

IBM WebSphere Application Server V4.0

# Installation and Migration Overview



# Agenda



- WebSphere V4.0 Installation
- Two Migration Paths
  - ▶ Version Migration
  - ▶ Edition Migration
- Migration Tools
  - ▶ WASPreUpgrade
  - ▶ WASPostUpgrade
  - ▶ SEMigrator
- Migration Improvements
- Staging Suggestions



## Installation



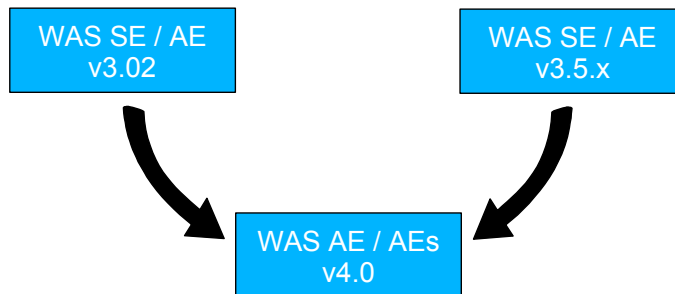
- InstallShield 5.5 (Windows)
- InstallShield for Java (AIX, Sun, HP)
- RPM (Linux)
- No Native Install
  - ▶ Use Java Installer with silent mode
- DB2 UDB
  - ▶ Switch to JDBC 2.0 driver
    - SQLLIB\java12\usejdbc2.bat
- Logfiles
  - ▶ WASPreUpgrade.log (in backup directory)
  - ▶ WebSphere/AppServer/logs/WASPostUpgrade.log
  - ▶ WebSphere/AppServer/logs/wssetup.log



- ▶ On Linux, WebSphere can be installed using the popular Red Hat Package Manager (RPM).
- ▶ Native Install is no longer an option. This option used to be available on V3.5.x and allowed using tools like SMIT to install the product. However, the Java installer in silent mode (i.e. with a response file) can be used if you need to install without using a GUI such as X-Window on UNIX systems.
- ▶ It is very important that you make sure that your DB2 installation is configured for JDBC 2.0.
  - ▶ This can be done by checking the content of a file called "inuse" in the SQLLIB\java12 directory.
  - ▶ If the file doesn't exist or if the content is different from the string JDBC 2.0 - you need to shut DB2 down completely and run "usejdbc2.bat".
  - ▶ If you try to start WebSphere V4.0 without the correct JDBC 2.0 support, you'll get a Java exception in the tracefile that points to a DB2 Data Source class not found.

## Two Flavors of Migration

### ■ Version Upgrade



### ■ Edition Upgrade



- ▶ There are two different migration issues with WebSphere V4.0.
- ▶ You may want to migrate your existing WebSphere V3.02 or V3.5.x environments to WebSphere Advanced Edition V4.0. This implies that the existing repositories need to be converted to the new format and that the existing applications need to be configured in the new J2EE compliant environment.
- ▶ The second aspect of migration is represented by migrating a WebSphere V4.0 Single Server environment (AEs or AEd) to WebSphere AE V4.0. This situation may occur when a customer has been running applications on AEs and later needs the capabilities of AE.
- ▶ Tools are provided to handle both scenarios - and we are going to discuss them.

## Version Upgrade from V3.0.2+



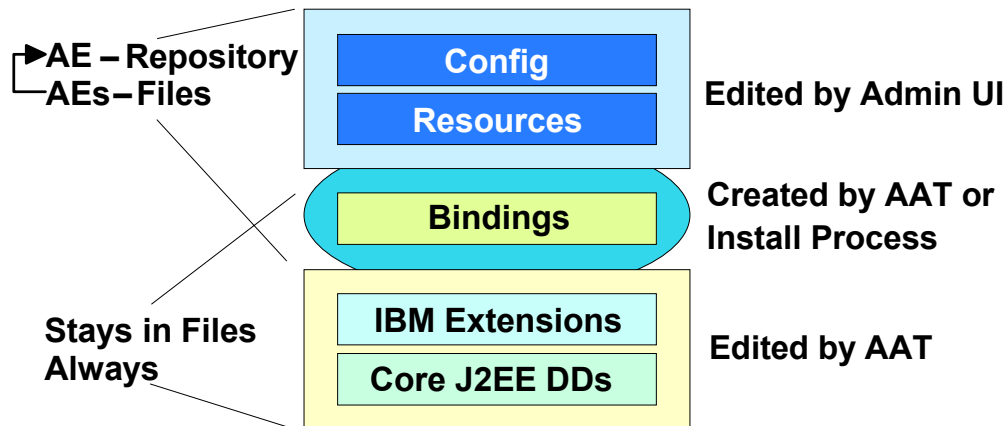
- Save V3.0.2+ configuration
  - ▶ Saves key product and user files
- Convert V3.0.2+ configuration to V4.0 model
  - ▶ Administrative configuration to V4.0 model
  - ▶ Application configuration to J2EE model
  - ▶ Security settings mapped to J2EE security model
  - ▶ Manual modifications may be required
- Restore configurations after the initial product upgrade
  - ▶ Loads administrative configuration
  - ▶ Creates enterprise applications



- ▶ The list above depicts the process of upgrading a WebSphere V3.02 (or later, including 3.5.x) environment to WebSphere Advanced Edition V4.0. Keep in mind that the upgrade only affects the configuration objects, **NOT** the application code. The process of migration will perform a "best effort" mapping between existing V3.x applications and J2EE Enterprise Applications.
- ▶ Similarly, for security, the migration process will try to "cleanly" migrate existing user permissions to the new J2EE role-based security model. In some cases, you may need to manually review and potentially reorganize the roles being created.
- ▶ Manual modifications may be required for complex applications that can't be cleanly reconfigured to a single Enterprise Application.
- ▶ Manual modifications may be required to take advantage of new APIs (EJB 1.1, Servlet 2.2, JSP 1.1), although most methods are upward compatible from EJB 1.0, Servlet 2.1, and JSP 1.0.
- ▶ Manual modifications will be necessary for any JSP 0.91 code.

## Edition Upgrade from AEs V4.0

- Upgrade from V4.0 AEs to V4.0 AE
  - ▶ SEMigrator tool
  - ▶ Converts system configuration from AEs XML-based to AE repository-based configuration
  - ▶ J2EE application configuration unchanged



- ▶ The configuration information is logically split in V4.0 in order to comply with the J2EE standards and separation of roles.
- ▶ Application configuration is stored in J2EE artifacts, primarily XML deployment descriptors that the developers and assemblers have included in their EAR, WAR, and JAR files.
- ▶ Runtime configuration information (VirtualHost, Servers ...) is stored in the WebSphere repository. The repository is implemented via a series of relational database tables in WebSphere AEV 4.0, but it is a plain XML file in WebSphere AEs or AEd.
- ▶ The SEMigrator tool converts the XML configuration information that is used by AEs to the RDB based configuration information that is typical of AE.

## Migration Issues



- JSP 0.91
- EJB 1.0
  - ▶ BMP
    - Automatic redeployment
  - ▶ CMP deployed via admin console (top-down)
    - Automatic redeployment
  - ▶ CMP deployed via VAJ
    - Requires Manual redeployment
- Merge EJB containers and Application Servers
  - ▶ All EJBs will be installed in a single EJB container per server
  - ▶ All Enterprise Applications will be installed on a single node (AEs)



- ▶ Some older features of the existing WAS V3.x products will not be handled by the migration tooling.
- ▶ JSP 0.91 is not supported. The install/migration process will notify in the log files about the presence of JSP 0.91 code.
- ▶ CMP EJBs deployed via VAJ could be bottom-up or meet-in-the-middle. These beans must be redeployed manually (or using VAJ 4.0) in order to specify the schema mapping. The schema mapping information must be specified in some special XML files that need to be packaged in the EJB JAR files.

## Features Deprecated or Modified



### ■ Deprecated

- ▶ EJB 1.0
- ▶ wlmjar script not needed in V4.0
- ▶ WLMJar.isWLMized() deprecated (returns true)

### ■ Modified

- ▶ UserProfileManager configuration not part of base configuration management, not migrated
  - UserProfile is now available as an EJB jar
  - Can be packaged with customer application



Some other existing features are deprecated:

- ▶ The EJB 1.0 programming model is deprecated. If you have an EJB 1.0 jar file, you will be able to convert it to an EJB 1.1 jar file (containing the correct J2EE deployment descriptors) using AAT. This process will not convert your code. There are some features of the 1.0 programming model that are tolerated in V4.0 but may not be supported in future releases of WebSphere Application Server.
- ▶ WebSphere Application Server, Advanced Edition V4.0 supports workload management in a more transparent way than in V3.x. The wlmjar utility and the associated Java class are deprecated. There is no need to use these because all EJBs in V4.0 can take advantage of the WLM support that is built into the ORB.
- ▶ In V3.0 and V3.5, WebSphere provided a User Profile Manager object which allowed you to store and retrieve information about each user. For example, you could ask the user to fill out a form that tells you what geographic location they are from, and the next time they access your site, you could show them news for that geographic location. This was handled through some built-in WebSphere code that was configured very similarly to the Session Manager. In WebSphere V4.0, the User Profile Manager is packaged separately.

## Additional Considerations on Selected Features



- Features removed from all V4.0 editions (AE, AEs, AEd)
  - ▶ OSE Remote (use HTTP Transport)
  - ▶ v2.0 Connection Manager
  - ▶ JSP .91, 1.0 / Servlet 2.1
  - ▶ Native Install (Java installer has silent install option)
  - ▶ Servlet Redirector (use HTTP Transport)
  - ▶ XML4J 2.0.15 (replaced by XML4J 3.1)
  - ▶ EPM APIs (Not a public API)
  
- AEs and AEd
  - ▶ XMLConfig and WSCP not provided
  
- AE
  - ▶ Removed AE Browser-Based Administration
    - Provided as tech preview in V3.5.x



- ▶ These features have been completely removed from WebSphere 4.0.
- ▶ A noteworthy function being removed is OSE remote. You must use the new HTTP support to allow the web server to communicate with WebSphere Application Server V4.0 .
- ▶ Notice that the servlet redirector is on the list. This feature is made totally unnecessary now that the Web server plug-in can connect to the application servers via HTTP/HTTPs.
- ▶ XML Config is not supported in AEs and AEd because the administrative repository is an XML file.
- ▶ The browser-based console is not available in the Advanced Edition. On the other hand, AEs and AEd only provide a browser-based console and no Java client console.

## Installation / Migration



- Start current Admin Server
- Install WebSphere V4.0
  - ▶ Detects prior installation (AE/SE V3.x or AEs V4.0)
- Prompts user to migrate
  - ▶ "Perform Migration" checkbox on install pane
  - ▶ Version migration (from V3.x to V4.0)
    - ◆ WASPreUpgrade runs under the covers
  - ▶ Edition migration (AEs to AE)
    - ◆ SEMigrator
  - ▶ Uninstall current WebSphere Application Server
  - ▶ Install WAS V4.x
    - WASPostUpgrade
      - ◆ Runs XMLConfig -import under the covers



- ▶ In order to have the migration process take place automatically, you need to start the administrative server on the existing (V3.x) installation, then start the installation process of WebSphere V4.0.
- ▶ The first step of the install process will check for existing installations and you will then be prompted to migrate.
- ▶ The "pre update" batch file will be initiated (WASPreUpgrade).
- ▶ If you are upgrading from AEs to AE, the SEMigrator tool will be used instead.
- ▶ This first step saves the existing configuration into a separate directory for future use. Once this step has completed, the install process will proceed by removing the existing product and installing the new one.
- ▶ It will then use WASPostUpgrade.bat to import the converted config into the repository. This process converts the saved configuration into a format that can be imported into the repository of WebSphere V4.0.

## WASPreUpgrade



- Called by Install or by command file interfaces
  - ▶ WASPreUpgrade (.bat or .sh)
  
- WASPreUpgrade Parameters
  - ▶ Backup directory to save configuration
  - ▶ Current SE/AE V3.x WAS install directory
  - ▶ WAS node name
  - ▶ Optional Parameters
    - -nameServiceHost host
    - -nameServicePort port
    - -traceString string
    - -traceFile file



- ▶ WASPreUpgrade is only called when the current installation is V3.x. It can be called manually to perform the upgrade process in a controlled way.
- ▶ WAS node name is used by the migration tooling to call XMLConfig.
- ▶ traceString is for the standard WAS tracing

## WASPostUpgrade



- Called by Install or by command file interfaces
  - ▶ WASPostUpgrade (.bat or .sh)
  
- WASPostUpgrade Parameters
  - ▶ Saved configuration directory
  - ▶ WAS node name (AE install only)
  - ▶ Optional Parameters
    - -nameServiceHost host (AE install only)
    - -nameServicePort port (AE install only)
    - -traceString string
    - -traceFile file
    - -import xmlFile
      - ◆ default: websphere\_3x\_backup.xml (generated at previous step)
    - -substitute string



- ▶ The WASPostUpgrade process takes the saved configuration and converts it into a valid V4.0 XML configuration file.
- ▶ XMLConfig is then called "under the covers" to import the newly converted configuration into the repository.
- ▶ The websphere\_3x\_backup.xml is a full XMLConfig export of the existing configuration. As such it could be used to restore the configuration on a V3.x system.

## Upgrading from AEs to AE



- Copy configuration and program files
  - ▶ /config
  - ▶ /properties
  - ▶ /installedApps
  - ▶ /installableApps
- Invoke SEMigrator -xmiFile <file name>  
-adminNodeName <node name>
- Uninstall AEs 4.0
- Install AE 4.0
- XMLConfig -import migratemof.xml -adminNodeName  
<node name>



- ▶ The process of upgrading from AEs V4.0 to AE V4.0 is more straightforward because both platforms are at the same level and comply with the J2EE standards.
- ▶ The migrator will make a copy of all the config and application directories. It will then convert the AEs XML-based repository into an XMLI file that will be imported into the AE repository database.
- ▶ AEs is uninstalled and the saved configuration will be imported with XMLConfig running under the covers.

# SEMigrator



- Called by Install or by command file interfaces
  - ▶ SEMigrator (.bat or .sh)
  
- SEMigrator Parameters
  - ▶ -xmiFile <xml data file>
  - ▶ -adminNodeName <node name>
  - ▶ Optional Parameters
    - -nameServiceHost <host name>
    - -nameServicePort <port number>
    - -traceString <trace string>
    - -traceFile <file name>



- ▶ This chart shows the parameters you can use to invoke the SEMigrator tool - the XML data file is the AEs/AEd administrative repository.

## Improvements over V3.5.x migration wizard



- Install calls migration tooling
- Install program performs backup and migration
- Better handling of security migration
- EJBs migrated and redeployed
- Enterprise Applications created for EJBs and Servlets
- Ability to call migration routines after install
- Handles Version and Edition migration



- ▶ Migration Security - passwords are encoded before being written to XML to prevent casual observation.

## Staging Suggestions



- Eliminate use of removed APIs
  - ▶ Connection Manager API
    - `com.ibm.servlet.connmgr.*`
  - ▶ JSP 0.91
  
- Move to JSP 1.1 and Servlet 2.2
  - ▶ Use V3.5.2 (minimum) for development and test
  
- Migrate to EJB 1.1 when new development tools are available
  - ▶ EJB 1.0 support is deprecated in WAS V4.0



- ▶ A lot can be done on the existing versions of WebSphere to ease the effort of migrating. For example, the use of removed APIs should be eliminated and the use of features that are not supported in V4.0 should be minimized.
  
- ▶ Portions of the J2EE programming model are already supported in V3.5.2 and later. For instance JSP1.1 and Servlet 2.2 specifications are supported now. It would be a good idea to convert your applications to use these features in your existing installation.
  
- ▶ EJB 1.1 is not supported in WAS V3.5.x . Additionally, some tools (VAJ 3.5.3) do not support creating EJB 1.1-compliant applications. However, EJB 1.0 can be imported into WAS V4.0, although some parts of the programming model are deprecated. As the new tooling is released, you'll be able to migrate those applications to be fully EJB 1.1 compliant.