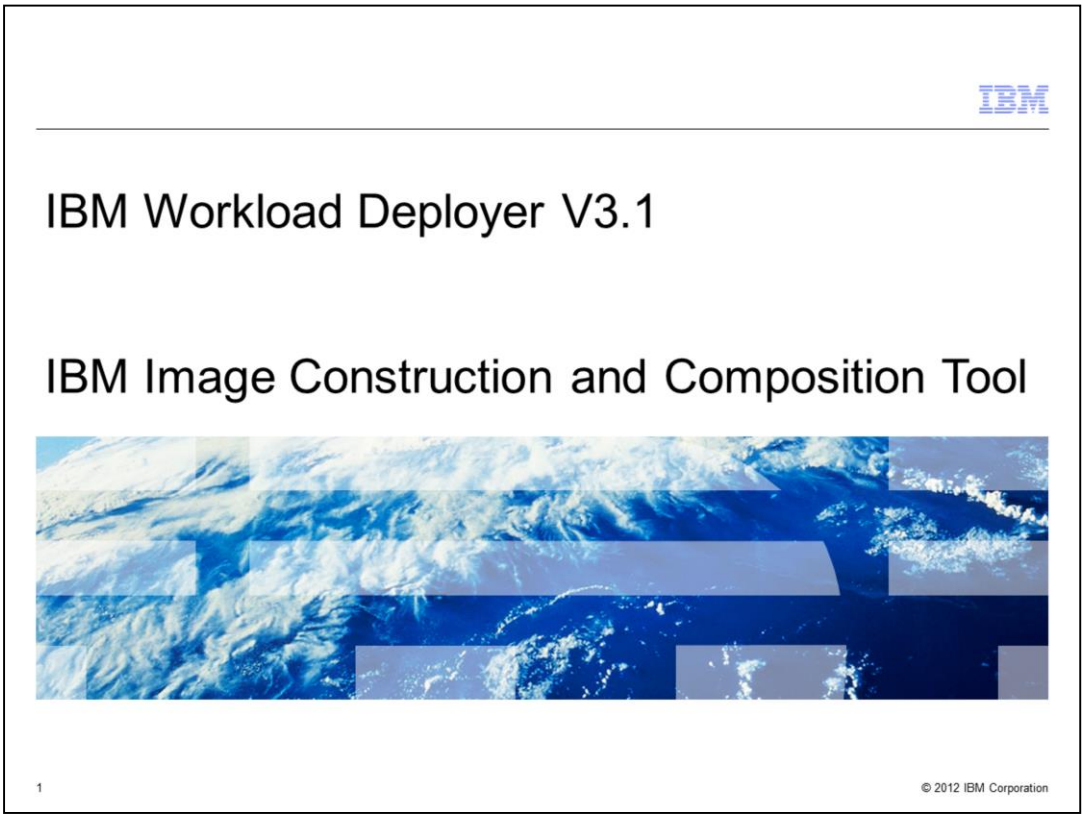
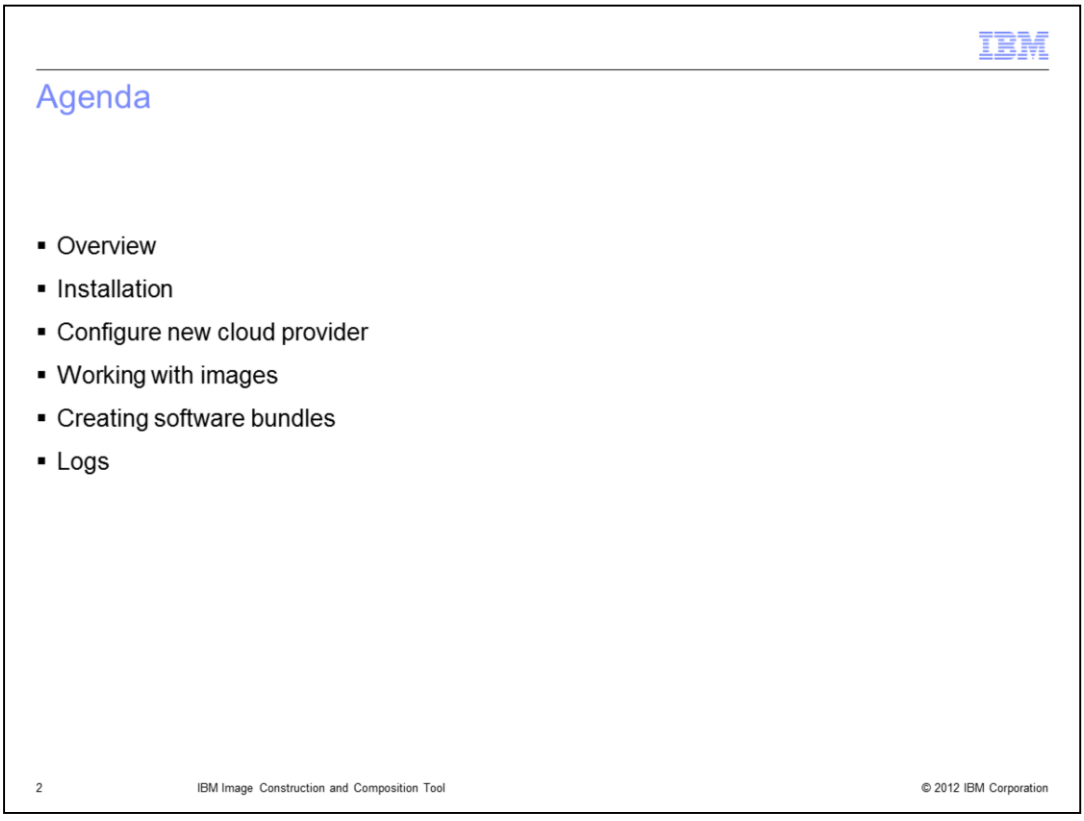
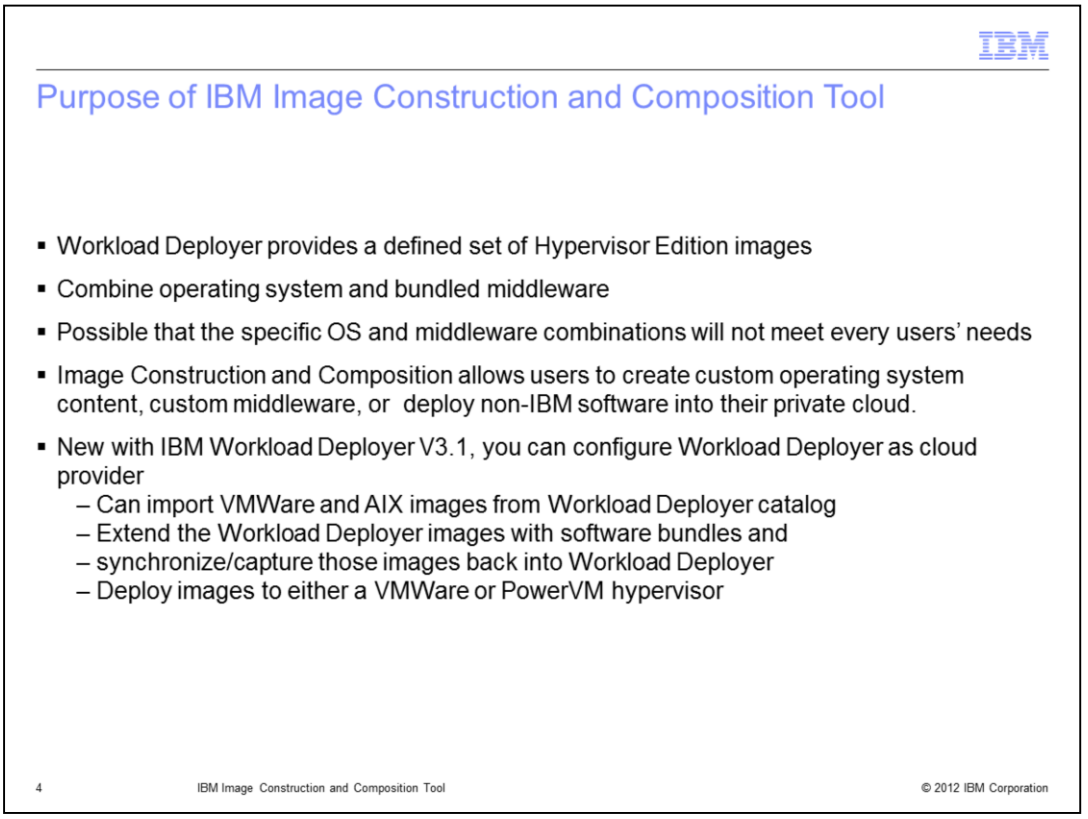


This presentation covers the IBM Image Construction and Composition Tool shipped with V3.1 of the IBM Workload Deployer product.

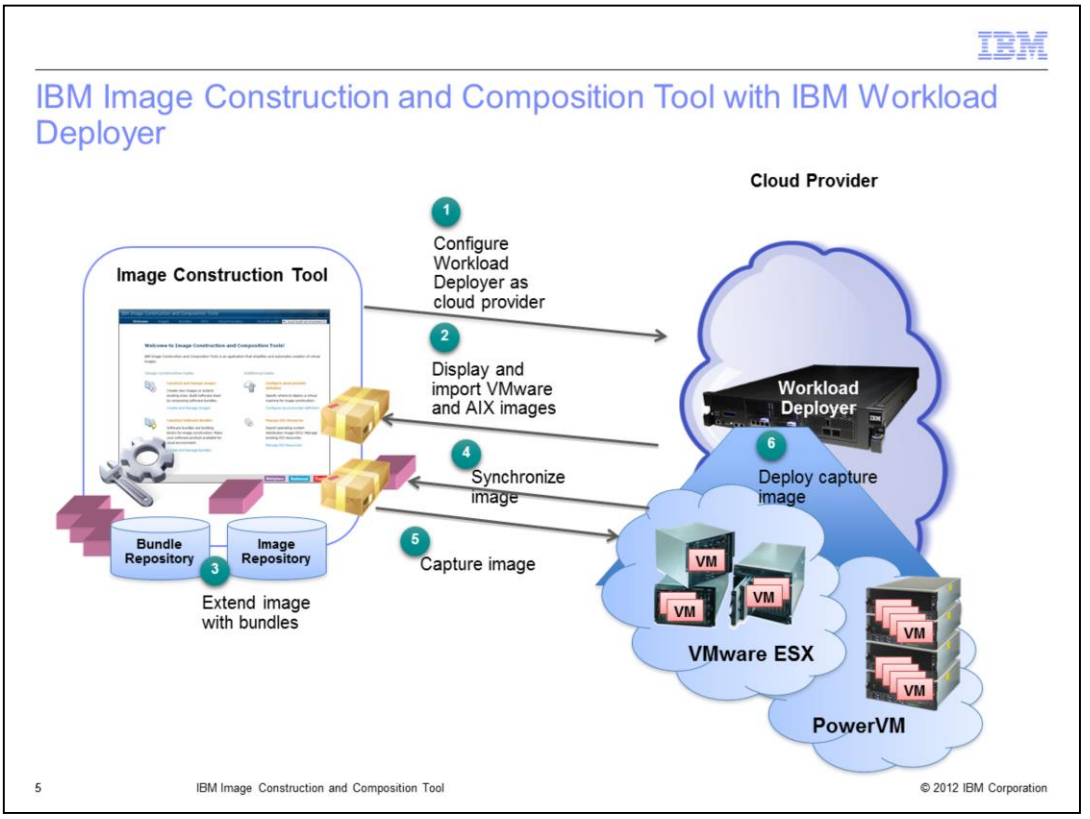


This presentation will present an overview of the Image Construction and Composition product, show the process of creating a virtual machine using the IBM Workload Deployer Image for x86 Systems, installing the Image Construction and Composition tool onto the virtual machine, adding software bundles, synchronizing, capturing, and completing the image. You will also see a high level overview of creating software bundles. Finally, there will be a slide about viewing logs.

This next section provides an overview of the Image Construction and Composition tool and new product features in IBM Workload Deployer V3.1.



The IBM Workload Deployer provides a defined set of Hypervisor Edition images that combine operating system and bundled middleware. However, it is possible that the specific operating system and middleware combinations will not meet your needs. The Image Construction and Composition Tool provides the capabilities to combine your own operating system definition along with custom software bundles to compose virtual images that can be provisioned into the cloud. In Workload Deployer version 3.1, you can configure the Workload Deployer as the cloud provider for the Image Construction and Composition Tool. This allows you to import VMware and AIX images from the catalog, extend those images with software bundles, then capture the new image back into Workload Deployer. You can then deploy the new image to a VMWare or PowerVM hypervisor.

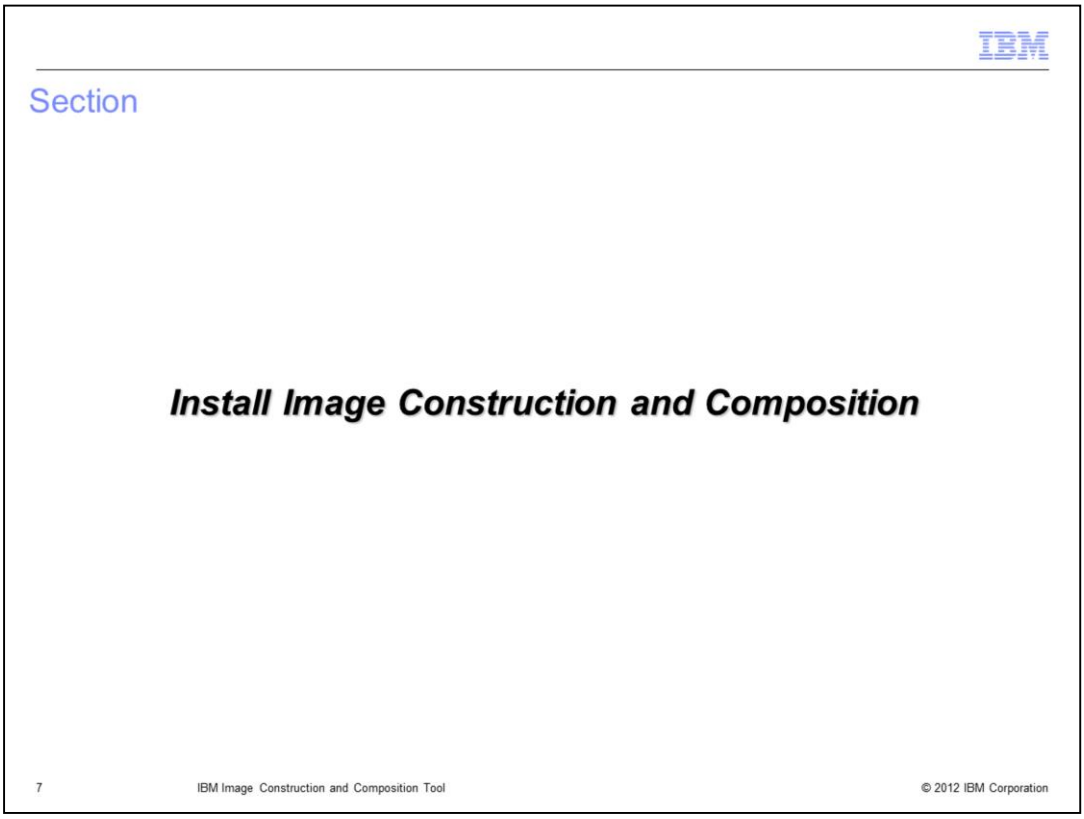


This diagram shows the interaction of the Image Construction Tool with the Workload Deployer. In step 1, you log into the Image Construction Tool and configure Workload Deployer as a cloud provider. In step 2, you display and import the VMware and AIX images that are extended. In step 3, you will extend the image by adding software bundles. Step 4 is to synchronize the image, which will create a temporary virtual system and install the software bundles on that system. The last step is to capture the new image with software bundles installed back into the Workload Deployer catalog.

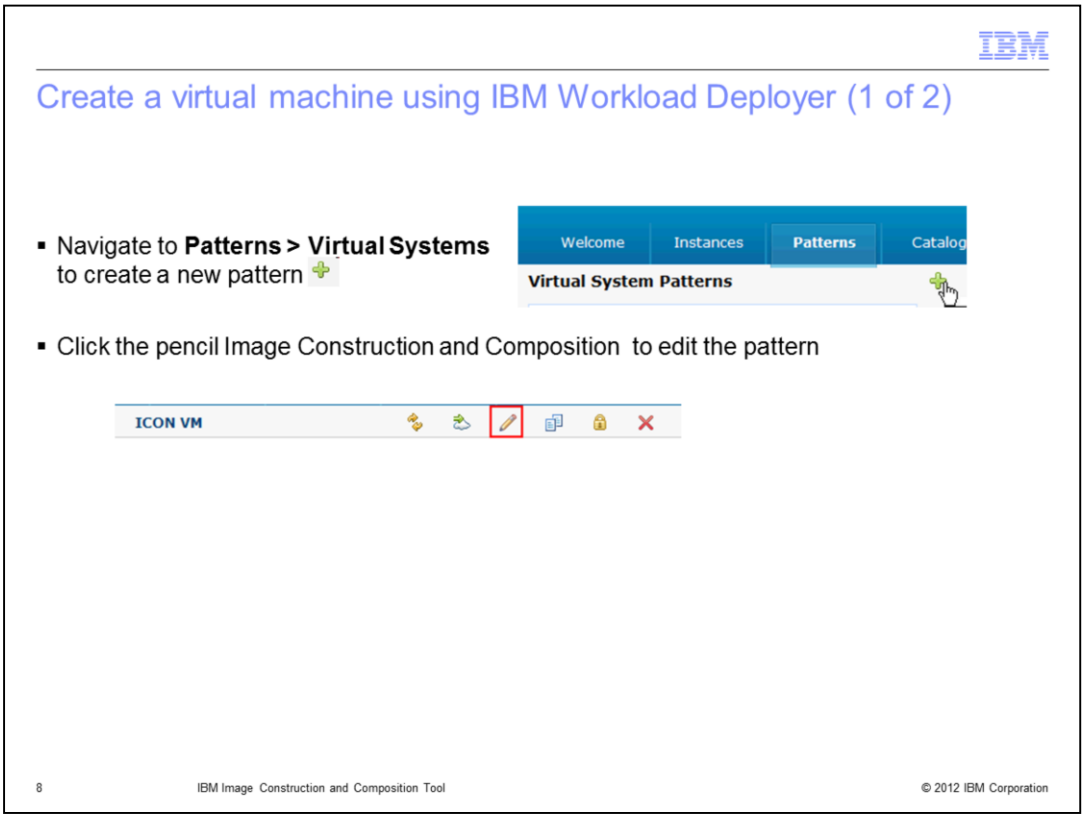
Virtual machine to host Image Construction and Composition

- Requirements for Image Construction and Composition virtual machine:
  - SuSE Linux Enterprise Server 11 SP1 32-bit or 64-bit
  - RedHat Enterprise Server 5.6 32-bit or 64-bit
- Hardware requirements
  - Minimum requirements
    - 1 CPU - physical or virtual
    - 1 GB memory - physical or virtual
  - Suggested requirements
    - 2 CPUs - physical or virtual
    - 2 GB memory - physical or virtual
- Storage
  - 100 GB of disk space for building Native VMWare images
  - 60 GB of disk space if only building IBM Cloud or IBM Workload Deployer
- Software requirements
  - IBM JDK SR9 FP1 bundled with Image Construction and Composition product
  - Supported browsers
    - Firefox 4, Firefox 3.x
    - IE 7, IE 8

This slide lists the minimum requirements for the virtual machine that will host the Image Construction Tool.



This section covers creating a virtual machine and installing Image Construction and Composition.



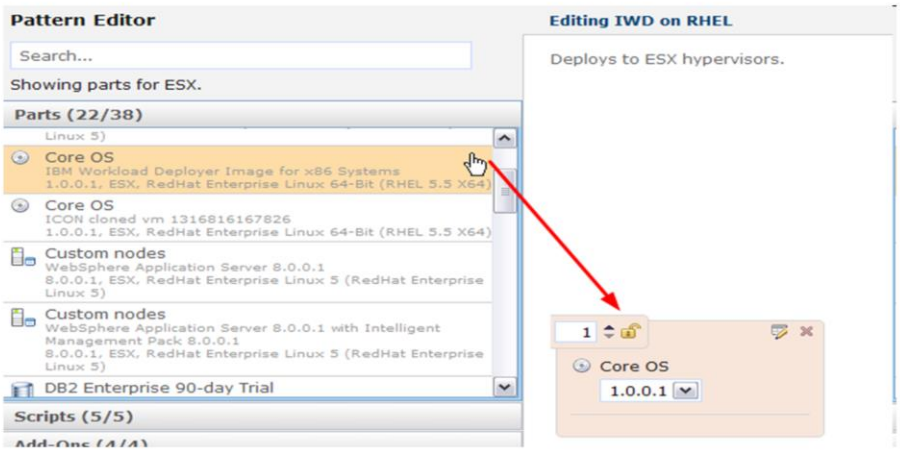
The first step is to create a virtual machine to host the Image Construction Tool. In Workload Deployer, navigate to **Patterns > Virtual Systems** and click the plus sign to create a new pattern. This creates a blank pattern.

Click the pencil icon to edit the pattern.

Drag and drop the IBM Workload Deployer Image for x86 Systems RedHat Enterprise Linux, 64 bit onto the canvas. Click **Done editing** and deploy to the cloud.

Create a virtual machine using IBM Workload Deployer (2 of 2)

- Drag and drop the Core OS part from the IBM Workload Deployer Image for x86 Systems onto the canvas

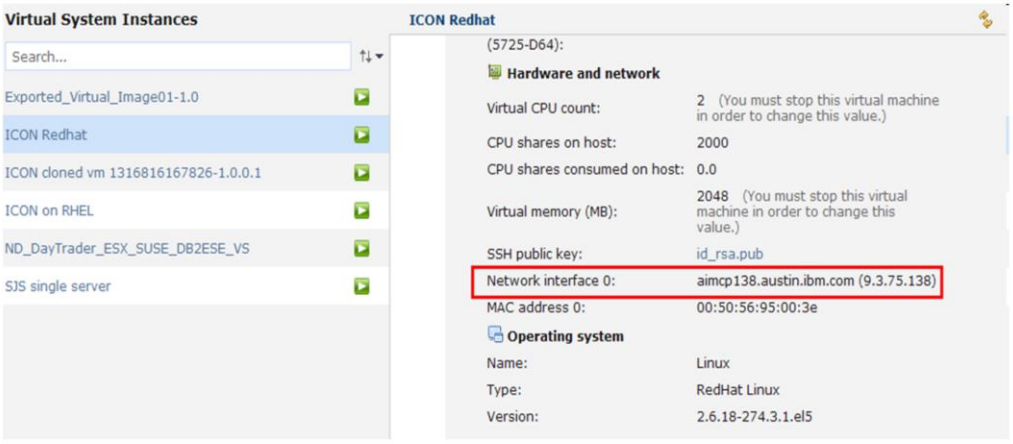


9 IBM Image Construction and Composition Tool

Drag and drop the IBM Workload Deployer Image for x86 Systems RedHat Enterprise Linux, 64 bit onto the canvas. Click **Done editing** and deploy to the cloud.

Install Image Construction and Composition on the virtual machine

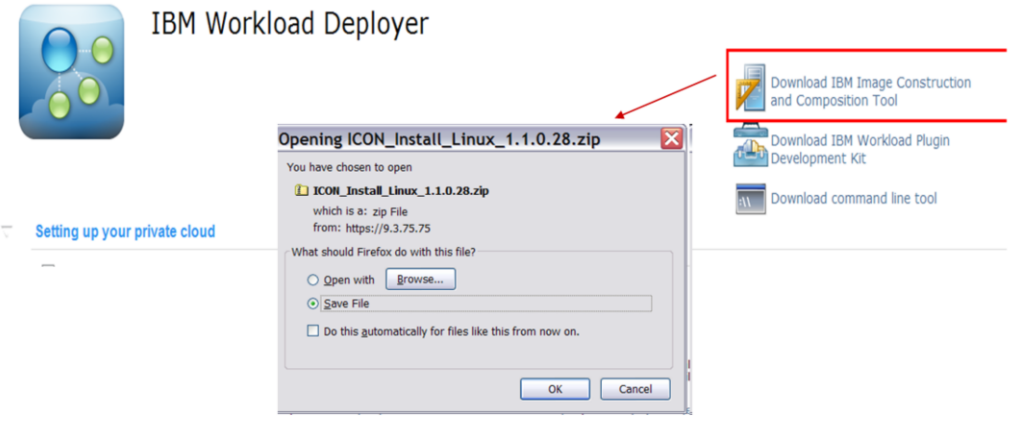
- In Workload Deployer, go to **Instances > Virtual Systems**
- Once the virtual system based on Image Construction and Composition shows a status of "Virtual system is ready", expand the "Virtual machines" section and note the "Network interface." This is the host name and IP address of the virtual machine where you will install Image Construction and Composition



Now you are ready to install the Image Construction Tool. In the Workload Deployer, determine the IP address of the virtual machine you just deployed by navigating to Instances > Virtual Systems. Expand the Virtual machines section and you will see that the Network interface field shows the host name and IP address.

Install Image Construction and Composition (continued)

- Download the Image Construction and Composition zip file by clicking on the link on the welcome page of Workload Deployer. The file is named ICON_Install_Linux_1.1.0.x.zip, where x is the build level.



Download the Image Construction Tool zip file by clicking on the link in the upper right corner on the welcome page of Workload Deployer.

Install Image Construction and Composition (continued)

- Installation instructions for Image Construction and Composition are in the Workload Deployer InfoCenter: http://worklodepid.raleigh.ibm.com/help/topic/com.ibm.worlodep.doc/pc/cicn_installation.html
- Core OS images (Linux and AIX) do not ship with any window managers, so customers extending these images must use the **silent install** instructions
- Need to **uninstall** any previously existing ICON tool and Installation Manager before installing the new Image Construction and Composition.
  - /opt/IBM/InstallationManager/eclipse/tools/ **.** `/imcl uninstallAll`
  - /var/ibm/InstallationManager/uninstall/./`uninstallc`
  - Remove /drouter if it exists: `rm -fr /drouter`
    - Removing /drouter will delete any existing images
  - Remove "icon" folder from /opt/IBM (or whatever the previous installation folder was)
  - Ensure nothing is running on port 443
    - To check this: `fuser -vn tcp 443`

12 IBM Image Construction and Composition Tool

Instructions are given for both GUI installation and silent installation. If you are extending a Core OS image(Linux or AIX) from Workload Deployer, you need to use the silent installation instructions. The Core OS images do not ship with any window managers.

Any previous existing Image Construction Tool installations need to be uninstalled along with the Installation Manager before installing the new Image Construction and Composition tool.

Installation and uninstall instructions are in the Workload Deployer InfoCenter at the link shown here, but slides 12 through15 also list the uninstall and silent installation steps.

Install Image Construction and Composition (continued)

- Move ICON_Install_Linux_1.1.0.x.zip to the virtual machine, and extract it into a folder. In this example, /temp is used.
- To continue with silent installation:
  - Go into the /temp folder and edit install.xml by removing these lines:
    - <repository location='icon'/>
    - <offering id ='com.ibm.cloud.Image icon'/>
  - Save the file
  - From /temp, install the Installation Manager by running `./installc -acceptLicense`
  - You should see this:

```
-bash-3.2# ./installc -acceptLicense
Installed com.ibm.cic.agent_1.5.0.20110909_1200 to the /opt/IBM/InstallationManager/eclipse directory.
-bash-3.2#
```


This slide shows installation of the Installation manager.

Install Image Construction and Composition (continued)

- Continuing with silent installation:
  - Go into the "icon" folder under the folder where you extracted the Image Construction and Composition file. In the example, this would be /temp/icon/
  - Edit icon_silent_install_response_file.xml as follows:
    - Edit the file so that the repository location points to the "Image Construction and Composition" folder
      - <repository location='/path/to/icon_im_repository'/>
      - In the example this would become <repository location='/temp/icon'/>
    - Set the username and password for the Image Construction and Composition console if required. By default they are set to admin/password
      - <data key='user.username,com.ibm.cloud.icon' value='admin'/>
      - <data key='user.password,com.ibm.cloud.icon' value='fufgZbY47EfxLYarBAIxeQ=='/>
      - <data key='user.confirmPassword,com.ibm.cloud.icon' value='fufgZbY47EfxLYarBAIxeQ=='/>
    - To encrypt a string for use in the password field execute:
      - /opt/IBM/InstallationManager/eclipse/tools/`./imcl encryptString <password>`
  - Save the file

This slide shows the xml files that need to be modified for silent installation of the Image Construction Tool. You can leave the username and password as the default values and change them after installation. The default values are "admin" and "password."

Install Image Construction and Composition (continued)

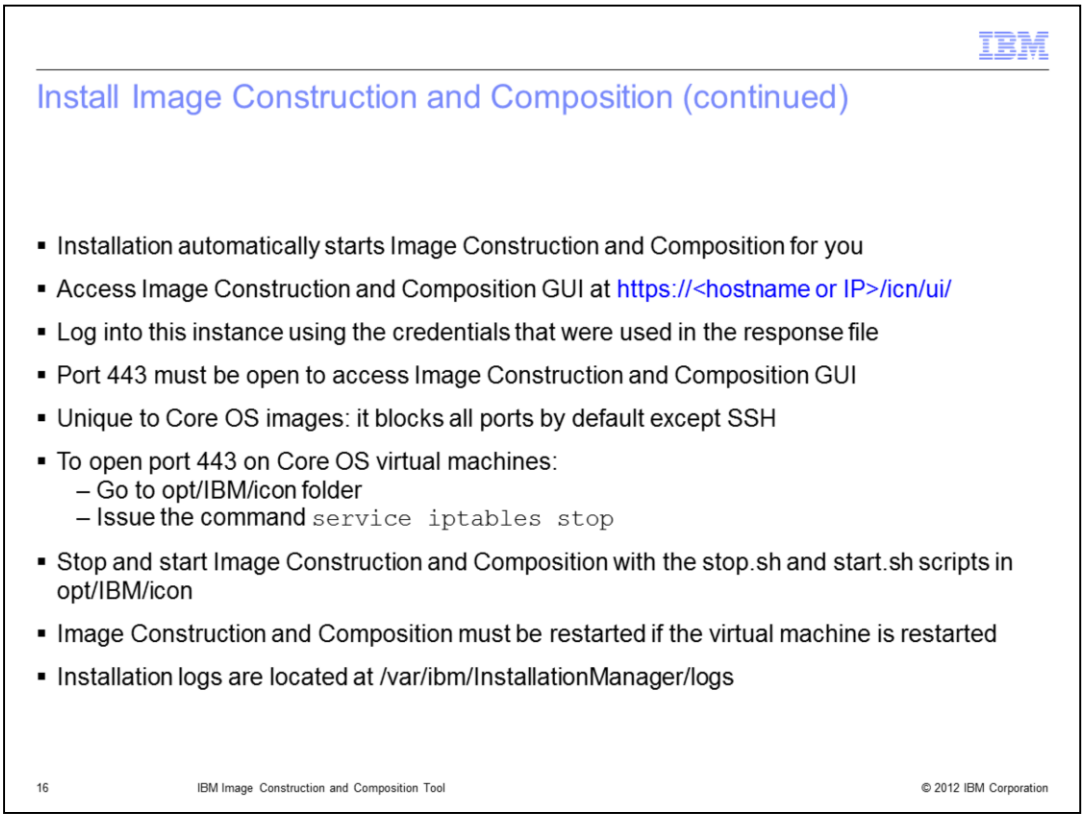
- Continuing with silent installation:
  - Go to this directory: /opt/IBM/InstallationManager/eclipse/tools
  - Run this command:

```
./imcl input <path to response
file>/icon_silent_install_response_file.xml -acceptLicense
```

    - In this example, the command would be `./imcl input /temp/icon/icon_silent_install_response_file.xml -acceptLicense`
    - You should see this message:

```
Installed com.ibm.cloud.icon_1.1.0.836 to the /opt/IBM/icon directory.
-bash-3.2#
```

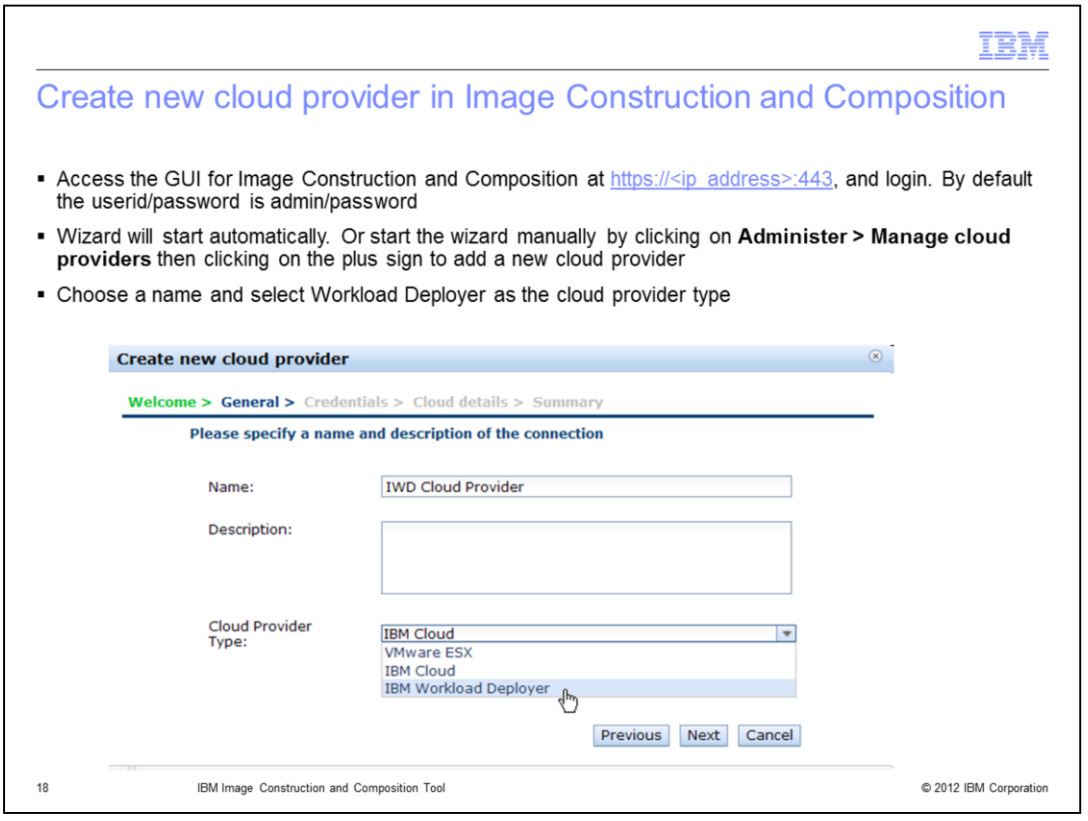

This slide covers the commands for a silent install of the Image Construction Tool.



The Image Construction Tool is automatically started by the installation process. Access the GUI by opening a browser and typing in the URL shown. You will use the credentials supplied in the response file to login. Note that port 443 must be open to access the GUI. If you have installed the tool on a Core OS image, you will need to unblock port 443. Core OS images block all ports by default except for SSH. Instructions are shown here and are also in the InfoCenter.

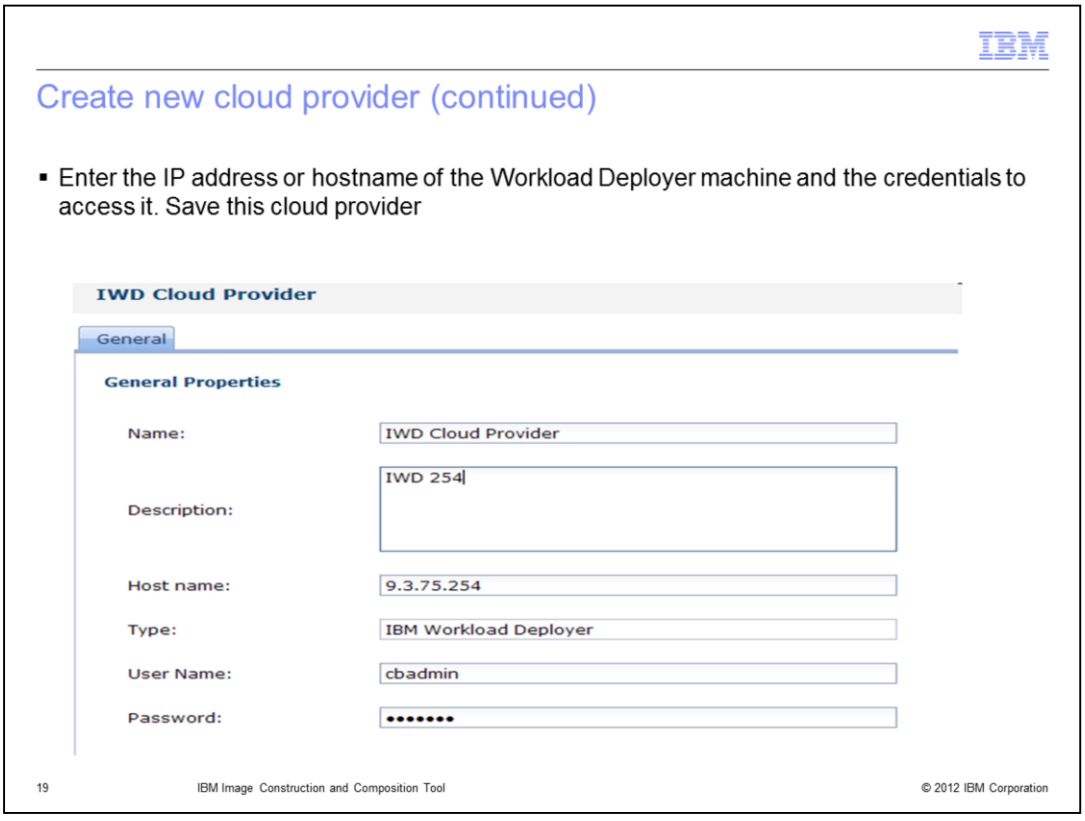
The start and stop scripts for the Image Construction Tool are in opt/IBM/icon by default.

This next sections covers creating a cloud provider.



Login to the GUI for the Image Construction tool. A “create new cloud provider” wizard will start automatically if no cloud providers are defined.

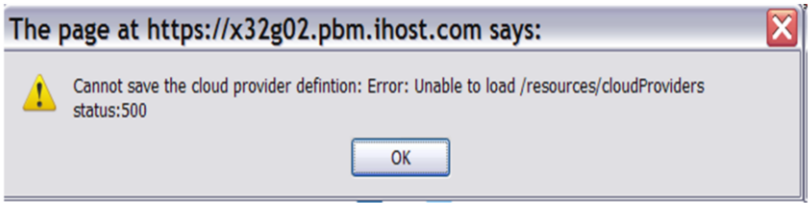
Choose a name and select Workload Deployer as the cloud provider type.



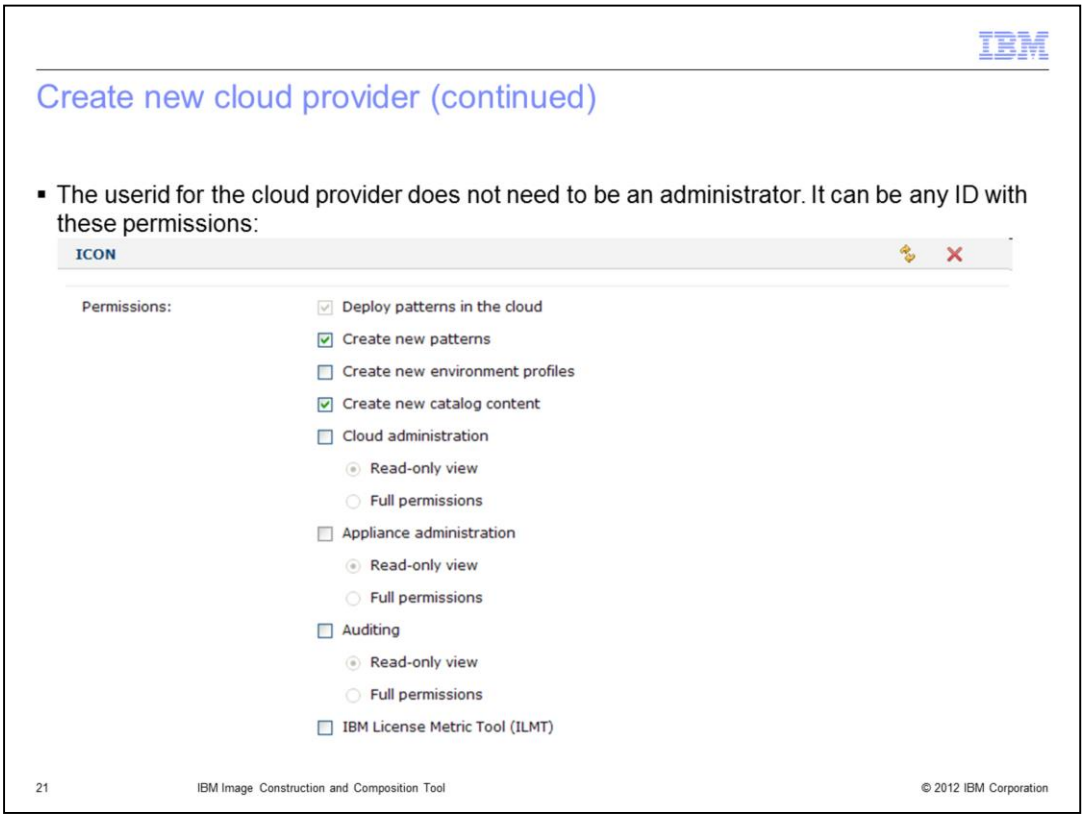
Enter the IP address or hostname of the Workload Deployer machine and the credentials to access it. Save this cloud provider.

Create new cloud provider (continued)

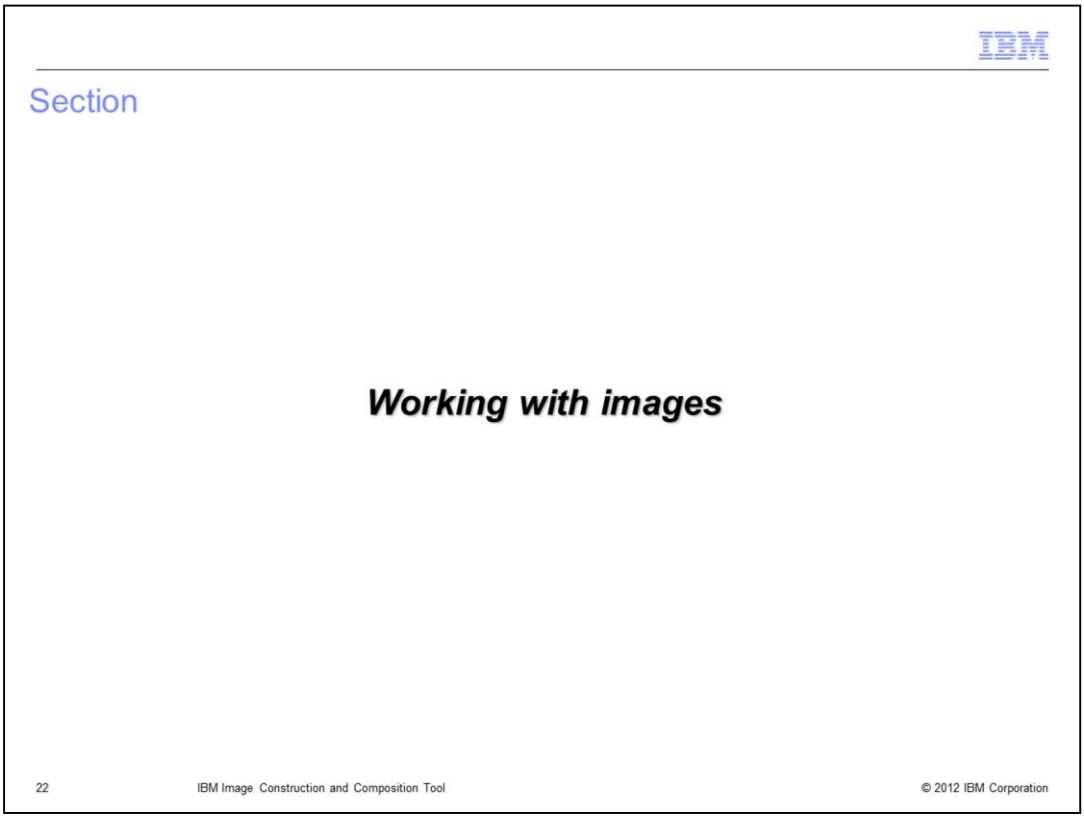
- Incorrect credentials do not save. You'll see this error:



Entering incorrect credentials for Workload Deployer will result in an error.



The user ID for the cloud provider does not need to be an administrator. It can be any ID with permission to deploy patterns in the cloud, create new patterns, and create new catalog content.

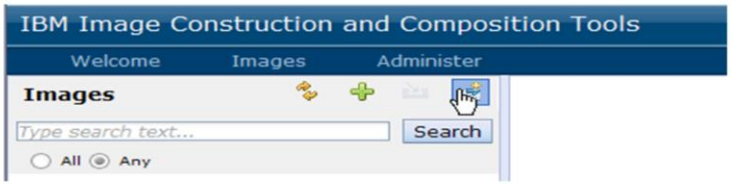


This next sections covers working with images.

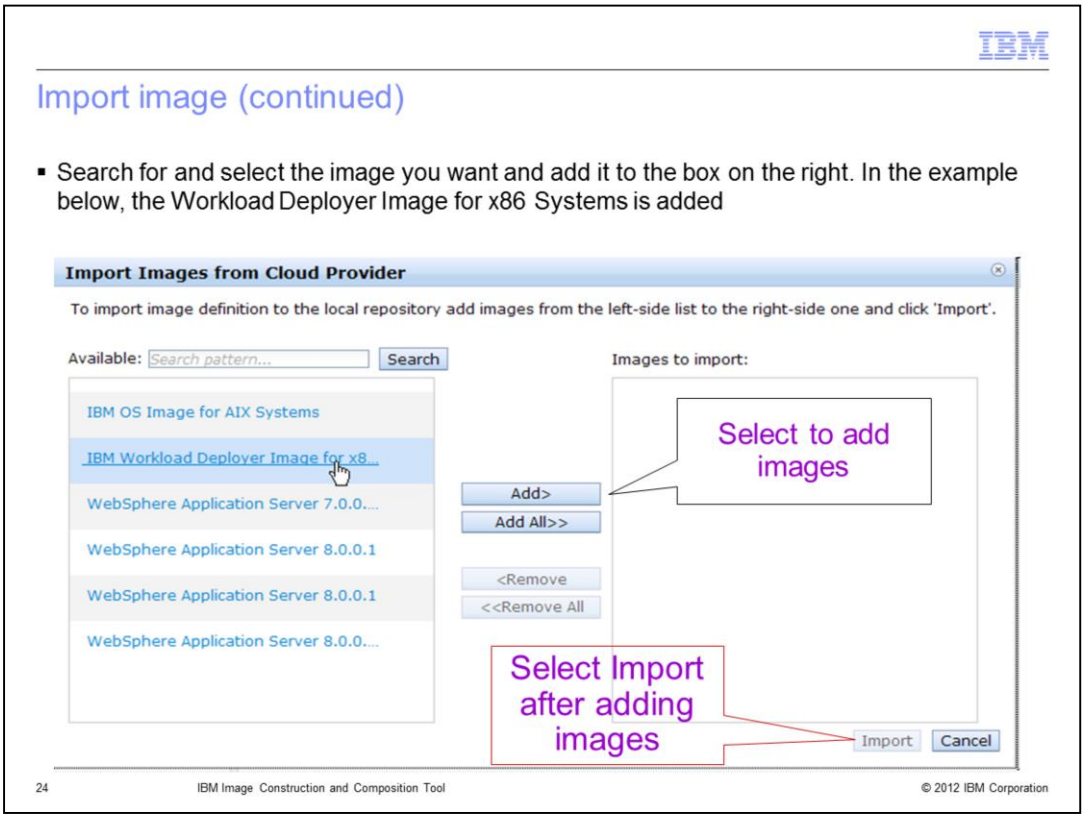
Import images from cloud provider (Workload Deployer)

- Choose **Images > Build images**. Be sure to select the appropriate cloud provider in the upper right corner

- Click the import icon to import images from the Workload Deployer appliance



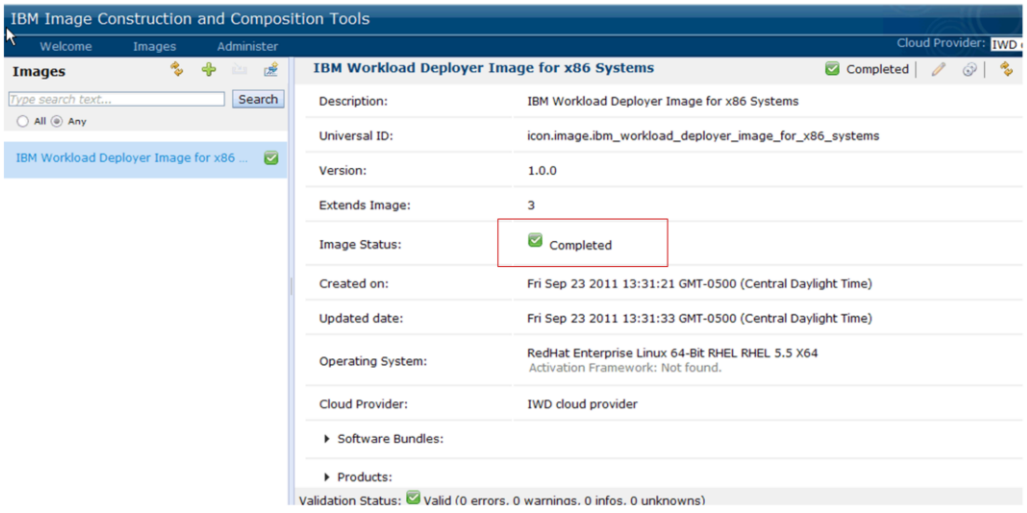
In the Image Construction Tool, choose **Images > Build images**. Be sure to select the appropriate cloud provider in the upper right corner. Click the import icon to import images from the Workload Deployer appliance.



Search for and select the image you want and add it to the box on the right. In the example shown, the Workload Deployer Image for x86 Systems is added.

Import image (continued)

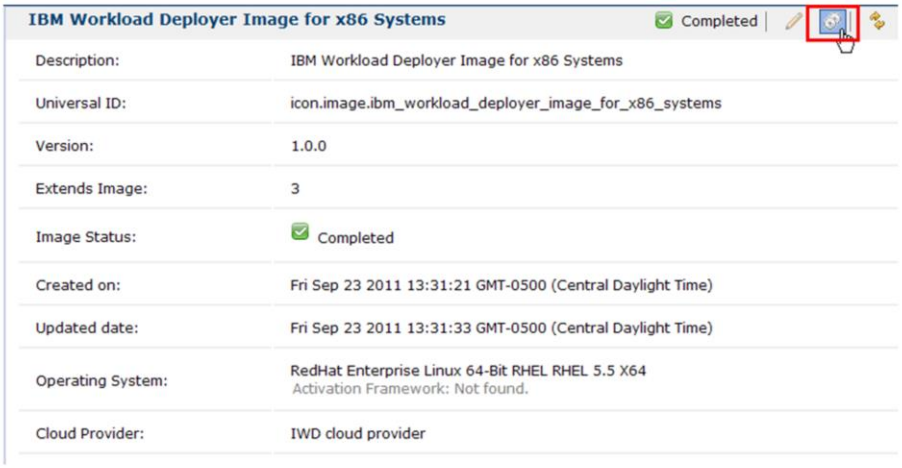
- Wait until the image has a status of “Completed”. The actual image content does not transfer to the Image Construction and Composition Tool, only a copy of the metadata is saved



Wait a few seconds until the image shows a status of “Completed.” The actual image content does not transfer to the Image Construction and Composition Tool, only a copy of the metadata is saved.

Extend the image

- Now you will extend the completed image by clicking on the extend icon. The tool does not copy or modify the base OS image during this step



Now you will extend the completed image by clicking on the extend icon. The tool does not copy or modify the base OS image during this step.

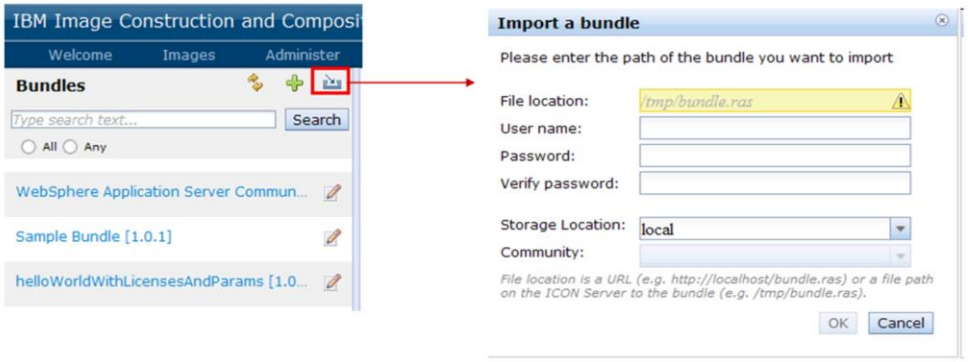
Extend the image (continued)

- Choose a name for the new image and a universal identifier. The universal ID is a means to identify an Image Construction and Composition Tool asset across different repositories, and is a required field
- Typically you use any dotted notation to create a universal identifier, such as the one shown below

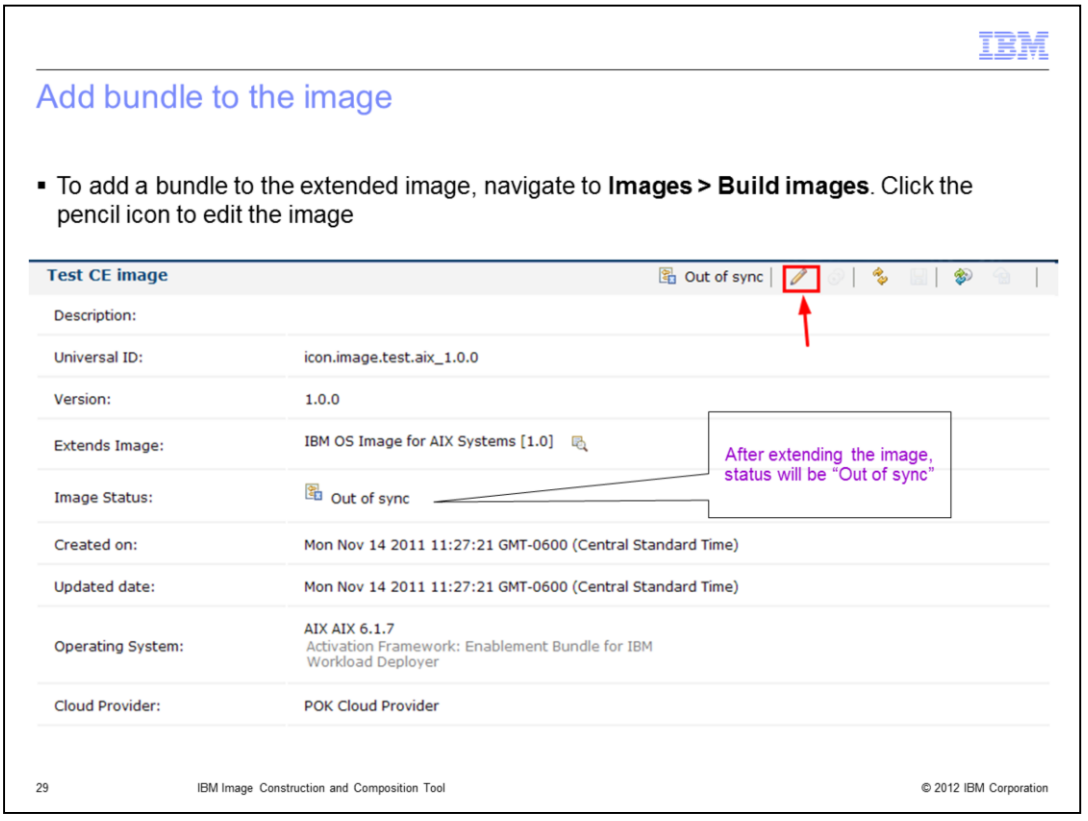
Choose a name for the new image and a universal identifier. The universal ID allows the Image Construction and Composition Tool to look up bundles independently from the repository where they are stored. Typically you use any dotted notation to create a universal identifier.

Import software bundles

- The next step is to add software bundles to the new image. Before you can do this, you need to import your bundles. Go to **Images > Build software bundles**. Click the import icon.
- File location can be local or a URL (e.g. http://hostname/bundle.ras)
- There is more on software bundles later in this presentation



The next step is to add software bundles to the new image. Before you can do this, you need to import your bundles. Go to **Images > Build software bundles**. Click the import icon. File location can be local or a URL (e.g. http://hostname/bundle.ras). There is more on software bundles later in this presentation.

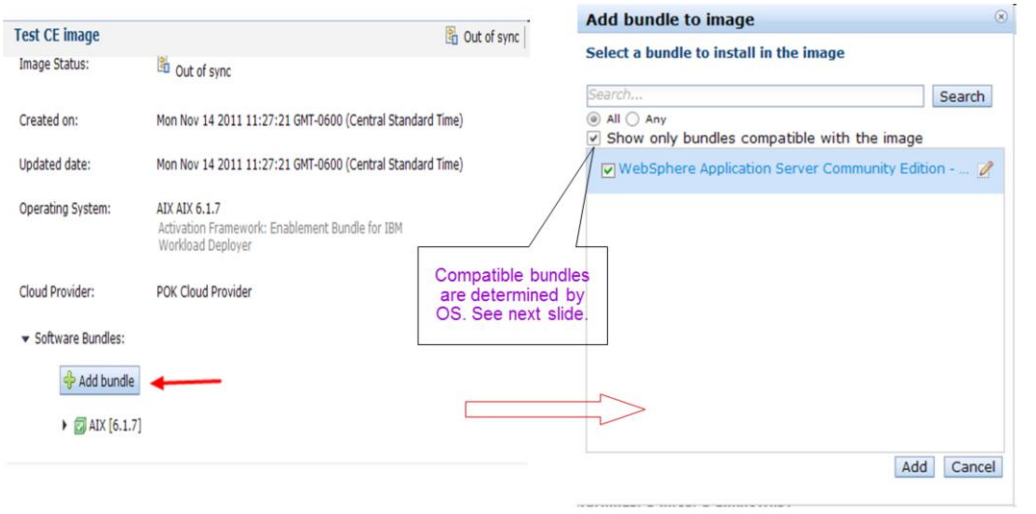


To add a bundle to the extended image, navigate to **Images > Build images**. Click the pencil icon to edit the image.

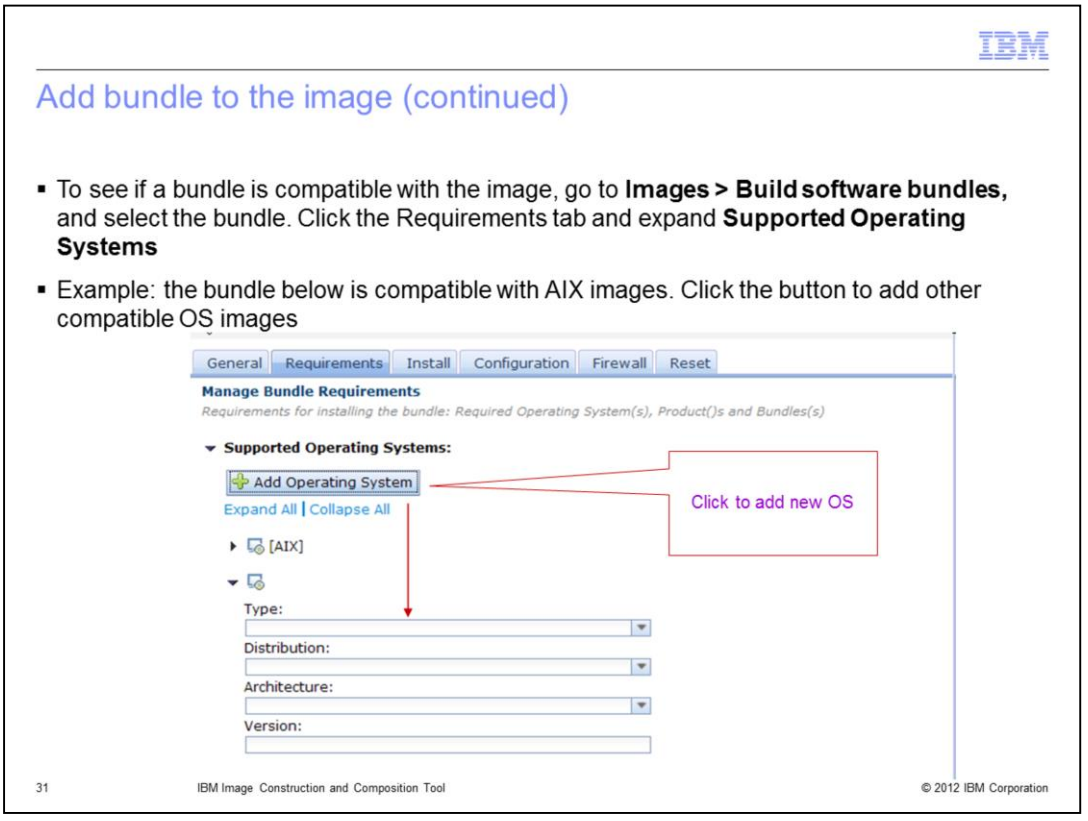
After extending the image, the Image Status will read "Out of sync" until a synchronization is performed. This is because under the covers an enablement bundle has been added to the image to allow Image Construction and Composition to perform silent installation tasks on software.

Add bundle to the image (continued)

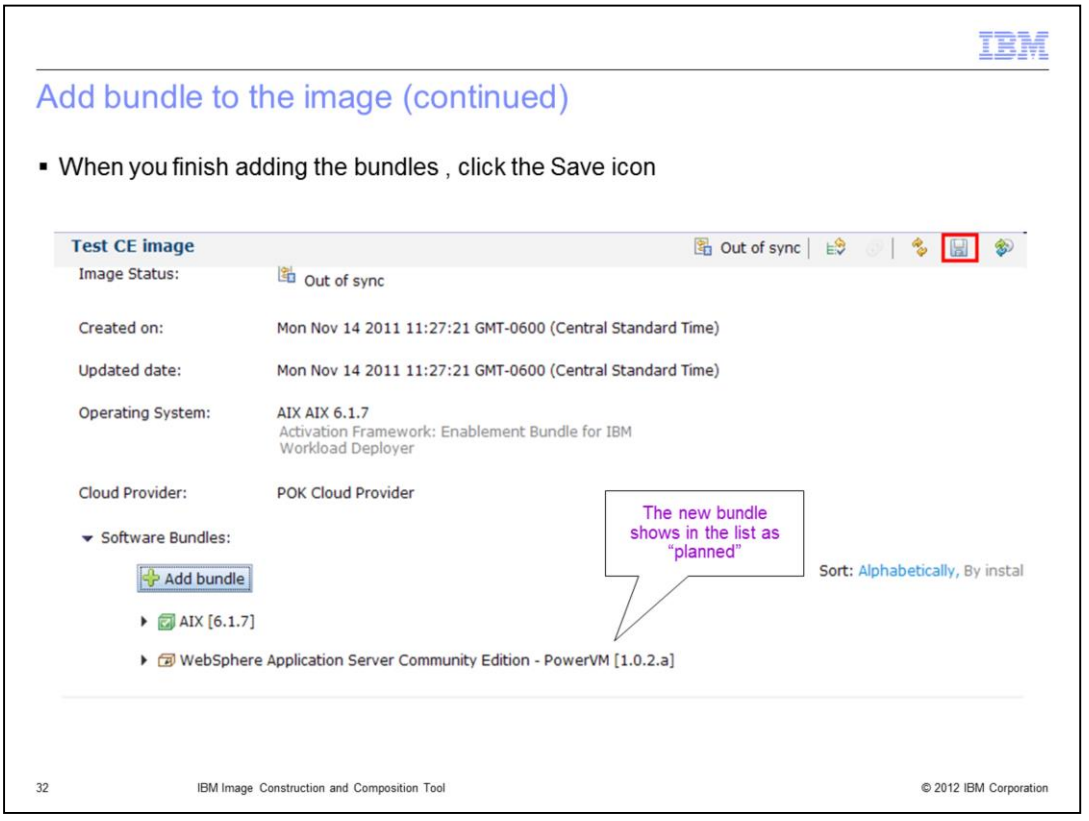
- Expand Software Bundles, click the Add bundle button. You are given a list of previously imported bundles to choose from. In the example below, the WebSphere Application Server Community Edition bundle is being added to Test CE Image



Expand Software Bundles, click the Add bundle button. You are given a list of previously imported bundles to choose from. In the example shown, the WebSphere Application Server Community Edition bundle is being added to Test CE Image. The tool does not copy or modify the actual software during this step.



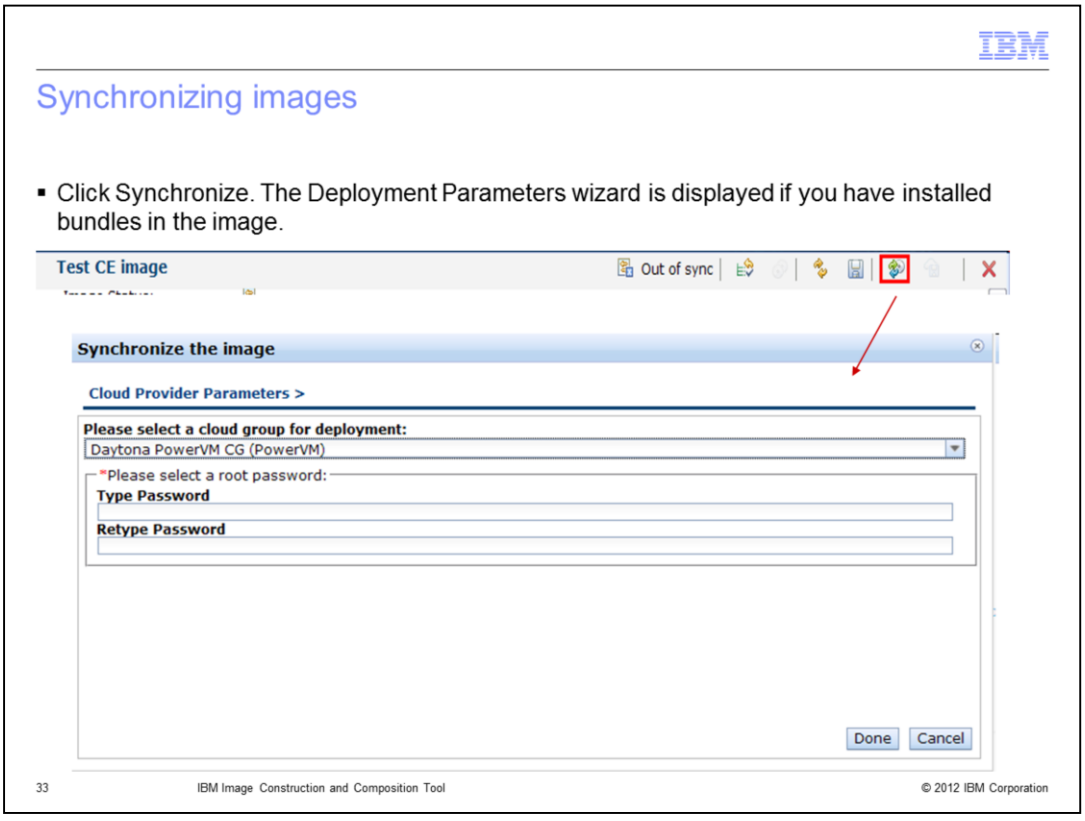
To see if a bundle is compatible with the image, go to **Images > Build software bundles,** and select the bundle. Click the Requirements tab and expand Supported Operating Systems. You specify other operating systems to be compatible by clicking the **Add Operating System** button.



When you finish adding the bundles , click the Save icon. As you edit the image, the Image Construction and Composition Tool identifies any missing or not valid input by highlighting any invalid entry or by including a message in the validation status section. When you save, the Image Construction and Composition Tool completes semantic validation to ensure that the image definition is consistent. For example, it validates that the specified bundle order satisfies any dependency requirements.

The validation is performed by the server and is ran only when you save changes.

The validation report entries have three severities, either info, warning, or error. If your image has any **error** severity validation entries, any synchronize or capture action for the image is likely to fail. Even if the synchronize or capture action succeeds, the resulting image might not usable.

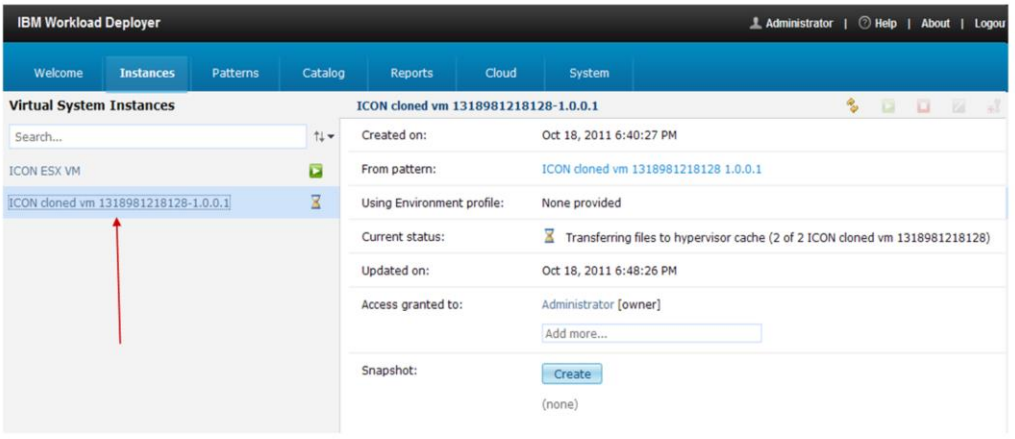


Click the Synchronize icon to synchronize.

The deployment parameters wizard is displayed, prompting you to enter values for the deployment parameters, such as passwords. Default deployment values that were specified during bundle creation are displayed. Make changes to the deployment parameters, as required. You are also asked to choose a cloud provider for the image from the drop down box.

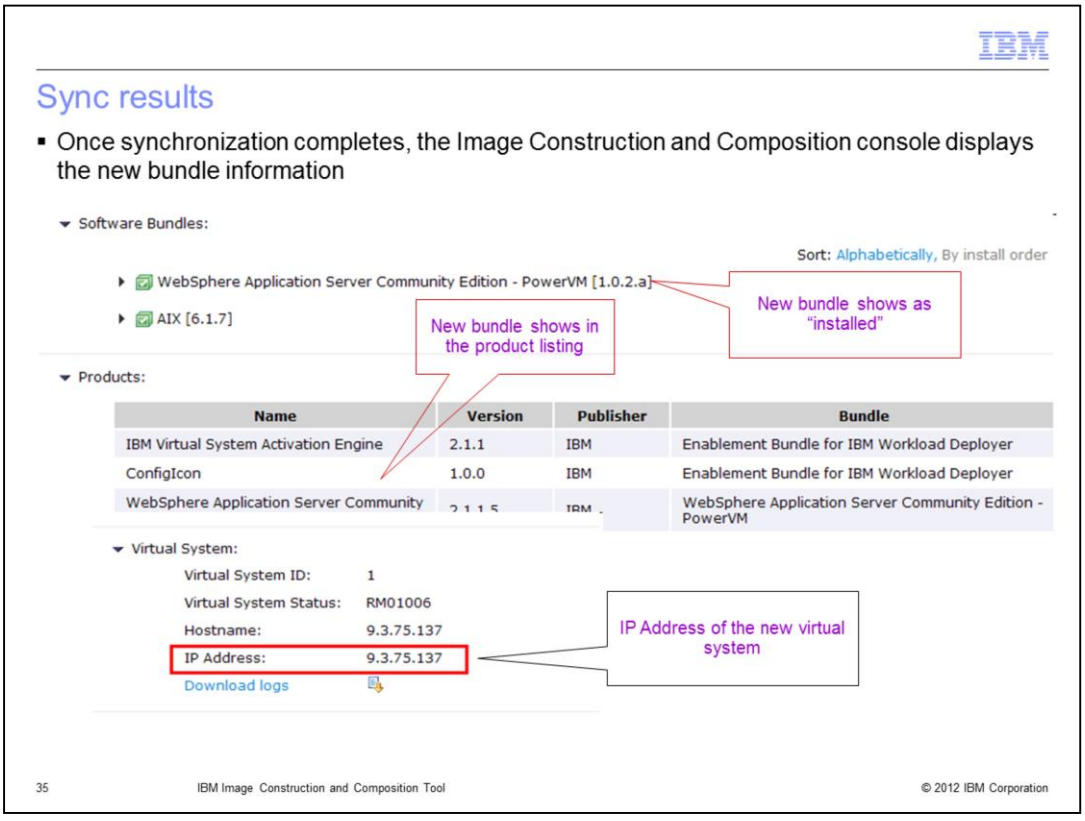
Synchronizing images (continued)

- Image Construction and Composition starts a VM, copies files and runs installation tasks
- Refresh the image in the Image Construction and Composition tool to monitor synchronization progress
- View the Workload Deployer console and note that a cloned VM is being created in Workload Deployer during this process
- Sync takes about 40 minutes to complete

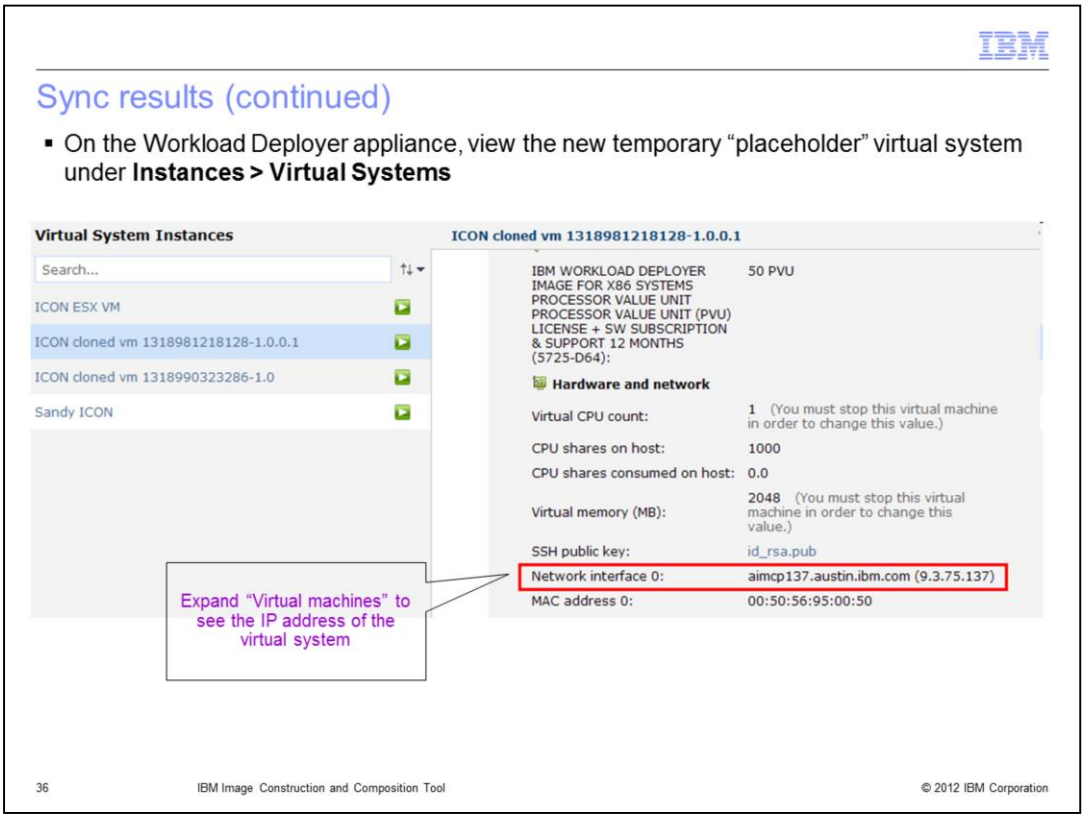


The synchronization process starts your base image in the build environment, performs the software bundle installations, and then performs any additional configuration specified in the software bundles. This step is when the Image Construction and Composition Tool starts a virtual machine from the base OS image, and during this step files are copied and installation tasks run. Synchronization takes about 40 minutes to complete.

You can perform the synchronize step multiple times. If you synchronize an image more than once, each synchronization executes any additional planned bundles. After executing a bundle, the tool moves that bundle to the Installed section under the Software tab for the image. If the synchronization process fails, you can edit the list of planned bundles and resynchronize by clicking Synchronize again.



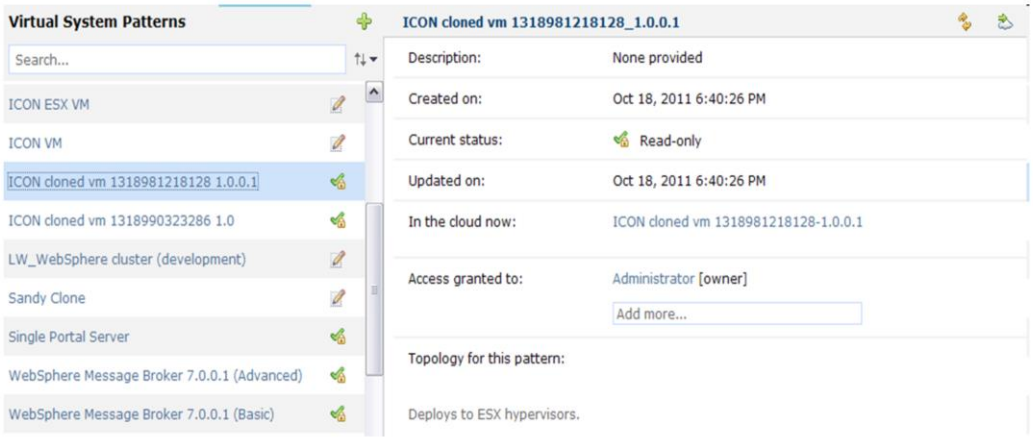
Once synchronization completes, the Image Construction and Composition console displays the new bundle information. The new bundle will show up with a green check mark, and it will also display in the product listing. Note the IP address of the new virtual system.



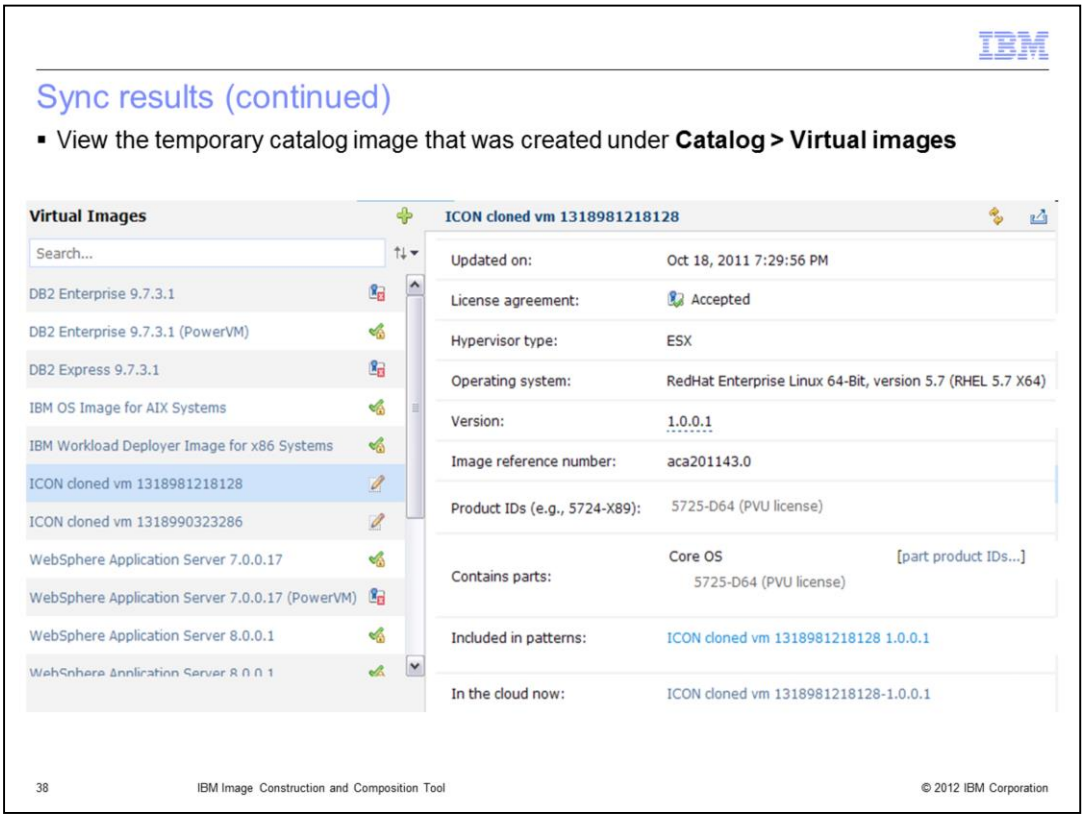
Go back to the Workload Deployer GUI, and login. View the new temporary "placeholder" virtual system under **Instances > Virtual Systems.** It is in the format of "ICON cloned vm" with a numerical string attached. The numerical string represents a timestamp.

Sync results (continued)

- View the temporary “placeholder” pattern that was created under **Patterns > Virtual systems**



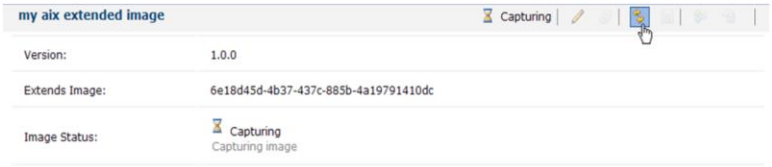
Still in the Workload Deployer GUI, view the temporary “placeholder” pattern that was created under **Patterns > Virtual systems.** It is in the format of “ICON cloned vm” with a numerical string attached.



Still in the Workload Deployer GUI, view the temporary catalog image that was created under **Catalog > Virtual images.**

Capture to complete the image

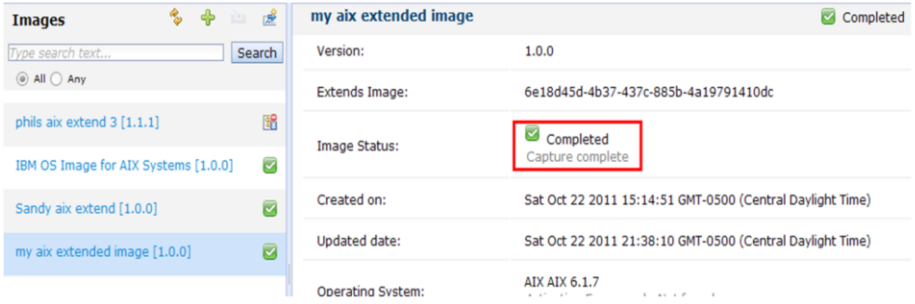
- The last step is to perform a capture operation which will complete the image
- Return to the Image Construction and Composition tool and select the extended image in **Images** > **Build Images**. Click the capture icon to start the capture process
- Monitor the process using the refresh icon. This will take about 40 minutes to complete



The last step is to perform a capture operation which will complete the image. Return to the Image Construction and Composition tool and select the extended image in **Images** > **Build Images**. Click the capture icon to start the capture process. Monitor the process using the refresh icon. This will take about 40 minutes to complete.

Capture to complete the image (continued)

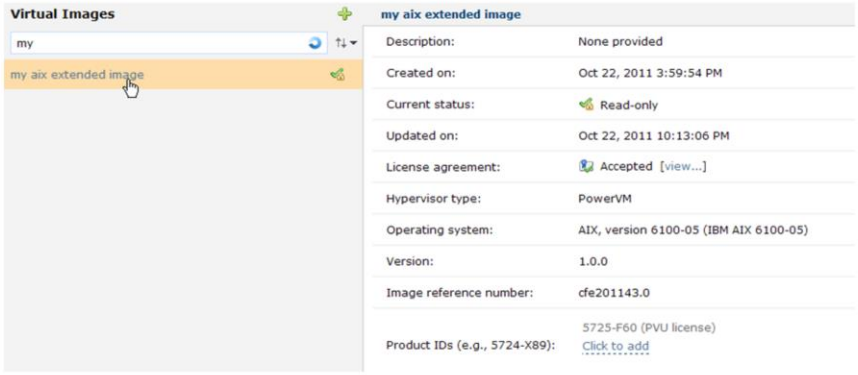
- When finished, the image status will show “Completed: Capture complete”



When finished, the image status will show “Completed: Capture complete”.

Capture results

- In the Workload Deployer appliance, the temporary placeholders in **Instances > Virtual Systems** and in **Patterns > Virtual Systems** are deleted.
- The image in **Catalog > Virtual Images** will remain, and the name will be changed to match the name in the Image Construction and Composition tool

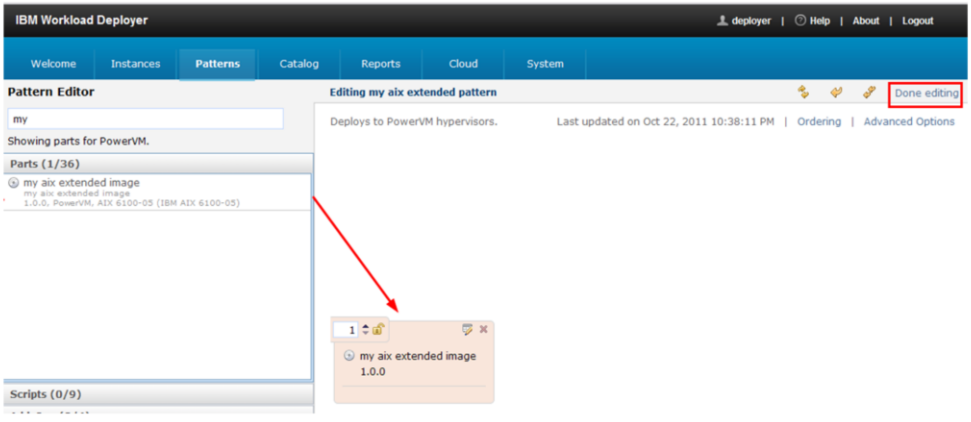


In the Workload Deployer appliance, the temporary placeholders in **Instances > Virtual Systems** and in **Patterns > Virtual Systems** are deleted.

The image in **Catalog > Virtual Images** will remain, and the name will be changed to match the name in the Image Construction and Composition tool.

Capture results (continued)

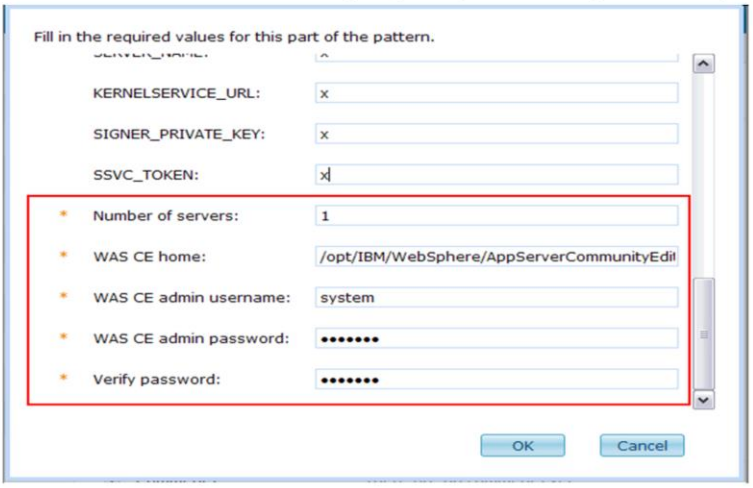
- The part from the new catalog image now shows up in the Workload Deployer Pattern Editor when creating a new pattern.
- You can add this image part to a pattern and deploy it to the cloud



The part from the new catalog image now shows up in the Workload Deployer Pattern Editor when creating a new pattern. You can add this image part to a pattern and deploy it to the cloud.

Capture results (continued)

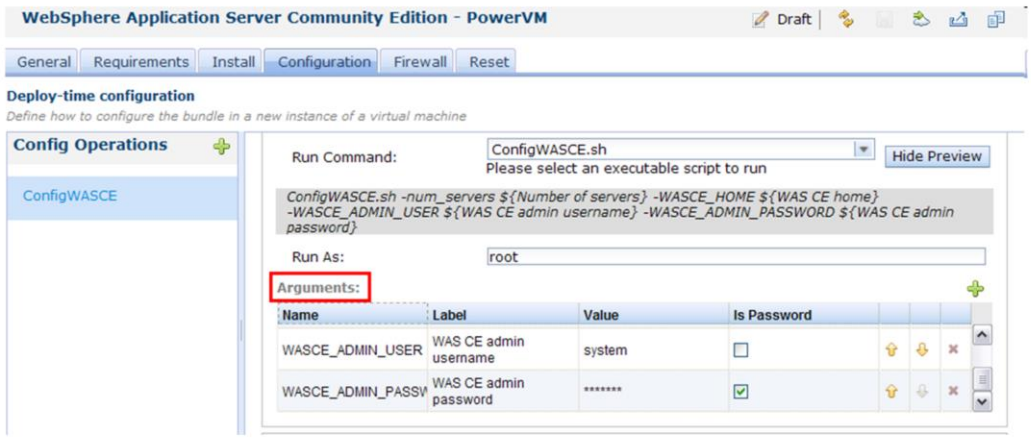
- When you deploy the new pattern to the cloud, you are prompted for any parameters required by the software bundles you added. The example below shows the prompt when WAS CE bundle is part of the image.
- If the software bundles do not have any required parameters, you are not prompted.



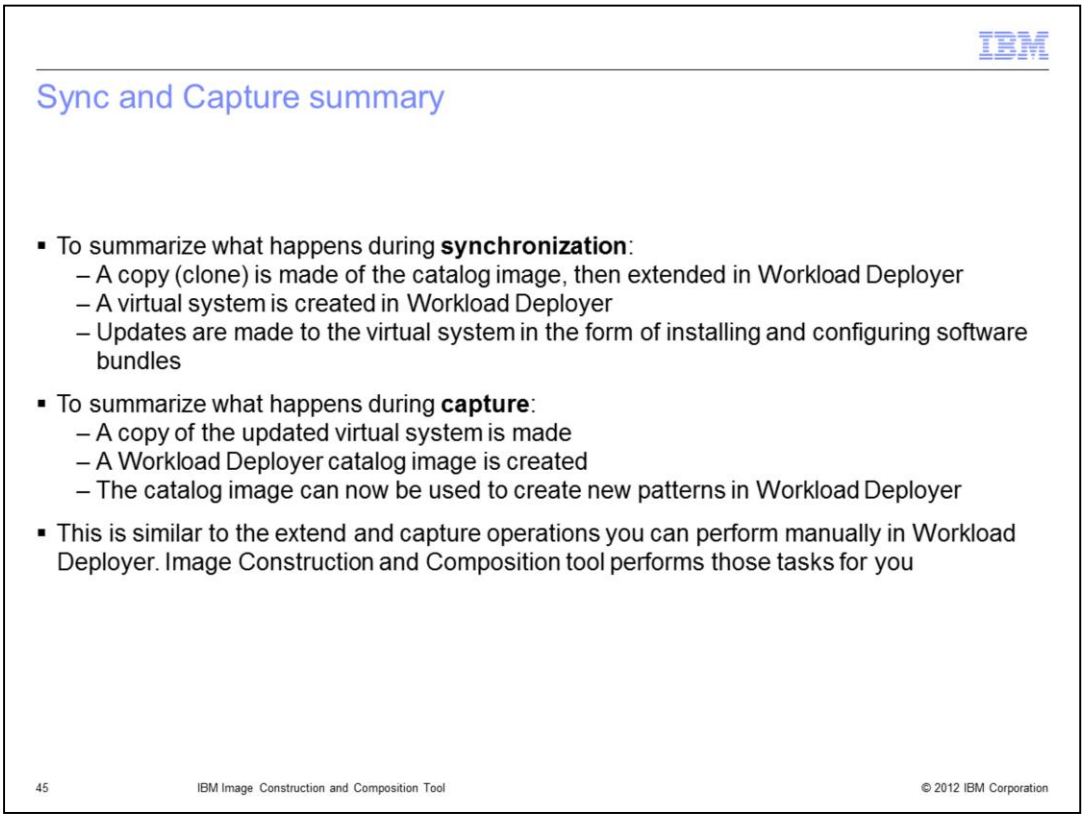
When you deploy the new pattern to the cloud, you are prompted for any parameters required by the software bundles you added. The example shows the prompt when WAS CE bundle is part of the image. If the software bundles do not have any required parameters, you are not prompted.

Capture results (continued)

- The required deployment parameters come from the arguments section of the Configuration tab inside the software bundle:



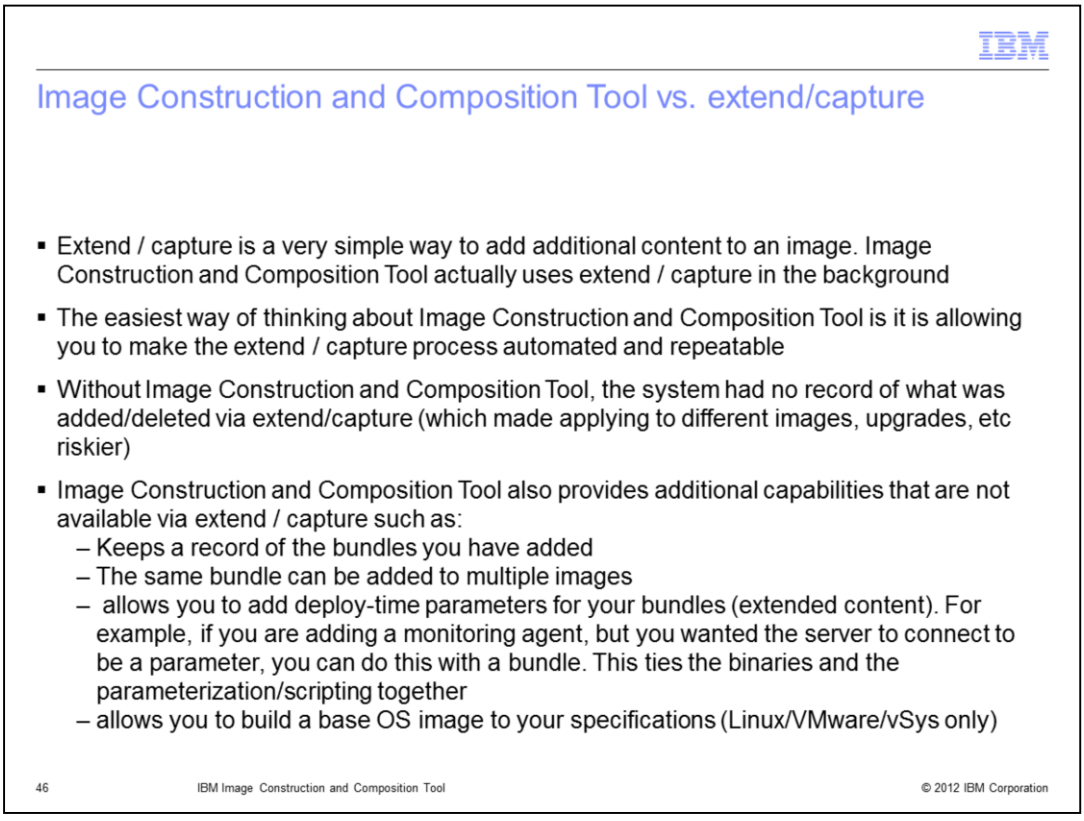
The required deployment parameters can be found in the arguments section of the Configuration tab inside the software bundle. There is more on this later in the presentation.



To summarize what happens during synchronization and capture: a clone is made of the catalog image, then extended in Workload Deployer. A virtual system is created in Workload Deployer. Updates are made to that virtual system in the form of installing and configuring software bundles.

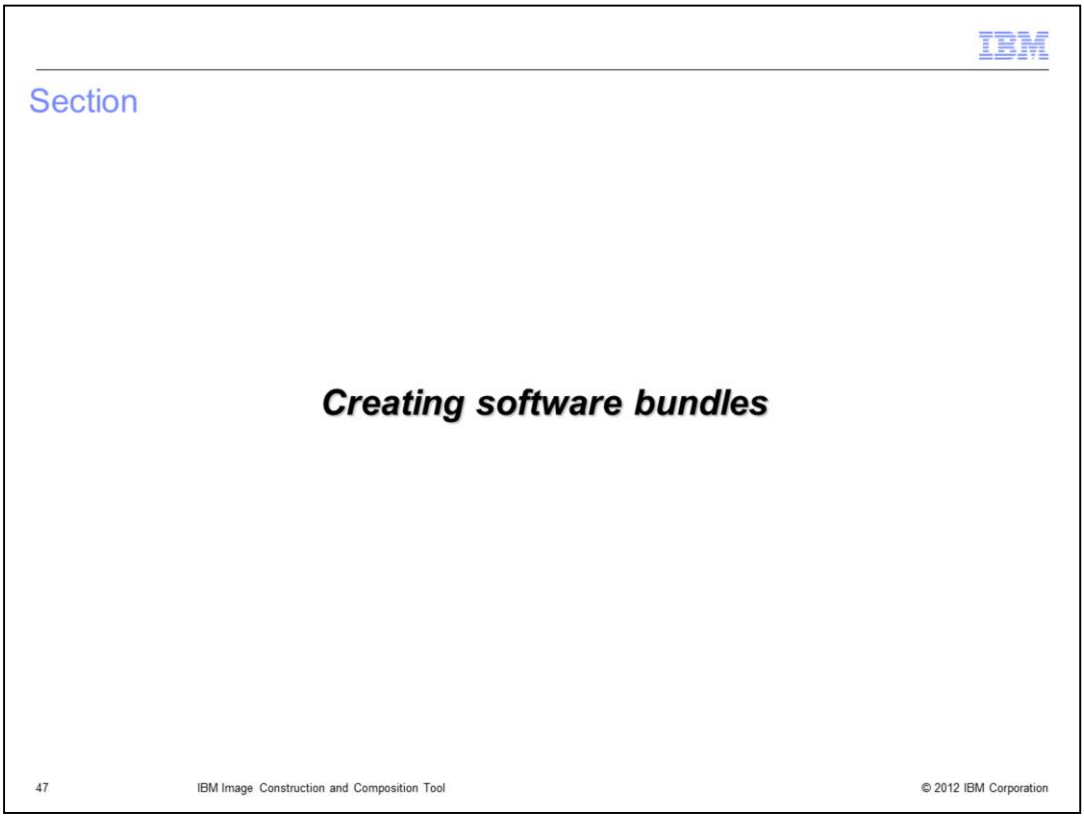
During the capture process, a copy of the updated virtual system is made, and a Workload Deployer catalog image is created.

These processes are similar to the extend and capture operations that you can perform manually in Workload Deployer. The Image Construction Tool performs those tasks for you.

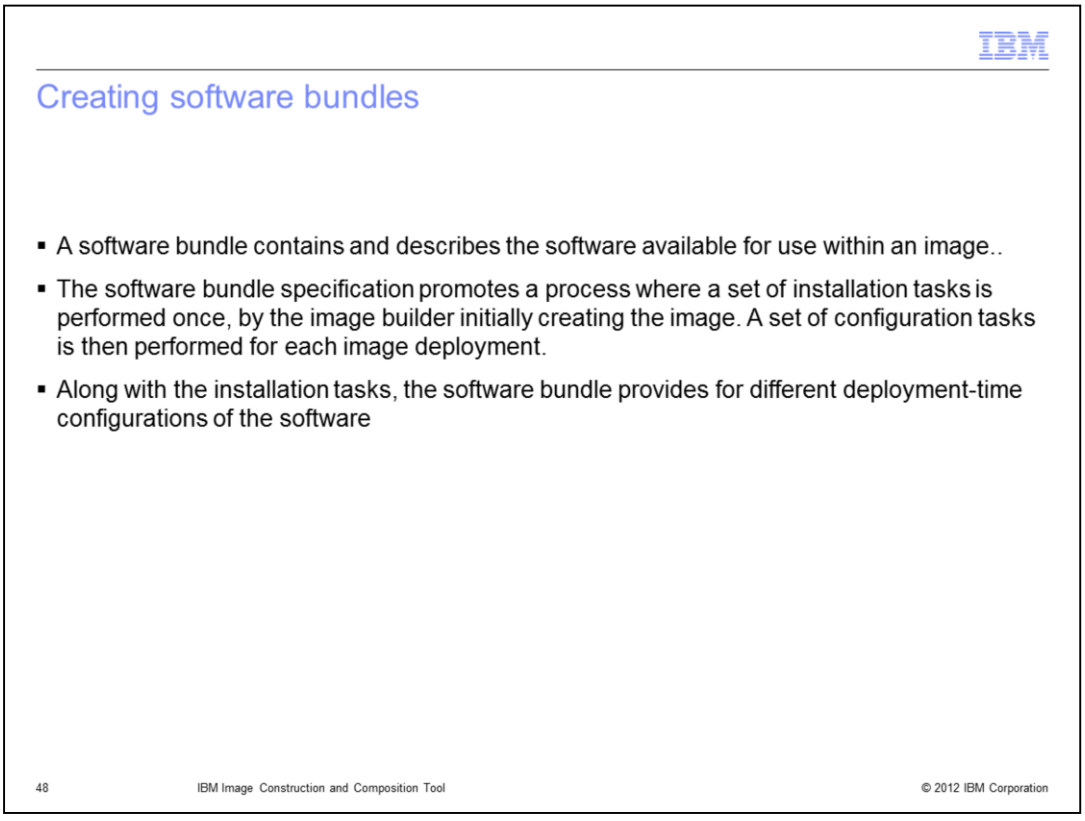


Extend/capture in Workload Deployer is a very simple way to add additional content to an image. Image Construction and Composition Tool actually uses extend / capture in the background. The best way of thinking about Image Construction and Composition Tool is it is allowing you to make the extend / capture process automated and repeatable. Without the tool, the system had no record of what was added/deleted via extend/capture (which made applying to different images, upgrades, etc riskier).

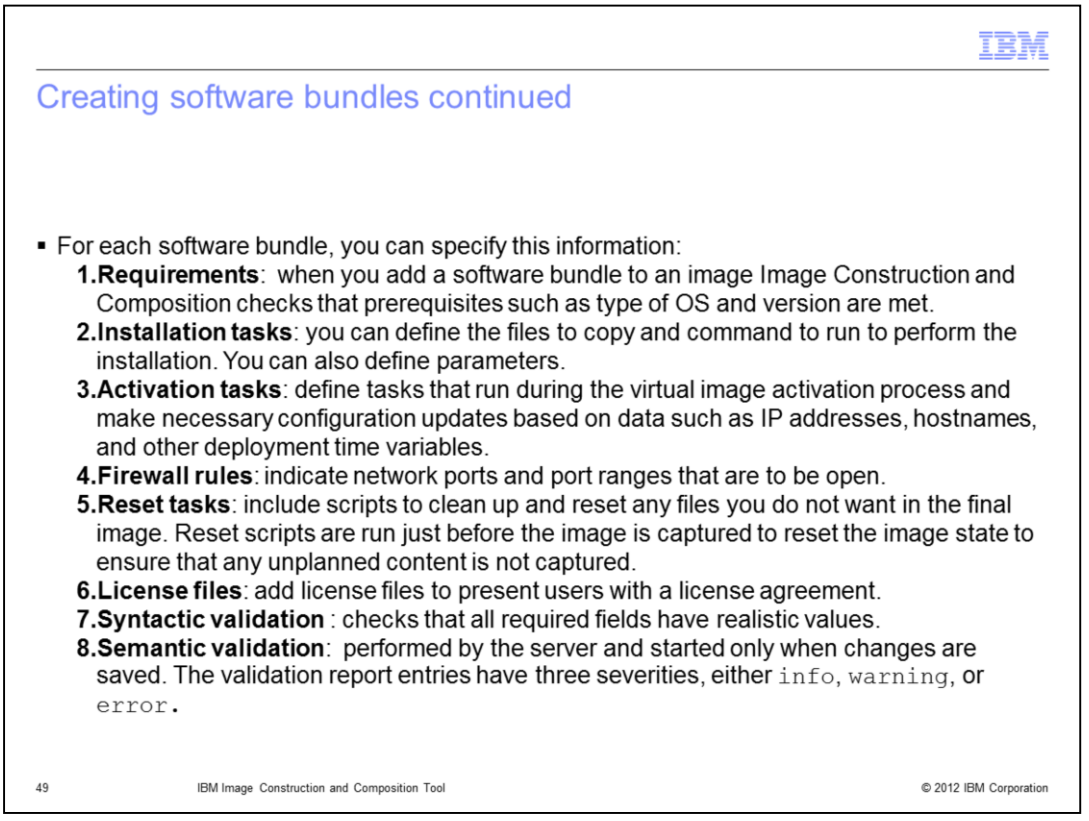
Image Construction and Composition Tool also provides additional capabilities that are not available via extend / capture such as: Keeps a record of the bundles you have added, the same bundle can be added to multiple images, allows you to add deploy-time parameters for your bundles (extended content). For example, if you are adding a monitoring agent, but you wanted the server to connect to be a parameter, you can do this with a bundle. This ties the binaries and the parameterization and scripting together. And also allows you to build some base OS images to your specifications



This next section gives a high level overview of creating and viewing software bundles.



The software bundle specification for the software includes information the tool needs. It includes how to install the software, prerequisites of the software, and parameters available for customizing the software. The recommendation is to define time intensive tasks, for example, installing large binary files, as part of the software bundle installation so the tasks run only once. The use of deployment-time configuration parameters reduces the number of images that you require by providing a means of customizing the software for each deployment.



For each software bundle, you can specify this information:

Requirements: when you add a software bundle to an image Image Construction and Composition checks that prerequisites such as type of OS and version are met.

Installation tasks: you can define the files to copy and command to run to perform the installation. You can also define parameters.

Activation tasks: define tasks that run during the virtual image activation process and make necessary configuration updates based on data such as IP addresses, hostnames, and other deployment time variables.

Firewall rules: indicate network ports and port ranges that are to be open.

Reset tasks: include scripts to clean up and reset any files you do not want in the final image. Reset scripts are run just before the image is captured to reset the image state to ensure that any unplanned content is not captured.

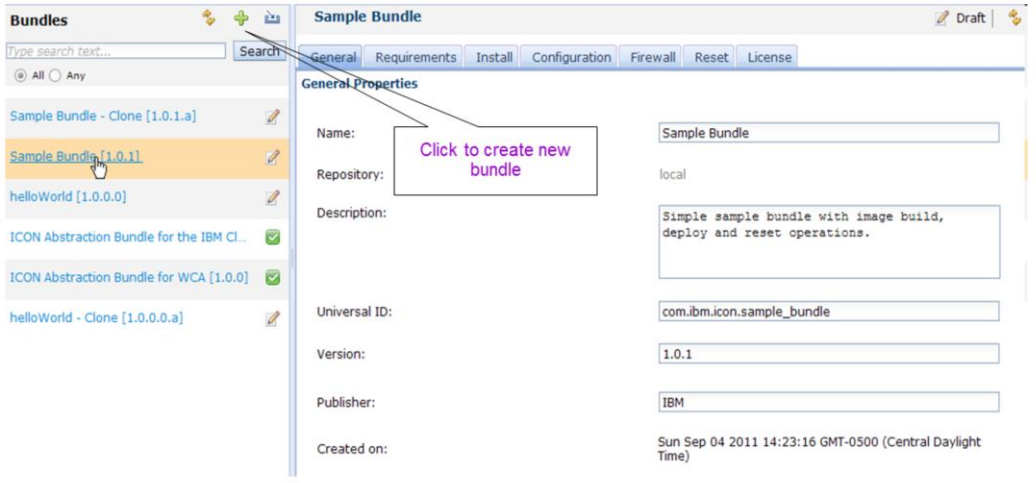
License files: add license files to present users with a license agreement.

Syntactic validation: checks that all required fields have realistic values.

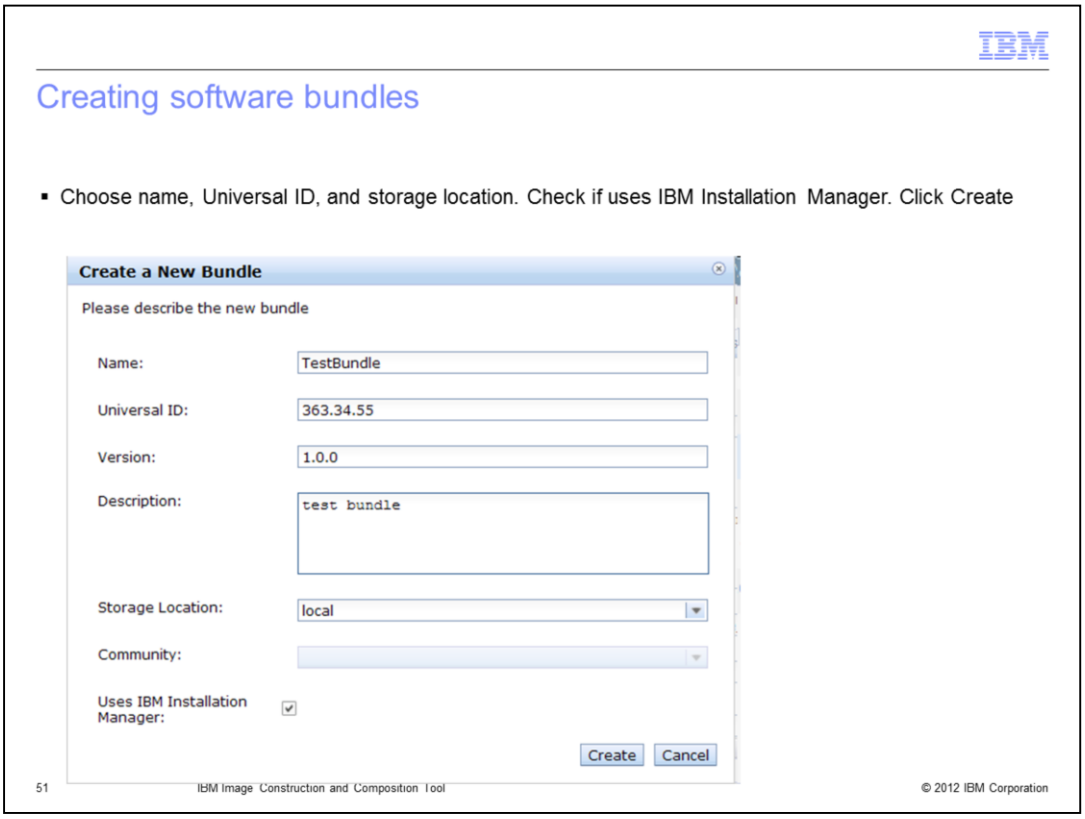
Semantic validation: performed by the server and started only when changes are saved. The validation report entries have three severities, either info, warning, or error.

Creating software bundles continued

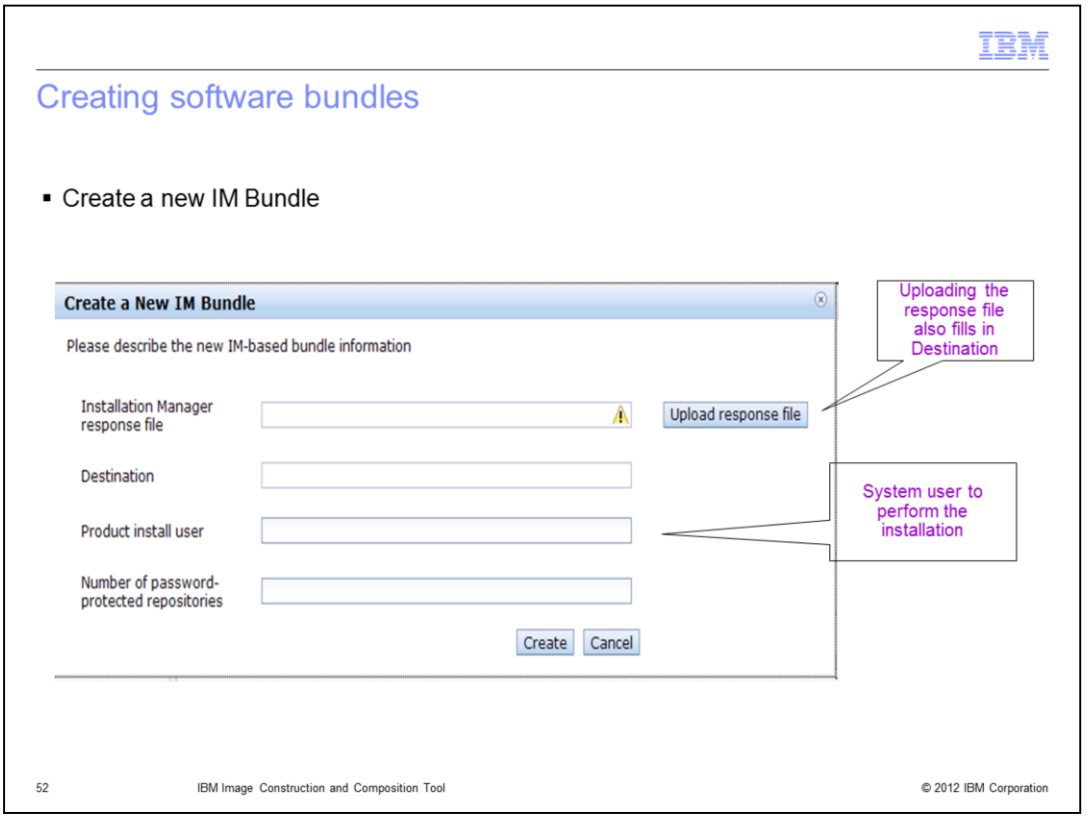
- To view the bundles in the Image Construction and Composition console, go to **Images > Build software bundles**



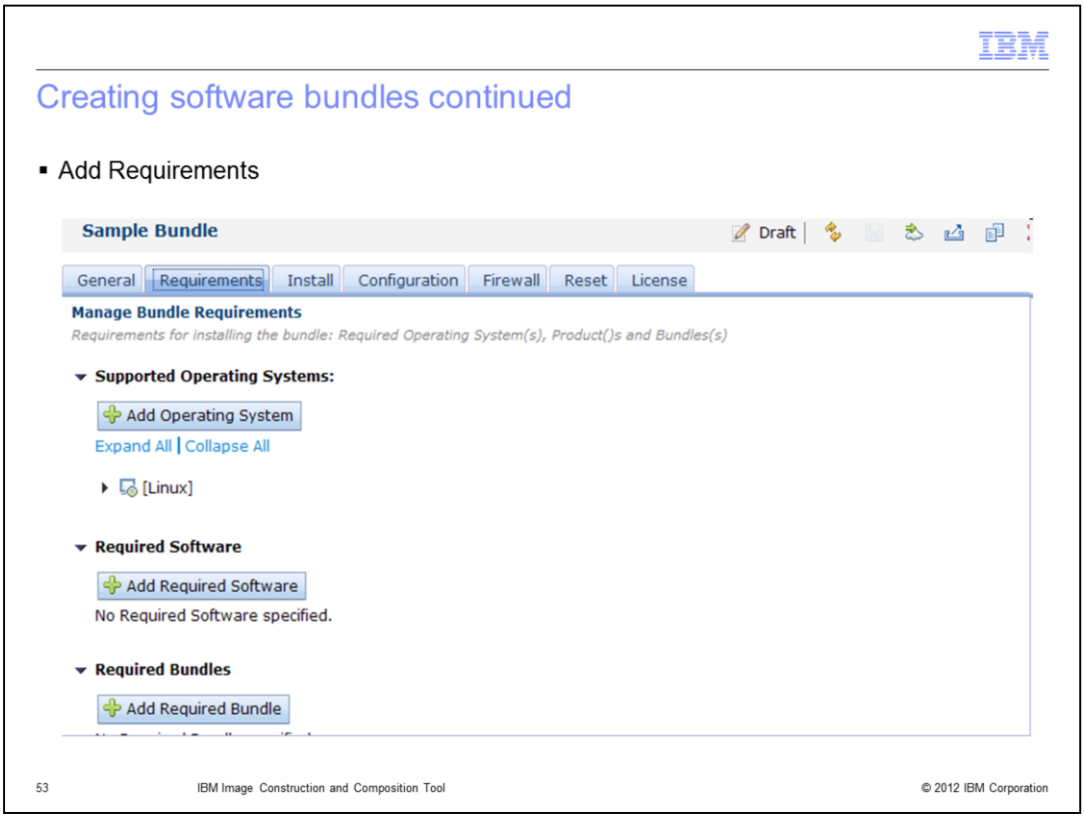
To view the bundles in the Image Construction and Composition console, go to Images > Build software bundles.



Choose name, Universal ID, and storage location. Check if it uses the IBM Installation Manager. And click Create.

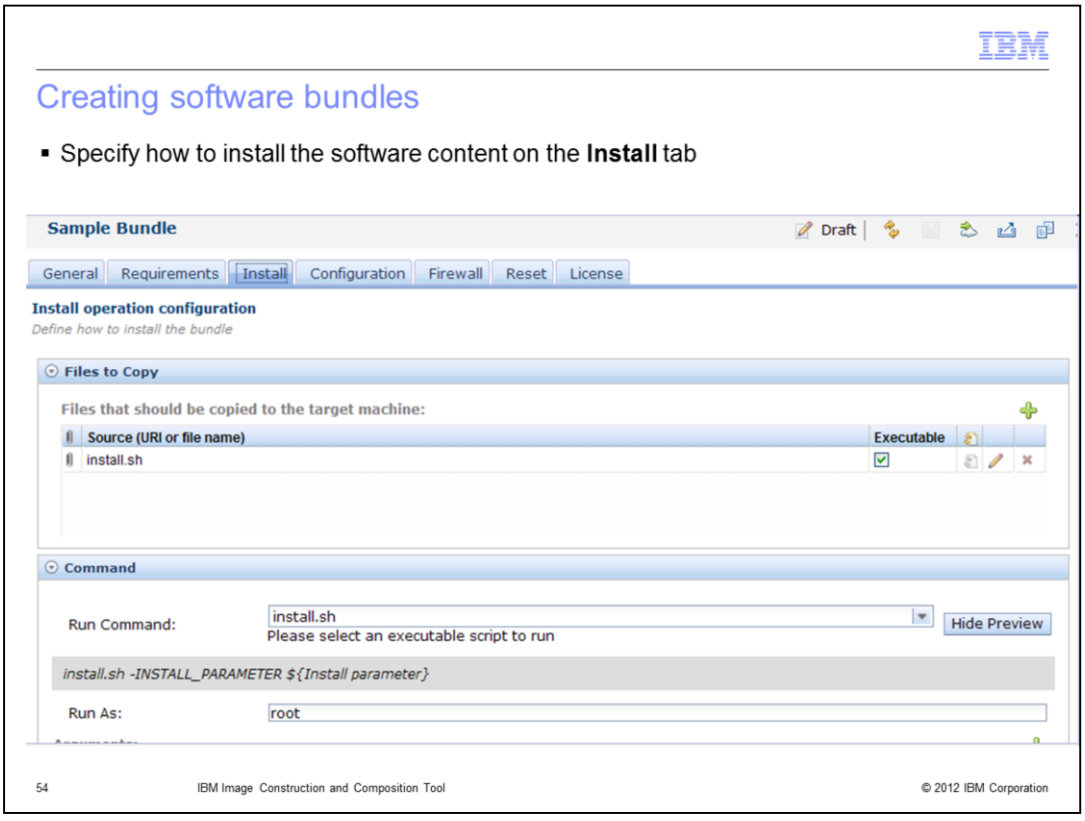


Fill in the fields when prompted. When you upload the response file, the destination is also completed. The Product install user is the system user who performs the installation.

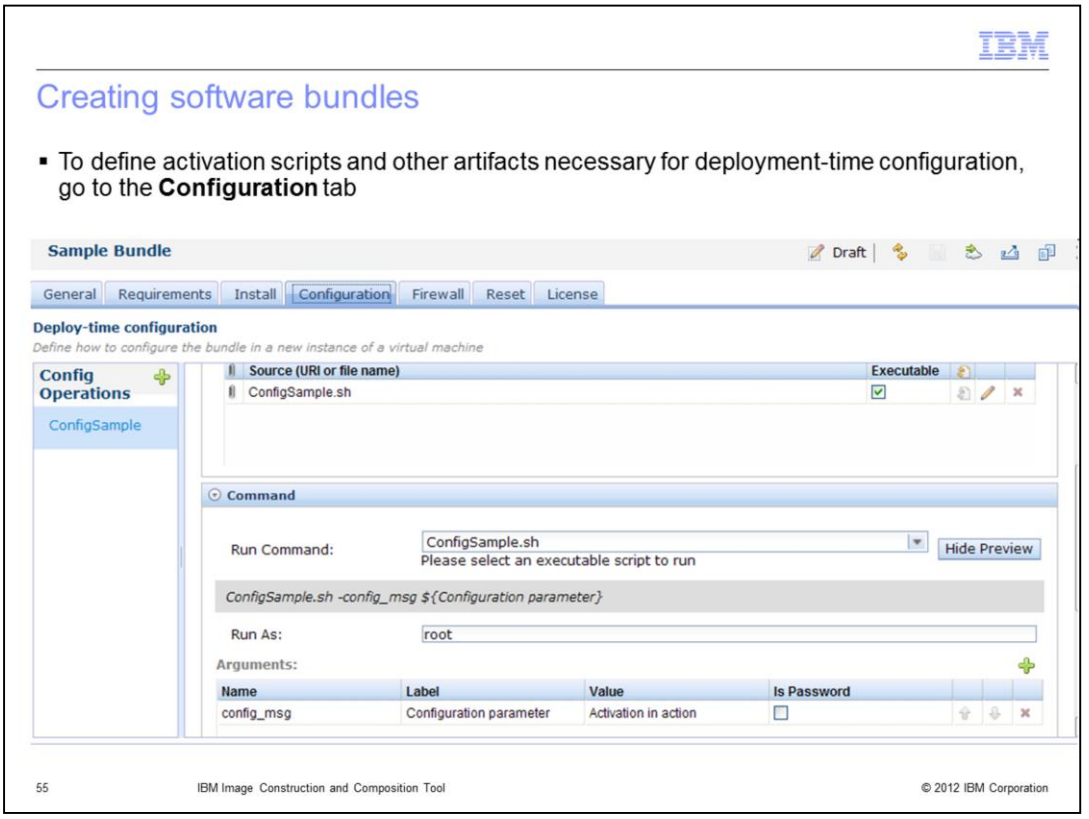


Click the plus sign to add requirements for operating systems, software, or bundles. You can leave fields empty if there are no specific requirements. Complete the Required Software section to specify the software requirements for your software bundle. You can enter the name of the software and the version. Complete the Required Bundles section to specify the bundles required for the installation.

The tool checks the supported operating systems against the operating system in the base image selected by the image builder. The tool checks the software prerequisite information against other software bundles selected for or installed in the image. To use software prerequisites, ensure that the name provided for the **Name** field matches the name of the software.



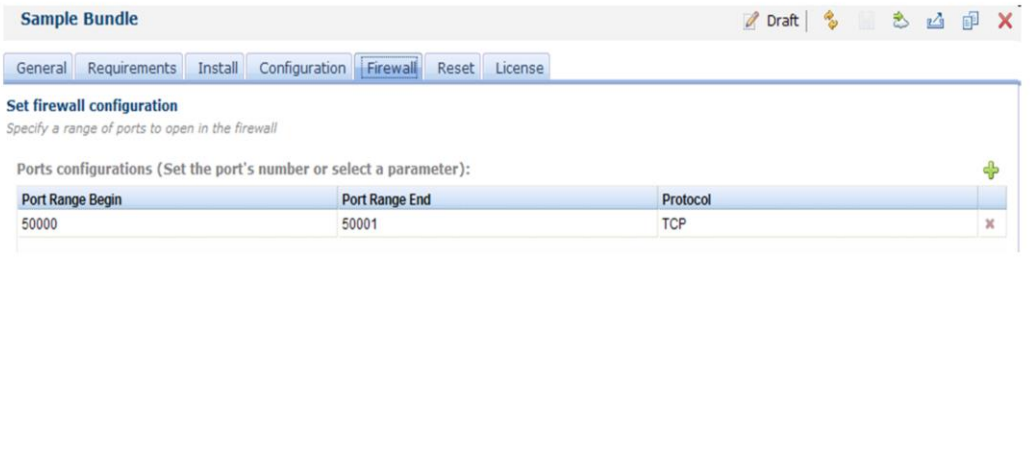
Specify how to install the software content on the Install tab by indicating the files to copy and commands to run.



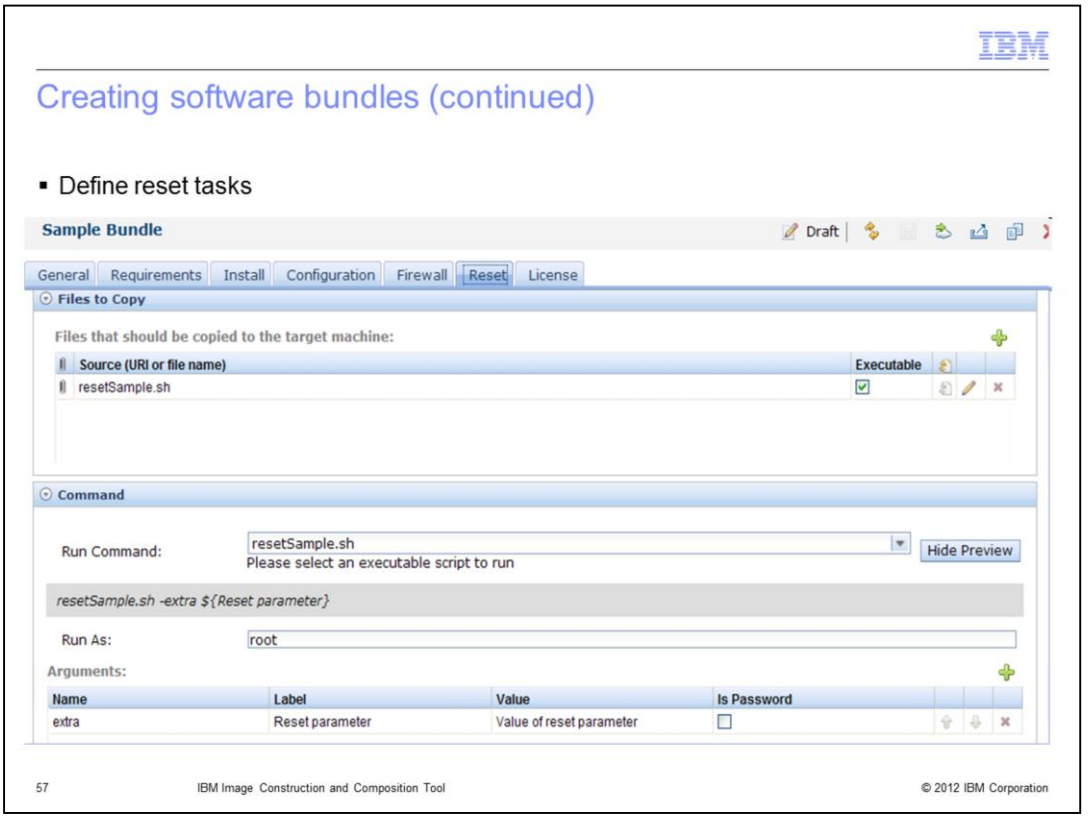
To define activation scripts and other artifacts necessary for deployment-time configuration, go to the Configuration tab.

Creating software bundles (continued)

- On the **Firewall** tab, specify port numbers that need to be open



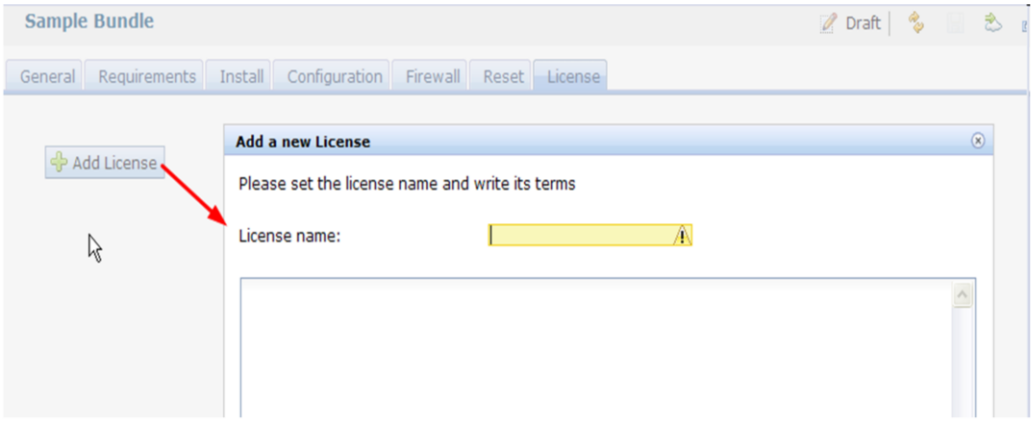
On the Firewall tab, specify port numbers that need to be open.



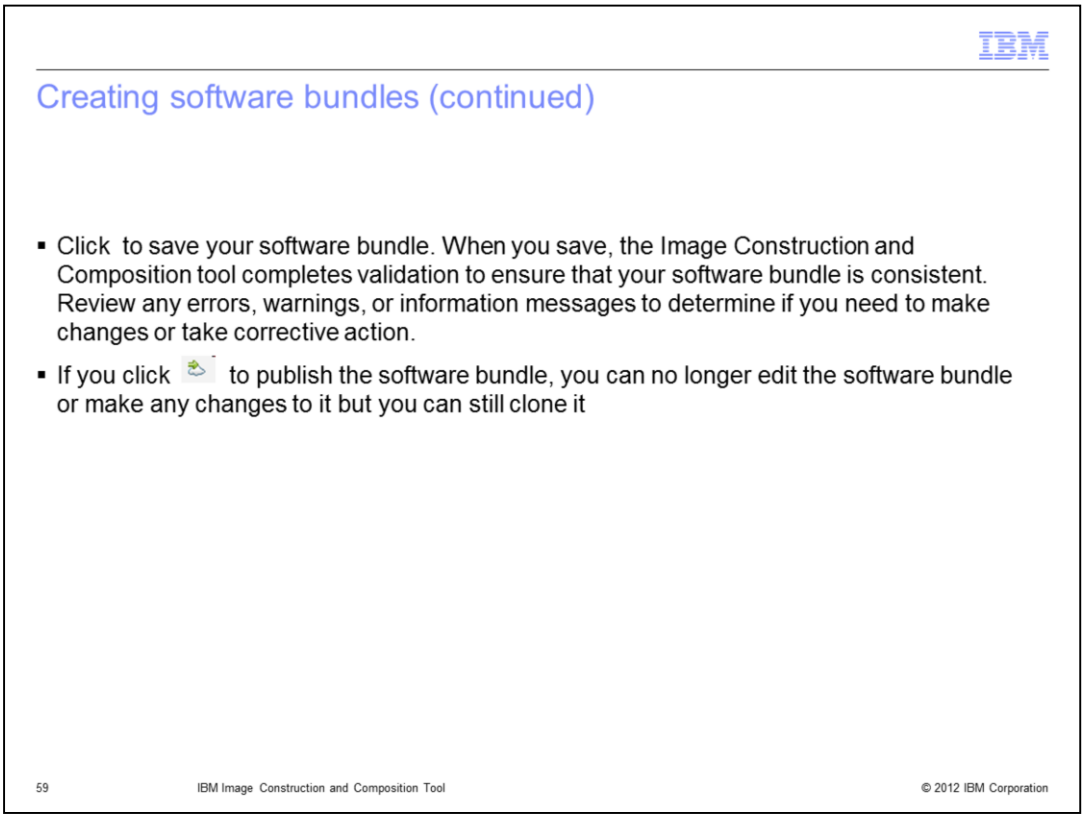
On the Reset tab, define tasks to clean up any files you do not want in the final image.

Creating software bundles (continued)

- Add a license to the software bundle



On the license tab, you can add a license for the software bundle.



Click to save your software bundle. When you save, the Image Construction and Composition tool completes validation to ensure that your software bundle is consistent. Review any errors, warnings, or information messages to determine if you need to make changes or take corrective action.

If you click the cloud icon to publish the software bundle, you can no longer edit the software bundle or make any changes to it but you can still clone it.

There are two locations to download Image Construction Tool logs. One place is the “Download logs” hyperlink in the virtual system section of the image.

Or you can get the same logs by clicking on Administer**,** then Download logs**. Extract** the file, and navigate to drouter\ramdisk2\mnt\raid-volume\raid0\logs\error. Open error.log in an editor and search for the approximate date and time of the failure. Installation logs are located at /var/ibm/InstallationManager/logs.

Trademarks, disclaimer, and copyright information