-time port conflicts, verify that each port value is unique because another installation of WebSphere Application Server or other programs might use the same ports. Click **Back** to assign the port values for the node agent.

**Application server ports**

HTTP transport port (Default 9080):	9080
HTTPS transport port (Default 9443):	9443
Bootstrap port (Default 2809):	2809
SIP port (Default 5060):	5060
SIP secure port (Default 5061):	5061
SOAP connector port (Default 8880):	8880
Administrative interprocess communication port (Default 9633)(X):	9633
SAS SSL ServerAuth port (Default 9404):	9404
CS/V2 ServerAuth listener port (Default 9406):	9406
CS/V2 MultiAuth listener port (Default 9405):	9405
ORB listener port (Default 0):	0
High availability manager communication port (DCS)(Default 9353):	9353
Service integration port (Default 7276):	7276
Container interprocess communication port (Default 7786):	7786



**Step 10:** Leave unchecked the option “Run the deployment manager process as Linux service” option and then click “Next”.

Profile Management Tool 9.0

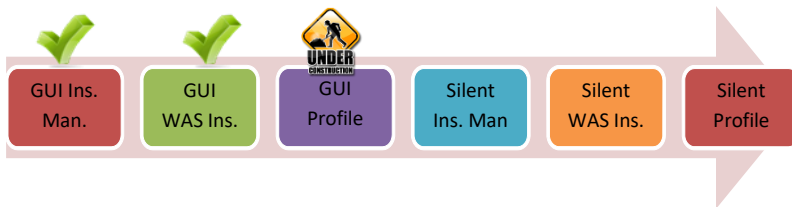
**Linux Service Definition**

Choose whether to use a Linux service to run WebSphere Application Server.

☐ Run the deployment manager process as a Linux service.

User name:

< Back   **Next >**   Cancel   Finish



**Step 11:** Uncheck “Create a Web server definition” and then click “Next”.

Profile Management Tool 9.0

### Web Server Definition

Optionally create a Web server definition if you use a Web server to route requests for dynamic content to the application server. Alternatively, you can create a Web server definition from the administrative console or a script that is generated during Web server plug-ins installation.

☐ Create a Web server definition

Web server type:  
IBM HTTP Server

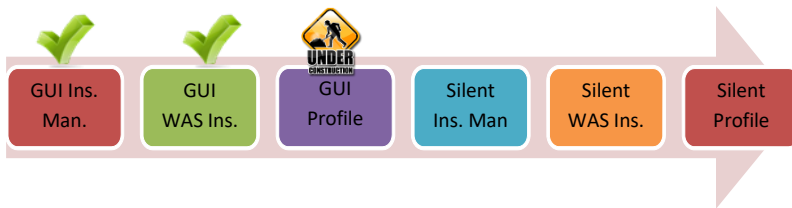
Web server operating system:  
Linux

Web server name:  
webserver1

Web server host name or IP address:  
wasv90

Web server port (Default 80):

< Back   **Next >**   Cancel   Finish



**Step 12:** In this step, you can see the configuration summary and click “Create” to complete profile creation.

Profile Management Tool 9.0

### Profile Creation Summary

Review the information in the summary for correctness. If the information is correct, click **Create** to start creating the new profiles. Click **Back** to change values on the previous panels.

Application server environment to create: Cell (deployment manager and a federated application server)

Location: /opt/IBM/WebSphere/AppServer/profiles

Disk space required: 230 MB

Profile type: Cell deployment manager

Profile name: Dmgr01

Make this profile the default: True

Cell name: wasv90Cell01

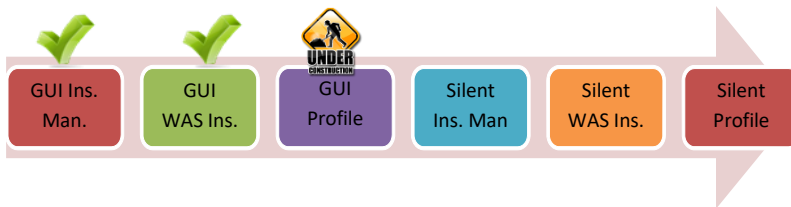
Node name: wasv90CellManager01

Host name: wasv90

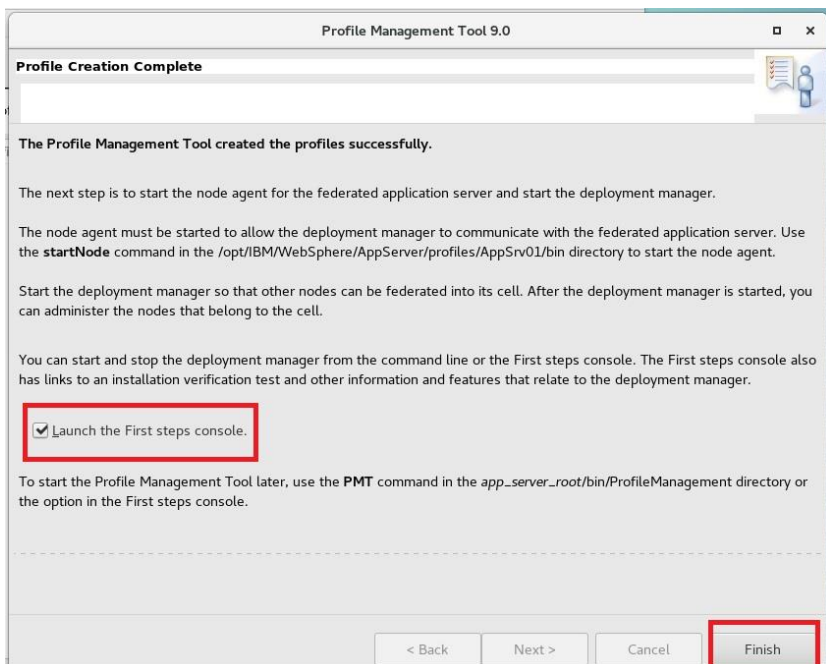
Deploy the administrative console (recommended): True

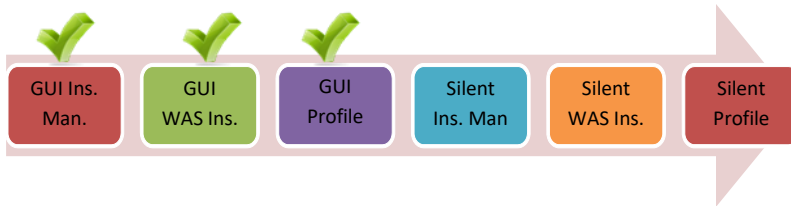
Deploy the default application: True

< Back   **Create**   Cancel   Finish

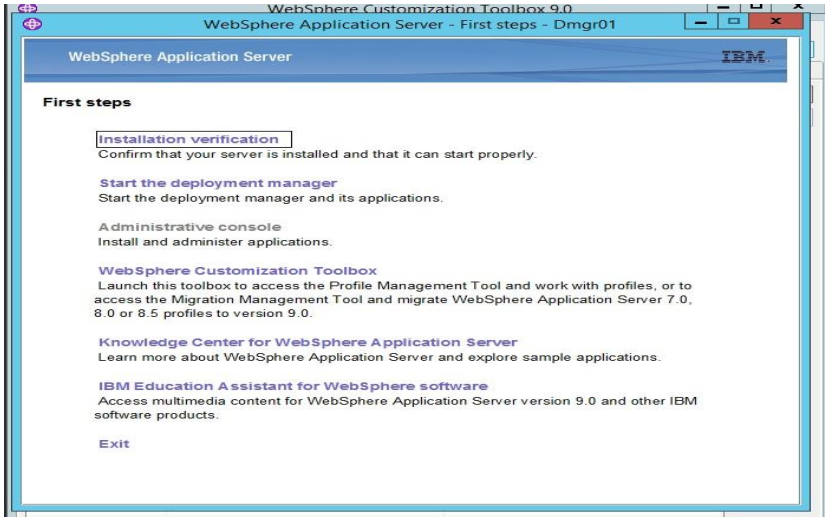


**Step 13:** Profile creation is completed. Make sure that “Launch the First steps console” and then click “Finish”.

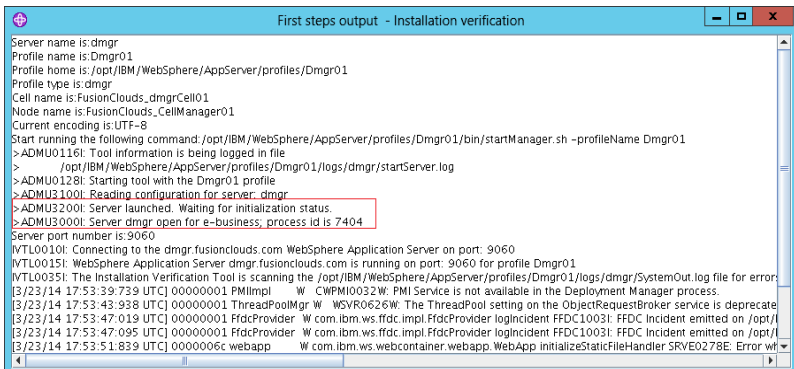




**Step 14:** Click on “Installation verification”.



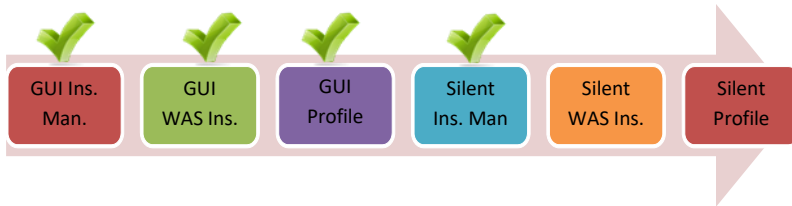
**Step 15:** Check for the message “Server dmgr open for e-business”.



**Task 3 is complete!**





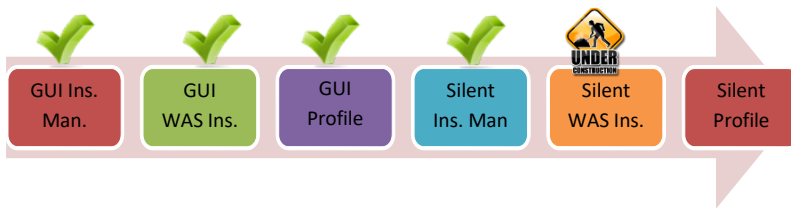


**Step 2:** Issue the command "installc -log /tmp/ibmim.log -acceptLicense" to install Installation Manager. In case of errors, check the log file for troubleshooting.

```
root@wasv90: ~/imins
File Edit View Search Terminal Help
configuration      install      license      repository.config  userinstc.ini
documentation      installc     native      repository.xml     userinst.ini
groupinst          installc.ini Offerings    silent-install.ini user-silent-install.ini
groupinstc         installc.ini p2          tools
groupinstc.ini     install.xml  plugins     userinst

[root@wasv90 imins]# cat silent-install.ini
-toolId
-isilentInstall
-accessRights
-admin
-vm
jre.7.0.9040.20160504_1613/jre/bin/java
-nosplash
--launcher.suppressErrors
--launcher.appendVmargs
-silent
input
@osgi.install.area/install.xml
-vmargs
-Xms40m
-Xmx1024m
-Xquickstart
-Xgcpolicy:gencon
[root@wasv90 imins]# ./installc -log /tmp/ibmim.log -acceptLicense
WARNING: Installation Manager 1.8.5 (internal version: 1.8.5000.20160506 1125) is already installed at location "/opt/IBM/InstallationManager/eclipse" and is using "/var/ibm/InstallationManager" for its data location. Use the installed Installation Manager.
00:02:15 WARNING [main] com.ibm.cic.agent.core.application.HeadlessApplication run
Installation Manager 1.8.5 (internal version: 1.8.5000.20160506 1125) is already installed at location "/opt/IBM/InstallationManager/eclipse" and is using "/var/ibm/InstallationManager" for its data location. Use the installed Installation Manager.
[root@wasv90 imins]#
```

**Task 4 is complete!**



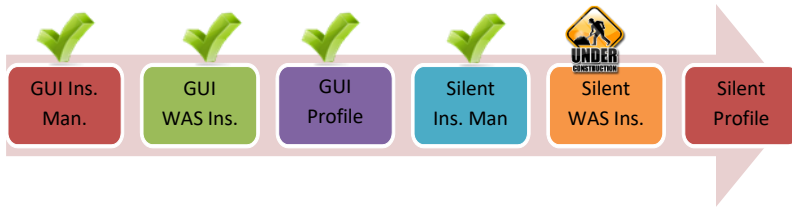
## Task 5: Silent installation of WebSphere Application Server

**Step 1:** Change directory to the newly installed IBM Installation Manager and then prepare a response file.

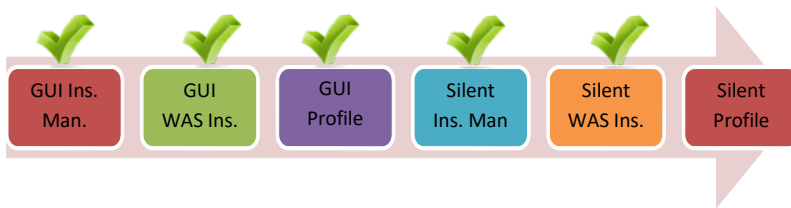
```
[root@wasv90 /]#
[root@wasv90 /]#
[root@wasv90 /]#
[root@wasv90 /]# cd /opt/IBM/InstallationManager/eclipse/tools/
[root@wasv90 /]# vi response_file.xml
[root@wasv90 tools]#
```

### Sample response file

```
<?xml version="1.0" encoding="UTF-8"?>
<!--The "acceptLicense" attribute has been deprecated. Use "-acceptLicense" command line
option to accept license agreements.-->
<agent-input acceptLicense='true'>
<server>
<repository location='/root/nd'/>
<repository location='/root/dsk'/>
</server>
<profile id='IBM WebSphere Application Server V9.0'
installLocation='/opt/IBM/WebSphere/AppServer'>
<data key='eclipseLocation' value='/opt/IBM/WebSphere/AppServer'/>
<data key='user.import.profile' value='false'/>
<data key='cic.selector.os' value='linux'/>
<data key='cic.selector.arch' value='x86'/>
<data key='cic.selector.ws' value='gtk'/>
<data key='cic.selector.nl' value='en'/>
</profile>
<install modify='false'>
<offering id='com.ibm.websphere.ND.v90' version='9.0.0.20160526_1854' profile='IBM
WebSphere Application Server V9.0'
features='core.feature,ejbdeploy,thinclient,embeddablecontainer,com.ibm.java.jdk.v8,samples'
installFixes='none'/>
</install>
<preference name='com.ibm.cic.common.core.preferences.eclipseCache'
value='/opt/IBM/IMShared'/>
<preference name='com.ibm.cic.common.core.preferences.connectTimeout' value='30'/>
<preference name='com.ibm.cic.common.core.preferences.readTimeout' value='45'/>
<preference name='com.ibm.cic.common.core.preferences.downloadAutoRetryCount'
value='0'/>
```



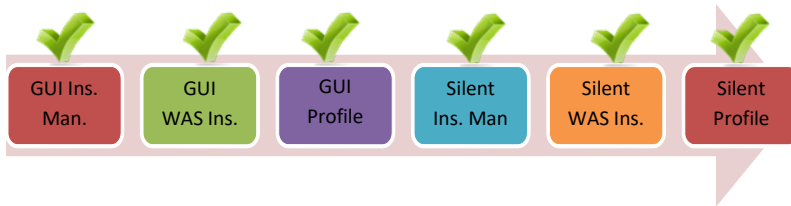
```
<preference name='offering.service.repositories.areUsed' value='true'/>
<preference name='com.ibm.cic.common.core.preferences.ssl.nonsecureMode' value='false'/>
<preference
name='com.ibm.cic.common.core.preferences.http.disablePreemptiveAuthentication'
value='false'/>
<preference name='http.ntlm.auth.kind' value='NTLM'/>
<preference name='http.ntlm.auth.enableIntegrated.win32' value='true'/>
<preference name='com.ibm.cic.common.core.preferences.preserveDownloadedArtifacts'
value='true'/>
<preference name='com.ibm.cic.common.core.preferences.keepFetchedFiles' value='false'/>
<preference name='PassportAdvantagsEnabled' value='false'/>
<preference name='com.ibm.cic.common.core.preferences.searchForUpdates' value='false'/>
<preference name='com.ibm.cic.agent.ui.displayInternalVersion' value='false'/>
<preference name='com.ibm.cic.common.sharedUI.showErrorLog' value='true'/>
<preference name='com.ibm.cic.common.sharedUI.showWarningLog' value='true'/>
<preference name='com.ibm.cic.common.sharedUI.showNoteLog' value='true'/>
</agent-input>
```



**Step 2:** Issue installation command using response file. “imcl -acceptLicense input response\_file.xml -log /tmp/wasins.log”

```
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]#  
[root@wasv90 tools]# ./imcl -acceptLicense input ./response file.xml -log /tmp/wasins.log
```

**Task 5 is complete!**



## Task 6: Adding new Profile via command line

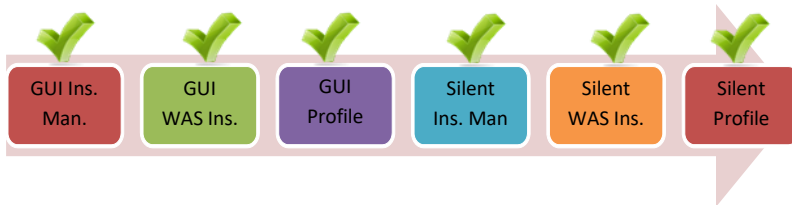
**Step 1:** In order to add new profile, use following command:

“manageprofiles.sh -create –templatePath

/opt/IBM/WebSphere/AppServer/profileTemplates/default”

```
[root@wasv90 bin]#  
[root@wasv90 bin]#  
[root@wasv90 bin]# ./manageprofiles.sh -create -templatePath /opt/IBM/WebSphere/AppServ  
er/profileTemplates/default  
INSTCONFSUCCESS: Success: Profile AppSrv02 now exists. Please consult /opt/IBM/WebSpher  
e/AppServer/profiles/AppSrv02/logs/AboutThisProfile.txt for more information about this  
profile.  
[root@wasv90 bin]#
```

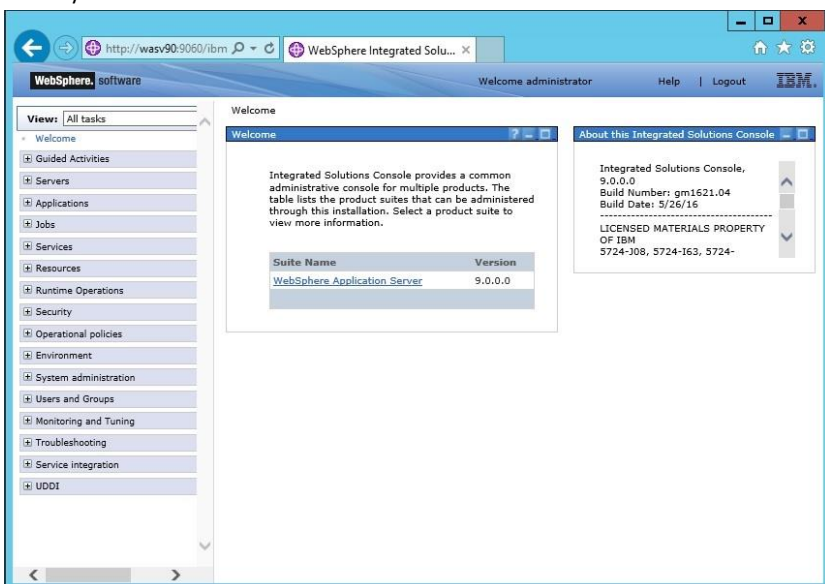
**Task 6 is complete!**



You can verify the installations by browsing: “<https://localhost:9043/ibm/console>”



Use any name to authenticate.



## **SUMMARY**

WebSphere Application Server has three main concepts, application server, node and cell. Cells manage nodes that can be installed on multiple systems but, nodes cannot span on multiple operating system instances. Nodes manage multiple application servers, where each has its own JVM to host multiple applications, using node agents. IBM Installation Manager can install, update, modify, roll back and uninstall WebSphere Application Server and similar packages. You can use Installation Manager on graphical or silent modes. In order to install WebSphere Application Server, we need to first install IBM Installation Manager and then configure repositories. In Network Deployment version, it is a best practice to first create deployment manager profile.



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