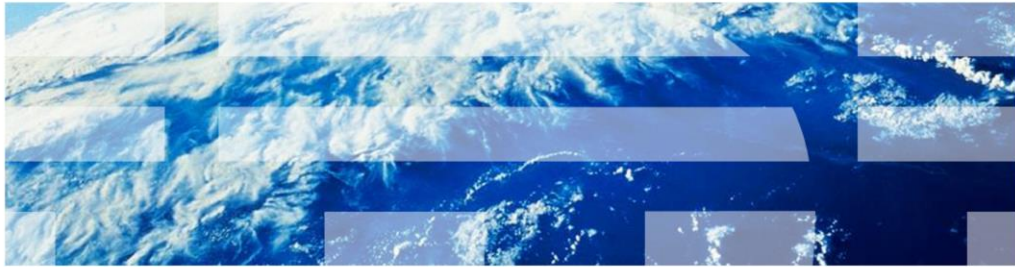


IBM Workload Deployer

Product Architecture



This presentation provides an overview of the architecture of the IBM Workload Deployer product.

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- Appliance architecture

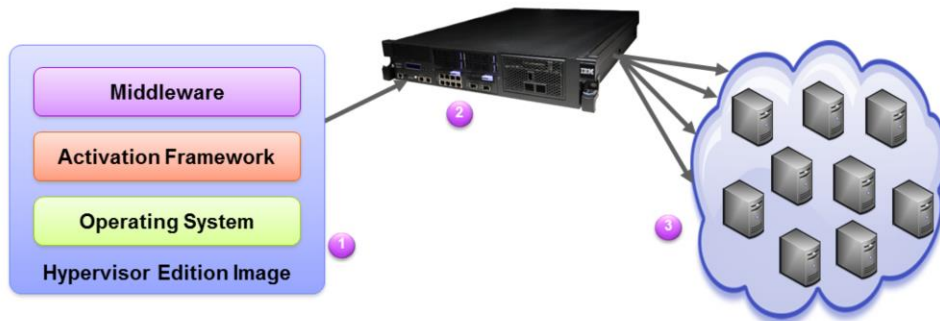
This presentation starts with an overview of the appliance components and then provides more details about the appliance architecture.

Overview

This section of the presentation provides an overview of the components that make up the IBM Workload Deployer appliance and the cloud computing environment that the appliance manages.

Components of the cloud computing environment

- **Hypervisor Edition virtual images** provide core components for building virtual systems
- **IBM Workload Deployer** hosts virtual images in its catalog and dispenses them to your private cloud
- **Private cloud**, hosting virtual systems managed by IBM Workload Deployer



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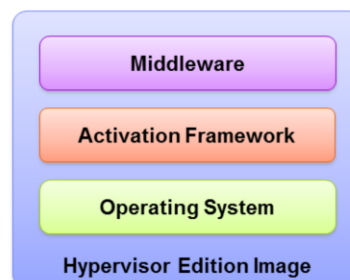
Product Architecture

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The cloud computing environment is made up of three pieces: the Hypervisor Edition virtual images, the IBM Workload Deployer appliance itself, and the hardware and software resources that make up your private cloud. The Hypervisor Edition images, provided by IBM, are packaged as virtual images. They include all of the components needed to build virtual systems – the operating system, the middleware binaries, and an activation framework which customizes the images after deployment. The IBM Workload Deployer appliance stores these virtual images in its internal catalog and uses them to provide a framework for creating virtual systems inside the private cloud. The cloud itself is made up of the resources that host your virtualized environments, including physical systems, storage, and network resources, like IP addresses. You can think of this configuration as a “bring your own cloud” environment – you provide the hardware components that make up the cloud, and the IBM Workload Deployer appliance offers a centralized mechanism to partition and manage virtual systems within that cloud.

Hypervisor Edition images

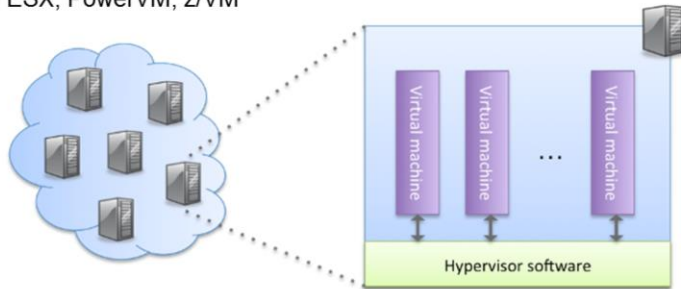
- IBM middleware shipped as an OVF virtual image, ready to run on a hypervisor
- The following products are available:
 - WebSphere Application Server
 - WebSphere Process Server
 - WebSphere Portal Server
 - DB2
 - WebSphere Message Broker
 - WebSphere Business Monitor
 - WebSphere Message Queue
- Products support various combinations of:
 - VMware ESX, z/VM, PowerVM hypervisors
 - Red Hat Enterprise Linux, SUSE Linux, AIX
- Maintenance, support, and fixes through IBM for both middleware and operating system
 - New images include most recent GA components of IBM middleware, and OS patches
 - Fixes also available through Fix Central



Hypervisor Edition images are specifically designed to run in a virtualized cloud environment. The middleware products available as Hypervisor Edition virtual images are packaged as pre-installed and configured virtual images using the open virtualization format, or OVF. Images are currently available for WebSphere Application Server, WebSphere Process Server, WebSphere Portal Server, DB2, WebSphere Message Broker, WebSphere Business Monitor and WebSphere Message Queue. Each image contains all of the components that are needed to build a fully functional virtual system, including the underlying operating system, middleware binaries, and activation framework. Virtual images are built to run on specific platforms. Products support various combinations of VMware ESX, z/VM and PowerVM hypervisors with the various operating systems shown. For example, the WebSphere Application Server Hypervisor Edition V7 virtual images for VMware ESX hypervisors are built on the SUSE Enterprise Linux operating system as both 32-bit and 64-bit images. The application server for the VMware ESX image in both cases, however, is 32-bit. For z/VM and PowerVM the application server that is included in the WebSphere Application Server Hypervisor Edition V7 virtual image, is 64-bit, along with the operating system which is also 64-bit. Inside each image, several different parts are defined. These virtual image parts represent the topology components that the image supports, and you use them to define the virtual system patterns that you want to be able to deploy from your appliance. For example, the WebSphere Application Server virtual images include parts for a deployment manager, custom node, stand-alone application server, an HTTP server and support for advanced flexible management topologies that include a job manager and an administrative agent.

Cloud resources

- The cloud is made up of the hardware, software, and network resources that host deployed virtual systems
- Cloud resources exist outside the appliance, but must be defined in the appliance configuration
 - **IP group:** a collection of IP addresses that are available for virtual systems to use
 - **Hypervisor:** a system running virtualization software, allowing multiple operating system virtual machines to access underlying hardware
 - Examples: VMware ESX, PowerVM, z/VM
 - **Cloud group:** a group of related hypervisors, used as a target for deployment



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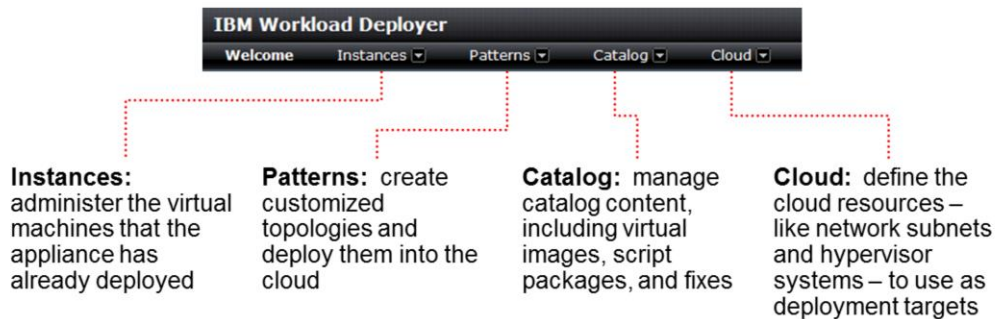
Product Architecture

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The cloud is made up of the hardware, software, and network resources that house your deployed virtual systems. Cloud resources exist outside the scope of the appliance and need to be defined in the appliance configuration. Within IBM Workload Deployer, there are three types of cloud resources: IP groups, hypervisors, and cloud groups. An IP group is a collection of IP addresses that are available for virtual systems to use. A hypervisor is a system running virtualization software that allows multiple operating system virtual machines to access the underlying hardware. Think of a hypervisor as an abstraction layer that allows the operating system and physical hardware to work together. Examples of hypervisors that are supported by IBM Workload Deployer are VMware ESX, PowerVM and z/VM. A cloud group is a collection of related hypervisors. When deploying patterns to create virtual systems, you use a cloud group as the deployment target.

Workload Deployer appliance

- IBM Workload Deployer is a physical appliance that is designed to deploy and manage virtualized middleware environments
- Administrative capabilities of the appliance are available for:



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Product Architecture

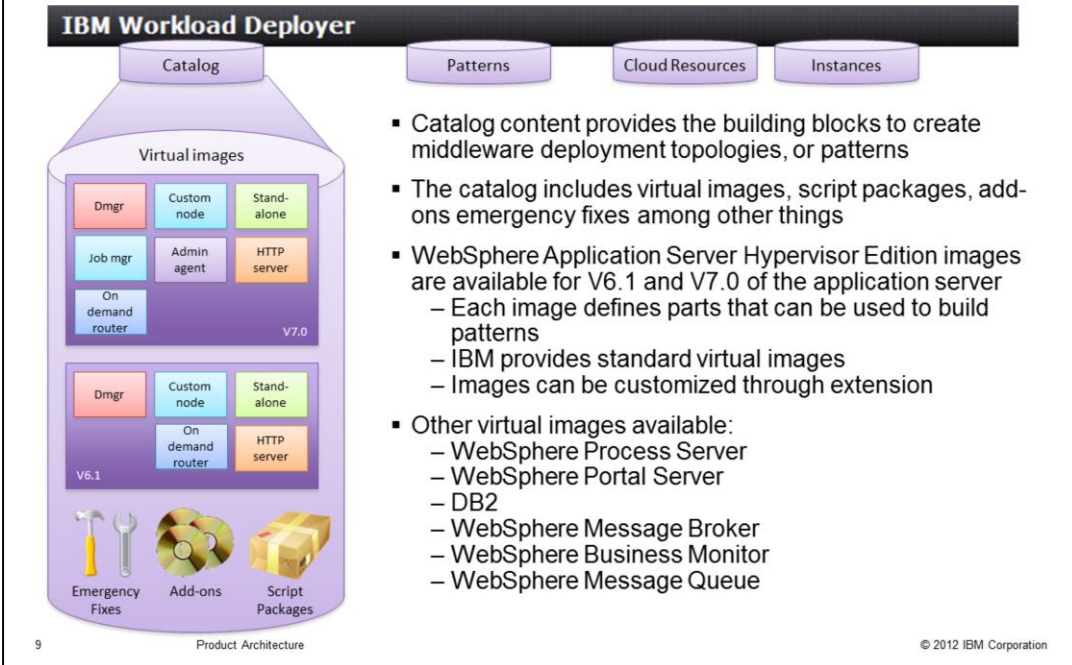
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The Workload Deployer product is a physical appliance that is designed to deploy and manage virtualized middleware environments. The administrative capabilities of the appliance are split into sections, four of which are shown here in the administrative console: instances, patterns, catalog and cloud. The instances area allows an administrator to work with virtual machines that the appliance has already deployed. Using patterns, you can create customized middleware topologies and deploy them into the cloud. The appliance catalog is where you store the content used to create and customize your virtual systems, including virtual images – like the WebSphere Application Server Hypervisor Edition images, script packages, and virtual system fixes. The cloud area of the console allows you to define the cloud resources in your network, like hypervisor systems and network subnets. These are the components that you use as deployment targets when you deploy patterns to create virtual systems.

Appliance architecture

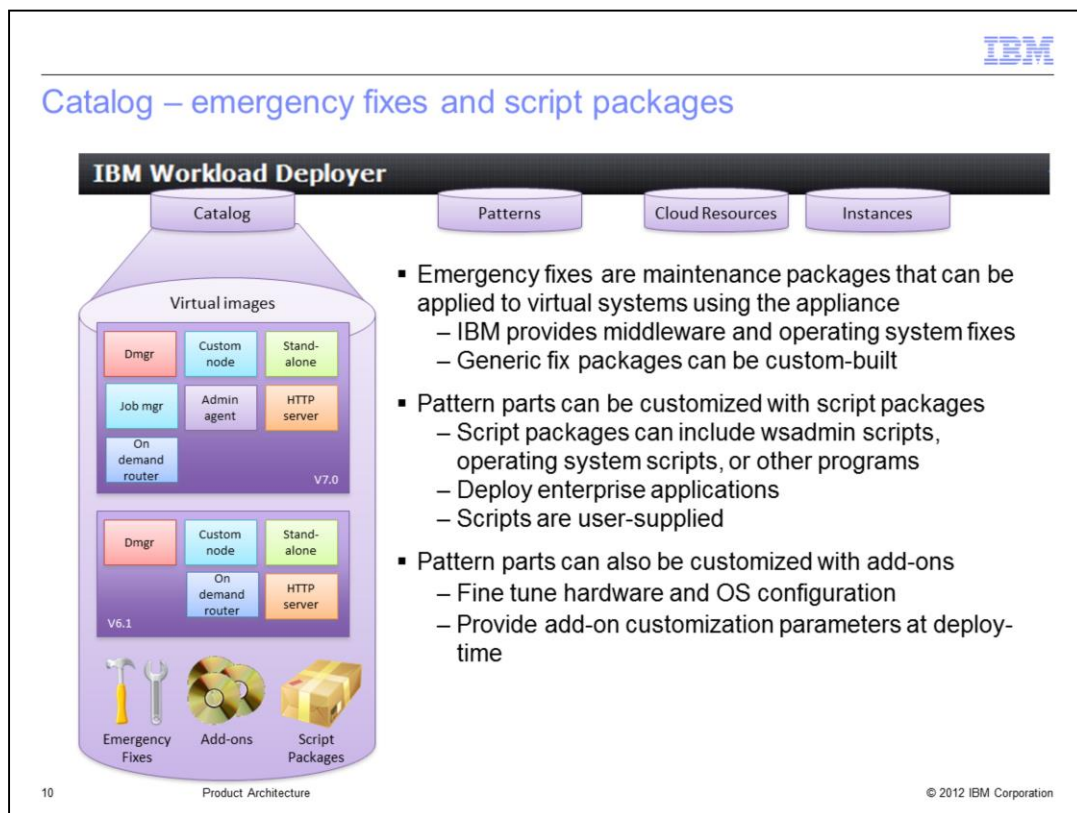
This section of the presentation focuses on the components that make up the IBM Workload Deployer, including the appliance catalog, patterns, cloud resource definitions, and virtual systems.

Catalog – virtual images



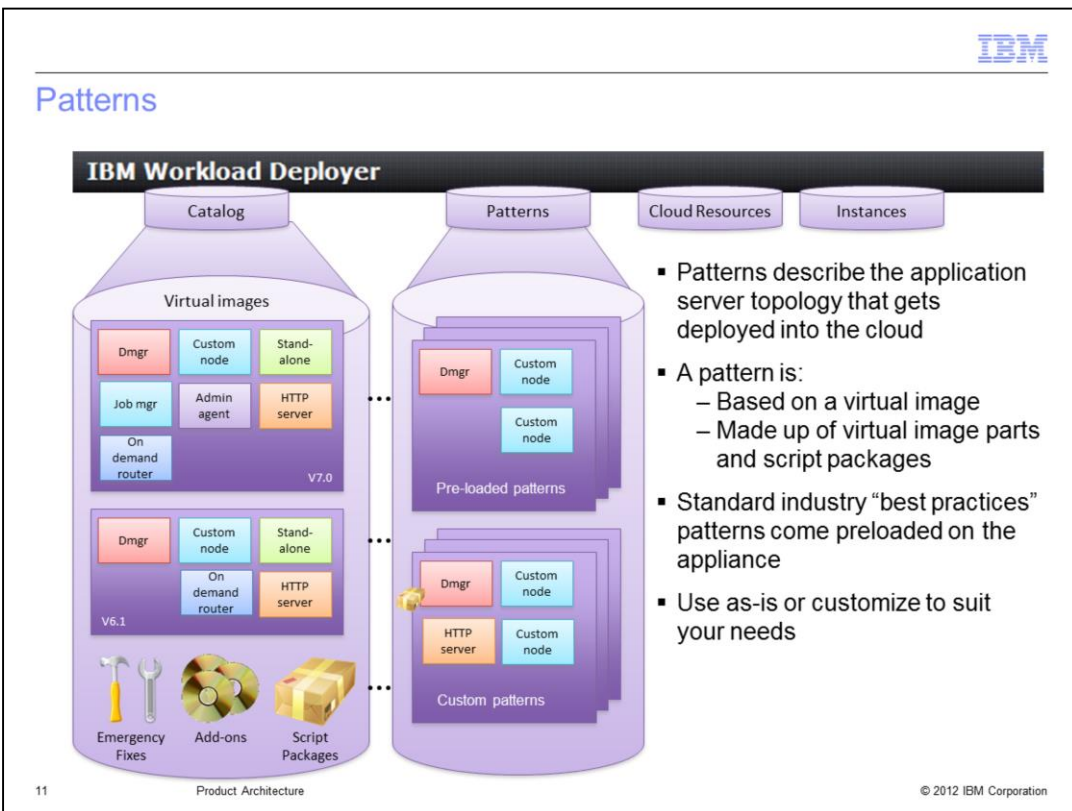
The appliance catalog stores content that allows you to create deployment topologies. This includes virtual images, emergency fixes, script packages and add-ons. These items are used as building blocks to create and customize your middleware deployment topologies, using patterns. This shows the WebSphere Application Server Hypervisor Edition image as an example. There are WebSphere Application Server Hypervisor Edition virtual images available for V6.1 and V7.0 of the application server. Each image defines parts, like a deployment manager, custom node, or stand-alone application server that can be used to build patterns. The images themselves contain the operating system, application server binaries, profile information, and the HTTP server. You can also customize these images – by including your own custom files or installing additional software – and store them on your appliance to use as a base for future deployments. That customization process is called image extension. The next slide describes emergency fixes and script packages.

Catalog – emergency fixes and script packages



Emergency fixes are maintenance packages that can be applied to virtual systems using the appliance. IBM provides emergency fix packages for both the middleware and the underlying operating system that make up the virtual images. If you need to run a custom maintenance package, you can create your own generic fix packages and use the appliance maintenance mechanism to apply those fixes to your virtual systems. Script packages are used to customize your deployment patterns. They can include WSAAdmin scripts, Operating System scripts, or any other programs that you want to run on your virtual system. A common use case for script packages is to deploy enterprise applications in your environment. IBM provides some sample script packages, but the majority of scripts are user-supplied. Add-ons can also be used to customize your deployment patterns. Add-ons are specialized scripts that customize virtual machine configuration. Add-ons provide fine tuning for hardware and operating system configuration.

Patterns

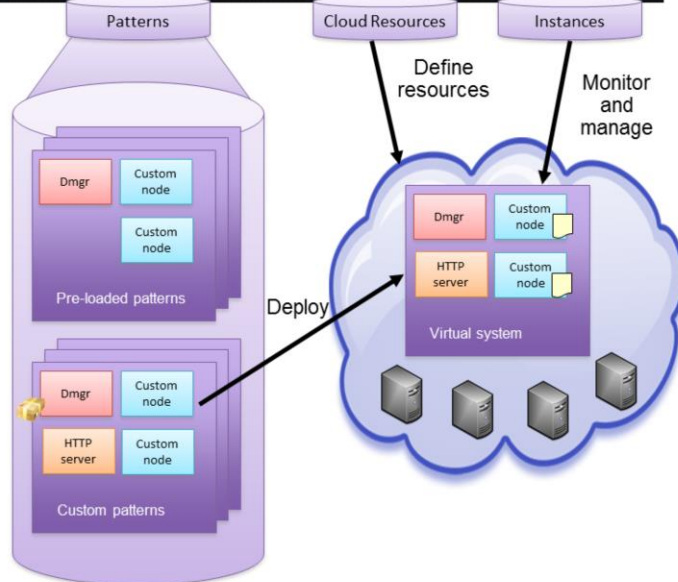


The content from the catalog is used to create the patterns that describe the application server topologies that you want to deploy into your cloud. A pattern is based on a virtual image and is made up of a group of virtual image parts. Parts are defined in the virtual image, so different image parts are available for a pattern, depending on the type of image being used. Typical image parts for WebSphere Application Server are a deployment manager, custom node, or stand-alone application server. After virtual image parts have been added to a pattern, these parts can be customized using script packages. The appliance comes with several pre-loaded patterns that represent standard industry best practices, such as clustering. You can use these patterns as-is, customize them to suit your needs, or build your own patterns from scratch. The diagram on this page shows two patterns. The top pattern is one of the pre-loaded patterns, typically used for doing testing in a clustered environment; it contains one deployment manager that manages two custom nodes. The bottom pattern is a custom pattern. In addition to the small cluster, this pattern contains an HTTP server and a script package associated with the deployment manager.

Cloud

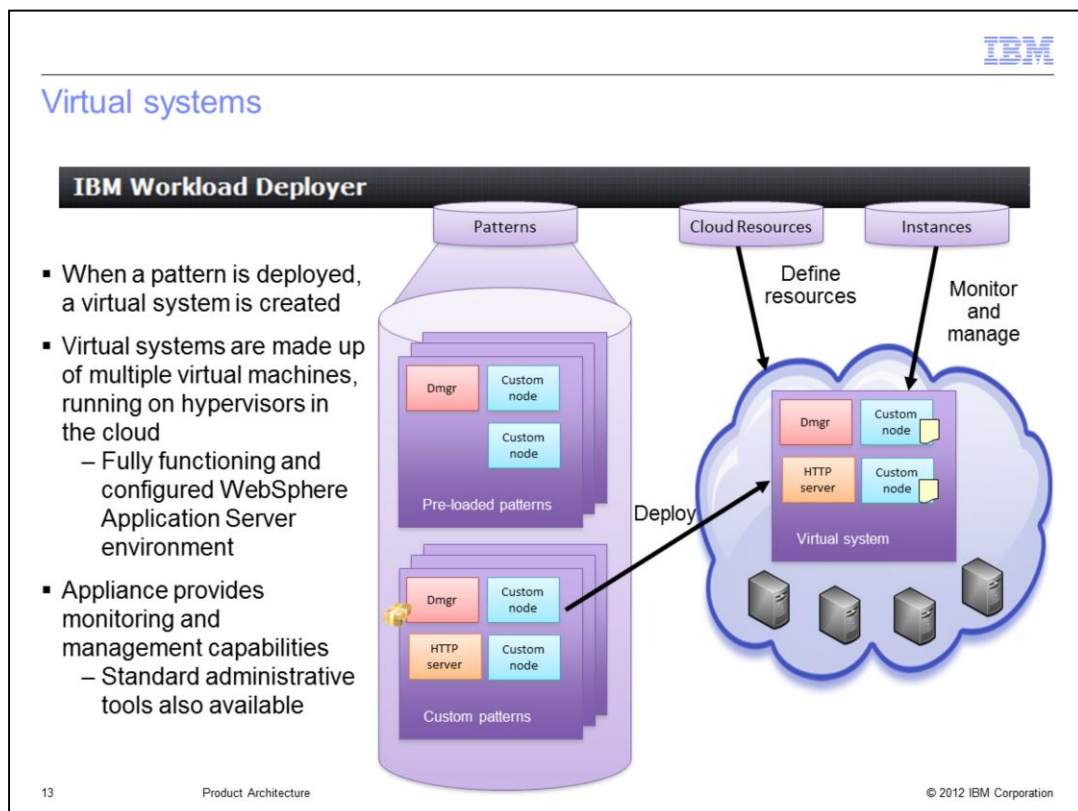
IBM Workload Deployer

- Cloud resources exist outside of the appliance
 - Network, hypervisors, storage
 - Cloud components must be configured before using with IBM Workload Deployer
- Define IP groups, hypervisors, cloud groups in the appliance configuration
- Pattern deployment is targeted to a cloud group



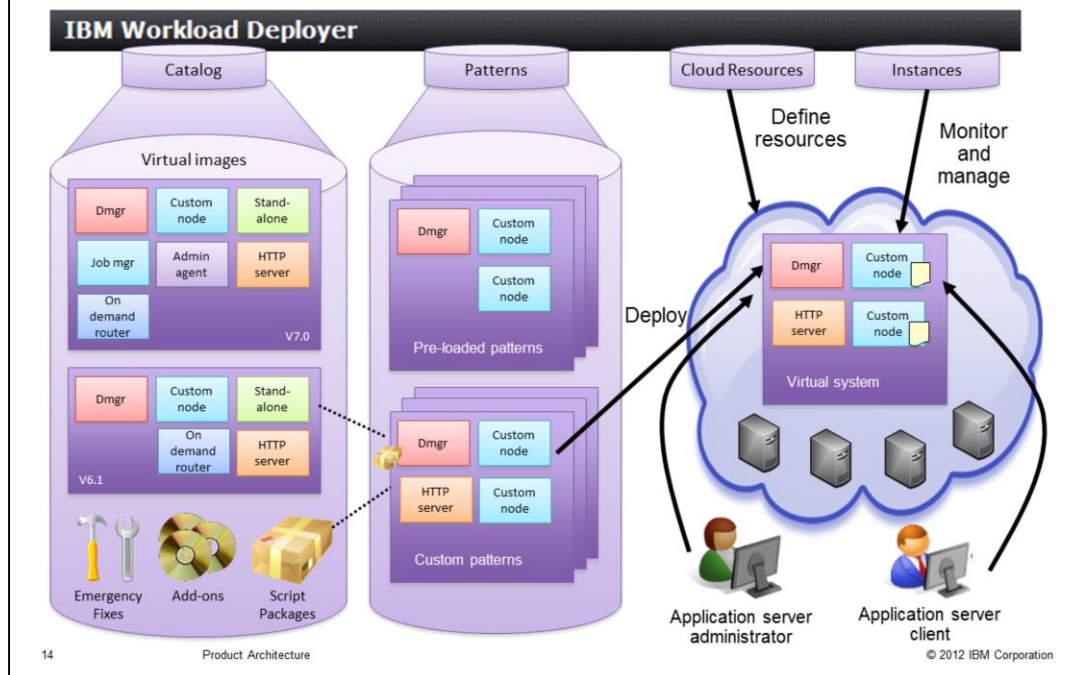
Cloud resources – like hypervisors, network resources, IP addresses, and storage – exist outside of the appliance, but they need to be defined within the appliance configuration. There are three cloud components that you need to define: IP groups, hypervisors, and cloud groups. A cloud group is a collection of hypervisors. The cloud group needs to be associated with an IP group – a pool of available IP addresses that can be assigned to virtual systems – before you can deploy any patterns to it. When deploying a pattern, you choose a cloud group as a target for the deployment. Then, the appliance automatically places the virtual systems on appropriate hypervisors within that cloud group, assigning IP addresses from the associated IP group to the virtual systems being created.

Virtual systems



When a pattern is deployed a virtual system is created. Virtual systems are made up of multiple virtual machines, running on hypervisors in the cloud. The virtual system represents a fully functioning and configured WebSphere Application Server environment. The example on this page shows deployment of a custom pattern, made up of a deployment manager with a script package, two custom nodes, and an HTTP server instance. When deployed, all of those virtual image parts are instantiated into virtual machines. The HTTP server is configured to intercept traffic coming in to the deployment manager, and the two custom nodes are federated into the deployment manager's cell. After the virtual machines have been created, the deployment manager runs its associated script package. In this case, the script deployed applications to the nodes in the cluster. The appliance provides monitoring and management capabilities for deployed virtual systems, or you can use standard administrative tools for WebSphere Application Server, like the administrative console.

Full deployment model



This page provides a recap of the overall IBM Workload Deployer deployment model. The virtual images and script packages in the catalog provide the building blocks for creating customized patterns. In this example, a custom pattern is created using a small cell topology with a script package designed to deploy applications. Before the pattern can be deployed, cloud resources – like hypervisors and IP addresses – need to be defined in the appliance configuration. During pattern deployment, a virtual system is created, made up of multiple virtual machines that mirror the application server topology described in the pattern. The virtual system is an installed and fully configured WebSphere Application Server environment. While the appliance provides some capabilities to monitor and manage the application server, you can also use traditional methods to interact with your application server environment – like an application client for deployed applications or the administrative console to manage the deployed environment.

Summary

This section provides a summary of the presentation.

Summary

- The cloud computing environment consists of:
 - WebSphere Application Server Hypervisor Edition images
 - IBM Workload Deployer appliance
 - Cloud resources, including hardware, software, network
- IBM Workload Deployer components are:
 - Catalog: virtual images, emergency fixes, script packages
 - Patterns: describe application server topology
 - Cloud: points to resources as deployment targets
 - Virtual systems: application server environments running in the cloud

The cloud computing environment is made up of virtual images, the IBM Workload Deployer appliance, and cloud resources. Middleware Hypervisor Edition images and IBM Workload Deployer are provided by IBM. Cloud resources consist of the hardware, software, and network resources you want to use to host your virtualized application server environments. There are four major components to the appliance: catalog, patterns, cloud, and virtual systems. The catalog contains virtual images, emergency fixes, and script packages that are used to build patterns. Patterns describe the application server topologies that you want to partition into your cloud. Cloud resources need to be defined in your appliance configuration before you can deploy patterns. When a pattern is deployed, a virtual system corresponding to that pattern's application server topology is created in the cloud.

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