Abstract

• The following products can be combined to meet your business needs for Business Process Management:
  - WebSphere Application Server V6.2
  - Web Services Feature Pack V6.2
  - WebSphere Process Server V6.2
  - WebSphere Business Services Fabric V6.2
  - WebSphere Business Monitor V6.2
• Configuration tasks, with recommended tools and procedures for capacity, availability, and scalability
• Different configurations will be explored:
  - Standalone Server
  - Single Cluster
  - Remote Messaging
  - Remote Messaging & Remote Support
  - Custom topology
**Need Intro – What are these BPM components for?**

- WebSphere Feature Pack for Web Services (WSFP) extends the capabilities of Application Server to enable Web Services messages to be sent asynchronously, reliably, and securely, focusing on interoperability with other vendors.

- WebSphere Process Server (WPS) allows deployment of standards-based business integration applications in a service-oriented architecture (SOA), which takes everyday business applications and breaks them down into individual business functions and processes, rendering them as services. Based on platform services provided by WebSphere Application Server, WebSphere Process Server can help you meet current business integration challenges including business process automation.

- WebSphere Business Services Fabric (WBSF) provides an end-to-end platform for the rapid assembly, delivery, and governance of industry-focused composite business services in an SOA solution. It adds an industry-specific layer to the IBM SOA Foundation by enabling dynamic business service personalization and delivery based on business context.

- WebSphere Business Monitor (WBM) provides the ability to monitor business processes in real-time, providing a visual display of business process status, business performance metrics, and key business performance indicators, together with alerts and notifications to key users that enables continuous improvement of business processes.

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**Configuration Topics - Objectives**

I. Business Process Management Prerequisites
   - BPM z/OS Architecture & Components

II. Production Topologies
   - Network Deployment (3 ways to ND)
   - One, Two or Three Clusters

III. Configuration Tasks
   - Planning and Preparing z/OS components
   - Creating DB2 Tables
   - Security Setup (& other post-configuration tasks)

IV. Building the BPM Topology

V. Appendix
   - Installation Verification & Trouble-Shooting
What’s new in Process Server V6.2 ??

• Installation and configuration
  - Requires Feature Pack for Web Services
  - Scripts for Configuration & Migration of production environments
  - Deployment Environment wizard
  - Migration (InterChange Server & WBISF)

• Application
  - Support versioned SCA modules (Life cycle & Shared libraries)
  - Governance framework (Version handling & Shared components)
  - Improve uninstalling a business module

• Support
  - Consolidated Failed event management sub-system
  - Dynamic modifications of process instances
  - BPEL based human tasks workflow monitor
  - Business calendar runtime & Administrative enablement
  - Relationship service enhancement (Script-based APIs)

• New business space widgets
  - Business Calendar
  - Security Manager
  - Health Monitor

• Administrative console enhancements
  - BPC Observer & Explorer merged
  - SCA module administration & SI Bus browser

WebSphere Process Server z/OS Architecture

One WebSphere z/OS Server

Controller Region

Embedded HTTP Server

Servant Regions

Message Engines

Adjunct Region

zWLM

Servant Regions (JVM each)

Web container

EJB container

Human Task Container

Web Services Engine

Business Process Container

WebSphere Platform Messaging dispatch

Data replication

Name server

Dynamic cache

Security

DB2 or Cloudscape

BPC Bus

SCA.APPLICATION Bus

SCA.SYSTEM Bus

CEI Bus

Fabric Bus

Monitor Bus
Process Server Components

- **Databases (& Data Sources)**
  - Common WPS
  - CEI Event & Event Catalog
  - Business Process Container & Business Space
  - Business Space
  - Messaging Engines (4+)

- **Service Integration Buses & Messaging Engines**
  - SCA System & SCA Application buses
  - CEI bus, BPC bus
  - Business Space bus

- **Common Even Infrastructure (CEI)**
  - Applications: event-application.ear & event-message.ear (MDB)

- **Business Process Choreographer applications**
  - Business Flow manager
  - Human Task Manager
  - BPC Explorer & Observer, Business Rules Manager

Other BPM Components

- **Other BPM (stacked) products**
  - WebSphere Business Services Fabric,
  - Business Space powered by WebSphere,
  - WebSphere Business Monitor,

- **Add’l Databases**
  - Fabric
  - Monitor
  - Messaging Engines (Monitor, Fabric)

- **Add’l Service Integration Buses & MEs**
  - Fabric
  - Monitor bus
**WPS/WESB V.6.2 for z/OS** (avail. 12/2008)

**Software Prerequisites**


- **z/OS** Version 1.8 or later
- **WAS for z/OS** Version 6.1.0.21 or later
- **WAS Feature Pack for Web Services** (Opt'l Mat'ls) V6.1.0.21
  - **zPMT** (WCT V 7.0.0.1 or ASTK)
- **DB2 for z/OS** Version 8.1 (PUT 0702) or later, or Ver. 9
- **WebSphere Integration Developer (WID)** V6.2

Information Center at:

- Program Directory:
- PSP (Preventive Service Planning) Buckets:
  - [https://techsupport.services.ibm.com/server/390.psp390](https://techsupport.services.ibm.com/server/390.psp390)
  - Upgrade= WPSZ, Subset= HWPS620
  - APAR/PTF Tables for WPS 6.2 at

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**BPM for z/OS V 6.2 Product Packaging**

**WebSphere Process Server for z/OS** (includes WESB)

```
/usr/lpp/zWPS/V6R2
```

```
hlq.SBPZHFS
FMID: HWPS620
```

**WebSphere Business Services Fabric for z/OS**

```
/usr/lpp/webify/V6R2
```

```
hlq.SBIFHFS
FMID: HWBS620
```

**WebSphere Business Monitor**

```
/opt/IBM/WebSphere/MonServer
```

Pgm: 5724-M24

**WebSphere Application Server for z/OS**

```
/usr/lpp/zWebSphere/V6R1
```

```
(WAS 6.1.0.21+ required for WPS V6.2)
```

**WAS for z/OS Opt'l Materials Feature Pack for Web Services**

```
/usr/lpp/zWebSphere_OM/V6R1/FPWS
```

```
(WAS FPWS 6.1.0.21+ required for WPS V6.2)
```

**WebSphere Services Fabric for z/OS**

**WebSphere Business Monitor**

```
Pgm: 5724-M24
```

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8/27/2009
WebSphere Business Process Management for z/OS
II. Production Topologies

Production Topologies on Distributed platforms

- Single Cluster ("Bronze")
- Remote Messaging – 2 Clusters ("Silver")
- Remote Messaging and Remote support - 3 Clusters ("Gold")
Production Topologies on z/OS

Distributed topologies (multiple clusters) don’t apply to z/OS.

- **Single cluster - Servants & Adjuncts provide scaling**
  - Less Overhead, Smaller Memory footprint
  - Less Administrative effort

- **Adding a second cluster depends on:**
  - Available hardware resources (More Memory, Overhead)
  - Types of business processes & Application invocation patterns
  - How heavily you intend to use the CEI
  - How heavily you use Messaging Engines (Consider MQ)

- **Number of Cluster Members**
  - Availability demands a “rule of multiple”
    - 1 LPAR may be able to back up the workload running on 2, using Intelligent Resource Director (IRD).
    - 2 LPARs have a better chance of backing up 3 without IRD
III. Configuration Tasks
Configuration Topics – “the plumbing”

• Getting Started - an overview
  - Planning the Configuration
  - Preparing z/OS components
  - Creating DB2 Tables
  - Security Setup (& other post-configuration tasks)

• Configuration Scenarios
  - Network Deployment
    - Start with Empty Node, DMgr, Federate
    - Start with standalone server, DMgr, Federate
  - Standalone server (Derby or DB2)

• Extended Capabilities
  - WebSphere Business Services Fabric
  - Business Space powered by WebSphere
  - Business Monitor

Planning cannot be over-emphasized

• Configuration Topologies
  - # of Clusters, # of cluster members (Systems)

• Hardware requirements
  - CPUs, Memory, Disk storage, Space allocations

• Names for
  - Cells, Nodes, Servers, Clusters,
  - User & Group IDs, etc.
  - z/OS Dataset Aliases

• UNIX file systems (use zFS)
  - Directories, and files (ownerships & permissions)

• DB2 components & Names for . . .
  - Databases, Storage groups, Schemas, Buffer pools, ...

• Security Identities, Auth.Aliases, & EJBROLEs
Planning your Configuration – draw a picture

B6 cell:

- Daemon B6DEMN
- Deployment Manager B6DMGR
- DMgr Servant B6DMGRS
- B6DMNODE
- Node Agent B6AGNTA
- Server B6SR01A
- Controller
- Servant B6SR01AS
- Adjunct B6SR01AA
- B6NODEA

(Future expansion)

- Daemon B6DEMN
- Node Agent B6AGNTB
- Server B6SR01B
- Controller
- Servant B6SR01BS
- Adjunct B6SR01BA
- B6NODEB

Use a spreadsheet to plan your names...
- Use Techdoc PRS1331, or RedBooks SG24-7703, 7733

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables related to Target z/OS Image on which WebSphere will be Configured</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
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</table>

- Enter System Names LPAHs that will have nodes
- Enter One Letter Node LPAH Qualifier
- Choose WPS Topology (single-cluster | two clusters)
- Enter 2-digit identifier for WPS cluster
- For a single-cluster topology, this field is not applicable

<table>
<thead>
<tr>
<th>B</th>
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</tr>
</thead>
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<tr>
<td>Variables related to WebSphere Application Server for z/OS V6.1 Configuration Variables</td>
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</tr>
</tbody>
</table>

- Enter Two Character Abbreviation
- WPS PLEX
- Enter Sample Name
- Primary Node
- Secondary Node
- W621
- SS53
- Use Win32/db2.1 Compatibility
- n
- For single-cluster topology, this field is not applicable
- y

<table>
<thead>
<tr>
<th>B</th>
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<th>F</th>
<th>G</th>
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</tr>
</tbody>
</table>

- Enter HLD of SDBP Datasets [PDS(E,F,G)’s]
- WAS66B. WAS
- EB06F3
- Run WebSphere from STEPLIB (Y | N)
- Y
- Use fully qualified ALIAS for SDBP Datasets (Y | N)
- Y

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<th>J</th>
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</thead>
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<td>Variables related to WebSphere Configuration HSFZ2FS</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Enter Configuration HFS Dataset HLD (Y | N)
- Y
- DSNAME
- TDF

<table>
<thead>
<tr>
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<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checklist</td>
<td>DMGR</td>
<td>EmptyNode</td>
<td>JCL_P</td>
<td>EmptyNode_S</td>
<td>JCL_S</td>
<td>WPS_RACF</td>
<td>WPS_LDAP</td>
<td>WPS_rsp</td>
</tr>
</tbody>
</table>
Setting Up WebSphere Application Servers

- General order of Augmentation:

Required order for “Stacked” products:

1. Create each Node w/ FPWS using zPMT (not ISPF dialogs.):
   - Empty nodes & standalone must be created with FPWS
   - DMgr can be augmented later with FPWS, but before WPS.
2. Augment Deployment Manager with WPS before federation.
3. Augment Empty Nodes or Standalone Server with WPS before federation
4. Federate Empty Nodes or Standalone Server

Process Server extensions to the Spreadsheet
- in Additional Materials for Redbook SG24-7703 & SC24-7733
Worksheets help you along the way...

The spreadsheet consists of the following separate worksheets which are described from left to right:

1. Documentation
2. Variables
3. Checklist
4. DMGR
5. EmptyNode_P
6. JCL_P
7. EmptyNode_S
8. JCL_S
9. WPS_RACF
10. WPS_LDAP
11. WPS_rsp
12. Stand-Alone Server
13. Federate

Planning & Preparing your z/OS system

Allow for incremental maintenance upgrade for each Node:
- Dataset aliases for WAS610.SBBO* libraries
- Symbolic links pointing to SMP/E HFSes
  - WebSphere Application Server for z/OS (zPMT can do this)
  - Feature Pack for Web Services Opt'l Materials (zPMT can do this)
  - WebSphere Process Server for z/OS (You do this)

Security
- User & Group IDs – Discrete or General?
- UNIX UIDs & GIDs - RACF profiles instead of UID=0:
  - UNIXPRIV SUPERUSER.FILESYS, ...
- AUTOUID & AUTOGID?
- EJBROLE & GEJBROLE profiles
- APPL class profile
- SUROGGAT class for Admin ID so Password not passed around on JOB card.

DB2 definitions:
- Databases, Storage Groups, Bufferpools
- Schema and SQLID names, & GRANTs
- SYSADM, DBADM, and other privileges
- Stored Procedure Builder for WPS Relationships (DSNTPSMP)
**DB2 Planning:**

**JDBC Data Sources & Databases used by WPS**

- **WPSCommon** – Relationship, Mediation, Recovery, Business rules, Selector, Scheduler, ESB logging (53 Tables)
  - Business Space – (26)

- **CEI** - Common Event Infrastructure - EVENT & EVENTCAT (38)

- **BPE** - Business Process Container & Human Task Manager (238)

- **SIBs** (4) – Messaging Engines (SCA, APPL, BPC, CEI) (12x4=48 tables)

. . . Additional product databases:

- Fabric – (3)
- Business Monitor – (95)
- LDAP – (11)

✓ **Determine your naming conventions**

- Plan ahead for Multiple Cells, Nodes, Clusters
- One database or multiple ?
- Use Current Schema or SQLID ?
- Work with your Database Administrator

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**DB2 databases – Sample naming – Single Database**

<table>
<thead>
<tr>
<th>Database</th>
<th>Database Name</th>
<th>Storage Group</th>
<th>Schema owner (1)</th>
<th>VCAT DSN-hlq</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPS Common</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCELL</td>
<td>xxWPS</td>
</tr>
<tr>
<td>ESB</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCELL</td>
<td>xxWPS</td>
</tr>
<tr>
<td>CEI</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCELL</td>
<td>xxWPS</td>
</tr>
<tr>
<td>BPC</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCELL</td>
<td>xxWPS</td>
</tr>
<tr>
<td>SIB-SCA</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCnS</td>
<td>xxWPS</td>
</tr>
<tr>
<td>SIB-APP</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCnA</td>
<td>xxWPS</td>
</tr>
<tr>
<td>SIB-CEI</td>
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<td>xxWPSSG</td>
<td>xxCnC</td>
<td>xxWPS</td>
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<tr>
<td>SIB-BPC</td>
<td>xxWPSDB</td>
<td>xxWPSSG</td>
<td>xxCnB</td>
<td>xxWPS</td>
</tr>
</tbody>
</table>

xx=cell identifier (for instance, 'B6' for B6CELL)

Cn = Cluster identifier

1. SIB databases have common tables names, so need unique schema
### Separate Databases - Sample naming

<table>
<thead>
<tr>
<th>Database</th>
<th>Dbase Name</th>
<th>Storage Group</th>
<th>Schema owner (1)</th>
<th>VCAT DSN-hlq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>xxWPSDB</td>
<td>xxWPSSTO</td>
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</tr>
<tr>
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<td>xxESBDB</td>
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<td>xxCELL</td>
<td>xxWPS</td>
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<tr>
<td>CEI</td>
<td>xxCLnDB</td>
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<td>xxWPS</td>
</tr>
<tr>
<td>BPC</td>
<td>xxCLnDB</td>
<td>xxBPCSTO</td>
<td>xxCELL</td>
<td>xxWPS</td>
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<tr>
<td>Observer</td>
<td>xxOBSDB</td>
<td>xxOBSSTO</td>
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<td>xxWPS</td>
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<tr>
<td>Bus.Space</td>
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<td>xxWPS</td>
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<tr>
<td>Fabric</td>
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<td>xxFABSTO</td>
<td>xxCELL</td>
<td>xxWPS</td>
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<tr>
<td>SIB-SCA</td>
<td>xxSIBDB</td>
<td>xxSIBSTO</td>
<td>xxCnS</td>
<td>xxWPS</td>
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<tr>
<td>SIB-APP</td>
<td>xxSIBDB</td>
<td>xxSIBSTO</td>
<td>xxCnA</td>
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<td>xxSIBSTO</td>
<td>xxCnC</td>
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<tr>
<td>SIB-BPC</td>
<td>xxSIBDB</td>
<td>xxSIBSTO</td>
<td>xxCnB</td>
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<tr>
<td>SIB-MON</td>
<td>xxSIBDB</td>
<td>xxSIBSTO</td>
<td>xxCnB</td>
<td>xxWPS</td>
</tr>
</tbody>
</table>

CLn, Cn = Cluster identifier

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### Creating Databases & Tables – Overview:

**Three Phases:**

1. **Plan your DB2 definitions** (Talk to your DB2 administrator!)
   - One Database / Storage Group, or Multiple DBs & StoGroups
   - Naming conventions for Databases, StoGroups, & Schema qualifiers
   - Database & Storage Group names needed to run zWPSConfig.sh
   - SQLIDs, GRANTs, Buffer Pools, & PRI/SEC Quantities

2. **Create the .sql (ascii) or .ddl (ebcdic) definition files**
   - Use `createDB.sh` script (recommended)
   - Use `zWPSConfig.sh`, for a standalone server
   - Other component-specific scripts (WPS, BPC, CEI, SIB)

3. **Execute the .sql/.ddl files**
   - First, create the Databases & StoGroups manually...
     - Use `createDB.sh` script, or
     - Use `DBUtility.sh` script to run tailored SQL, or
     - Convert to EBCDIC, Copy to MVS datasets, Use `batch jobs` or `SPUFI`
DB2 GRANT statements – several options:

Using `currentSQLID=<schema>`

- `<schema>` must have DBADM to create objects:
  - `GRANT DBADM ON DATABASE <dbname> TO <schema>`, etc.
  - `GRANT USE OF STOGROUP <sgname> TO <schema>`, etc.
  - `GRANT USE OF BUFFERPOOL BP0, BP8K0, BP16K0 TO <schema>`
- Use Authentication Alias ID which maps to SQLID (i.e., `<schema>` name)

Using `currentSchema=<authID>`

- SQL execute under identity of J2C authentication alias ID.
- ID has no implicit privileges over the tables under the schema,
- Must `GRANT` privileges (SELECT, UPDATE, INSERT, DELETE) for all tables.
  - `GRANT ALL ON <schema>.<tableName> TO <authID>;`

Using Started Task User ID (e.g., xxASRU) to connect to the database...

- No need to code `currentSchema` or `currentSQLID`; No Authentication Alias ID
- Table owner determined by servant user ID (for all servants, CRAs, & DMGRS.)
- Define ALIASes for the owner of each table:
  - `CREATE ALIAS <schema>.<tableName> FOR <xxASRU>.<tableName>`;

See RedBook SC24-7733, Section 2.4.5 for details.
- The `GRANT`s req’d for WPS DBs depend your installation’s standards.
- Work with your DBA!

Security: EJBROLE Profiles for WPS

RACF Profiles for BPC, HTM & Explorer:

- `<domain>.BPESystemAdministrator`
- `<domain>.BPESystemMonitor`
- `<domain>.TaskSystemAdministrator`
- `<domain>.TaskSystemMonitor`
- `<domain>.WebClientUser`
- `<domain>.BPEAPIUser`
- `<domain>.TaskApiUser`
- `<domain>.JMSApiUser` APPLDATA(xxADMIN)
- `<domain>.EscalationUser` APPLDATA(xxADMIN)

Profiles for CEI:

- `<domain>.eventAdministrator`
- `<domain>.eventConsumer`
- `<domain>.eventUpdater`
- `<domain>.eventCreator`
- `<domain>.catalogAdministrator`
- `<domain>.catalogReader`

Profiles for Fabric:

- `<domain>.FabricAdministrator, FabricBasicUser,`
- `<domain>.RESTServiceUser` etc.

See RedBook SG24-7733 for details:
- Sample Jobs in Sample “Web material”
- Sample Spreadsheet ‘JCL_P’ and ‘WPS_RACF’ sheets.
- GEJBROLE Profiles can simplify Security
Security: APPL Profiles for WAS

- If APPL class is active, APPL profiles control whether an authenticated user can use any applications in the cell.

- If Security Domain is specified, the APPL class profile name will be the security Domain name (‘B6’), or ‘CBS390’ if not specified.

```c
/* Permit the JMS and DB alias to APPL profile */
PERMIT B6 CLASS(APPL) ID(B6JMSG,B6DBG)
/* Permit the role groups to the APPL profile */
PERMIT B6 CLASS(APPL) ID(B6BPEADG,. . .
SETROPTS RACLIST(APPL) REFRESH
```

- If the User or Group IDs are not given READ Access to the profile, the user is denied with messages saying: *(cryptic)*

SECJ0055E: Authentication failed for B6JMSU. The user id or password may have been entered incorrectly or misspelled.
SECJ0369E: Authentication failed when using LTPA.
CWSIP0301E: Unable to authenticate user B6JMSU when creating a connection to secure messaging engine . . .<userName=B6JMSU> . .
SECJ6219I: Basic authentication failed for user "B6JMSU".

IV. Building the Topology
(single cluster)
**Several WPS Scenarios/Topologies**

**Standalone Application Server (Not for Production)**

1. **Using Derby (Cloudscape)**
   - Augment (zSMPInstall.sh, zWPSConfig.sh) & you’re done!
2. **Using DB2**
   - Augment
   - Create DB2 tables

**Network Deployment Cell**

3. **Start w/ DMgr, Empty Node (We will focus on this)**
   - Augment, Federate
   - Create DB2 tables
   - Run SCA, CEI, BPC Wizards (or Deployment Environment Wizard)
4. **Start with Standalone AppServer & DMgr**
   - Augment
   - Create DB2 tables
   - Federate

---

**Starting with Deployment Manager & Empty Node (recommended)**

1. **Create Deployment Manager with FPWS**
   - Augment with WPS
   - Create Database tables
   - Setup Security
   - Start up & Test
2. **Create Empty Node with FPWS**
   - Augment with WPS
   - Federate server into ND cell
3. **Create Cluster / Server**
4. **Wizards to create SCA, CEI & BPC extensions**
5. **Add Fabric**
6. **Configure Business Space**
7. **Configure Business Monitor**
8. **Create Additional Nodes, HTTP servers or proxies . . .

Reference: SC24-7703
**Steps to configure your ND Cell for WPS:**

**Deployment Manager**
1. zSMPInstall
2. zWPSConfig
3. Create DB tables
4. Define Security Profiles
5. Start DMgr

**Empty Node**
1. zSMPInstall
2. zWPSConfig

5. Federate into DMGR cell
6. Create Cluster
   - Back-up Configuration zFS files

7. Wizards
   - SCA
   - CEI
   - BPC

8. BPM Extensions
   - Fabric
   - Monitor

8. Validate Configuration . . . with sample applications

---

**You can get (almost) everything from the spreadsheet!**

- Spreadsheet Response files and Sample Jobstreams
- RACF Defs
- Sample JCL
- zPMT: Create DMgr
- zPMT: Create Empty Node
- WPS Augment DMgr
- WPS Augment Empty Node
- createDB.sh DB2 tables
- Federate Empty Node
- Create Cluster
- ISC: SCA Wizard
- ISC: CEI Wizard
- ISC: BPC Wizard & BPC Explorer
- Business Space Wizard
- Fabric Configuration
- Business Monitor

8/27/2009  WebSphere Business Process Management for z/OS
Creating the target Servers

You must use the Profile Management Tool (zPMT) – WCT or AST
- Select “Feature Pack for Web Services” Environment
  - Required for WPS V6.2

Creating the Deployment Manager & Empty Node

1. Use spreadsheet to plan DMgr & Empty Node
   - Produce response files for zPMT & WPS augmentation

2. Use the zPMT to create the installation jobs
   - Select App. server with Feature Pack for Web Services
   - Use response file from spreadsheet

3. Create dataset name Aliases (& Symbolic links)

4. Run the configuration jobs to create the server

5. Start the server and verify the configuration
Augment Nodes with WPS

- Two scripts provided to Configure WPS
- Run against each node (DMgr & Empty Node):

1. zSMPInstall.sh in `<wps_smpe_root>/zos.config/bin`
   - Creates symLinks in `<app_server_root>` to `<wps_smpe_root>`
   - Updates the administration console for WPS/WESB

2. zWPSConfig.sh in `<app_server_root>/bin/
   - Reads installation-specific parm variables from “response” file.
   - ‘Augments’ profiles to use the WPS functions.
   - Creates resource definitions (data sources, databases, queues,...)
   - Installs applications, profiles, scripts, DDL (sql), etc.
   - Use the response files from the spreadsheet “WPS_rsp” tab

- Do not start the server until DB2 tables created and Security setup

"Response" Files Used by zWPSConfig.sh

Samples provided in: `/usr/lpp/zWPS/V6R2/zos.config/
- `standAloneProfile.rsp` (Cloudscape only)
- `standAloneProfileDB2.rsp`
- `DmgrDB2.rsp`
- `ManagedDB2.rsp`

Copy to ‘working’ directory, edit for your environment:
- Cell, Node, Server names
- Profile & Template path names
- Database Configuration: JDBC and Location names, User ID/Pwd, Database, StoGroup, Schema names

Or use response file generated by the spreadsheet
- Examine both, and see if they match.

Run zWPSConfig.sh with Admin’s UserID
`<app_server_root>/bin/zWPSConfig.sh -augment`
`response <response_file>`

Messages:
INSTCONFSUCCESS: Profile augmentation succeeded. . .
Create DB2 database & tables

- Work with your DB2 administrator!
- Database & Storage Group names must match .rsp file used by zWPSCConfig.sh
- Sample SQL/DDL (if using one Database/StoGroup):

```
CREATE STOGROUP xxDBSTO VOLUMES ('*') VCAT xxWPS;
CREATE DATABASE xxCELL
    STOGROUP xxDBSTO
    BUFFERPOOL BP0 CCSID UNICODE INDEXBP BP0;
COMMIT;
```

```
GRANT USE OF STOGROUP xxDBSTO TO xxCELL WITH GRANT OPTION;
GRANT DBADM ON DATABASE xxCELL TO xxCELL;
GRANT USE OF BUFFERPOOL BP0 TO xxCELL;
GRANT USE OF BUFFERPOOL BP1 TO xxCELL;
GRANT USE OF BUFFERPOOL BP8K0 TO xxCELL;
```

Tables must be created after augmentation
- SQL templates generated by zWPSCConfig.sh & createDB.sh

createDB.sh - Create (& exec) sql files for DB2 Tables

- Copy {wps_smpe_root}/zos.config/samples/createDB.sh to working dir.
  - Edit Names, Locations, and desired actions:
    - Generate .sql files for DB2 Tables - WPS, BPC, CEI, & SIBs
    - Execute .sql to Create the Tables.
- .sql files created in {profile_root}/dbscripts/CommonDB/DB2zOSV8/<DB_NAME>/
  - createDatabaseX.sql creates database, storage groups
  - bpc.sql for BPC tables
  - ceidb.sql CEI tables
  - common.sql WPS (common) tables
  - sibAPP.sql SCA Application Bus tables
  - sibBPC.sql BPC Bus tables
  - sibCEI.sql CEI Bus tables
  - sibSCA.sql SCA System Bus tables

NOTE: Requires async terminal (telnet.) Will not run in OMVS, or Batch!

- Various Options to execute the .sql statements:
  - Use createdDB.sh, or ...
  - Convert to EBCDIC, Copy to MVS files, and use SPUFI or Batch jobs.

- Documented in help (type “createDB.sh ?”) and Redbooks
createDB.sh script - Help

- Help is available with: createDB.sh ?

```
In /shared/zWPS/V6R1/zos.config/samples/
directory
```

```
-DBCreate  Bypass Creating Database
+DBCreate  Create Database
-DBSqlid   Bypass Setting SQLID
+DBSqlid   SET CURRENT SQLID
-DBWPS     Bypass WPS
+DBWPS     Define WPS
-DBBPC     Bypass BPC
+DBBPC     Define BPC
-DBCEI     Bypass CEI
+DBCEI     Define CEI
-DBSIB     Bypass SIB
+DBSIB     Define SIB
*DBSIB     Drop/Define SIB
-DBPrefix  <Prefix> DataBase Prefix
+DBPrefix  <Prefix> DataBase Prefix
-DBScope   <Scope> DataBase Scope
+DBScope   <Scope> DataBase Scope
-gen       Run SQL
+gen       Regenerate SQL
```

```
createDB.sh +All -DBCreate
```

Running the createDB.sh script ...

- Copy createDB.sh & other samples to working directory
  
  cp /shared/zWPS/V6R2/zos.config/samples/* ~/wpswork/

- Modify for your server:
  
  DBGenerate=true
  DBPREFIX=B6
  DBSCOPE=C1
  DBJDBCClasspath=/shared/db2910_jdbc/classes
  DBUSER=sysadm1
  DBPASSWORD=sysadm1
  DBJDBCProperties=/u/user1/wpswork
  DBConnectionLocation=WG31DB2
  DBDelayConfig=false

- Run setupCmdLine.sh before invoking to set WAS_HOME:
  
  cd <profile_root>/bin
  . ./setupCmdLine.sh

- Run modified createDB.sh script from working directory:

  ./createDB.sh +All

- SQL generated in this directory:
  
  <profile_path>/dbscripts/CommonDB/DB2zOSV8/DB_Name/

- Output messages written to:
  
  <working_directory>/createDB/tmp/error.out & output.out

Period important to have WAS_HOME set
The ISC Configuration “Wizards”

- Create Cluster
- Bus. Space
- SCA
- CEI
- BPC
- BPC explorer

Deployment Environment (watch for this soon)

SCA Wizard

- ISC: <CLUSTER_NAME> > Service Component Architecture
- Configures service integration buses and messaging engines

- Set databaseName to DB2 Location name
- Set schemaName
- Uncheck ‘Create tables’
CEI Wizard

- Servers -> Clusters -> cluster_name
- Expand “Common Event Infrastructure Server” under “Business Integration”
- Click on Common Event Infrastructure Server
- Enable event infrastructure server check box.
- Correct the Schema names
  - CEI database to “B6CELL” and the
  - CEI Bus destination to “B6C1C”.

BPC Wizard

- Servers > Clusters >cluster_name
- Expand “Business Choreographer”
- Click on “Business Process Choreographer Containers”

- Database Instance set to DB2 location name
- Set Schema Name used by BPC tables
- Uncheck “Enable e-mail service”

- Expand Security section
- Set user IDs and groups
**Enabling the BPC Explorer**

- Servers > Clusters > cluster_name
- Under “Business Integration”
- Expand Business Process Choreographer,
- Click Business Process Choreographer Explorer.
- Click on “Add”
- Fill out the following screen:
  - Enable autostart
  - BFM REST API URL
  - HTM REST API URL
  - Enable reporting function

**Messaging Engine validation**

Verify data store schema for all SI Buses

- Service integration > Buses > bus_name > Messaging engines > ME_name > Message Store / Data store
- Verify Schema name:
- Verify Security
  - Users & Groups in bus connector roles
New applications, data sources & Buses

Many data sources defined

New applications installed

New buses
BPM Extensions
- Fabric
- Monitor
- Business Space

Extending Business Process Management in V6.2

- **WebSphere Business Services Fabric for z/OS V6.2**
  - IBM Business Services Foundation Pack – provides run-time envir.
  - IBM Business Services Tool Pack – provides design-time environ.
  - Industry Content Packs – provide pre-built assets for development

- **WebSphere Business Monitor V6.2**
  - Reports on business operations by processing events, calculating business metrics
  - Presents key performance indicators (KPIs) through business dashboards

- **Business Space powered by WebSphere**
  (Component of WebSphere Process Server for z/OS)
  - Integrate Web Interfaces for Business Management
**WebSphere Business Services Fabric for z/OS**

- **Configuration overview:**

  1. Copy Fabric artifacts using `copyfabric.sh` script
     - profileTemplates, WBSF.registrar
     - Create symbolic links for `/usr/lpp/webify/V6R2`
  2. Configure security – Local OS: RACF Users, Groups, EJBROLES
  3. Create Fabric DB & Tables – `define_db.sql`, `define_tables.sql`

**Post-configuration tasks:**

  1. Re-define Data source using non-XA DB2 Universal Driver
  2. Correct Fabric SI Bus data source schema name
  3. Map EJBROLES for Fabric Tools applications
  4. Update REST URL in `wbsfEndpoints.xml`
  6. Verify Fabric Configuration

See Chapters 5-7 in “z/OS Business Process Management V6.2 Production Topologies” SC24-7733

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**Business Space powered by WebSphere**

- **Configuration overview:**

  For standalone server
  - Created automatically

  For ND:

  1. Enable Widgets
     - Update `wpsEndpoints.xml` & `bpcEndpoints.xml` URLs
  2. ISC Business Space Configuration wizard
  3. Prepare & Execute Business Space DDL
  4. Define EJBROLE profiles & permissions
  5. Start applications
  6. Enable Business Rules
  7. Configure local Help
  8. Clear OSGI cache.

See Chapter 9 in “z/OS Business Process Management V6.2 Production Topologies” SC24-7733
WebSphere Business Monitor (WBM)
- Configuration overview:

- New with WBM V 6.2
  - KPI (Key Performance Indicators) History, Dynamic Alerts

- WBM Topology:
  - WBM does not run on z/OS (We chose Linux on System z)
  - WBM communicates via CEI Bus

- Installation tasks . . .
  - Create WBM data source & database tables
  - Install WBM nodes and profiles (scripts)
  - Create WBM Clusters (ISC wizards)
  - Configure WBM infrastructure (wsadmin scripts)
  - Install WBM support applications (Action manager, scheduler, REST API, Alphablox, Business space)
  - Configure security with federated LDAP
  - Configure WBM to use remote CEI server using a foreign bus link

See Chapter 8 in “z/OS Business Process Management V6.2 Production Topologies” SC24-7733
Appendix

• Other Extensions
• Installation Verification
• zSMPIInstall.sh details
• zWPSConfig.sh details
• Configuring Message Engines to use MQ Shared Queues
• DB2 Tools & Tricks
• Performance Measurement & Tuning
• Trouble-shooting

Other extensions

See z/OS Business Process Management V6.2 Production Topologies - SC24-7733

• Implement 64-bit mode in your servers
• Configure Message Engines to use MQ Shared Queues
• Configure HTTP Servers or Proxies
• Configure LDAP Security
• Clear the OSGI cache
• Backup Configuration ZFS datasets for each node.
• Troubleshooting Tips & Tools
Installation Verification for WPS on z/OS V.6.1
- using Techdoc WP101218

- Does the Server start, and are all SI Buses active?
- Web Service and Mediation Module deployment (BookOrderApp).
- AdminConsole – List the SCA Apps
- SCA runtime - Test BookOrderApp
- ESB Logging – Verify by looking in DB2 Tables
- CEI infrastructure - Enable events in BookOrderApp and testing
- CBE Browser – Examine events in the browser
- BPEContainer – Test with bpcivt application
- AdminConsole – Test Business Processes & Human Task functions
- BPCEXplorer - List & instantiate a BP & HT
- TaskContainer - Test with bpcivt

Running zSMPInstall.sh in Batch Job

- Can run the job from JCL as well:
  (Allows you to disconnect your telnet session)

    //B6WPSINS JOB 1, 'zSMPInstall 6.1', MSGCLASS=O, CLASS=A, USER=B6ADMIN, PASSWORD=B6ADMIN, TIME=NOLIMIT, REGION=0M
    //*************************************************************
    //SMPIINST EXEC PGM=IKJEFT01, REGION=0M
    //SYSPRINT DD SYSOUT=*  
    //STDOUT  DD SYSOUT=*  
    //STDERR  DD SYSOUT=*  
    //SYSTSPRT DD  *  
    //SYSTIN DD *
    bpxbatch sh +
    cd /shared/zWPS/V6R1/zos.config/bin; +
    export PATH=./:$PATH; +
    ./zSMPInstall.sh -smproot /shared/zWPS/V6R1 +
    -runtime /wavs61config/b6cell/nodea/AppServer -install
    /*
New directories with links and new links within existing directories

Running `zSMPInstall.sh`

```bash
cd /shared/zWPS/V6R1/pos.config/bin/
./zSMPInstall.sh -smproot <SMP_WPS_HFS> -runtime <app_server_root> \ -install
```

- ‘Installs’ WPS into your profile using many ant scripts, and Creates symLinks in `{app_server_root} => {wps_smpe_root}` dirs
- Log files written to `{app_server_root}/logs/wbi/` directory:
  
  ```
  2866 May 23 09:30 101SUpgradeServerAdminConsolePlugins.ant.log
  2715 May 23 09:30 101SWbiWebuiUpgrade.ant.log
  2659 May 23 09:30 102SUpgradeIsodeploy.ant.log
  240489 May 23 09:30 cmtInstall.log
  324 May 23 09:30 zSMPInstall.log
  4296 May 23 09:30 zSMPInstall.trace
  2840 May 23 09:30 100SUpgradeCoreAdminConsolePlugins.ant.log
  67328 May 23 09:30 99SDeployCoreAdminConsolePlugins.ant.log
  31 May 23 09:30 99SWbiProfileUpgrade.log
  4248 May 23 09:24 98SDeployServerAdminConsolePlugins.ant.log
  3545 May 23 09:24 98SDeployBPCAdminConsolePlugins.ant.log
  4637 May 23 09:24 90SInstallCEI.ant.log
  2875 May 23 09:24 90SUpdateJavaOptions.ant.log
  2908 May 23 09:24 91SConfigNoProfileFirstStepsCharset.log
  3609 May 23 09:24 90SConfigNoProfileFirstStepsWBI.ant.log
  3672 May 23 09:24 90SConfigNoProfileFirstStepsESB.ant.log
  3111 May 23 09:24 90SConfigureWSProfileForWBI.ant.log
```
Batch job to run augment (zWPSConfig) script

//B6AUGMNT JOB (\?,\?), 'Run augment JOB', MSGCLASS=O, CLASS=A,
// USER=B6ADMIN, REGION=0M, TIME=NOLIMIT
//***********************************************************************
//AUGMENT EXEC PGM=IKJEFT01, REGION=0M
//SYSTSPRT DD SYSOUT=* 
//SYSPRINT DD SYSOUT=* 
//STDOOUT DD SYSOUT=* 
//STDERRR DD SYSOUT=* 
//SYSTSSIN DD *

bpxbatch sh +
cd /wasv61config/b6cell/nodea/AppServer/bin; +
export LIBPATH=/shared/db2810/jcc/lib:$LIBPATH; +
./zWPSConfig.sh -response /u/user1/wpswork/b6Profile.rsp +
-augment
/*

Logs created by zWPSConfig.sh ...

Standard Output directs you to
<app_server_root>/logs/wasprofile/wasprofile_augment_default.log
Configuring Message Engines to use MQ Shared Queues

1. Add STEPLIBs for MQ libraries to Server procs
2. Set program attribute bits for JMS runtime libraries
3. Create new WebSphere MQ Server in ISC for Shared Queues
4. Add new Bus member to Fabric SI bus with Queue Destination
5. Change existing JMS resource for inbound Fabric Queue to use the new WebSphere MQ Queue.
6. Recycle the servers.

See section 5.2.2 in “z/OS Business Process Management V6.2 Production Topologies” SC24-7733

DB2 Tools

DASD space used by WPS data bases

DB2 Tablespaces are backed by VSAM datasets have the following form…
Vcatname.DSNDBD.dbname.tsname.y0001.znnn where …
Vcatname - is the Integrated catalog name or VCAT.
DSNDBD - indicates it is the data component of the VSAM cluster.
database - is the database name.
tspace - is the table space name or index name.

• Use ISPF option 3.4 (list dataset names using the DB2 catalog name (VCAT) then ‘sort tracks’ to display the largest Datasets Matching WPSDB2.*

<table>
<thead>
<tr>
<th>Command ==</th>
<th>sort tracks</th>
<th>TRACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPSDB2.DSNDBD.B6ESBDB.ESBCL OB.I0001.A001</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>WPSDB2.DSNDBD.B6WPSDB.BBLOB2TS.I0001.A001</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>WPSDB2.DSNDBD.B6WPSDB.TICKETTS.I0001.A001</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>WPSDB2.DSNDBD.B6BPEDB.SCHE1Y3Y.I0001.A001</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>WPSDB2.DSNDBD.B6ESBDB.ESBTS.I0001.A001</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>WPSDB2.DSNDBD.B6EVT.BLOB00RV.I0001.A001</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>
DB2 Admin Utility:

- TSO Logon as sysadm1 – specify ‘Command ==> db2810n’ in Logon Panel
- Go to ISPF option ‘6’ (TSO command) and type: adbl (ADBL)
- Select ‘1’ (DB2 Catalog)
- Select ‘D’ (Databases), and you will see all the Databases defined.
- Type ‘T’ next to any of the Databases (e.g., B6CELL) and you will see the Tables defined in that DB.

DB2 Admin Utility:

- TSO Logon as sysadm1 – specify ‘Command ==> db2810n’ in Logon Panel
- Go to ISPF option ‘6’ (TSO command) and type: adbl (ADBL)
- Select ‘1’ (DB2 Catalog)
- Select ‘D’ (Databases), and you will see all the Databases defined.
- Type ‘T’ next to any of the Databases (e.g., B6CELL) and you will see the Tables defined in that DB.

DB2 Batch Jobs (DSNTEP2) or SPUFI

Batch Jobs:

//B6CRDB JOB 1,'CREATE DBS',CLASS=A,REGION=0M,MSGCLASS=H
//IKJSTEP EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPT DD SYSOUT=*  
//SYSSDUMP DD SYSOUT=*  
//SYSPRINT DD SYSOUT=*  
//SYMSSIN DD *  
DSN SYSTEM(DSN8)
RUN PROGRAM(DSNTEP2) PLAN(DSNTEP81) -LIB('DSN810.RUNLIB.LOAD')
END  
//SYMSSIN DD *  
CREATE STOGROUP B6DBSTO VOLUMES ('WSL001') VCAT B6WPS; 
CREATE DATABASE B6CELL STOGROUP B6DBSTO... . . .

SPUFI:

- TSO Logon as sysadm1 – specify ‘Command ==> db2810n’ in Logon Panel
- In ISPF, Type ‘DB2’ to get to the DB2 panel, and then Type ‘1’ for SPUFI
- Enter a DATA SET NAME ..=> in option ‘1’ such as ‘USER1.WAS.CNTL(SELECTX)’ and hit enter twice.
- Enter DB2 select statements such as the following, and hit PF3 to save them, and then Enter to execute them, and to see the results...

select * from SYSIBM.SYSTGROUP ;
select name, creator from SYSIBM.SYSDATABASE ;
select name, creator from SYSIBM.SYSTABLESPACE WHERE DBNAME='B6BPEDB';
select name, creator from SYSIBM.SYSTABLES WHERE DBNAME='B6BPEDB';
**Performance - TUNING CHECKLIST**

- z/OS system
- WebSphere Application Server
- Process Server
- Common Event Infrastructure
- Business Process Choreographer
- Messaging and Message Bindings
- Database
- Java
- Application

**TUNING PARAMETERS**

- Tracing and logging flags
- Java tuning parameters
- Workload Profile
- Workload Manager Service Class
- MDB ActivationSpec
- MQ Listener Port
- MDB Throttle
- Thread Pool Sizes
- JMS Connection Pool Sizes
- DataSource Connection Pool Size
- DataSource Prepared Statement Cache Size
- Messaging Engine Properties
- Minimize security
- Disable automatic synchronization for ND
- Run production servers in production mode
TUNING PARAMETERS – Advanced Tuning

- Tracing and Monitoring considerations
- Tuning for Large Objects
- Tuning for Maximum Concurrency
- Messaging Tuning
- Web Services Tuning
- WebSphere MQ Tuning
- Make judicious use of tracing
- Business Process Choreographer Tuning
- WESB Tuning
- WebSphere Business Monitor Tuning
- Database: General Tuning
- Database: DB2 Version 9.1 for z/OS Specific Tuning.
- Advanced Java Heap Tuning
- WBSF Tuning

Common Problems:
- Spellling, TYping, & Following directions…
  - AppServer up (when it shouldn’t be)
  - Scripts not run in the correct order
- Scripts interrupted
- Space exhausted in configuration HFS (& /tmp), or DB2 volumes
- Authorization problems (wrong UserID)
  - File/Directory - Ownership/Permissions

Skills Required:
- MVS System Programming: ISPF, SDSF, RACF, CommServer, etc.
- UNIX commands, Scripts, & Tools - Finding & using Logs & Traces
- DB2 Administration
- Experience, Contacts & Patience.
References ...


**Information Center:**
  - Includes InfoCenters for Business Space, Fabric, and Business Monitor
- **IBM Education Assistant**
  [http://publib.boulder.ibm.com/infocenter/ieduasst/v1r1m0/index.jsp](http://publib.boulder.ibm.com/infocenter/ieduasst/v1r1m0/index.jsp)
  - Look under WebSphere Server => V6.1 for z/OS, V6.2

**Techdocs**
- WP101084 “WebSphere for z/OS - Feature Pack for Web Services”

**RedBooks**
- REDP-4388 WebSphere Process Server for z/OS: Configuring a ND Environment
- SC24-7703 z/OS Business Process Management V6.1.2 Production Topologies
- SC24-7733 z/OS Business Process Management V6.2 Production Topologies