

Federating a cell



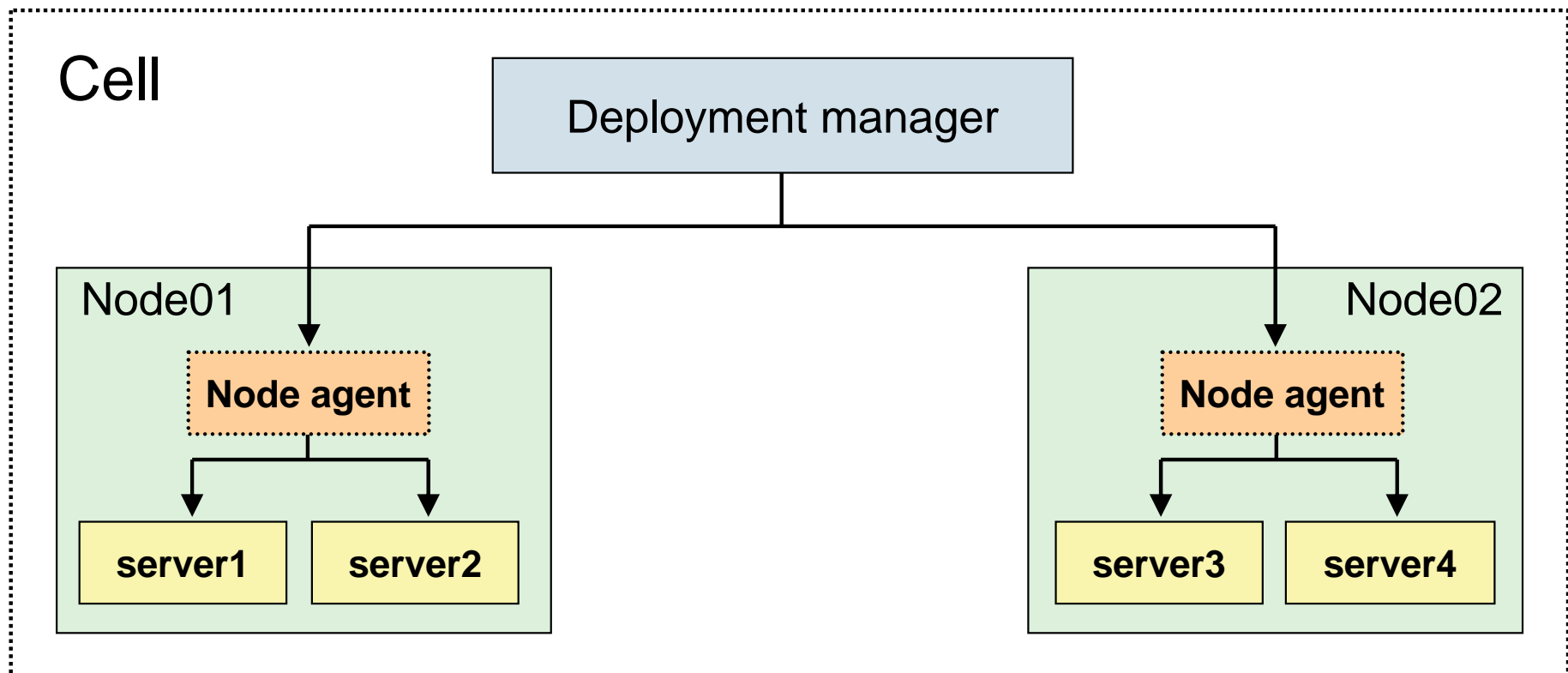
Unit objectives

After completing this unit, you should be able to:

- Describe WebSphere Application Server cell concepts
- Describe and create the deployment manager profile
- Describe and create other profile types
- Describe custom profiles and automatic federation
- Describe the directories and configuration files for profiles
- Add a node by using commands or the administrative console
- Compare the deployment manager administrative console with the base administrative console
- Compare managed and unmanaged nodes
- Use the administrative console to manage a web server

WebSphere cells

- A WebSphere cell defines an administrative domain
 - Available in WebSphere Application Server Network Deployment
 - A deployment manager provides centralized administration for entire cell
 - A cell is created as a profile
 - Nodes run application components in application servers



WebSphere Application Server process types

- **Application server**

- Provides the functions that are required to support and host user applications
- Runs on only one node, but one node can support many application servers

- **Node agent**

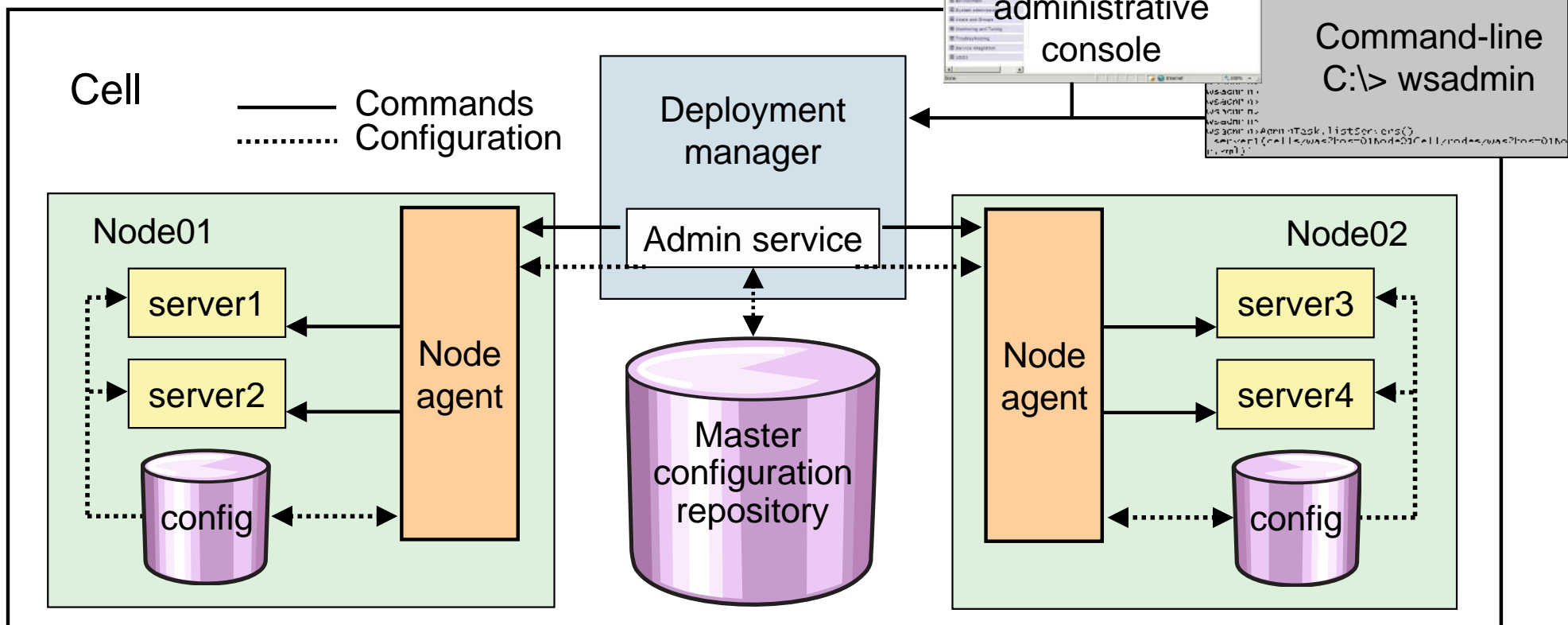
- Created and installed when a node is federated into a cell
- Works with the deployment manager to perform administrative activities on the node

- **Deployment manager**

- Administers multiple application servers from one centralized manager
- Works with the node agents on each node to manage all the servers in a distributed topology
- Application server nodes are federated with the deployment manager before the deployment manager can manage them

Network deployment concepts

- Deployment manager (dmgr)
 - Manages the node agents
 - Holds the configuration repository for the entire management domain, called a **cell**
 - Administrative service runs inside the dmgr
 - The deployment manager is defined within a profile
- Node
 - Logical grouping of servers
 - A single **node agent** process manages it
 - Each node is defined within a profile



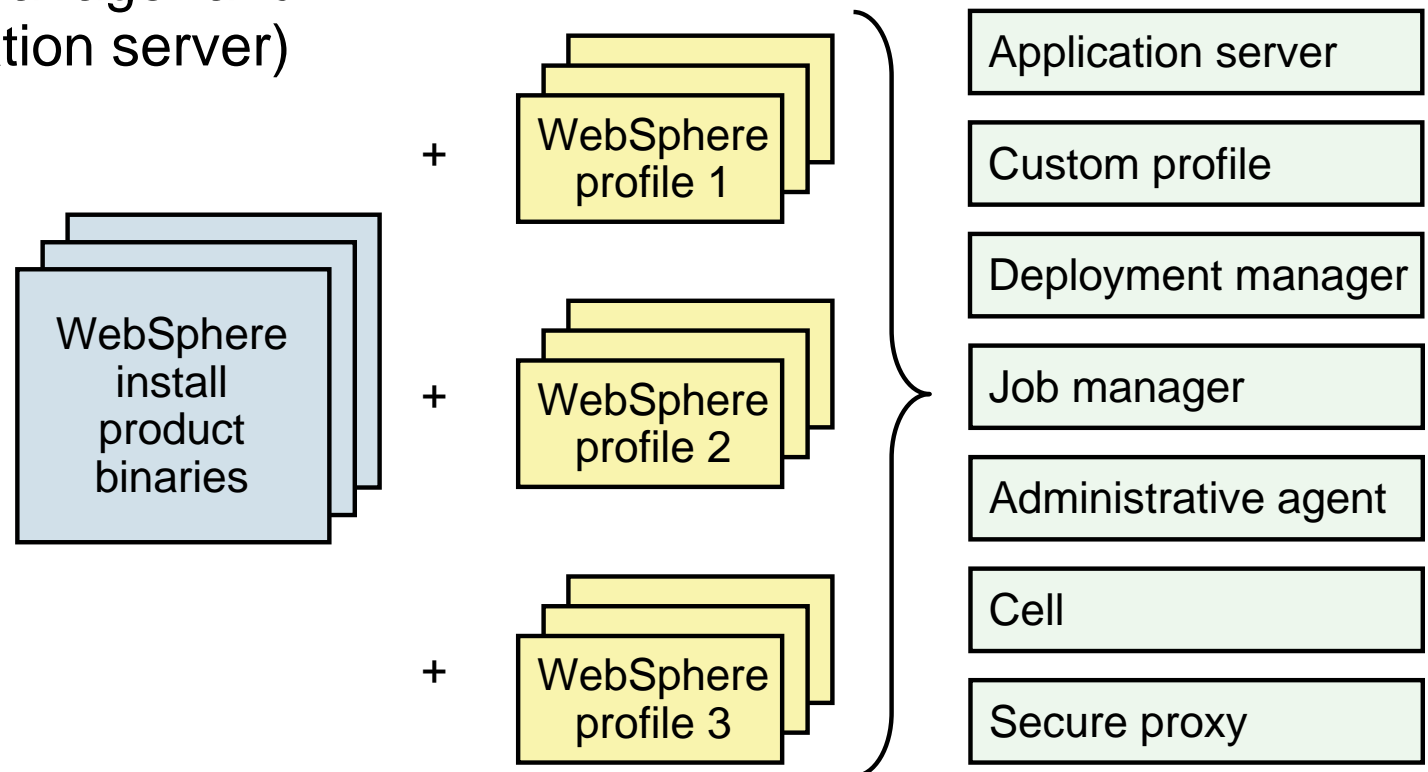
Profiles in network deployment

Profiles represent the nodes

- Multiple nodes can be installed on a single computer
- Nodes can contain a single stand-alone application server
- Nodes can be federated into a cell

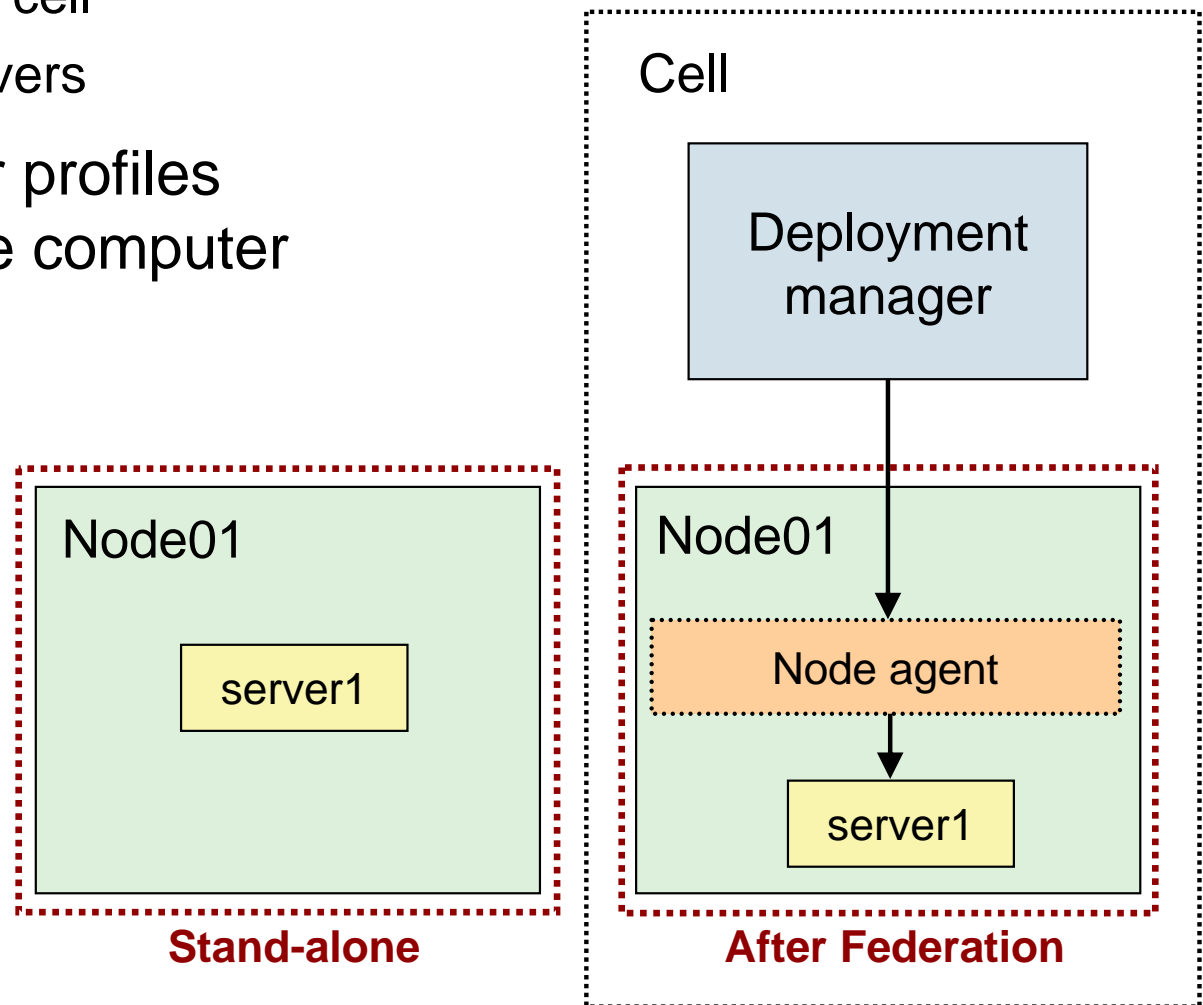
Each profile uses the same product files regardless of type:

- Cell (deployment manager and a federated application server)
- Management
 - Administrative agent
 - Deployment manager
 - Job manager
- Application server
- Custom profile
- Secure proxy



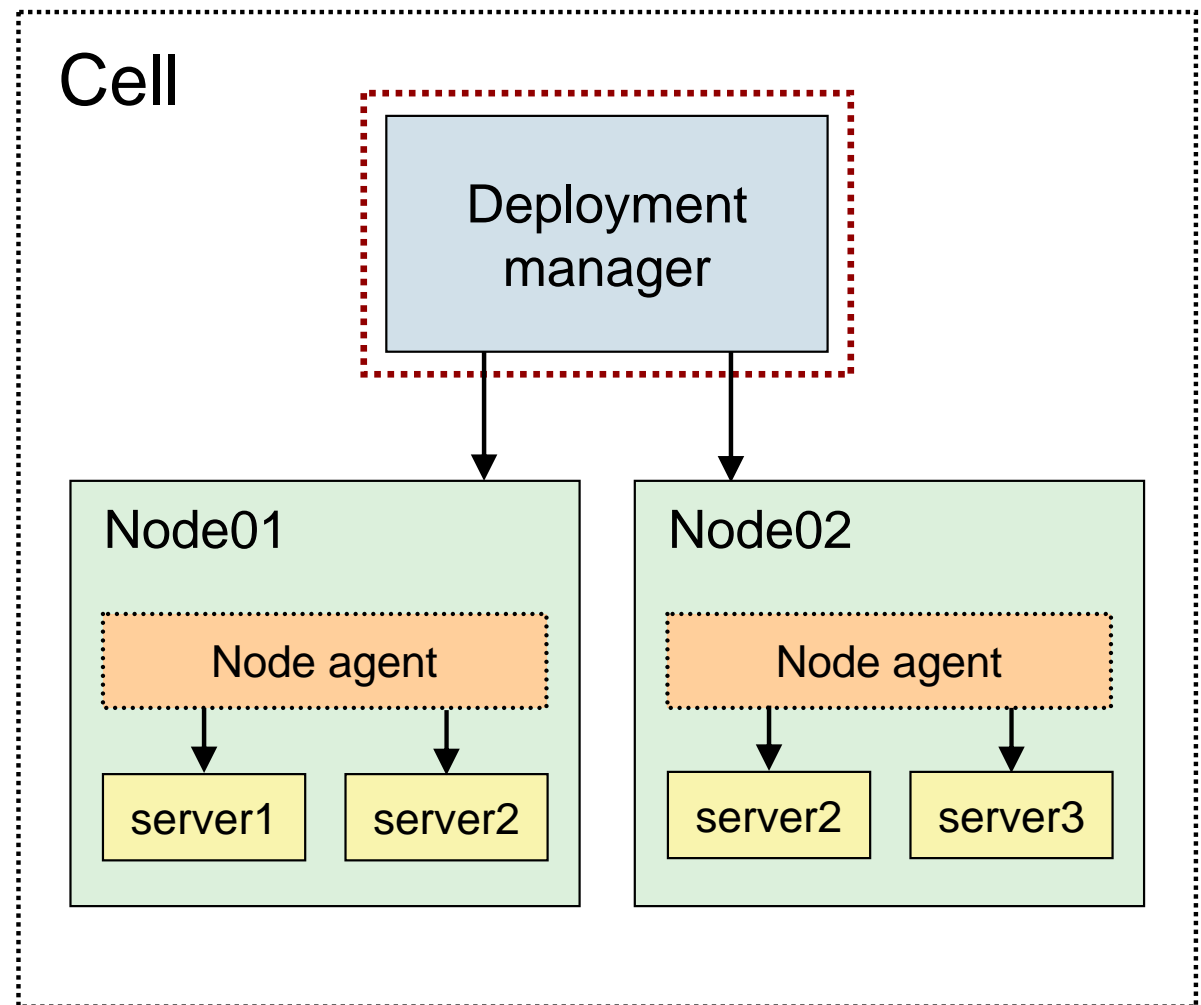
Application server profile

- Application server profiles provide a base installation
- Application servers in the network deployment product can run as:
 - Part of managed nodes in a cell
 - Stand-alone application servers
- Multiple application server profiles can be created on a single computer
- Each application server profile can be federated into a cell
- Multiple base profiles on a single computer can be federated:
 - Into the same cell
 - Into different cells
 - Remain stand-alone



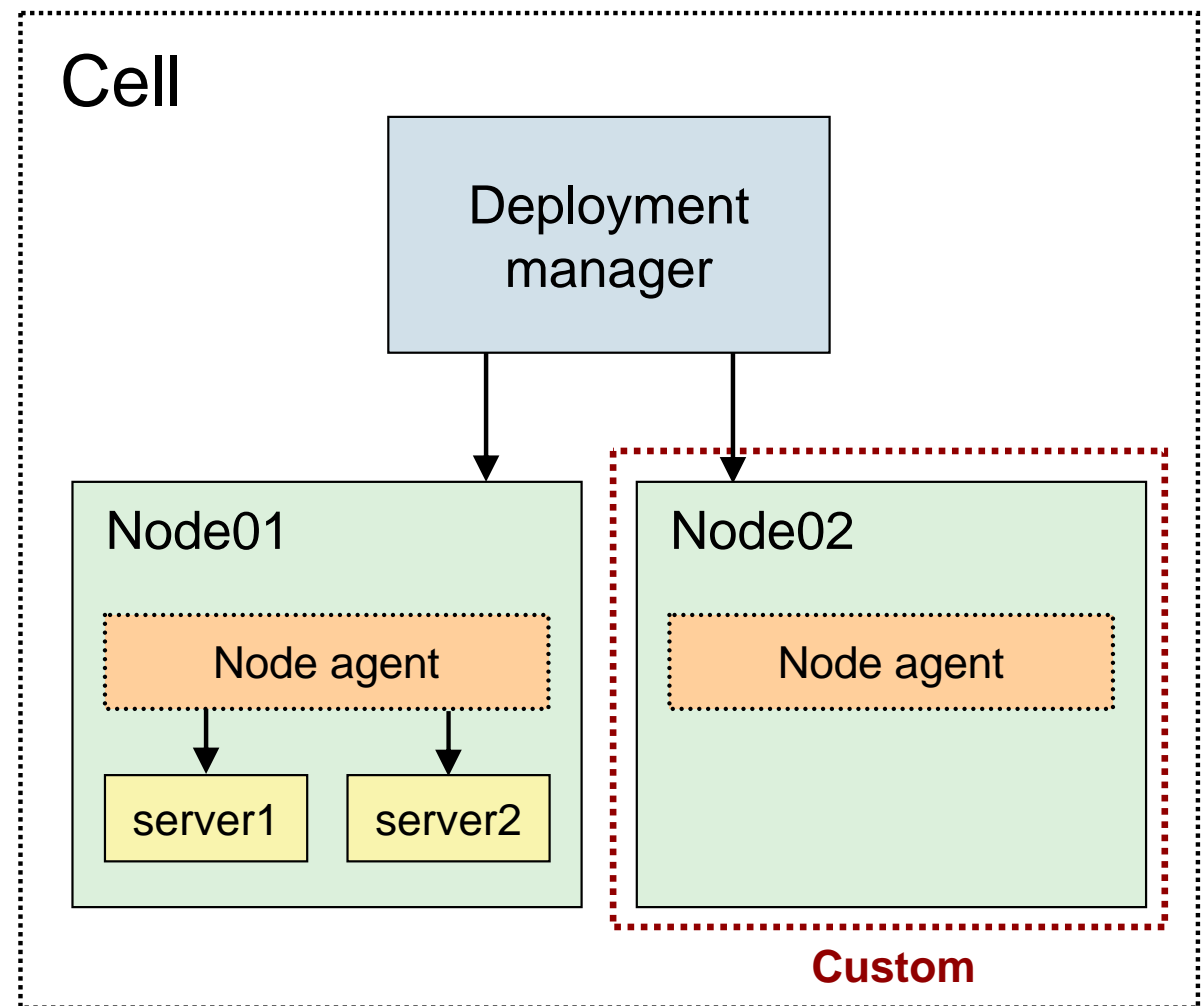
Deployment manager profile

- Is used to create a deployment manager process (dmgr)
- Can exist on an independent computer
- Can exist on a computer with other profiles
- Provides centralized administration of managed application server nodes and custom nodes as a single cell



Custom profile

- A custom profile creates a node without an application
- Automatically federated into a cell during profile creation by default
- No application servers are created during profile creation
- Use the deployment manager administrative console to create servers and clusters on the federated node
- Consider a custom profile as a production-ready shell, ready for customization to contain your servers and applications



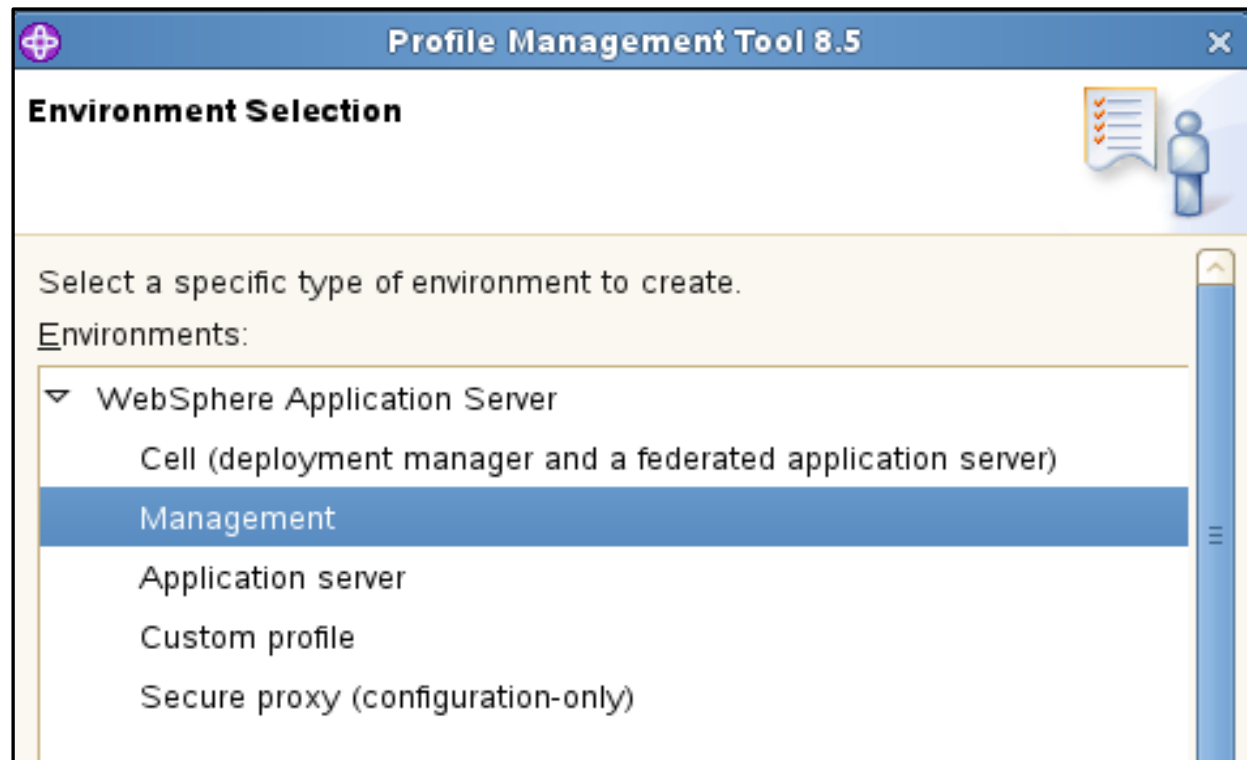
Creating profiles

Profile Management Tool

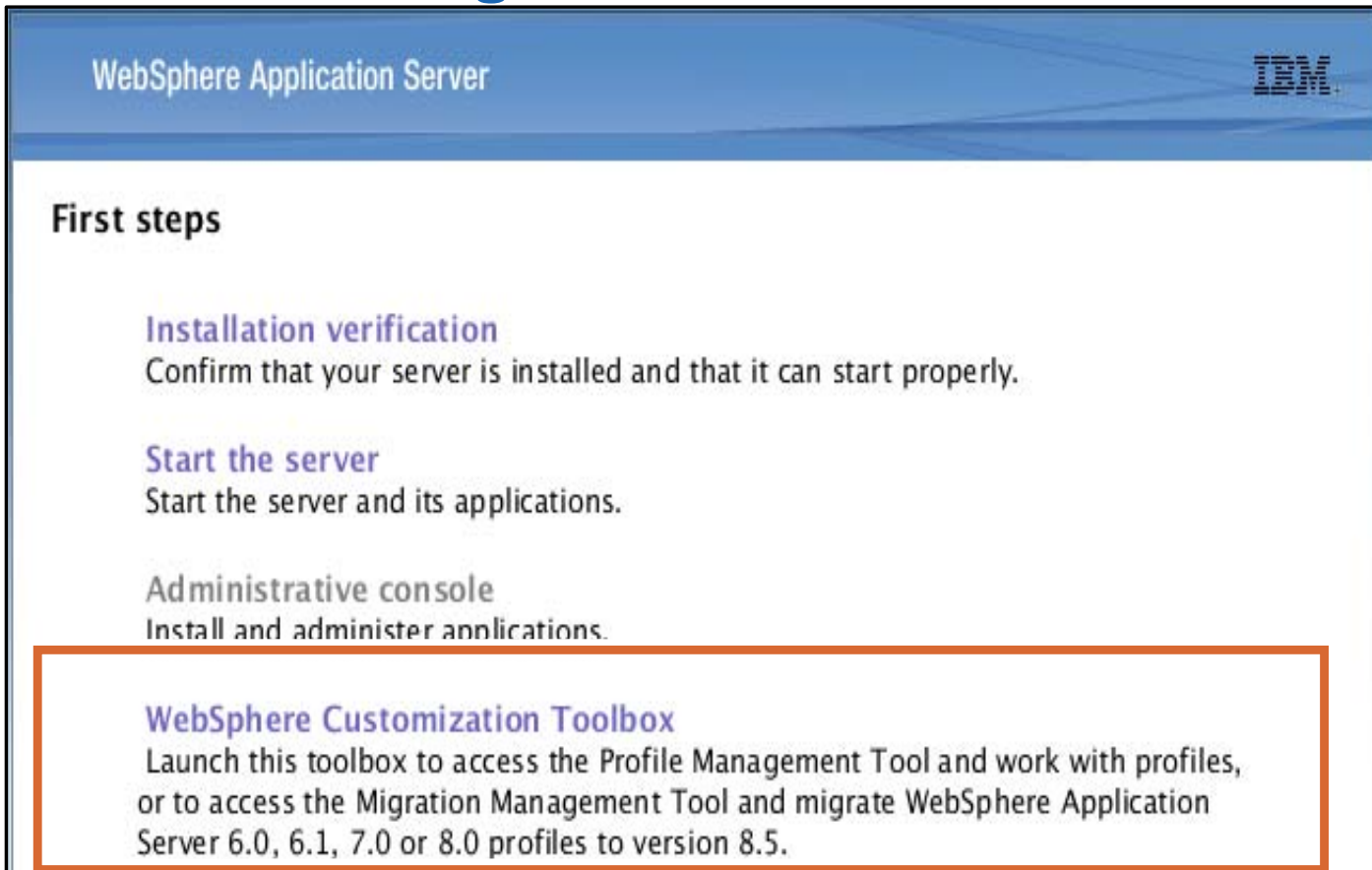
- Start menu (Windows only)
- Started from installation wizard
- Launch command-line tool **pmt.bat**
 - `<was_root>\bin\ProfileManagement\`
 - Similar command exists for UNIX
 - Wizard in First steps console

manageprofiles

- Command-line tool
- Use **manageprofiles -silent** option to create profiles in silent mode
- Other **manageprofiles** options include:
 - **-listProfiles**
 - **-delete**



Profile Management Tool: Launch and create



WebSphere Application Server

First steps

Installation verification
Confirm that your server is installed and that it can start properly.

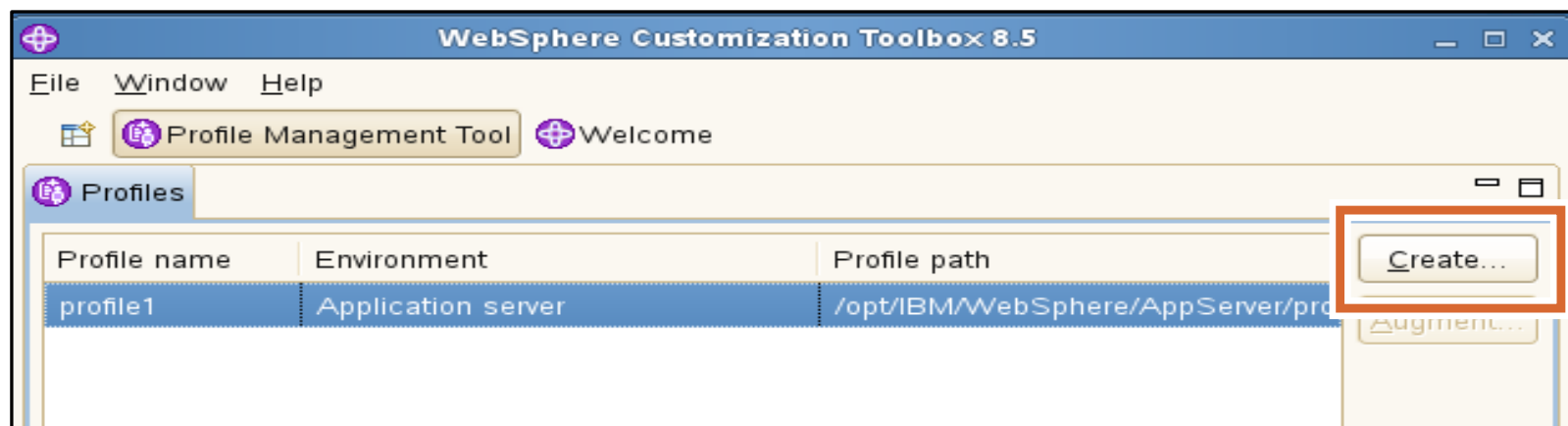
Start the server
Start the server and its applications.

Administrative console
Install and administer applications.

WebSphere Customization Toolbox
Launch this toolbox to access the Profile Management Tool and work with profiles, or to access the Migration Management Tool and migrate WebSphere Application Server 6.0, 6.1, 7.0 or 8.0 profiles to version 8.5.

- 1** Start the Profile Management Tool
- Started from:
 - First steps** or **Windows Start menu** > **WebSphere Customization Toolbox**
 - Command-line
 - Click **Launch Profile Management Tool** to manage profiles

- 2** Create a profile
- Existing profiles are shown
 - Click **Create**



WebSphere Customization Toolbox 8.5

File Window Help

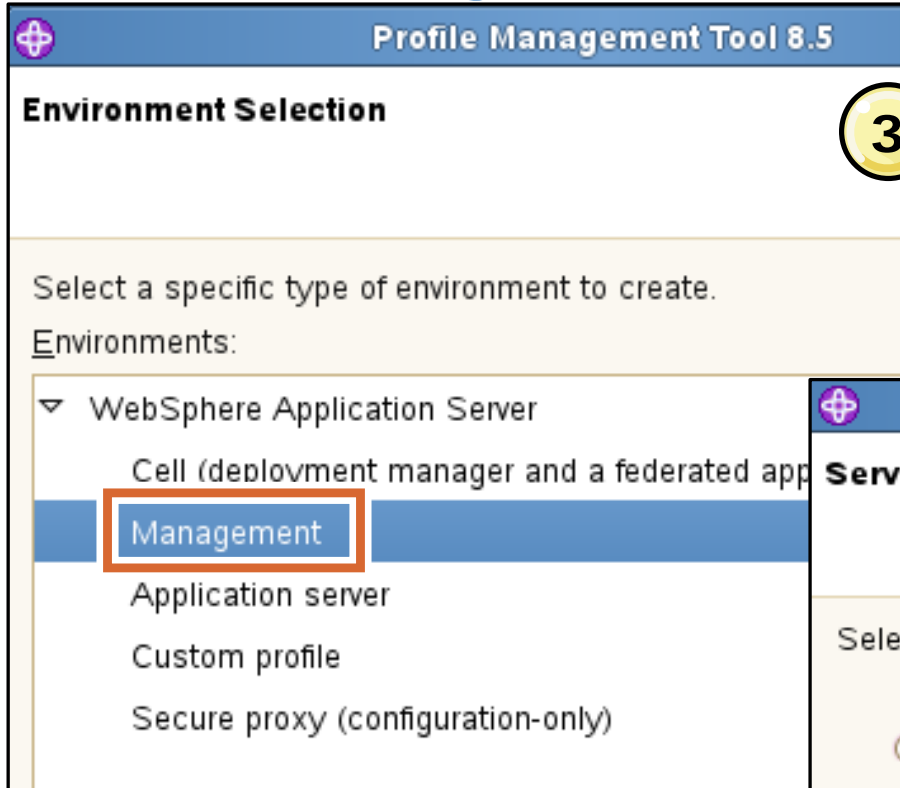
Profile Management Tool Welcome

Profiles

Profile name	Environment	Profile path
profile1	Application server	/opt/IBM/WebSphere/AppServer/pro

Create...

Profile Management Tool: Environment and server type



3

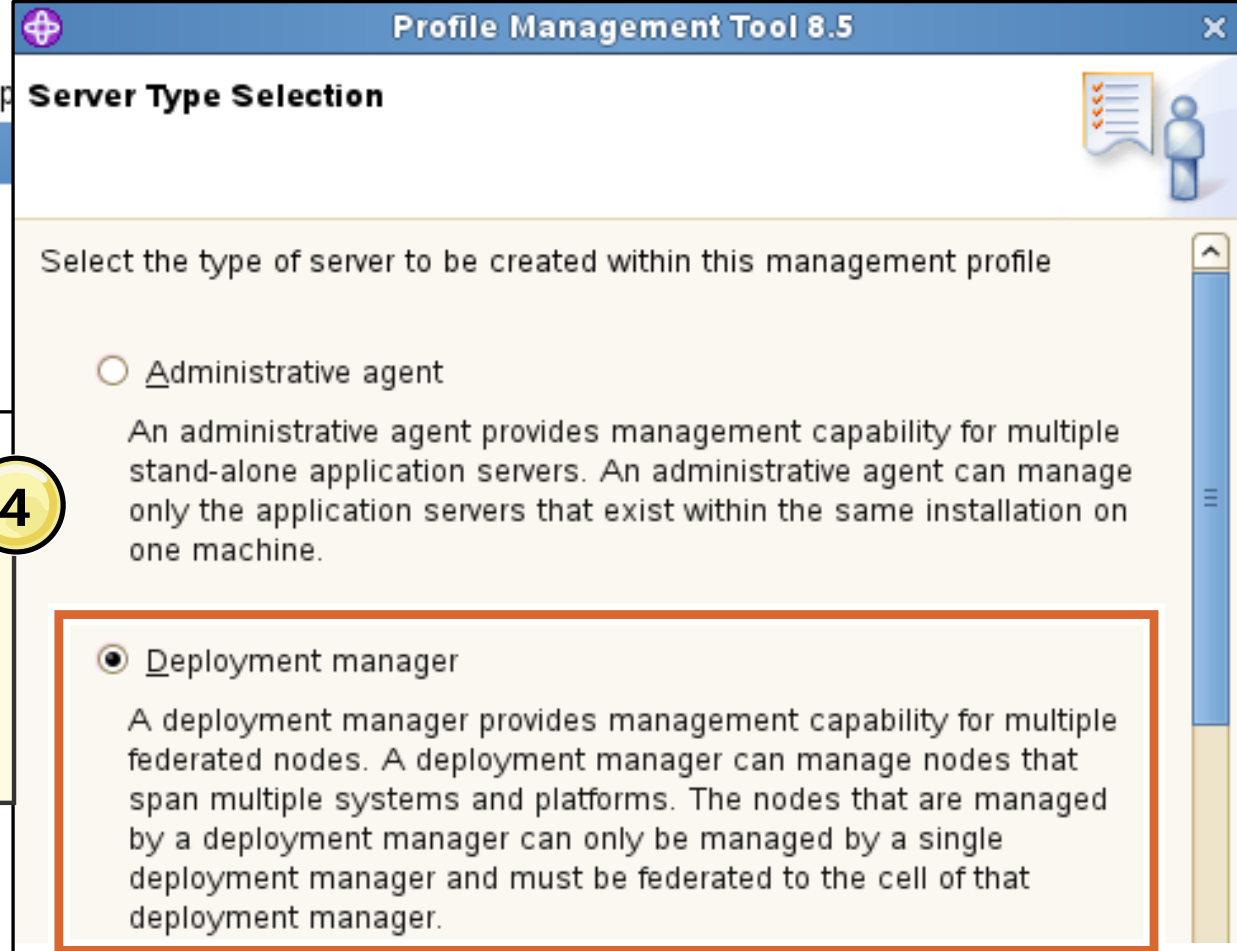
Environment Selection

- A profile is associated with an environment type
- Following panels vary by environment
- Example follows creation of a deployment manager

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Server Type Selection

- Administrative agent
- Deployment manager
- Job manager



Profile Management Tool: Options

Profile Creation Options

- Typical profile creation uses default configuration settings
- Advanced profile creation allows you to accept default settings or specify your own

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Profile Management Tool 8.5

Profile Creation Options

☐ Typical profile creation

Create a deployment manager profile that uses default configuration settings. The Profile Management Tool assigns unique names to the profile, node, host, and cell. The tool also assigns unique port values. The administrative console will be installed and you can optionally select whether to enable administrative security. The tool might create a system service to run the deployment manager depending on the operating system of your machine and the privileges assigned to your user account.

Note: Default personal certificates expire in one year. Select Advanced profile creation to create a personal certificate with a different expiration.

☒ Advanced profile creation

Create a deployment manager using default configuration settings or specify your own values for settings such as the location of the profile and names of the profile, node, host, and cell. You can assign your own port values. You can optionally choose whether to deploy the administrative console. You might have the option to run the

Profile Management Tool 8.5

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.

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Optional Application Deployment

- Deploy the administrative console

Profile Management Tool: Names and location

Profile Name
and Location

7

Profile Management Tool 8.5

Profile Name and Location

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

Profile name:

Dmgr

Profile directory:

/opt/IBM/WebSphere/AppServer/profiles/Dmgr

☐ Make this profile the default.

Each installation of WebSphere Application Server always has one default referring to a specific profile use the default profile. Select this option to r

Node, Host, and Cell Names

Specify a node name, a host name, and

Node name:

was85hostCellManager01

Host name:

was85host

Cell name:

was85hostCell01

8

Node, Host, and
Cell Names

Profile Management Tool: Security

Profile Management Tool 8.5

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:
wasadmin

Password:
●●●●●●●●

Confirm password:
●●●●●●●●

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

< Back Next > Cancel Finish

9

Specify Administrative Security

- User name and password

Profile Management Tool: Security certificate (1 of 2)

Profile Management Tool 8.5

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:

Password:

Keystore type:

Keystore alias:

< Back Next > Cancel Finish

- 10** Security Certificate (Part 1)
- Create or import a default personal certificate
 - Create or import a root signing certificate

Profile Management Tool: Security certificate (2 of 2)

Profile Management Tool 8.5

Security Certificate (Part 2)

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

[Restore Defaults](#)

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

Issued to distinguished name:

Issued by distinguished name:

Expiration period in years:

Root signing certificate (personal certificate for signing other certificates):

< Back Next > Cancel Finish

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Security Certificate
(Part 2)

Profile Management Tool: Ports and Windows service

Profile Management Tool 8.5

Port Values Assignment

The values in the following fields define the ports for the deployment manager and do not conflict with other profiles in this installation. Another installation of WebSphere Application Server or other programs might use the same ports. To avoid run-time port conflicts, verify that each port value is unique.

Default Port Values

Recommended Port Values

Administrative console port (Default 9060):

Administrative console secure port (Default 9043):

Bootstrap port (Default 9809):

SOAP connector port (Default 8879):

Administrative interprocess communication port (Default 9632)(X):

SAS SSL ServerAuth port (Default 9401):

CSIV2 ServerAuth listener port (Default 9403):

< Back Next >

12

Review port value assignments

13

Specify Windows service option

Linux Service Definition

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

☐ Run the application server process as a Linux service.

Profile Management Tool: Results and exit

14 Profile Creation Summary

Profile Creation Summary

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

Application server environment to create: Management
Server type: Deployment manager
Location: /opt/IBM/WebSphere/AppServer/profiles/
Disk space required: 30 MB

Profile name: Dmgr
Make this profile the default: False

Cell name: was85hostCell01
Node name: was85hostCellManager01
Host name: was85host

Deploy the administrative console (recommended)

< Back Create

15 Profile Creation Complete

Profile Creation Complete

The Profile Management Tool created the profile successfully.

The next step in creating a Network Deployment environment is to start the deployment manager so that nodes can be federated into its cell. After the deployment manager is started, you can administer the nodes that belong to the cell.

You can start and stop the deployment manager from the command line or the First steps console. The First steps console also has links to an installation verification test and other information and features that relate to the deployment manager.

☒ Launch the First steps console.

Profile creation: Command-line tool

The `manageprofiles` script supports a number of functions:

- Create new stand-alone application server profiles

```
manageprofiles -create
```

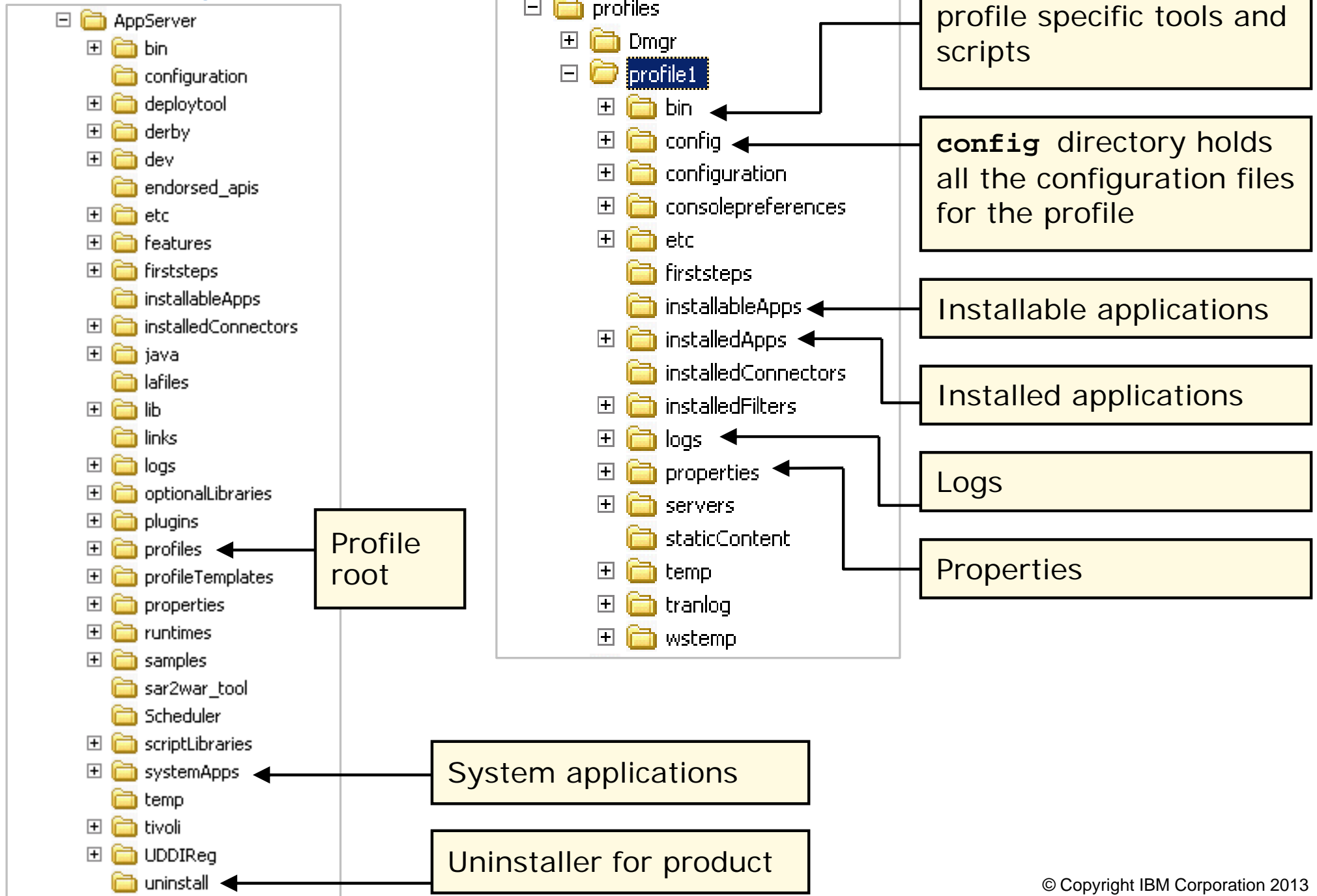
- List all profiles

```
manageprofiles -listProfiles
```

- Delete profiles

```
manageprofiles -delete -profileName
```

Directory structure



Server commands review

- WebSphere commands are profile aware
 - There is a **-profileName** option on many WebSphere commands
 - Or issue the commands from the appropriate directory:
`<profile_root>\<profile_name>\bin`
- If no profile is used, the default profile is assumed
 - There can be only one default profile
 - Unless otherwise manually set, the first profile that is created is the default profile
- Examples (from `<was_root>\bin`):
 - `startServer server1 -profileName profile1`
 - `startManager -profileName DmgrProfile`
 - `stopServer server1` (assumes default profile)

Profile precautions

When multiple profiles are created on a single computer, be careful:

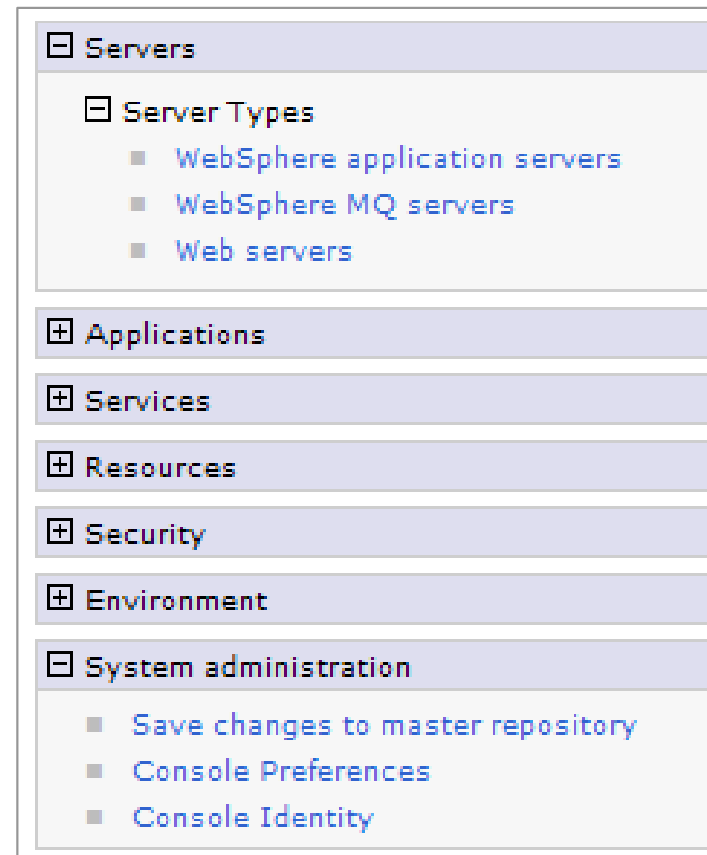
- Use the correct profile `bin` directory to perform:
 - `startServer`
 - `stopServer`
 - `serverStatus`
- Be aware of possible port conflicts for node agents and application servers
- There can be multiple `server1` instances on a single computer
- Ensure that consistent host names within a computer are used

Communications

Ports

Port Name	Port
BOOTSTRAP_ADDRESS	9810
SOAP_CONNECTOR_ADDRESS	8880
ORB_LISTENER_ADDRESS	9100
SAS_SSL_SERVERAUTH_LISTENER_ADDRESS	9401
CSIV2_SSL_SERVERAUTH_LISTENER_ADDRESS	9403
CSIV2_SSL_MUTUALAUTH_LISTENER_ADDRESS	9402
WC_adminhost	9060
WC_defaulthost	9080
DCS_UNICAST_ADDRESS	9353
WC_adminhost_secure	9043
WC_defaulthost_secure	9443
SIP_DEFAULTHOST	5060
SIP_DEFAULTHOST_SECURE	5061
SIB_ENDPOINT_ADDRESS	7276
SIB_ENDPOINT_SECURE_ADDRESS	7286
SIB_MQ_ENDPOINT_ADDRESS	5558
SIB_MQ_ENDPOINT_SECURE_ADDRESS	5578
IPC_CONNECTOR_ADDRESS	9633

Deployment manager console versus stand-alone console



Stand-alone

Deployment manager

- Deployment manager administrative console has more functions for administration of the cell

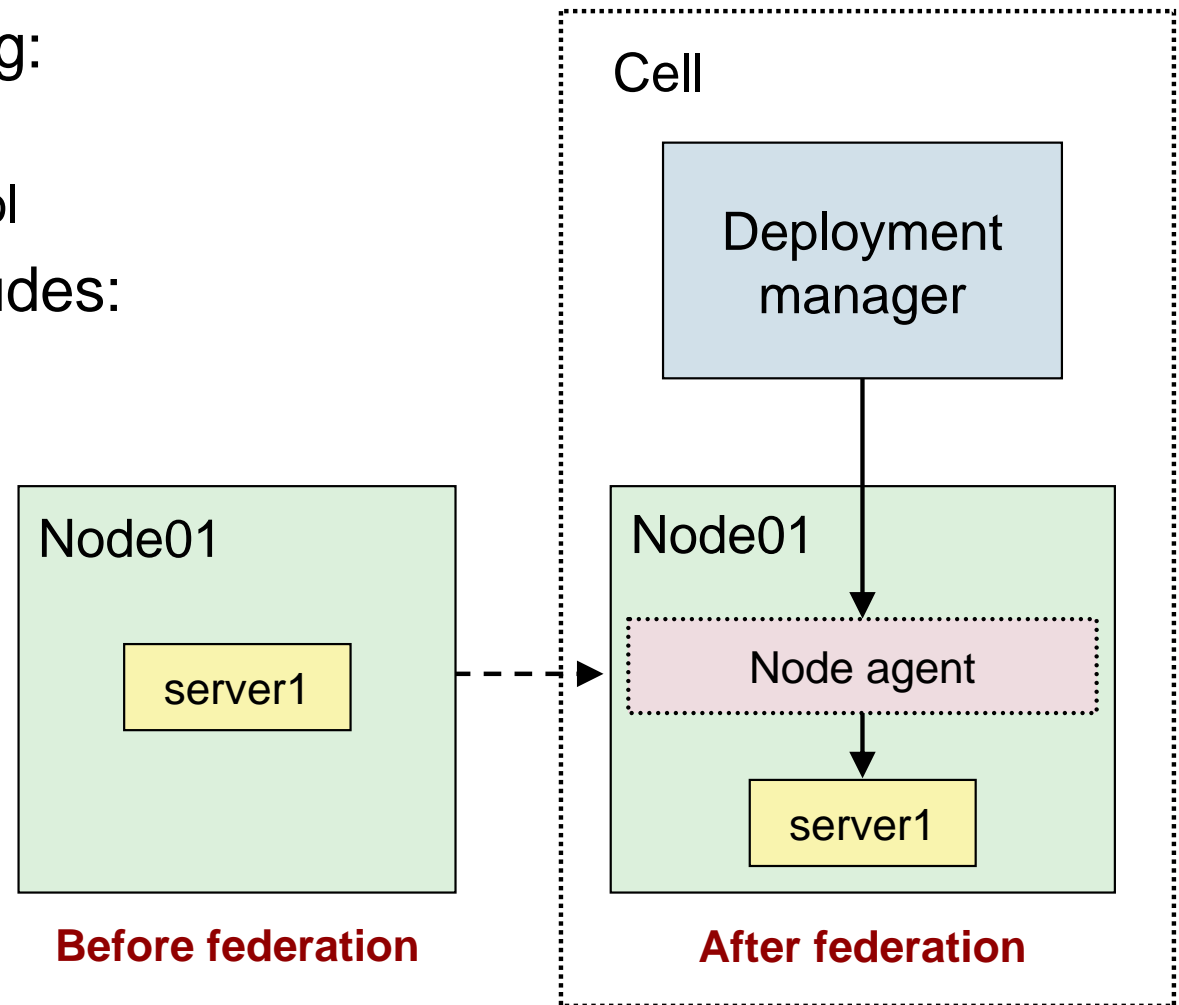
Common command-line tools

- In several directories:
 - `<was_root>\bin`
 - `<profile_root>\<profile_name>\bin`
- Tools include:

Command	Function
addNode	Add a node to a cell
syncNode	Synchronize a node with the cell configuration
removeNode	Remove a node from a cell
cleanupNode	Cleans up a node configuration from the cell repository
startNode	Start the node agent
stopNode	Stop the node agent
startManager	Start the deployment manager
stopManager	Stop the deployment manager

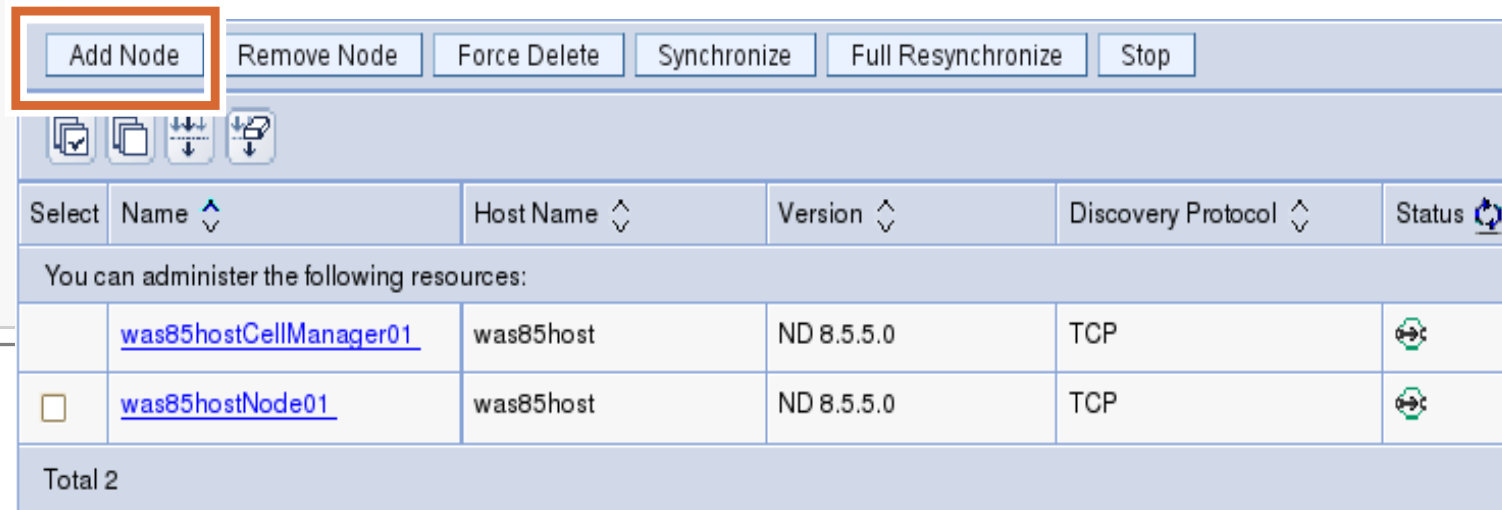
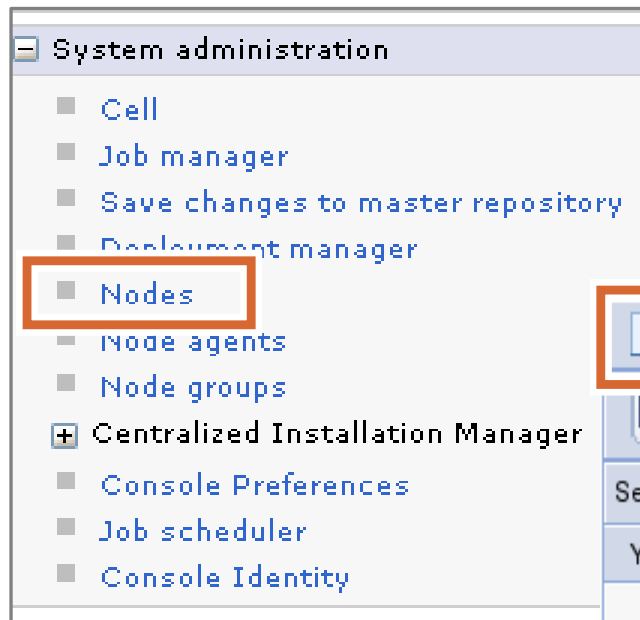
Adding a node to a cell

- Add a node to a cell by using:
 - Administrative console, or
 - **addNode** command-line tool
- Adding a node to a cell includes:
 - Creation of a backup of current configuration
 - Connection to the deployment manager
 - Configuration of the node agent
 - Addition of applications of node to cell configuration
- After the node has been added:
 - Use **startNode** to start the node agent
 - Use **syncNode** to synchronize a node



Adding a node

- Deployment manager administrative console



- Command line

```
addNode dmgr_host [dmgr_port] [-profileName profilename]
[-conntype type] [-excludesecuritydomains true | false] [-includeapps]
[-startingport portnumber] [-portprops qualified_filename]
[-nodeagentshortname name] [-nodegroupname name]
[-includebuses] [-registerservice] [-serviceusername name]
[-servicepassword password] [-coregroupname name] [-noagent]
[-statusport 1231] [-quiet] [-nowait] [-logfile filename] [-replacelog]
[-trace] [-username uid] [-password pwd] [-localusername localuid]
[-localpassword localpwd] [-help]
```

Managed versus unmanaged nodes

- Managed nodes
 - Use node agent or administrative agent to manage their servers
 - Application server process runs within the deployment manager cell
- Unmanaged nodes
 - Node agent or administrative agent does not manage its servers
 - A stand-alone application server is an unmanaged node
 - Commonly used for web servers

Add Node

Use this page to add either a managed or an unmanaged node.

☒ **Managed node**

Specifies the creation of a managed node. A managed node contains an application server process that runs within the deployment manager cell. The managed node is associated with a node agent process that maintains the configuration for the node and controls its operation. Choosing this option results in running the add node utility to federate an existing standalone application server.

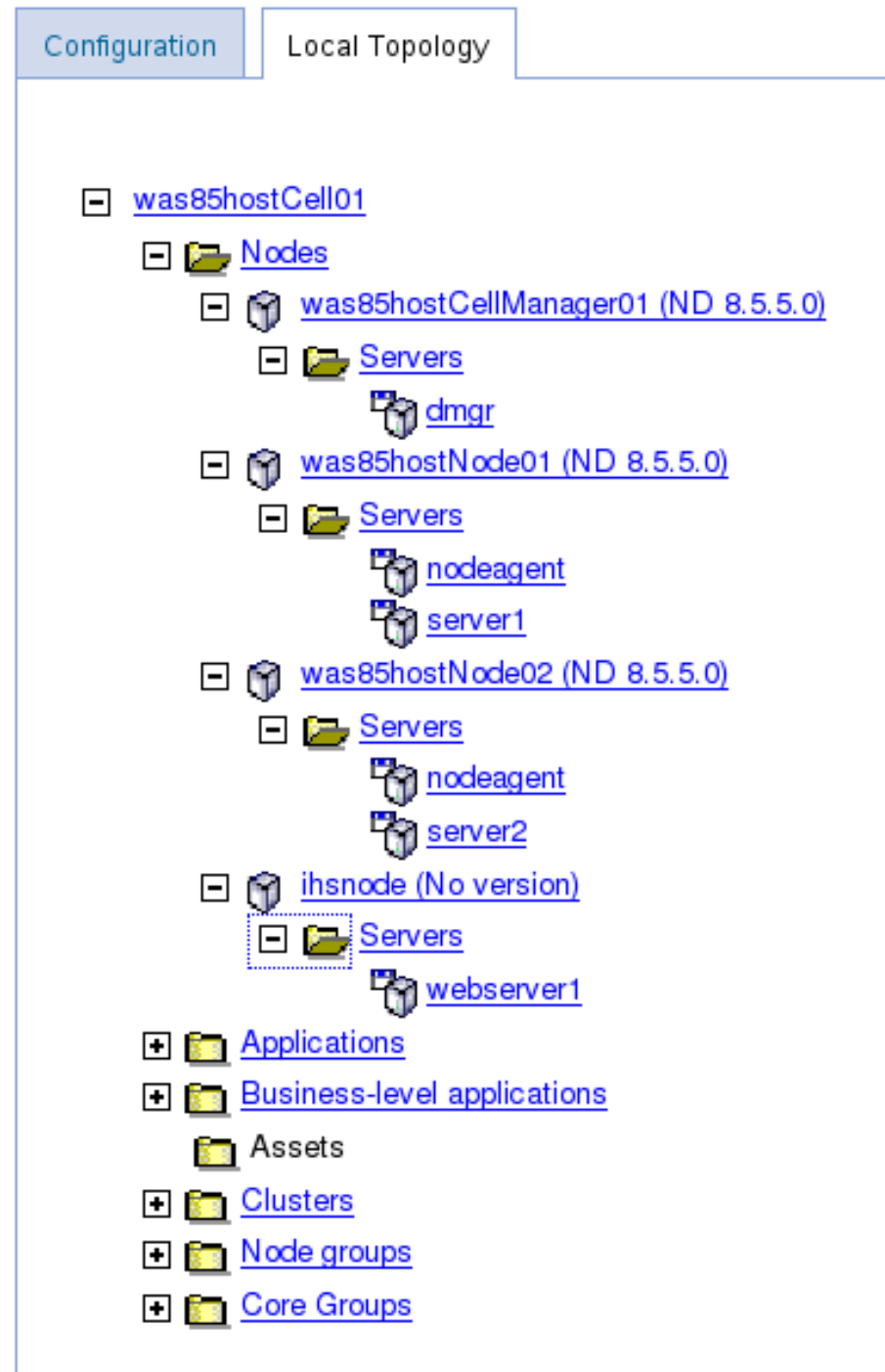
☐ **Unmanaged node**

Specifies the creation of an unmanaged node. An unmanaged node represents a node in the topology that does not have an application server process or a node agent process. Unmanaged nodes are for other server processes, such as Web servers that exist on their own node in the topology.

Next **Cancel**

Cell topology

- Cell topology can be viewed through the administrative console
 - From
System Administration > Cell > Local Topology



Configuring synchronization

Node agents

[Node agents](#) > [nodeagent](#) > **File synchronization service**

Use this page to configure the file synchronization service. The file synchronization service runs in the deployment manager and node agent. It ensures that configuration changes made to the cell repository are propagated to the appropriate node repositories.

Configuration

General Properties

☒ Enable service at server startup

* Synchronization interval
1 minutes

☒ Automatic synchronization

☐ Startup synchronization

Exclusions

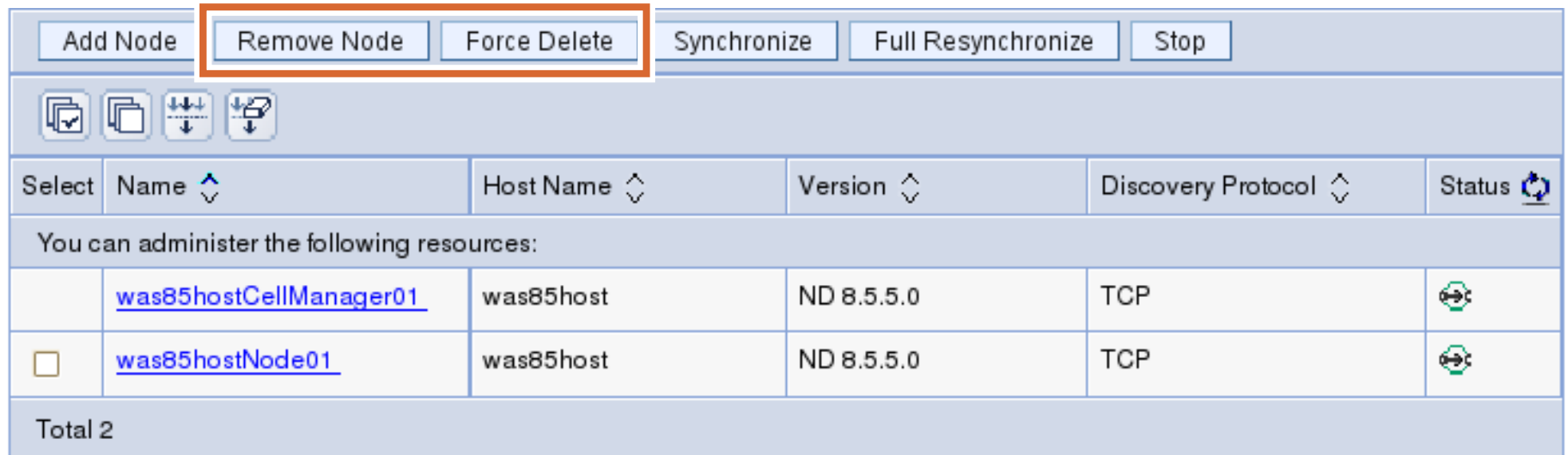
Additional Properties



■ [Custom properties](#)

From the node agent detail page, click **File synchronization service**

Remove a node from a cell

- Use the `removeNode` command to remove a node from a cell
 - Restores stand-alone configuration of the node from a backup
 - The `removeNode` command is equivalent to using the **Remove Node** action
- Use the `cleanupNode` (Force Delete) command to force the removal of a node from a cell
 - Used to clean up a node that is defined in the cell configuration, but no longer exists
 - The `cleanupNode` command is equivalent to using the **Force Delete** action



Select	Name	Host Name	Version	Discovery Protocol	Status
	was85hostCellManager01	was85host	ND 8.5.5.0	TCP	
<input type="checkbox"/>	was85hostNode01	was85host	ND 8.5.5.0	TCP	

Total 2

Synchronization

• Synchronize

- Uses the normal synchronization optimization algorithm
- Node and cell configuration might still be out of synchronization after operation

• Full Resynchronize

- Clears all synchronization optimization settings
- No mismatch between node and cell configuration

Add Node
Remove Node
Force Delete
Synchronize
Full Resynchronize
Stop

Select	Name	Host Name	Version	Discovery Protocol	Status
You can administer the following resources:					
	was85hostCellManager01	was85host	ND 8.5.5.0	TCP	
<input type="checkbox"/>	was85hostNode01	was85host	ND 8.5.5.0	TCP	

Total 2

Managing a web server: Adding a node to a cell

- Create an unmanaged node for defining remote web servers
 - From **System administration > Nodes > Add node**

The image shows two overlapping windows from the WebSphere administrative console. The background window is titled 'Add Node' and contains three radio button options: 'Managed node', 'Unmanaged node' (which is selected), and 'Recover an existing node'. The 'Unmanaged node' option is described as specifying the creation of a topology that does not have a node agent running. The foreground window is titled 'Nodes > New...' and contains a 'Configuration' tab. Under the 'General Properties' section, there are three required fields: 'Name' (containing 'ihsnode'), 'Host Name' (containing 'was8host01'), and 'Platform Type' (a dropdown menu set to 'Windows'). To the right of these fields is a section for 'Additional Properties' with a 'Custom Properties' checkbox. At the bottom of the 'Nodes > New...' window are buttons for 'Apply', 'OK', 'Reset', and 'Cancel'.

Add Node

Use this page to add either a managed or an unmanaged node.

☐ Managed node
Specifies the creation of a node that runs within the deployment process that maintains topology. This option results in running a node agent.

☒ Unmanaged node
Specifies the creation of a topology that does not have a node agent running. Unmanaged nodes are for other server topologies.

☐ Recover an existing node
Specifies to replace a damaged node and give it the same name as the original node in the cell with the same configuration.

Next **Cancel**

Nodes > New...

Use this page to view or change the configuration for an unmanaged node. An unmanaged node is a node defined in the cell topology that does not have a node agent running to manage the process. Unmanaged nodes are typically used to manage web servers.

Configuration

General Properties

* Name
ihsnode

* Host Name
was8host01

* Platform Type
Windows

The additional properties will not be available until the general properties for this item are applied or saved.

Additional Properties

☐ Custom Properties

Apply **OK** **Reset** **Cancel**

Managing a web server: Add the web server

- Add the web server to the created node
 - From **Servers > Server Types > Web servers > New**

1

Select a node for the Web server and select the Web server type

Select a node that corresponds to the Web server you want to add.

Select node

ihsnode

* Server name

webserver01

* Type

IBM HTTP Server

2

Select a Web server template

Select the template that corresponds to the server that you want to create.



Select	Template Name	Type	Description
	IHS	System	The IHS Web Server Template

3

Enter the properties for the new Web server

Enter the Web server properties.

* Port

80

* Web server installation location

C:\Program Files\IBM\HTTPServer

* Service name

IBMHTTPServerV8.0

* Plug-in installation location

ci:\Program Files\IBM\HTTPServer\Plugins

Application mapping to the Web server

All

Enter the IBM Administration Server properties.

* Administration Server Port

8008

* Username

ihsadmin

* Password

* Confirm password

☐ Use SSL

Managing a web server: Plug-in configuration file

- The plug-in configuration file contains routing for all applications that are mapped to the web server
- After changes that affect routing, regenerate and propagate the plug-in file to the web server
 - From **Servers > Server Types > Web servers**



1. Generate plug-in

☐ Messages

PLGC0005I: Plug-in configuration file = C:\Program Files\IBM\WebSphere\AppServer\profiles\DmgrProfile\config\cells\was8host01Cell01\nodes\ihsnode\servers\webserver01\plugin-cfg.xml

PLGC0052I: Plug-in configuration file generation is complete for the Web server. was8host01Cell01.ihsnode.webserver01.

2. Propagate plug-in

☐ Messages

PLGC0062I: The plug-in configuration file is propagated from C:\Program Files\IBM\WebSphere\AppServer\profiles\DmgrProfile\config\cells\was8host01Cell01\nodes\ihsnode\servers\webserver01\plugin-cfg.xml to c:\Program Files\IBM\HTTPServer\Plugins\config\webserver01\plugin-cfg.xml on the Web server computer.

PLGC0048I: The propagation of the plug-in configuration file is complete for the Web server. was8host01Cell01.ihsnode.webserver01.

Unit summary

Having completed this unit, you should be able to:

- Describe WebSphere Application Server cell concepts
- Describe and create the deployment manager profile
- Describe and create other profile types
- Describe custom profiles and automatic federation
- Describe the directories and configuration files for profiles
- Add a node by using commands or the administrative console
- Compare the deployment manager administrative console with the base administrative console
- Compare managed and unmanaged nodes
- Use the administrative console to manage a web server

Checkpoint questions

1. Which managed processes can be part of a cell?
 - A. Deployment manager
 - B. Node agent
 - C. Load balancer
 - D. Application server

2. Which profiles can be created by using the Profile Management Tool?
 - A. Load balancer profile
 - B. Custom profile
 - C. Plug-in profile
 - D. IBM HTTP Server profile

3. All application servers have a corresponding node agent.
 - A. True
 - B. False

Checkpoint answers

1. Which managed processes can be part of a cell?

Answer: A, B, and D

A. Deployment manager

B. Node agent

D. Application server

2. Which profiles can be created by using the Profile Management Tool? Answer: B

B. Custom profile

3. All application servers have a corresponding node agent.

Answer: B

B. False

Exercise 9

Creating a federated cell

Exercise objectives

After completing this exercise, you should be able to:

- Create a deployment manager profile
- Back up the deployment manager configuration
- Use the deployment manager administrative console
- Federate a node into the deployment manager cell
- Create a custom profile
- Create an unmanaged web server node
- Use the administrative console to start and stop a web server
- Map an application to a web server