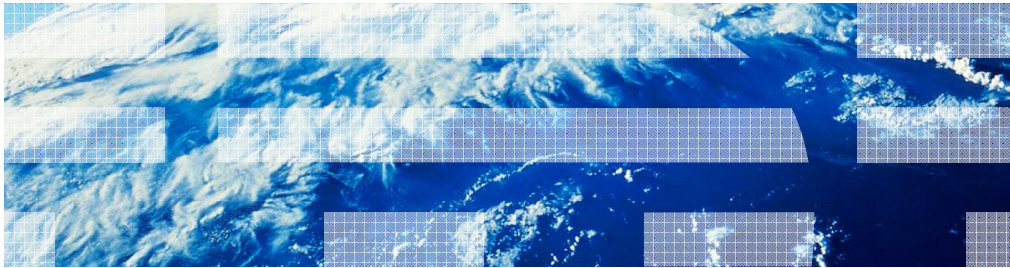IBM

IBM WebSphere Application Server V7

Product overview

This presentation provides an overview of the new features in WebSphere Application Server V7.

Agenda

- Offerings and platform support
- Standards support and programming models
  - Java EE 5.0
  - Web services
  - Portlet support
- Systems management
- Security
- Other enhancements
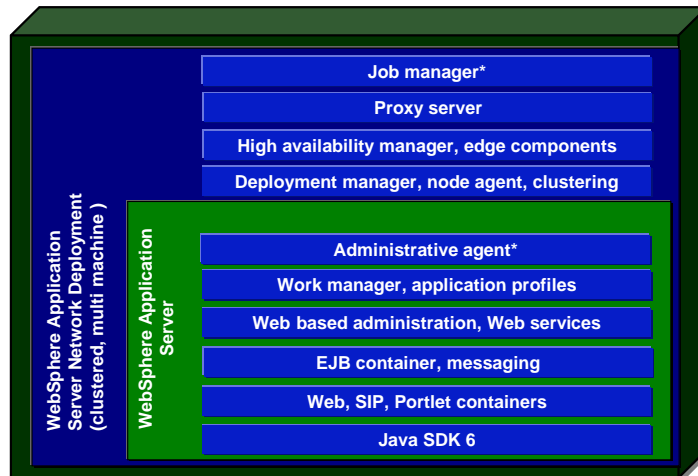- Development tools

Product overview

First, a brief discussion of product offerings and supported platforms is provided. An introduction to the main new features of WebSphere Application Server V7 will follow, including support for industry standards, systems management, security, and other notable enhancements. Finally, a short introduction to the preferred development tool for this release, Rational Application Developer for WebSphere V7.5 is provided.

Section

Offerings and platform support

Product overview

This section covers product offerings and supported platforms.

Product offerings

- Offerings remain similar to V6 offerings

WebSphere Application Server Network Deployment (clustered, multi machine)

WebSphere Application Server

Job manager*

Proxy server

High availability manager, edge components

Deployment manager, node agent, clustering

Administrative agent*

Work manager, application profiles

Web based administration, Web services

EJB container, messaging

Web, SIP, Portlet containers

Java SDK 6

Plus…..

Application client

Thin client libraries*

IBM HTTP Server

Web server plug-ins

Install tools

App development tools

IBM Support Assistant

* = new in V7

The product offerings in V7 remain similar to the offerings from V6. WebSphere Application Server and WebSphere Application Server Express support the full Java EE 5 programming model, and enable you to create individual application servers, without support for building clustered environments. WebSphere Application Server Network Deployment gives you the ability to build a cell, managed by a deployment manager, which supports clustering multiple servers for improved availability and performance. WebSphere Application Server for z/OS provides the capabilities of the Network Deployment offering, while also taking advantage of the z/OS platform's security and quality-of-service facilities.

Several new components have been added to these offerings in V7. The administrative agent is a new process that enables you to manage multiple individual application servers on a single host, without creating a cell. This feature is available with all offerings. The Network Deployment offering introduces a new component called the job manager, which can manage servers on a network of machines asynchronously by sending administrative tasks to the previously described administrative agents. Both the administrative agent and job manager are components of a feature known as "flexible management," as described in more detail later in this presentation.

Platform support

- Supported platforms:
  - AIX 5L 5.3 (ppc32, ppc64)
  - Linux (ia32, x64, System z)
    - Red Hat Linux Enterprise 4.0 or 5.0
    - SuSE Linux Enterprise Server 9 or 10
  - Windows Server 2003 (ia32, x64)
  - Solaris 9 or 10 (Sparc, 32- or 64-bit)
  - HP-UX 11iv2 or 11iv3 (PA-RISC, IA-64)
  - z/OS 1.8 or later(31- or 64-bit)
  - i5/OS 5.4 or later (32- or 64-bit)

The platforms supported by WebSphere Application Server V7 are shown here. Several of the platforms listed require that you apply recent operating system maintenance. Consult the WebSphere Application Server support Web site for more detailed requirements. The support Web site also lists supported levels of other software, including databases and Web servers.

Section

Standards support and programming models

Product overview

This section covers supported standards and programming models.

Standards

- Updated standards supported in this release
  - Java EE 5
  - Java SE 6
  - web services standards and profiles
  - New SIP RFCs
  - Java Portlets (JSR 286)

Product overview

As with previous releases, WebSphere Application Server V7 supports many of the latest industry standards. This is the first release of WebSphere Application Server based on Java SE 6, with support for Java EE 5. Many new web services standards are supported, including JAX-WS 2.1 and updated specifications from the WS-I, W3C, and OASIS standards groups. SIP support has been enhanced to support new methods and headers, as defined by the latest RFCs. V7 also introduces support for JSR 286, the latest revision of the Java Portlet specification.

Goals of Java EE 5

- Make the simple things easy, while keeping the complex things possible

- Simplify development and usage
  - Avoid invasiveness
  - Utilize context appropriate defaults
    - Only require actions when the default needs to be overridden

- Enable Java SE developers to quickly learn Java EE and develop enterprise applications

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The main goal of the Java EE 5 specification is to simplify the enterprise Java programming model, making it more accessible to anyone with Java development skills. The new programming model provides intelligent default values to reduce the amount of work required in the most common scenarios, and always allows you to override those values when necessary. A common saying about Java EE 5 is that it makes the simple things easy while keeping the complex things possible.

Java EE 5 overview

- Latest specifications
  - EJB 3.0, JPA, JAX-WS 2.0, JSP 2.1, Servlet 2.5, JSF 1.2
- Improved developer experience
  - Uses the concept of progressive disclosure
  - Java annotations and injection support reduce complexity
  - Enterprise beans are developed as Plain Old Java Objects (POJOs)
    - Simple to develop and unit test
  - Java Persistence API (JPA) allows simpler entities to be created using annotated POJO model
- Integration with the latest web services standards

Product overview

Java EE 5 revises all of the core Java EE specifications, including Servlets, Enterprise Java Beans, JavaServer Pages, JavaServer Faces, and the Java API for XML web Services. All of these revised specifications contribute to the overall goal of simplifying the development experience. Intelligent default values enable progressive disclosure of complexity, so that you only need to implement methods that you actually intend to use. A key concept behind this simplification is the use of Java annotations for providing metadata about Java code. The new programming model enables you to develop components like EJBs and web services as plain-old Java objects, while providing metadata directly in your code using annotations, rather than in an XML deployment descriptor. Several previously required deployment descriptors are optional in Java EE 5. Annotations also enable dependency injection, which greatly simplifies calling resources like enterprise beans or Data Sources by eliminating the need to use boilerplate code to look up these resources. The Java Persistence API, a subset of the EJB 3.0 specification, provides a new alternative to Container-Manager Persistence and Entity Beans. JPA is a simple, yet capable and flexible framework for Java object persistence and object-relational mapping.
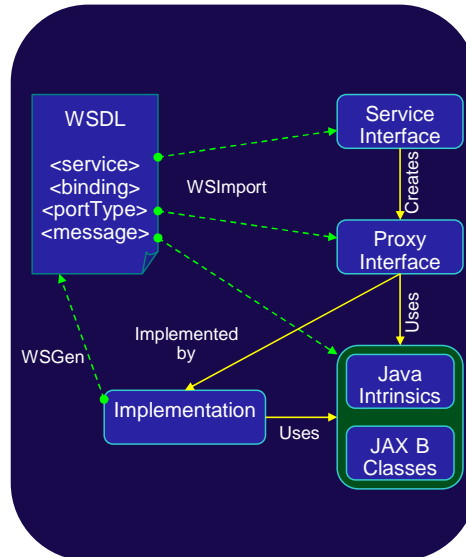
Java SE 6

- Developer productivity
  - Java compiler API – the ability to invoke the compiler from with the JVM
  - Java scripting support – gives scripts the ability to access APIs in the JVM

- Upgrades to existing components
  - JMX – MBean event generation at thresholds

- Added components
  - web services standards: JAX-WS, JAXB, StAX
  - JDBC 4.0

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Version 6 of the Java SE platform provides new APIs, updating support for new versions of industry standards, and incorporates some of the new language features introduced in Java 5 – Like generics and annotations – More broadly across the Java platform. One of the focus areas of technology in version 6 is XML and web services. The SE version of the Java specification includes a full Web services client stack, built around annotations and taking advantage of the Java architecture for XML binding, the Java API for XML-based Web services, and an XML pull parser based on the streaming API for XML. This release also features an updated level of the JDBC specification that focuses on making it simpler to develop applications for accessing relational data sources. Version 6 includes enhanced annotation support, with a new set of APIs for creating dynamic annotation processing tools and more common annotations for building Web services, processing XML, and incorporating metadata into your Java programs. JSR 199 defines a set of interfaces that allows tool vendors to interact with the Java compiler – Call the compiler, interact with the file system, and retrieve error messages – From within Java programs.

JAX-WS

- JAX-WS 2.0
  - Successor to JAX-RPC 1.1
  - Supports multiple data bindings
    - JAX-B - Preferred
    - SAAJ 1.3 (SOAPMessage)
    - XML Source
    - Activation Data Source
  - SOAP 1.1, SOAP 1.2, MTOM
- JAX-WS 2.1
  - WS-Addressing support
  - Included in Java SE 6

WSDL
<service>
<binding>
<portType>
<message>

Service Interface

WSImport

Creates

Proxy Interface

Uses

Implemented by

WSGen

Implementation

Uses

Java Intrinsics

JAX B Classes

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The Java API for XML based web services version 2.0 was designed to be a major improvement over JAX-RPC. The specification describes how to map WSDL elements to and from Java artifacts. The specification supported multiple data bindings, JAX-B 2.0 is the preferred binding provider, but SAAJ 1.3, XML source and activation data source are also options. The JAX-WS specification has been updated to support version 2.1 in WebSphere Application Server version 7. This is included in Java SE 6, and includes better API support for WS-Addressing.

WASv7_Overview.ppt   Page 11 of 35

web services specification updates

- WS-I
  – Basic Profile 1.2, 2.0, Reliable Secure Profile 1.0, Basic Security Profile 1.1
- OASIS
  – WS-ReliableExchange (WS-RM), WS-SecureExchange (WS-Trust/WS-SecureConversation), WS-DistributedManagement (WSDM), WS-Policy
- W3C
  – SOAP 1.2, MTOM, XOP, WS-Security 1.1, WS-Addressing (WSDL)

Product overview

Various web services specifications have also been updated in WebSphere Application Server version 7. Interoperability continues to be of significant importance, with specific updates to the basic profile specifications, the reliable secure profile, and the basic security profile specifications. There is also support for Web services reliable exchange and secure exchange, which allow developers to reliably send service messages over HTTP, and secure those messages. There is also support for WS-Policy, which allows quality of service information to be described in WSDL documents. There have also been updates to related specifications for SOAP, MTOM, WS-Security and WS-Addressing.

Session Initiation Protocol (SIP) enhancements

- SIP session failover supported on z/OS
- Continued focus on lower latency

New standards support	
RFC 3263	Locating SIP servers
RFC 3311	SIP UPDATE method
RFC 3325	Private extensions to SIP for asserted identity in trusted networks
RFC 3891	SIP "replaces" header
RFC 3911	SIP "join" header

As latency is one of the most important factors for a SIP application, measures have been taken to reduce latency across the board. Several new standards are also supported in this release. Including the "update" method, described in RFC 3311 and the "replaces" and "join" headers, as described by RFCs 3891 and 3911.

JSR 286 Portlet specification
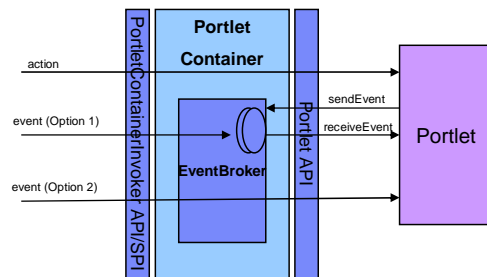
- Change Portlet state based on Portlet events
- Share session attributes with Servlets and JavaServer Pages
- Share render parameters with other Portlets
- Serve resources in the context of the portal

Product overview

JSR 286 allows Portlets to share session data across Web application boundaries. This allows Portlets to gather information from other Portlets outside a specific application. Session data can be scoped to the current user session. JSR 286 also adds two more mechanisms for information exchange in Portlets. Shared navigational state provides portal-managed URL information that is accessible to multiple Portlets. Event-based communication allows Portlets to send and receive events with a publish-subscribe model that is controlled by the portal.

Section

Systems management

This section covers the systems management changes in WebSphere Application Server V7.

Flexible management

- Aims to reduce the overhead of administration
  - Reduce management footprint
  - Consolidate management agents
  - Improve administrative scalability

- Loosely coupled administrative model
  - Nodes are autonomous
  - Central "job manager" queues administrative tasks for execution on individual nodes

- Traditional cell model still available
  - Flexible management is optional

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This release introduces an optional administrative model that enables you to implement a more flexible, scalable, and asynchronous administrative topology. This new loosely-coupled model, called "flexible management", is built around autonomous nodes that maintain local control over their configuration. Servers on a node are locally managed by an "administrative agent" that can host the administrative logic for all servers on a node, reducing their footprint. A central "job manager" process provides a single interface from which you can asynchronously submit administrative tasks to a node or group of nodes. Because it does not rely on tightly-coupled, synchronous communication, flexible management can be advantageous in situations that push the limits of the cell model, including environments with very large numbers of nodes, or topologies that include high-latency, long-distance links. Keep in mind that this new model is an option, and the cell model is still available. Many environments will still find the cell model to be the most appropriate, since it provides many services, like high-availability, that applications might require.
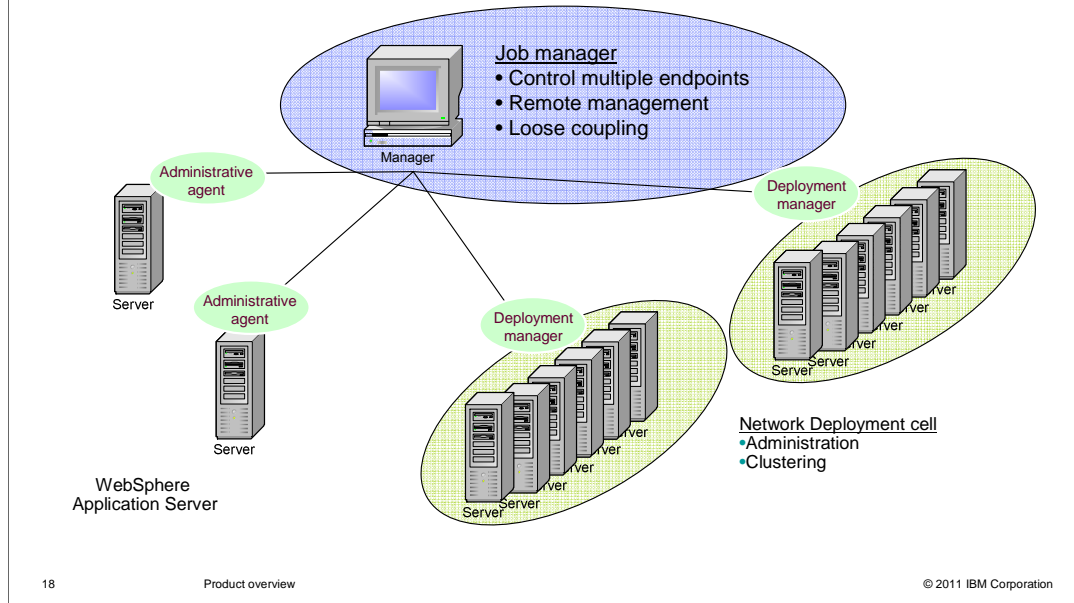
Flexible management components

- Administrative agent
  - Local agent that runs the administrative logic for all servers on a node
  - Runs a local administrative console
- Job manager
  - Submits management jobs to administrative agents on each node
  - Can manage multiple base servers, or multiple Network Deployment cells

　　　　Product overview　　　　　　　　　　　　　　　

Two new Java processes, the administrative agent, and the job manager work together to enable the "flexible management" administrative topology. The administrative agent is responsible for the administrative logic for all servers on a node. By consolidating the management logic for all servers on the node, administrative overhead is reduced, and there is a single point of administration. After a profile has been registered with an administrative agent, the administrative console runs on the administrative agent, and not the application server. An administrative agent can only manage local servers. Multiple nodes can be administered remotely using a job manager. The job manager provides its own console, and enables you to send management jobs to registered servers through the administrative agent. Note that individual nodes retain their autonomy, and can still be managed locally, even when registered with a job manager. A job manager can also send commands to a deployment manager, providing a way to administer multiple Network Deployment cells from a single interface. The administrative agent is available as a part of all WebSphere Application Server packages, while the job manager is only available with the Network Deployment offering.

Flexible management topology

Job manager
• Control multiple endpoints
• Remote management
• Loose coupling

Manager

Administrative agent

Administrative agent

Server

Server

WebSphere
Application Server

Deployment manager

Deployment manager

Server

Server

Server

Server

Network Deployment cell
•Administration
•Clustering

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The job manager communicates with either administrative agents or deployment managers. The flexible management components enable some scenarios, like very large server farms, or a single administrative interface for separate data centers, that are not easy to manage with the traditional cell model.

DataPower administrative integration

- Manage DataPower devices through the administrative tools
  - Administrative console, wsadmin
  - Can manage multiple devices
- Application management functions support integration with DataPower
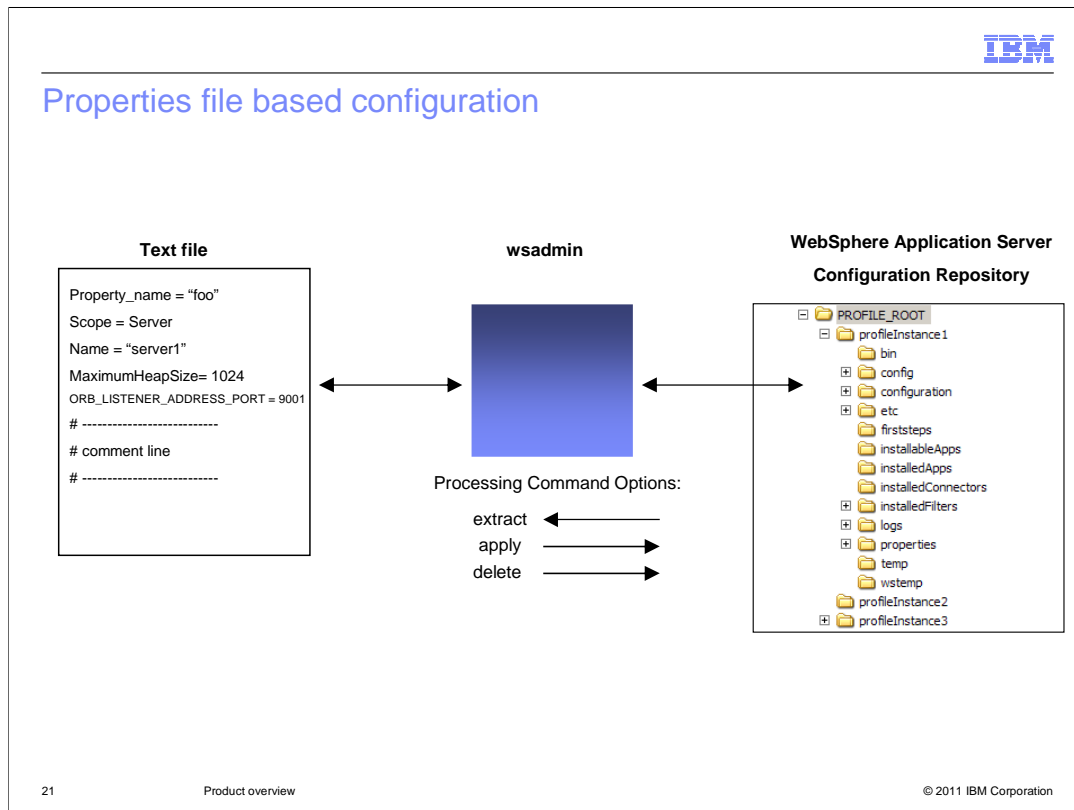 - Such as offloading of WS-Security processing
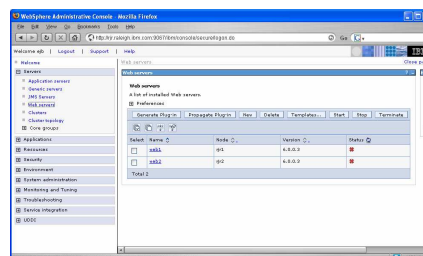
The WebSphere Application Server administrative tools have been updated to enable remote management of DataPower appliances. The administrative console and wsadmin can be used to configure DataPower appliances, update the firmware of an appliance, and configure applications to use the appliances. For example, you can use the administrative tools to offload WS-Security processing to a DataPower appliance.

Business level applications

- Extends the scope of an "application" beyond an EAR file
  - Offers a logical view from the perspective of lines of business
  - May include multiple EARs, JARs, shared libraries, static content and other resources
- Offers management for application life cycle
  - Includes application upgrades and version control

Product overview

While the Java EE specification considers an "application" to be contained within a single EAR file, that might not be the way that some lines of business think about applications. To help understand and manage the relationship between applications, WebSphere Application Server V7 enables you to create logical groups of related applications, known as business-level applications, that you can manage together as a single entity. For example, you might group several artifacts together, such as EAR files, JARs, shared libraries, or other related resources, so that they can be managed as a single entity, after they have been installed individually.

Properties file based configuration

Text file	wsadmin	WebSphere Application Server Configuration Repository

Text file

Property_name = "foo"
Scope = Server
Name = "server1"
MaximumHeapSize= 1024
ORB_LISTENER_ADDRESS_PORT = 9001
# --------------------------
# comment line
# --------------------------

wsadmin

Processing Command Options:

extract

apply

delete

WebSphere Application Server

Configuration Repository

□ 📁 PROFILE_ROOT
　□ 📁 profileInstance1
　　📁 bin
　　⊞ 📁 config
　　⊞ 📁 configuration
　　⊞ 📁 etc
　　📁 firststeps
　　📁 installableApps
　　📁 installedApps
　　📁 installedConnectors
　　⊞ 📁 installedFilters
　　⊞ 📁 logs
　　⊞ 📁 properties
　　📁 temp
　　📁 wstemp
　　📁 profileInstance2
　⊞ 📁 profileInstance3

21   Product overview

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A new utility built into wsadmin can import and export configuration objects to and from a WebSphere Application Server configuration repository using plain-text files that contain key-and-value pairs of properties. While a configuration repository is made up of a hierarchy of files, and not meant to be human-readable, an exported properties file can be edited with any text editor, and then imported back into a server to change the modified properties.

Section

Security

Product overview

This section covers new security-related features in V7.

Fine-grained administrative security

- Support introduced in V6.1

- Extended to the administrative console in V7.0

- User roles can be given a resource scope
  - For example, 'John' is granted the 'Operator' role on 'Cluster 2'

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Fine-grained settings for administrative security were first introduced in WebSphere Application Server V6.1, and were available only when using wsadmin. This capability has been added to the administrative console in V7. In addition to granting users roles, such as 'Operator' or 'Administrator', users can be granted those roles on specific resources, such as servers, clusters, or nodes. Previously, a user's role applied cell-wide.

Multiple security domain support

- Administrative security can use a different realm than applications
- Application security realms can be separated by nodes, node groups, clusters, or servers

Product overview

V7 also adds the ability to configure more than one security domain within a cell. This means that you can use separate security domains (and therefore different user repositories) for securing your administrative tools and applications. You can separate application security realms based on server, cluster, node, or node group boundaries.

Security auditing support

- Audit records show who did what, and when
- Enforce administrative accountability and satisfy legal or corporate requirements
- New 'auditor' role allows viewing of audit records but does not grant administrative rights
- Support for integration with services from other companies

Product overview

Security auditing support has also been added to V7. New audit records keep track of who performed what actions, and at what time. These can be useful for complying with corporate guidelines or legal requirements, and help to enforce administrative accountability. A new security role called 'Auditor' can be granted to a user to allow her to view audit records, while not granting any administrative rights.

Secure proxy server

- Proxy server hardened for DMZ topologies
    - External port usage minimized
    - Loads only digitally-signed jars
    - Runs as unprivileged user while binding to well known ports
    - Optionally allows remote management
    - Static and dynamic routes are supported
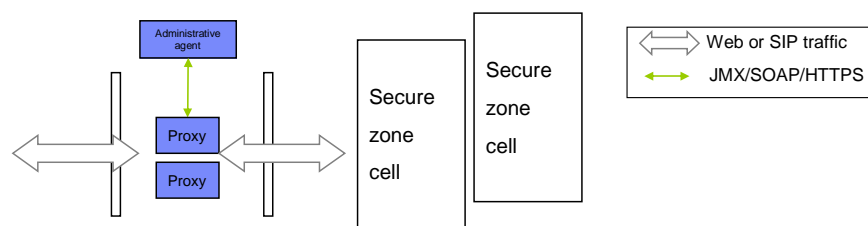
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The secure proxy server is designed for use in DMZ environments. It runs as an unprivileged user, with as few open ports as possible, and loads only trusted JAR files. It has easily configurable security levels, "low", "medium", and "high". The proxy supports remote management and dynamic workload management, though both of these can be disabled to shut down the ports they require. With these features disabled, the only open ports are the ports in use for HTTP or SIP proxying.

Section

Additional enhancements

Product overview

This section covers messaging enhancements and the Centralized Installation Manager.

Messaging enhancements

- Administrative simplification
  - Simplified panels
  - New configuration wizards

- Improved integration with WebSphere MQ V7
  - JCA 1.5 resource adapter

- Message monitoring and control enhancements
  - Link transmission queue management
  - Improved notification and control of delivery failures

- Improved diagnostics and documentation

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Several messaging-related enhancements have been made in V7. Administration of messaging-related artifacts has been simplified in this release, through streamlined panels and new wizards that help guide you through the necessary steps. Applications can now communicate with WebSphere MQ V7 using Java EE-standard activation specifications, by way of a new JCA resource adapter for WebSphere MQ. Additionally, there are new ways to manage link transmission queues and improved administrative tools for dealing with message delivery failures.

Centralized Installation Manager

- Remote product installation
    - Use deployment manager to install on remote hosts
    - No IBM agent required on remote host

- Remote product update
    - Download refresh packs, fix packs, and interim fixes from IBM support web site
        - Directly from the administrative console
    - Apply maintenance to cell members

Product overview

The Centralized Installation Manager introduces support for remote installation functionality in WebSphere Application Server V7. The deployment manager can be used as a central interface for installing WebSphere Application Server to remote hosts and integrating them into a cell. These remote hosts do not require any IBM software to be present before installation, as the installation is performed using operating system tools. In addition to installing WebSphere Application Server, the V7 deployment manager also has the ability to remotely install fix packs, refresh packs, and interim fixes on remote nodes that have been added to the cell. Fixes can be downloaded from IBM directly within the deployment manager's administrative console and remotely installed to member nodes.

Section

Development tools

Product overview

This section introduces the development tools provided with WebSphere Application Server V7.

Rational Application Developer for WebSphere

- Included with WebSphere Application Server V7
  - Rational Application Developer Assembly and Deploy module for WebSphere

- "Assembly and Deploy" content is fully licensed and supported with WebSphere Application Server license

- Remaining content is optionally installable
  - 60-day trial
  - Becomes fully licensed on purchase of Rational Application Developer for WebSphere

Product overview

Rational Application Developer for WebSphere V7.5 is the preferred development tool for WebSphere Application Server V7. It provides many improvements over Rational Application Developer V7, including support for developing Java EE 5 applications and testing them on V7 application servers. A subset of the tool's functionality, called "assembly and deploy" is fully licensed with your purchase of a WebSphere Application Server license. This subset is the rough equivalent of the V6.1 Application Server Toolkit, which it replaces. The remaining content is optionally installable under a sixty-day trial license, and can be converted to a fully licensed copy with the purchase of a Rational Application Developer for WebSphere license.

Package content

- "Assembly and deploy" includes:
  - J2EE 1.4 support
  - Java EE 5 support
  - Java EE 5 XML form-based DD editors
  - WebSphere Application Server V7 support only
  - WebSphere Application Server debug extensions
  - Application deployment to WebSphere Application Server V7
  - SIP tools
- Rational Application Developer for WebSphere includes:
  - Visual editing
  - EJB 3.0 and web services productivity features
  - WebSphere Application Server 6.0 and 6.1 support
  - Adapters: CICS, IMS, SAP, Siebel, JDE, Oracle, PeopleSoft
  - Much more

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The "assembly and deploy" portion of the product contains tools for developing Java EE applications, and testing, debugging, and deploying them on V7 application servers. The full Rational Application Developer for WebSphere product includes more advanced features, such as visualization tools, development tools for WebSphere Adapters, and tools for working with older versions of WebSphere Application Server.

Summary

- WebSphere Application Server V7 focuses on simplifying development and administration
  - Java EE 5.0 lessens the learning curve for Java developers and improves time-to-value
  - Flexible management provides a highly-scalable, loosely-coupled option for administration
  - New security options enable robust and flexible security configurations
  - Centralized Installation Manager enables remote product and maintenance installation

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In summary, WebSphere Application Server V7 contains enhancements throughout the product, many of them focused on simplifying administration and application development. This release introduces Java EE 5 support, which greatly simplifies the programming model for enterprise Java applications. The flexible management components give you the option to build a highly-scalable and loosely-coupled administrative topology as an alternative to the cell model. V7 contains many new security features as well, including multiple domains, fine-grained administrative security, and auditing support. The Centralized Installation Manager lets you install WebSphere Application Server and maintenance to remote nodes, using the Deployment Manager. These and other enhancements combine to provide a better user experience than previous versions, for both developers and administrators.

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