



# WebSphere Application Server

## Day 1. Introduction

Expectations:

What is JEE

What is an Application Server

What is the difference between Application Server and WebServer

Introduction to Websphere Application Server

Basic Architecture of WAS

Various Versions / Evaluation History

# What is JEE

- Short for Java Platform Enterprise Edition. JEE is a platform-independent, Java-centric environment from Sun for developing, building and deploying Web-based enterprise applications online. The J2EE platform consists of a set of services, APIs, and protocols that provide the functionality for developing multitier, Web-based applications.
- Some of the key features and services of JEE:
  - At the client tier, JEE supports pure HTML, as well as Java applets or applications. It relies on Java Server Pages and servlet code to create HTML or other formatted data for the client.
  - Enterprise JavaBeans (EJBs) provide another layer where the platform's logic is stored. An EJB server provides functions such as threading, concurrency, security and memory management. These services are transparent to the author.
  - Java Database Connectivity (JDBC), which is the Java equivalent to ODBC, is the standard interface for Java databases.
  - The Java servlet API enhances consistency for developers without requiring a graphical user interface.

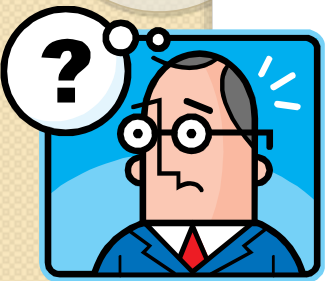
# More on JEE ( What Oracle Says....)

- Java Platform, Enterprise Edition (Java EE) is the industry standard for developing portable, robust, scalable and secure server-side Java applications. Building on the solid foundation of Java SE, Java EE provides component development, web services, management, and communications APIs that make it the industry standard for implementing enterprise class service-oriented architecture (SOA) and Web 2.0 applications.
- Benefits of JEE
  - Developer productivity.
  - Feature rich platform
  - Faster solutions delivery time to market.
  - Freedom of choice
  - Complete web services support.



# What is difference between J2EE and JEE

JEE was just a rebranding when Sun released what is essentially J2EE v1.5.



## Perplexed, Please start from basics.....

"Java" refers to both a language and a platform. The runtime and libraries that comprise the platform are based on the Java language and come in 3 flavors:

Java SE (Standard Edition): Formerly J2SE but renamed to Java Standard Edition when the Java 2 convention was dropped with the release of Java 5 (formerly J2SE 1.5). It contains a good all-around mix of general purpose libraries including JDBC (Java Database Connectivity), JNDI (Java Naming Directory Interface), RMI (Remote Method Invocation), AWT, and Swing.

Java EE (Enterprise Edition): Formerly J2EE. It includes Java Standard Edition plus most of the other Java technologies including Java Mail, Activation, JAXB (Java API for XML Binding), Servlets, JSF (Java Server Faces), JMS (Java Messaging Service), EJB (Enterprise Java Beans), and others. Most of the APIs are very component-oriented and are intended to provide pluggable interfaces for business components to form robust, distributed internet applications.

Java ME (Micro Edition): Formerly J2ME. It includes most of Java SE and some additional APIs for handheld devices.

# What is an Application Server

- A service that handles requests for business operations, and performs business logic. It provides the infrastructure for executing applications that run your business.
- Typically used for complex transaction-based applications. To support high-end needs, an application server has to have built-in redundancy, monitor for high-availability, high-performance distributed application services and support for complex database access
- Acts as middleware between back-end systems and clients. It provides a programming model, an infrastructure framework, and a set of standards for a consistent designed link between them.
- In most cases application servers wrap their business logic under an API layer. That API layer can be access via a common protocol the client supports, or via custom socket communication. There are multiple development platforms that have all these things built-in for the developer. They include platforms like J2EE or .NET

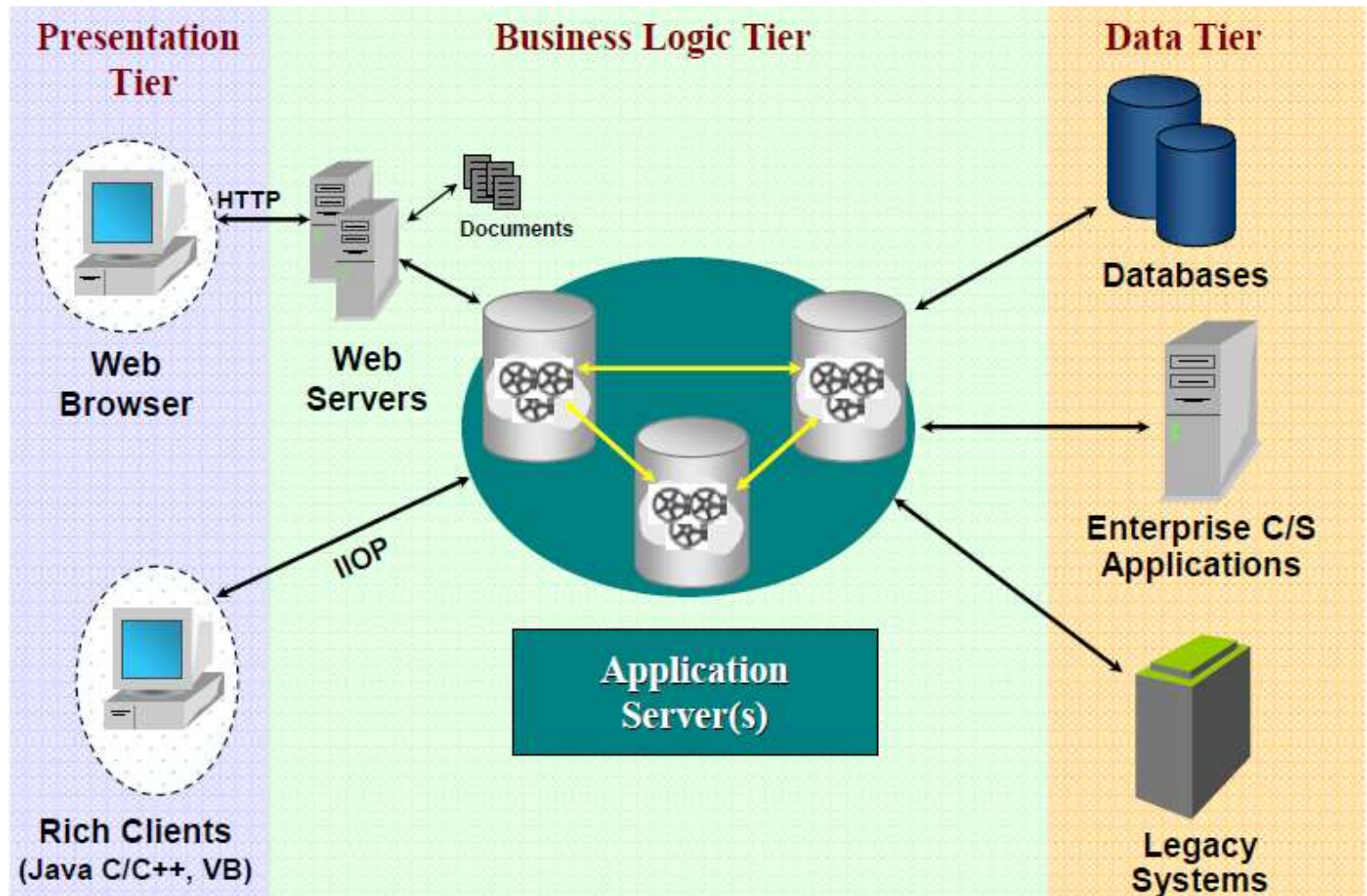
# Lets Compare AppServer and WebServer

	Application Server	Web Server
Purpose	App Server can also serve HTTP Content but is not limited to just HTTP. It can be provided other protocol support such as RMI/RPC	Web Server is mostly designed to serve static content, though most Web Servers have plug-in to support scripting languages like Perl, PHP, ASP, JSP etc. through which these servers can generate dynamic HTTP content
Job:	Application server is used to serve web based applications and enterprise based applications(i.e. servlets, jsps and ejbs). because application server contains web server internally.	Web server is used to serve web based applications.(i.e. servlets and jsps)
Such As:	Sun Java Application server, weblogic server, Apache Geronimo, IBM WebSphere Application Server, Glass Fish Server	Apache, Microsoft IIS, Tomcat, Jetty

As web servers are well suited for static content and app servers for dynamic content, most of the production environments have web server acting as reverse proxy to app server. That means while service a page request, static contents such as images/Static html is served by web server that interprets the request. Using some kind of filtering technique (mostly extension of requested resource) web server identifies dynamic content request and transparently forwards to app server. Example of such configuration is Apache HTTP Server and BEA WebLogic Server. Apache HTTP Server is Web Server and BEA WebLogic is Application Server.

In some cases the servers are tightly integrated such as IIS and .NET Runtime. IIS is web server. when equipped with .NET runtime environment IIS is capable of providing application services

# Architectural Topology







# WebSphere Application Server

Leading software platform for On Demand Business and service-oriented architecture (SOA) for enterprises.

Providing comprehensive leadership, WebSphere is evolving to meet the demands of companies faced with challenging business requirements. This includes the following tasks:

- Increasing operational efficiencies
- Strengthening client loyalty
- Integrating disparate platforms and systems
- Responding with speed to any market opportunity or external threat
- Adapting existing business to change quickly





## To enable customers to achieve their e-business goals, WebSphere is available in three editions:

The **WebSphere Application Server Standard Edition** (also called the Standard Application Server) combines the portability of server-side business applications with the performance and manageability of Java technologies to offer a comprehensive platform for designing Java-based Web applications. It enables powerful interactions with enterprise databases and transaction systems.

The **WebSphere Application Server Advanced Edition** (also called the Advanced Application Server) builds on the Standard Application Server. It introduces server capabilities for applications built to the Enterprise JavaBeans™ Specification from Sun Microsystems and provides some support for integrating the Web applications to other non-Web business systems.

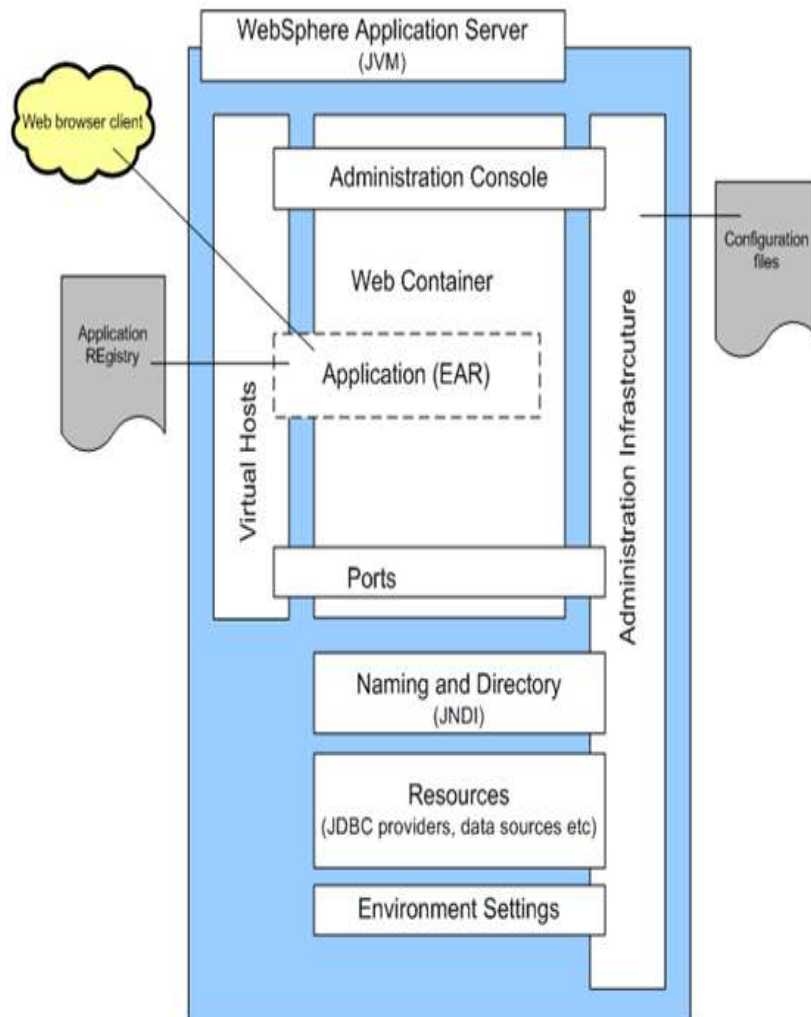
The **WebSphere Application Server Enterprise Edition** (also called the Enterprise Application Server) builds on the Advanced Application Server and also offers a robust solution to grow e-business applications into enterprise environments. It combines TXSeries™, IBM's world-class transactional application environment, with the full distributed object and business-process integration capabilities of Component Broker. The Enterprise Application Server contains a complete version of the Advanced Application Server.

These three editions are available on two UNIX® platforms (IBM AIX® and Sun® Microsystems Solaris™) and Microsoft® Windows NT®. WebSphere Application Server is also available for the OS/390® and AS/400® platforms (Single Edition).

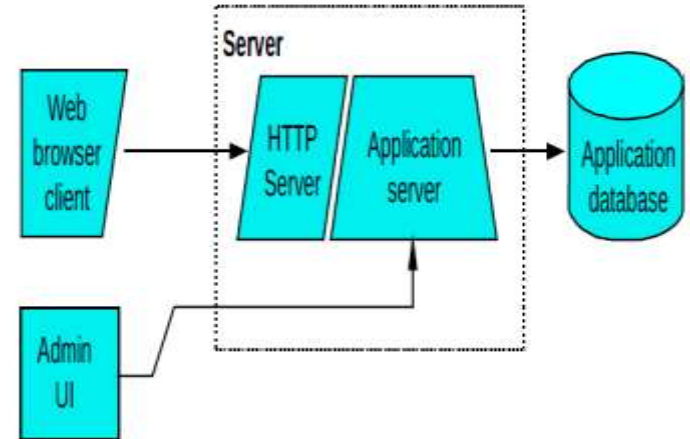
# Short History of WebSphere

- WebSphere started out as HTTP server and became one of the first z/OS products running under the UNIX interfaces
- In 1997, a JVM plug-in was added to run servlets
- Version 4 saw the move to J2EE branding
- Version 5 (2003) of the application server was synchronized with other platforms
- Today, WebSphere is not only a J2EE application server but middleware implementing the concepts of a Service Oriented Architecture, Enterprise Service Bus and Business Process Management

## The Basic Architecture of WebSphere Application Server



## Basic Model for WAS



# Version History

WebSphere version	8.5.5	8.5	8.0	7.0	6.1	6.0	5.1	5.0	4.0	3.5
Release date	14 Jun 2013 <sup>[3]</sup>	15 Jun 2012 <sup>[4]</sup>	17 Jun 2011	17 Oct 2008	30 Jun 2006	31 Dec 2004	16 Jan 2004	03 Jan 2003	15 Aug 2001	31 Aug 2000
End of support					30 Sept 2013 <sup>[5]</sup>	30 Sept 2010	30 Sept 2008	30 Sept 2006	30 April 2005	30 Nov 2003
J2SE/Java SE	7	7 <sup>[6]</sup>	6	6	5	1.4	1.4	1.3	1.3	1.2
JavaEE	6	6	6	5	1.4	1.4	1.3	1.3	1.2	1.2 (not fully compliant)
Servlet	3.0	3.0	3.0	2.5	2.4	2.4	2.3	2.3	2.2	2.1&2.2
JSP	2.2	2.2	2.2	2.1	2.0	2.0	1.2	1.2	1.1	0.91 and 1.0&1.1
JSF	2.0	2.0	2.0	1.2	1.1	1.0				
EJB	3.1	3.1	3.1	3.0	3.0 <sup>[7]</sup>	2.1	2.0	2.0	1.1	1.0
JMS	1.1	1.1	1.1	1.1	1.1	1.1	1.02			
JDBC	4.0	4.0	4.0	4.0	3.0	3.0				
JPA	2.0	2.0	2.0	2.0	1.0					

# Available Options ( Version 7)

## **WebSphere Application Server - Express**

An affordable, ready-to-go solution for developing and running dynamic Web sites and applications. WebSphere Application Server - Express deployment environment offers outstanding capabilities for secure transaction management. It supports the full Java EE 5 programming model and includes Web 2.0 Feature Pack and Web services support. It also includes easy-to-use integrated wizards and samples to get started quickly. WebSphere Application Server - Express is limited to single-server implementations and up to a maximum of 240 Processor Value Units per server and includes a set of integrated applications, wizards, and samples to help you get up and running quickly.

## **WebSphere Application Server**

Optimized to ease administration in a scalable, single-server deployment environment, it supports the full Java EE 5 programming model, Web 2.0 Feature Pack, and Web services, and delivers a secure, high-performance transaction engine for dynamic applications. Perfect for stand-alone servers, departmental applications, and Web services, WebSphere Application Server offers unlimited CPUs per server and unbeatable platform coverage.

## **WebSphere Application Server for Developers**

The functional equivalent of the core WebSphere Application Server configuration (licensed for development use only), WebSphere Application Server for Developers is an easy-to-use development environment to build and test applications for your SOA.

## **WebSphere Application Server Network Deployment**

For enterprises that need near continuous availability, advanced management, and automated performance optimization for their mission-critical applications, WebSphere Application Server Network Deployment delivers an environment that is highly available, dynamically scalable, and easily managed. Building on the core WebSphere Application Server configuration, WebSphere Application Server Network Deployment offers:

- World-class clustering and high availability management to help eliminate the cost of system downtime.
- Edge components, which offer sophisticated load balancing, caching, and centralized security for enhanced performance at the edge of the network.
- Advanced Web services capabilities to enable you to connect to systems outside the firewall and across disparate application frameworks.
- Extended Web services management and advanced remote administration to make management of more complex environments less time-consuming and resource-consuming

# Version 8 has more options...

	<b>WebSphere Application Server – Liberty Core</b>	<b>WebSphere Application Server - Express</b>	<b>WebSphere Application Server</b>	<b>WebSphere Application Server Network Deployment</b>	<b>WebSphere Application Server Hypervisor Edition</b>	<b>WebSphere Application Server for z/OS®</b>
Optimized for:	Smaller scale deployments of dynamic web applications. This version of the Liberty profile delivers the Web Profile option. It delivers a reduced-cost, ready-to-go solution.	Developers or business leaders at small and midsize businesses who need an easier, reduced-cost, ready-to-go solution for smaller scale deployments of dynamic web applications	Developers or business leaders at medium to large businesses who need a scalable foundation to build, run and manage dynamic web applications on a single server or in moderately sized deployment environments	Developers or business leaders who need advanced management, scalability, automated performance optimization and near-continuous availability for their most mission-critical applications	Developers or business leaders who need advanced management, scalability, automated performance optimization and near-continuous availability for their most mission-critical applications; optimized to run in VMware and other server virtualization environments	Developers or business leaders at enterprises that require z/OS qualities of service to achieve optimized performance and near-continuous availability for their most mission-critical applications

# ??? Time for a quick Check

- What is Processor Unit Value

A Processor Value Unit (PVU) is a unit of measure used to differentiate licensing of software on distributed processor technologies (defined by Processor Vendor, Brand, Type and Model Number). IBM continues to define a processor, for purposes of PVU-based licensing, to be each processor core on a chip (socket). Each software Program has a unique price per PVU.





## PMR – Problem Management Record

- A record of assistance that is submitted by a customer and used by a technical support professional
- IBM's internal tracking mechanism receives PMRs from customers, moves them between support queues, and presents them to support teams for action
- IBM devised the term Service Request (**SR**) to represent a concept which directly describes what a customer is doing when they contact IBM - they are submitting a Request for Service. IBM's Support Portal allows a customer to submit a Service Request via our Service Request Tool (SR Tool).
- A Service Request action performed by the customer results in the creation of a PMR

# How to submit a request

- Go to [www.ibm.com/support](http://www.ibm.com/support).
- Click the **Sign in** link located in the black box to the right and sign in with your IBM Web ID (email address) and password.
- Click the **Service requests and PMRs** tab located at the top of the page.
- Click the **Open a new software service request** link in the center of the page (under the IBM Service Request for software).
- In the **Preferred products** section, click your preferred product
- Fill out the Service Request form. The fields with red asterisks are required fields. Some of the fields will automatically populate for you.
- Click **Continue**. A Summary of your Service Request will appear.
- Verify the information is correct. Please make sure to indicate how you would like to be contacted.
- Click **Create request**.

You will receive a Service Request number and a support engineer will respond shortly.



## **DAY 2**

# **INSTALLATION AND CONFIGURATION**

# Lets Do a Lab



Adobe Acrobat  
Document

# Silent Installation

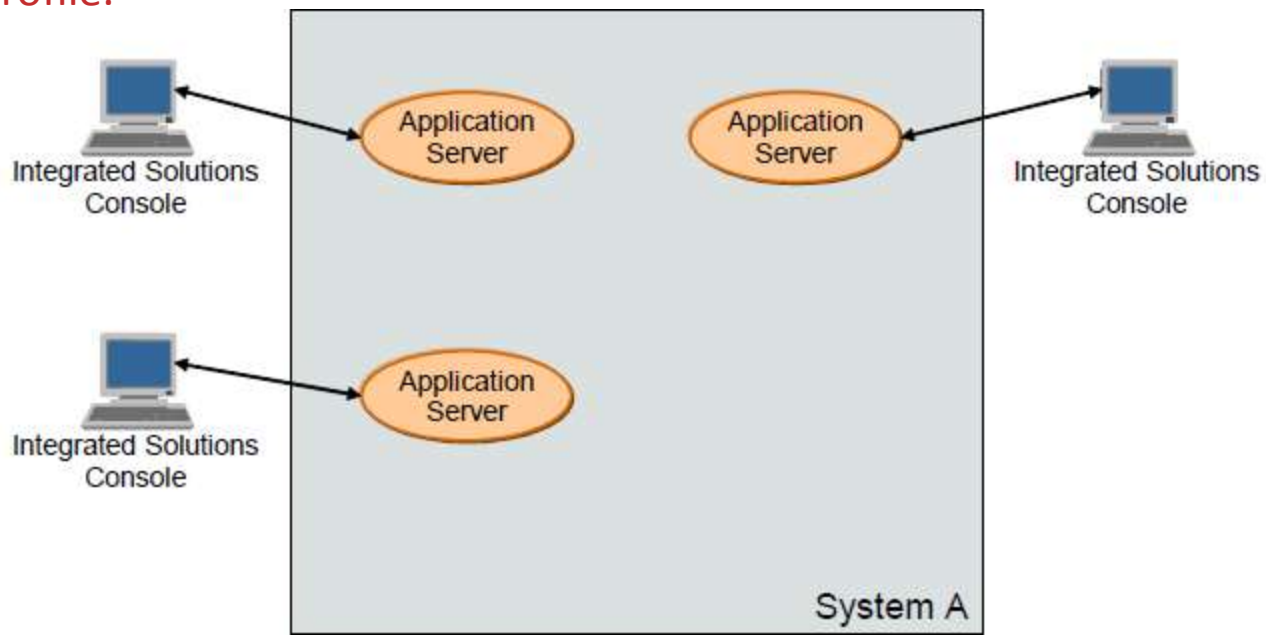
- Installation parameters are set in a text file.
- Execute the following command  
`install.exe -options <response file name>.txt -silent`
- Sample response file



responseFile

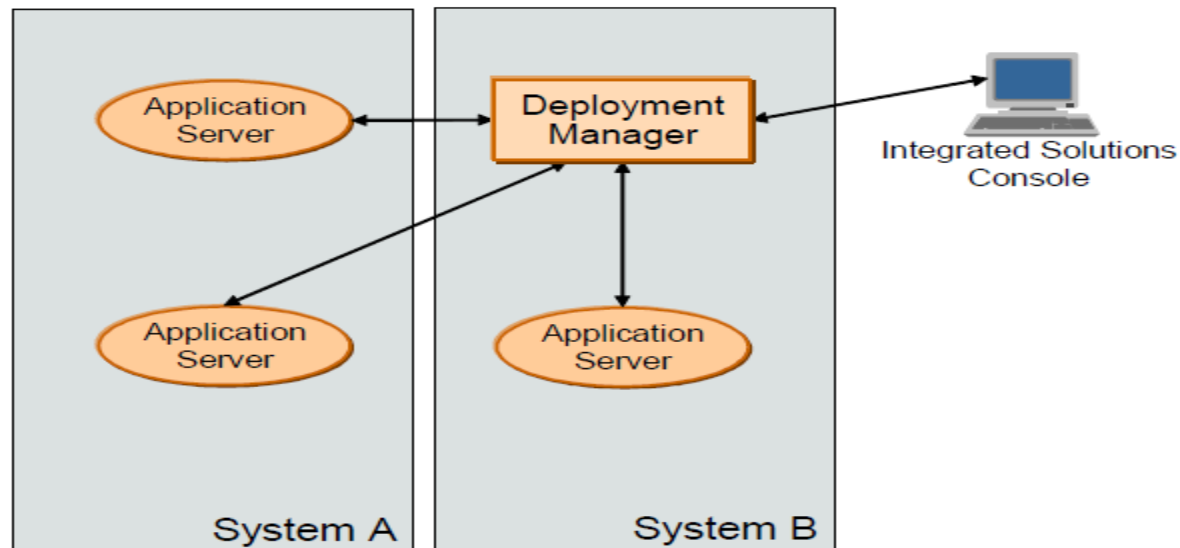
# Stand Alone Server Configuration

- All WebSphere Application Server packages support a single stand-alone server
- environment.
- With this configuration, each application server acts as an unique entity. An application server runs one or more applications and provides the services required to run those applications.
- Each stand-alone server is created by defining an application server profile.



# Distributed Configuration

- Enable central administration, workload management, and failover.
- One or more application servers into a cell that is managed by a central administration instance, a deployment manager.
- The application servers can reside on the same machine as the deployment manager or on multiple separate machines.
- cluster application servers to allow for workload management and failover capabilities





# Application Server Concepts

## Application Server

- Primary runtime component in all configurations and is where an application actually executes

## Nodes

- Administrative grouping of application servers for configuration and operational management within one operating system instance

## Node Agents

- Each node has a node agent that works with the deployment manager to manage administration processes.
- Created automatically when you add (federate) a stand-alone node to a cell.
- Not included in Base and Express configurations

## Node groups

- Grouping of nodes within a cell that have similar capabilities.
- Validates that the node is capable of performing certain functions before allowing them.

## Cells

- Grouping of nodes into a single administrative domain
- Cell configuration containing nodes running on the same platform is called a homogeneous cell.
- Cell made up of nodes on mixed platforms is called heterogeneous cell.

# Application Server Concepts – Administrative Domains

## Deployment Manager

- Central administration point of a cell
- Uses the node agent to manage the applications servers within one node
- Provides management capability for multiple federated nodes and can manage nodes that span multiple systems and platforms.
- The configuration and application files for all nodes in the cell are centralized into a master configuration repository.
- This centralized repository is managed by the deployment manager and synchronized with local copies that are held on each of the nodes.

## Administrative Agents

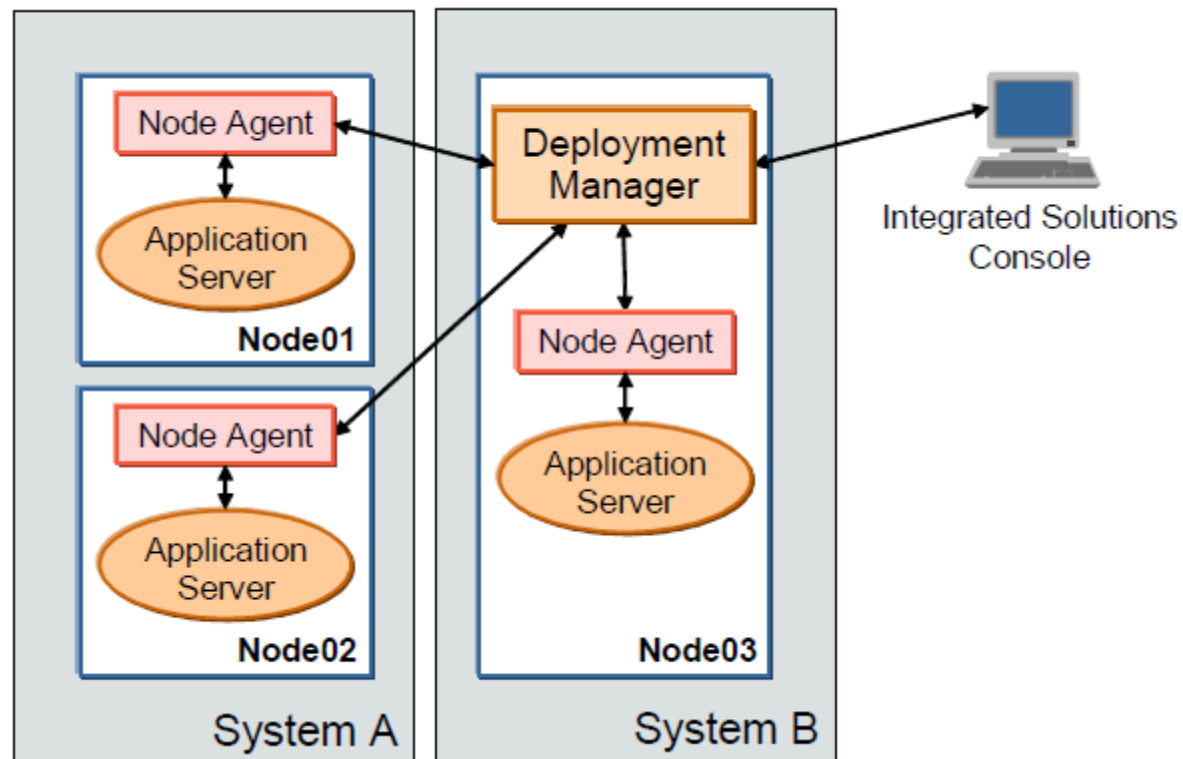
- Provides enhanced management capabilities for stand-alone (Express and Base) application servers.
- Manage multiple stand-alone server instances on a single system or z/OS image.
- New concept introduced with WebSphere Application Server V7.0., wherein most of the administrative components are separated from the application server runtime

## Job Managers

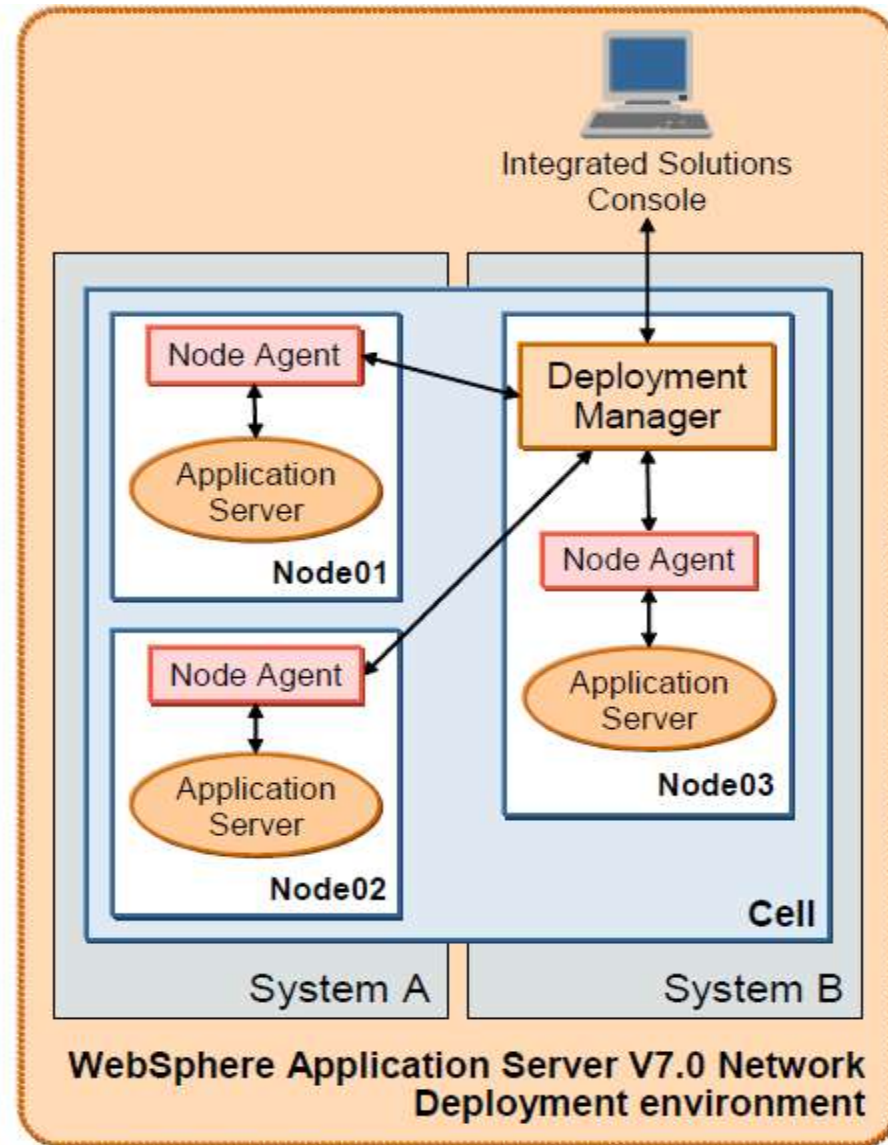
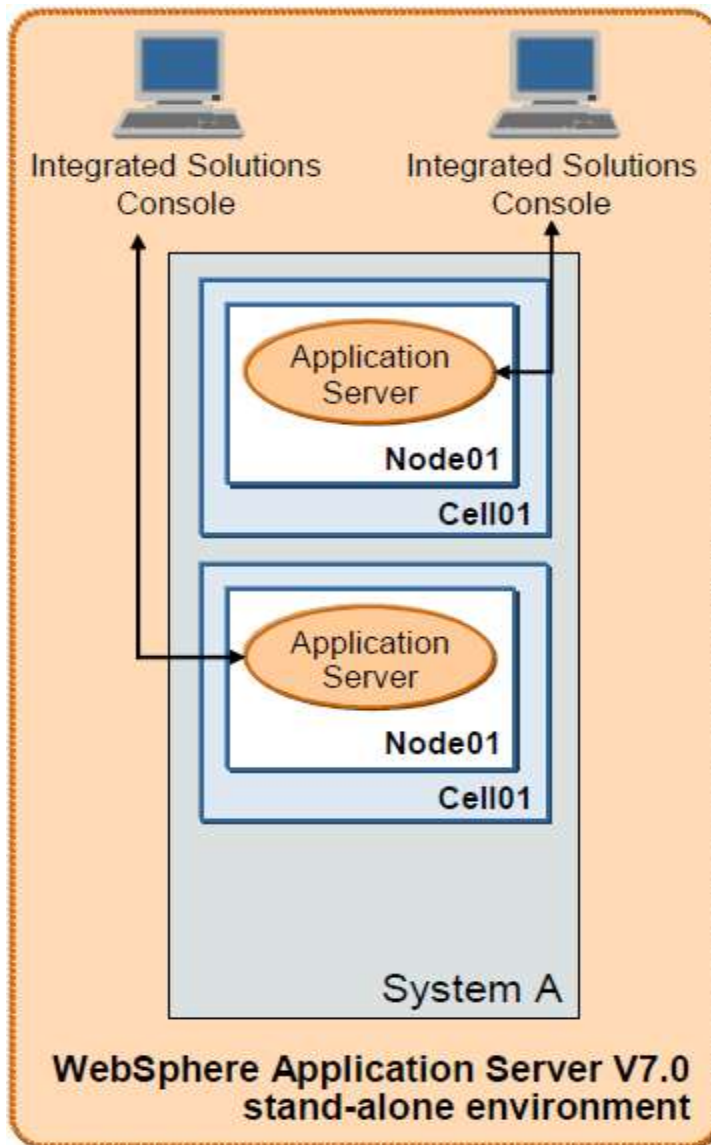
- Provides management capabilities for multiple stand-alone application servers, administrative agents, and deployment managers.
- The purpose of the job manager is to execute daily tasks in one step for multiple installations.
- New concept introduced with WebSphere Application Server V7.0

# Design – ND Installation

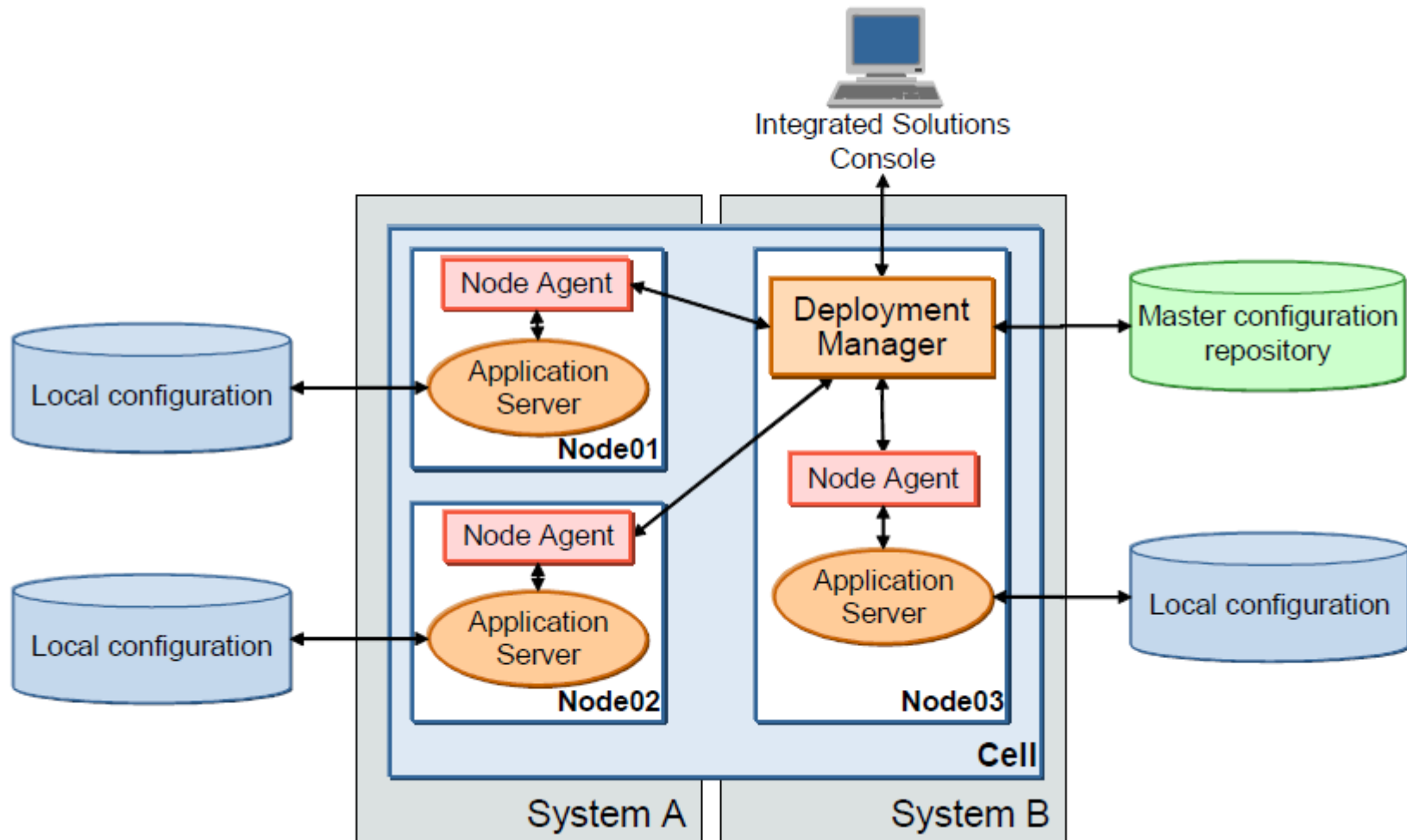
- Various Configuration representations.



# Design Topology - Comparision

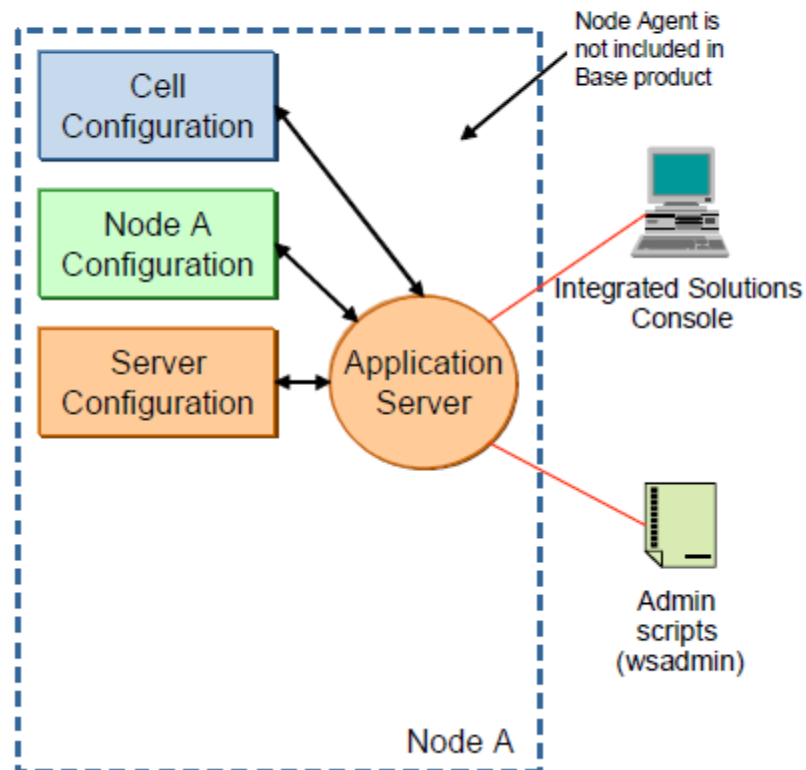


# Deployment Manager

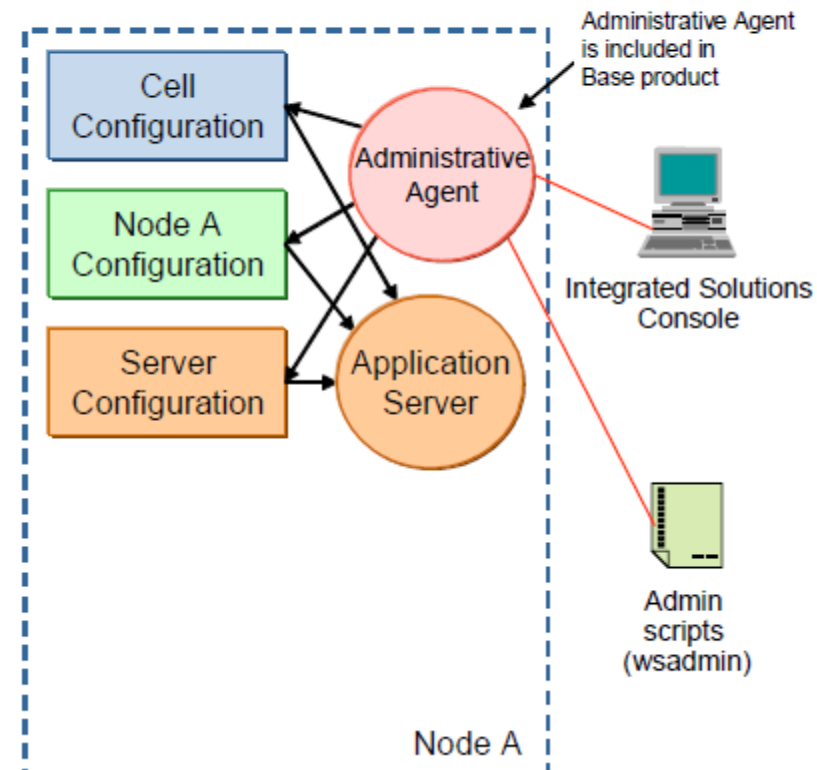


# Administrative Agent – Pictorial Rep.

## WebSphere Application Server V5 & V6 Base Product Architecture



## WebSphere Application Server V7.0 Base Product Architecture



# Job Manager – Pictorial Representation

