

ITSO zSeries Workshop Tour 2005

Problem Determination WebSphere for z/OS V6



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Who is the workshop for?

- System Programmers & Administrators working with Websphere for z/OS V6
- targeted towards those who need to
 - identify problems,
 - analyze them and
 - fix them

in an efficient way to deliver good support for the WebSphere environment

- aimed to assist
 - IBM support and
 - technical professionals as well as
 - Java developers who work in this environment



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What is the workshop about?

1. Problem Determination Methodology
2. Skills needed for PD
3. Contacting IBM
4. Problem areas and concerns in production
5. Typical problem symptoms
6. Diagnostic flowcharts for PD

Part I
before lunch break



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What is the workshop about?

7. Means and tools for PD
 - WebSphere commands
 - Logs, traces and dumps
 - Other diagnostic tools
8. Problem avoidance in phases:
 - Installation and Configuration
 - Migration and Coexistence
 - Application Deployment
 - Applications in Production
9. PD Web Sites

Part II
after lunch break



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This presentation is based on the Redbook draft, SG24-6880-02

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IBM
5054 7/30/05
**Problem Determination
on WebSphere for z/OS**

Methodology
Symptoms and solutions
Dzesses of helpers



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Module 1: Problem Determination Methodology

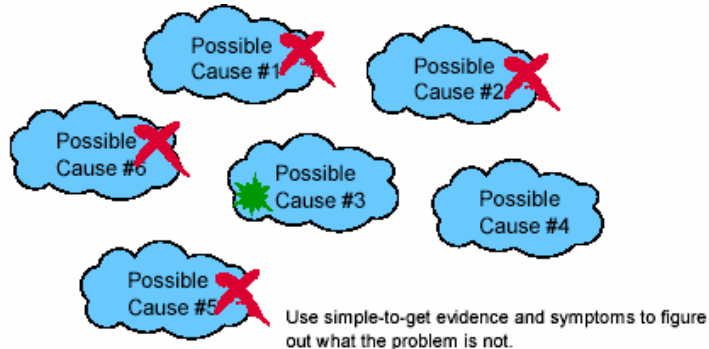


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What PD/PSI is

The **goal of PD/PSI**, in its most basic sense, is to **get to the root** of a problem. It is similar to what a programmer might call debugging, but on a much larger scale.



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What PD/PSI is not

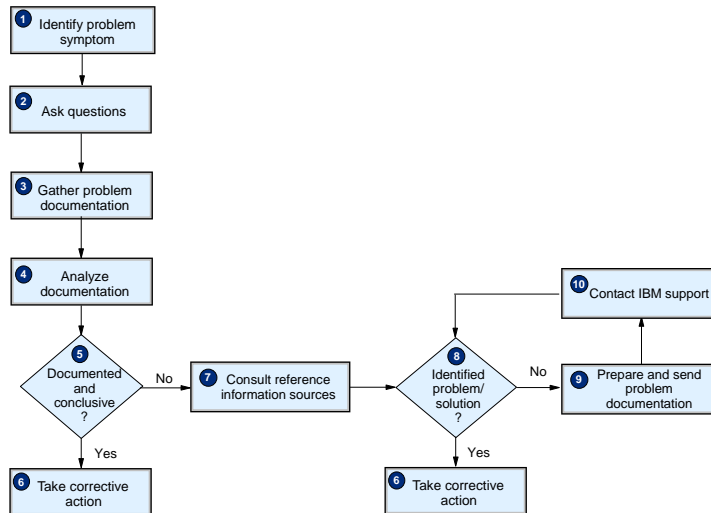
- **Poor system performance**, for instance, can definitely be a problem but the process of checking and **solving normal performance problems is often referred to as Tuning.**
- **Tuning a system** involves its own separate set of tools and processes relating to obtaining optimum performance.
- **Understanding the difference** between **PD/PSI** and **Tuning** is very important and knowing when to use what will save you a lot of time.
- **PD/PSI fixes functional problems** while Tuning means adjusting the system and/or application.



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General PD flowchart



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Keep in mind for PD on z/OS

- complex software product involving many z/OS components
- components require many environment parameters and variables to be set to a specific value
- User-set components require consistency throughout environment
- **Not all problems are WebSphere for z/OS related**
- always keep detailed, up-to-date records of
 - network topology
 - high-level application description
 - detailed model of your application
 - detailed model of how your application interacts with other IBM products, tools, or third-party SW
 - log of your setup
 - e-fixes installed
 - log of your hardware specifications
- history log of changes better to retrace steps than a simple log of the current environment



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Module 2: Skills needed

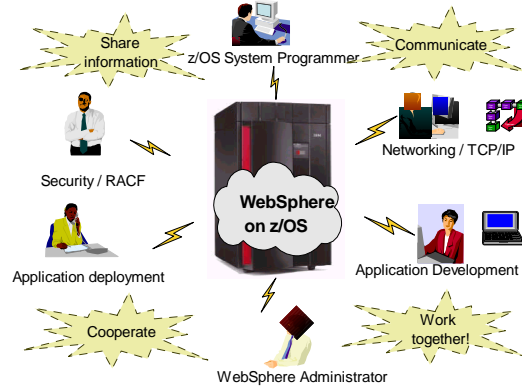


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System Skills needed

- expertise in many different areas required
- work closely together with system support and application developers



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System Skills needed

to successfully install and establish a runtime of WebSphere for z/OS

- z/OS
- UNIX Systems Services
- TCP/IP
- RACF (or equivalent)
- Logger
- Parallel sysplex
- RRS
- ARM
- WebSphere



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Application Skills needed

The people who are deploying and running the application should:

- Understand the WebSphere for z/OS structure
- Understand the J2EE architecture
- Be able to use the Admin Console
- Be familiar with and capable of setting trace settings
- Be able to understand output of JOBLOG, WebSphere for z/OS error log, and trace output
- Work closely with system programmers for WLM
- Work closely with the Security Administrator



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Application Skills needed

- Work closely with application developers
- Be familiar with USS and comfortable using the shell
- Be familiar with their TCP/IP setup

Optionally:

- Work closely with the DB2 Administrator, MQ administrator, etc. in case of problems with data sources

No one person can possess all these skills. It takes a team of specialists to set up the WebSphere runtime and run the server. See:
<http://www.ibm.com/services/learning>



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Module 3: Contacting IBM

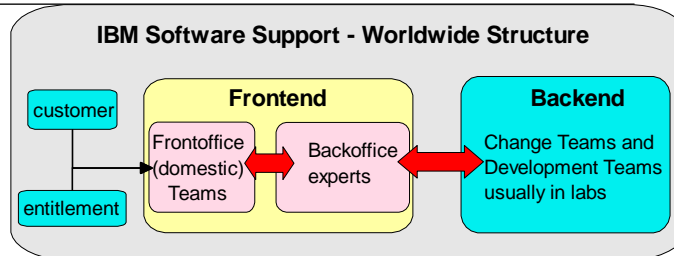
<http://www.ibm.com/planetwide>



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IBM Support Structure



A problem is reported via a
Problem Management Record = **PMR**

- **Frontend** Support Personnel with broader skills about IBM software products
- **Backend** with more in-depth skills (i.e. IBM software laboratories)



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Before Contacting IBM

benefit immediately from IBM's extensive self
help support Web-site

[http://www.ibm.com/software/webserver
/appserv/zos_os390/support](http://www.ibm.com/software/webserver/appserv/zos_os390/support)

- download fixes
- search on keywords
- find how-to information

TechDoc "Steps to getting support for
WebSphere Application Server" at:

[http://techsupport.services.ibm.com/guides
/handbook.html](http://techsupport.services.ibm.com/guides/handbook.html)



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Before Contacting IBM

Define the problem

Being able to **articulate the problem and symptoms** before contacting software support will expedite the problem solving process. It is very important that you are as **specific as possible** in explaining a problem or question to IBM software specialists.

Document the Problem

- Date and Time
- User name or user ID involved
- LPAR name, server name, jobname or STC name, etc.
- **Recent changes** that have been made to your processing environment, such as HW or SW that has been added or removed
- System configuration updates



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Before Contacting IBM

Determine if this situation has **already been reported**

The problem might already be documented and resolved. Check these product support resources to see if the answer you are looking for is available:

1. Information Centers and Release Notes
2. Software and hardware prerequisites
3. WebSphere Application Server and related sites
4. MySupport
5. Link2000
6. DeveloperWorks WebSphere



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Open a PMR

Before creating a Problem Management Record (PMR) see Mustgather documents (search at IBM support web page)

Information necessary when opening a PMR:

- Customer number
- Contact address
- OS name
- OS version
- product name and the Component ID
WebSphere Application Server for z/OS V6
[5655-N01](#)



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Exchanging Data with IBM

common and preferred way to exchange data:

- to **send it to an FTP server**
- **Compress** large files or data sets before sending them to any FTP server
- Compressed data **sent in binary** instead of ASCII format
 - TRSMAIN/Packlib z/OS files
 - The tar command USS files
 - ZIP file PC files
- Sent to ftp.emea.ibm.com unless instructed otherwise
- additional information about file upload and download procedures at:

<http://www.ibm.com/de/support/ecurep/mvs.html>



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Exchanging Data with IBM

Naming conventions

- when sending data to an FTP server in IBM, to give an indication on the file type or data set
- indication on the PMR number should be given

File/dataset name	Comments
PMR12345.CEEDUMP	This data set belongs to PMR #12345 and contains a CEEDUMP.
PMR12345.CEEDUMP.TERSED	This data set belongs to PMR #12345, contains a CEEDUMP and is compressed using TRSMMAIN.
PMR12345.CONFIGFILES.ZIP	This data set belongs to PMR #12345, contains configuration files and is compressed on the PC using a ZIP program.



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Module 4: Problem Areas and Concerns



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Troubleshooting problems in runtime

Most common causes

- 1. Recent changes** - not properly tested before any code or configuration change
- 2. Recent operational activities** starting and stopping of components, or running other programs and tools
- 3. Recent users activities** unusual request traffic coming from end users and system users



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Troubleshooting problems in runtime

4. Growing resource constraints

fluctuating and even volatile workload, new business requirements, and advances in underlying technologies

5. Unexpected resource constraints

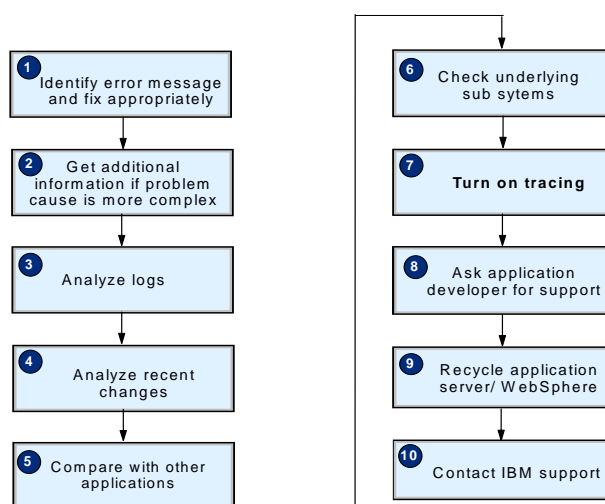
shortage of CPU MSUs, memory file system space, session pools or thread pools



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The Troubleshooting Process



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Troubleshooting Process in words 1/2

- 1) If there is an error message that clearly identifies the cause of the problem then fix the problem.
- 2) If the problem requires more information to identify the source of the problem, then retrieve it and fix the problem.
- 3) Review the SYSLOG, Server Joblogs & SYSPRINT, and WebSphere for z/OS error logs for error messages.
- 4) If there is still no evidence of an error symptom, find out what had changed since the application last worked correctly.
- 5) Check to see if other applications work or if they also exhibit the same problem.



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Troubleshooting Process in words 2/2

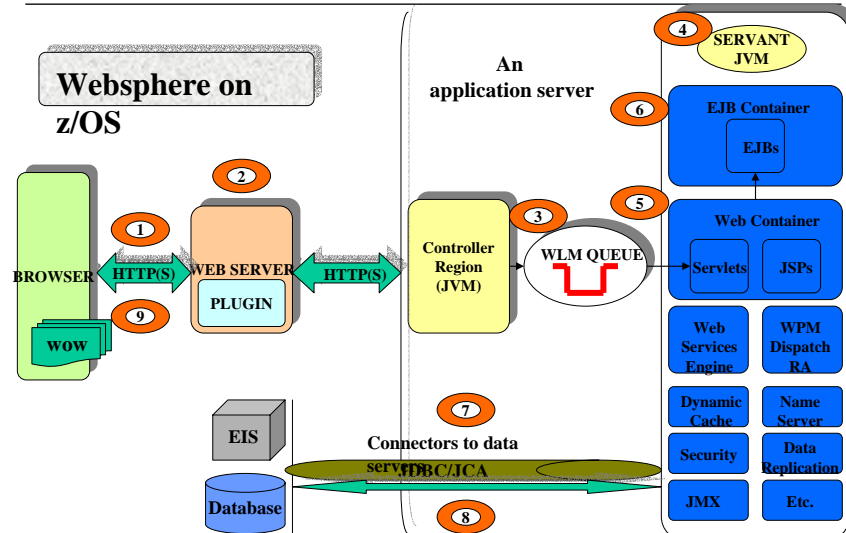
- 6) If other applications do not work, it might be a system problem. Check TCP/IP, DNS, WLM, z/OS resources, as ADSM, JES, DB2, etc...
- 7) If you still do not know the cause of the problem, turn on tracing.
- 8) If you get incorrect output or other uncommon response from your application then it could be an application problem. Ask your application developers for help.
- 9) Recycle the application servers, and the WebSphere for z/OS system as the last resort, because it usually requires coordination.
- 10) Contact IBM support



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Request/Response Flow for PD



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Problems in presentation tier (1,2,3,9)

Can't get to an application

1. Make sure that you don't have any typo error in URI
2. all HTTP error codes 4xx are client error codes, check IBM support pages for help
3. also see reference and descriptions from the W3 Consortium's site:
<http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html>
4. Check to see if the Web Server has been started (SDSF, URL, ping)
5. Start Web Server and verify application access
<http://<hostname>/snoop>
6. Check if application can be accessed in Web Container
<http://<hostname>:port/snoop>
7. Potential Plug-in problem due to incorrect or corrupt changes made to the Plug-in file (restore/backup config file)
8. Swap Plug-in configuration file

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Typical problems in Presentation tier

Can't get to an application (cont.)

9. Analyze differences in Plug-in files to fix problem
10. Regenerate plug-in file from Admin Console
Go to Login => Servers => Web Servers and click Generate plug-in
11. Check the servant job in SDSF if request gets passed WebServer but application does not respond
12. Start application server or select running servant's SYSOUT and check if any exceptions logged
If the server is up but the application is not responding, usually that means it has run into an Out of Memory (OOM) problem
13. use the Admin console to verify status of the app server (Go to Administrative web console => Expand Troubleshooting => Logs and Trace)



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Typical problems in Presentation tier

Browser rendering static content incorrectly

- Due to source file being transferred to z/OS in ASCII from workstations
- HFS handles files in EBCDIC and any data at the presentation layer must be in ASCII
- verify content on workstation
- Set transfer mode to bin
- retransfer file and verify

Browser: erratic response, inconsistent and quirky interface

- Sometimes due to older (outdated) browsers
- check for updates, fixes and for a list of supported browsers at:
<http://www.ibm.com/software/webservers/appserv/doc/atest/prereq.html>
- And InfoCenter at:
http://publib.boulder.ibm.com/infocenter/wasinfo/v6r0/index.jsp?topic=/com.ibm.websphere.base.doc/info/aes/ae/rtrb_plugincomp.html



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Problems in control tier (4,5,6)

Majority of application problems as this is WebSphere engine (Web and EJB container)

Loss of session affinity

i.e. If you have to re-logon and re-enter passwords within same application

- Plug-in configuration file contains CloneId parameter for session ids (default)
- Check to make sure cookie writing is allowed in your browser and client firewall software

Program Loop

i.e. request not responding, hanging followed by a time-out error

- Usually a code problem
- Find thread number repeatedly logged in SYSOUT
- Find phrase/event/action repeatedly logged in SYSOUT
- Contact application developer for help (class and method in trace)



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Problems in model tier (7,8)

Application data and its authorization

Application not able to access data

1. The user of a request has insufficient authorization granted for a certain resource
 - Check job logs for authorization failure messages
 - Contact security administrator to grant appropriate permissions
2. Connection to EIS or datasources has problems
 - Check SYS logs if resource mentioned
 - Check JDBC log if DB2 access
 - Check specific subsystem logs (or with administrator) if CICS, IMS or other EIS resources access
 - Verify properties and connection



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Security issues

Some common runtime activities can cause **security issues**, as a result of:

- Upgrading to a new maintenance level
- Adding of new security profiles, resource types, etc.
- Adding of new application servers
- Adding of WebSphere for z/OS resources
- Adding of new applications
- Adding of new application resources
- Adding of new users or operators
- Expiration of various security credentials



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Security issues

Usually troubleshooting security issues is no different from other kinds of problems

- look for symptoms in messages, job logs, traces, dumps, etc.
- **telltale symptoms** of security problems are:
 - Security violation
 - No permission
 - Access denied
 - Invalid logon ID, user ID, password, etc.
 - Password, token, security credential, etc. expired
 - Insufficient privilege

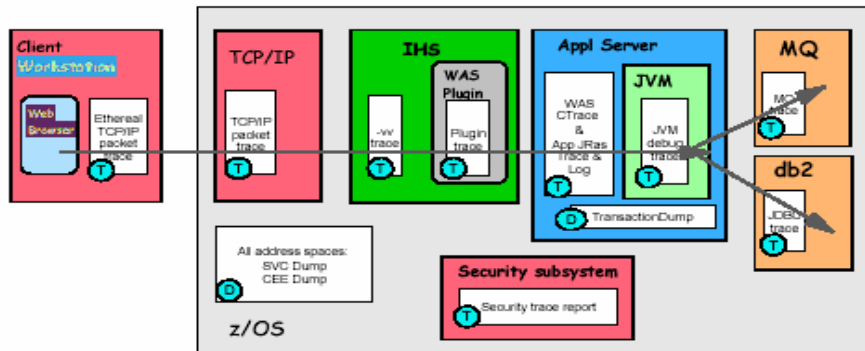


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Tracing the runtime environment

This figure shows some of the most **useful tools**



T stands for **trace** and D for **dump**.



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Tracing the runtime environment

recommended steps to avoid extensive output creation and unnecessary strain to the system:

- If **runtime** problem or communication problem between servers: **enable WebSphere CTRACE**
- If **application** problem: **enable JRAS tracing**
- If **naming** problems (**resources lookup**), use **dumpNameSpace.sh** in the OMVS shell
- **Verify runtime** alright with traces turned on
- **Drive a simple application** function to recreate the error
- Try another application function, or complex request
- **Check the error messages** and symptoms
- **compare the traces** with a "working" application
- use JVM messaging via **JVM debug option** to get more detail about Java application
- For TCP/IP packet tracing, **use IP addresses and port numbers as filters**



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Limit trace for PD

- **Minimize the amount of traces** produced whenever possible
- Consider default settings create an enormous amount of information
- **Turn on tracing for only a few specific components**
- **Turn on tracing for only a short interval**
- Use z/OS operator console command to dynamically turn on and off tracing
- Ask you application developer for more details and assistance

NOTE: For occasional or rare occurrences of region hung or crashes, which require tracing for prolonged hours or days, remember that **turning on trace has a severe impact** on system performance as well as requires huge disk or spool space.



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Module 5: Symptoms



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Types of Symptoms

- Messages and Codes
- Incorrect Output
- Browser Problems
- Abends
- Hang
- No response
- No resource access
- Java Exceptions
- Timeout
- Does not start/stop
- Performance Problems/high CPU



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Messages and Codes

In nearly all cases a message is issued if any problem occurs. You can find these **messages** in various places. The most common are:

- Browser
- Error log
- Console
- Joblog or Syslog

Other places to find messages are traces and dumps.



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Messages and Codes

Information is in the "**WebSphere for z/OS InfoCenter**" on the WebSphere for z/OS library site :

<http://www.ibm.com/software/webservers/appserv/zos/os390/library/>

BBO	Identifies it as a WebSphere for z/OS message
DYNA	Identifies it as a WebSphere for z/OS Dynamic Fragment Cache message
c	Indicates the component
nnnn	A unique identifier
t	Severity (Information, Warning or Error)



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What are exceptions

- Exceptions are errors that came from anticipated normal day-to-day operations of a Websphere environment. For example a class missing, out of space condition on logs, a requested server is down.
- Exceptions also reflect missing or inadequate resources that the system needs to fulfill its requests, or to keep itself from performing. A request can be an inquiry, update or browse function initiated from a client.
- Exceptions are logged in SYSLOG by default or SYSPRINT.



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The types of exceptions

There are three types of exceptions:

1. Exceptions from native code that supports the Websphere z/OS environment
2. Exceptions from Websphere for z/OS Java code itself
3. Exceptions from Websphere applications that are hosted on the platform



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The causes of exceptions

1. Application code bugs
(bad code, incorrect, invalid properties file, etc...)
2. Environment's limits
(out of memory due to inefficient throughput and/or excessive consumption)
3. Configuration errors
(resources misconfigured)
4. System code bugs from IBM or other vendors



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Java exceptions

When a **Java exception occurs**, the Java run time will display the **stack trace** in the **ncf.log** file for the plug-in environment or SYSPRINT for the J2EE server.

However, SYSPRINT must be set in the Manage WebSphere Variables panel within the Admin Console for this message to be appear in SYSPRINT.

You can dynamically change where the trace is sent by issuing the z/OS Modify (**F**) command:

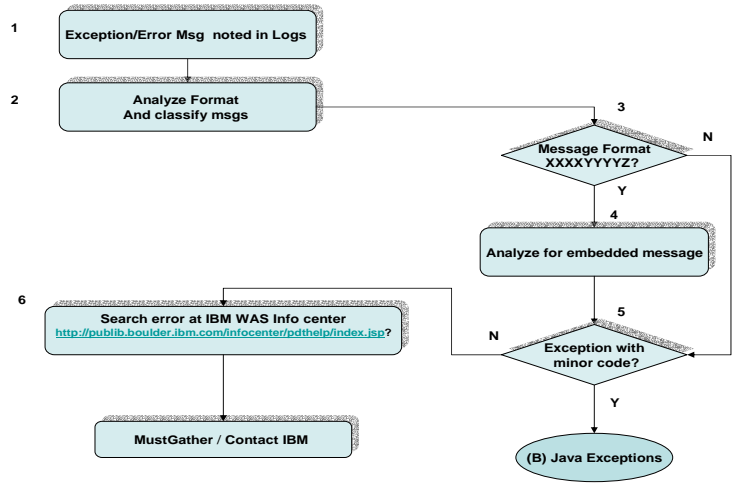
```
F <server-proc>, TRACETOSYSPRINT=YES
```



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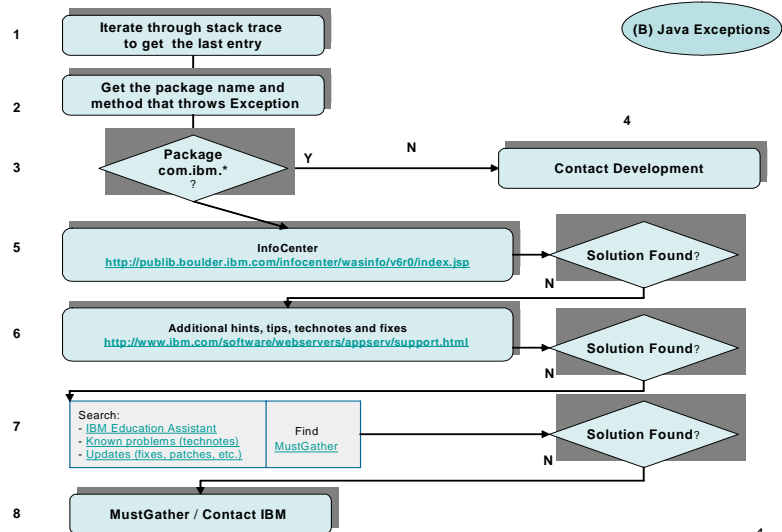
Symptom flowchart (1 of 2)



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Symptom flowchart (2 of 2)



A Java trace as an exception occurs

B

A

```
SQL Exception: Schema 'TRADER' does not exist at
db2j.ai.j.generateCsSQLException(Unknown Source) at
db2j.ai.g.wrapInSQLException(Unknown Source) at
itso.j2ee.trader.servlet.TraderSuperServlet.handlePerformLogon(TraderSuperServlet.java:427) at
itso.j2ee.trader.servlet.TraderSuperServlet.performTask(TraderSuperServlet.java:303) at
itso.j2ee.trader.servlet.TraderSuperServlet.doPost(TraderSuperServlet.java:78) at
javax.servlet.http.HttpServlet.service(HttpServlet.java:Compiled Code) at
javax.servlet.http.HttpServlet.service(HttpServlet.java:Compiled Code) at
com.ibm.ws.webcontainer.servlet.ServletWrapper.handleRequest(ServletWrapper.java:Compiled Code) at
com.ibm.ws.webcontainer.servlet.CacheServletWrapper.handleRequest(CacheServletWrapper.java:Compiled Code) at
com.ibm.ws.webcontainer.WebContainer.handleRequest(WebContainer.java:Compiled Code) at
com.ibm.ws.webcontainer.channel.WCChannelLink.ready(WCChannelLink.java:Compiled Code) at
com.ibm.ws.http.channel.inbound.impl.HttpInboundLink.handleDiscrimination(HttpInboundLink.java:Compiled Code) at
```

C

1



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Example details

- In this example the JMS resource name was missing resulting in the exception, i.e., this class EOFException, reaches and end-of-file when parsing for the resource value.
- You can go to the admin console and add it as shown in next slide.

Go to Admin console > Resources > JMS Providers > Websphere MQ > Websphere MQ Connection Factory > Connection Factories > New



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Adding a JMS MQ connection factory



- The required items for adding a connection factory after you click “new” are:
Name and JNDI name



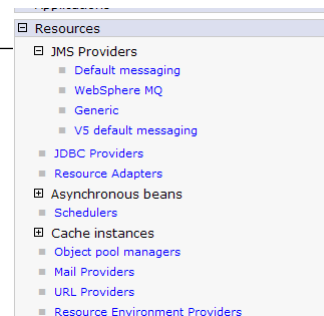
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Additional notes

The two most frequent causes of Websphere exceptions:

1. Configuration problems
 - usually if you do not get a response
 - package and class name give a clue – what resource
 - talk to Administrator or use Admin console
 - all resources configurations under “Resources” pane



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Additional notes (2)

2. Code problems

- usually if you get incorrect or unexpected results
- often package name and class name that take the exception - point to exact problem area
- Java naming convention fairly descriptive
- If not, talk to development
- Sometimes not straightforward



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Common problems for this symptom

"Common" causes of exceptions:

- Most of them came from the fact that a value for an expected variable is 'null' or incorrect.
- All Java problems take exceptions at runtime.
- It is usually configuration scripts and application code looking for missing resources that trigger exceptions.
- There are also IBM and third-party code bugs because they do exist.



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What is the workshop about?

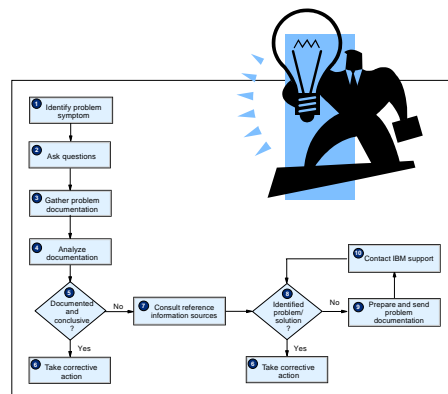
1. Problem Determination Methodology
2. Skills needed for PD
3. Contacting IBM
4. Problem areas and concerns in production
5. Typical problem symptoms
6. Diagnostic flowcharts for PD



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Module 6: Diagnostic Flowcharts for PD



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Abend

When a program runs into an unexpected and unhandled condition, it may call the **Recovery Termination Manager** (RTM) to issue an **abend** (*abnormal end*). In most cases the operating system will create a dump for the task before it is automatically purged from the system.

Most abends come with some symptoms, such as messages and codes that give some hints about the problem. Search for known problems.

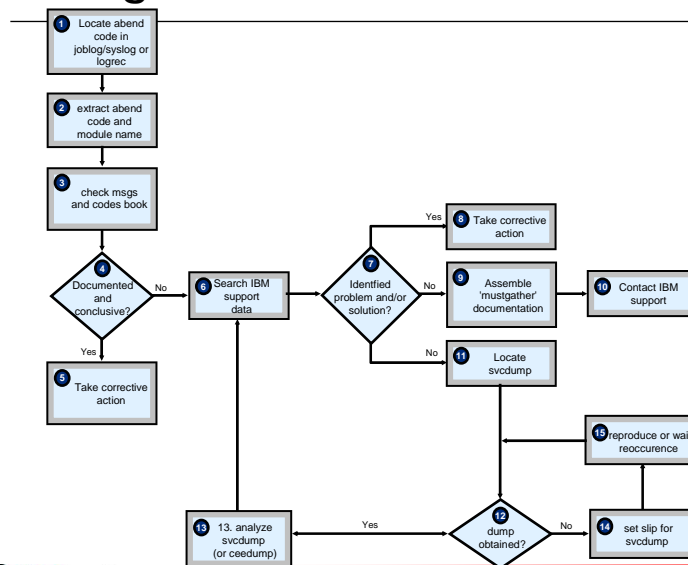
Abend Code	Issuer
CC3	Daemon processing failure
DC3	Control region processing failure
EC3	Server region processing failure



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Diagnostic flowchart for "abend"



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The abend flowchart in words

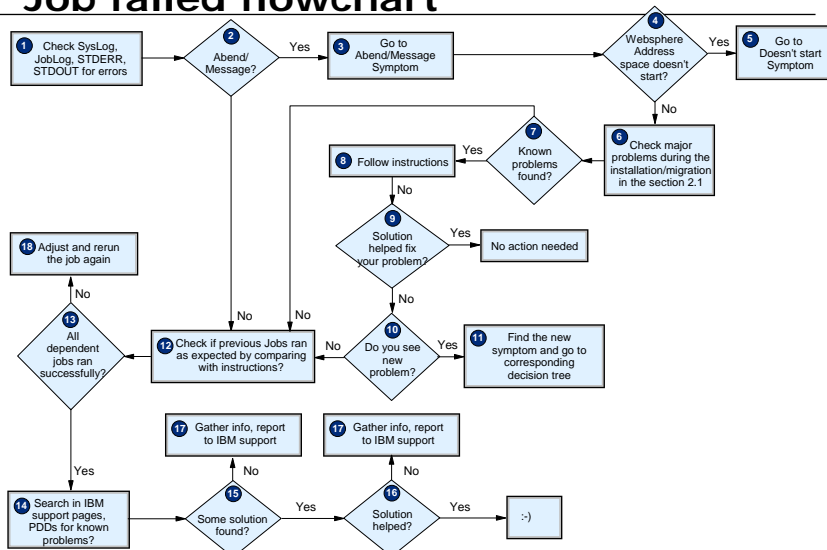
- issued by either the z/OS operating system or websphere
- found in the websphere server region joblog
- reason code associated - documented in the Infocenter
- issued by z/OS then documented in MVS System Codes manual SA22-7626. e.g. 0C4
- Sometimes name of the module that issued the abend and an svcdump may be needed to determine cause
- SVCdump is a core unformatted dump - analyze it after formatted using IPCS
- sometimes necessary to find the related method name - examine the traceback data
- If SVCdump is not automatically generated then set a slip to capture a dump on re-occurrence of the problem - MVS SET SLIP command



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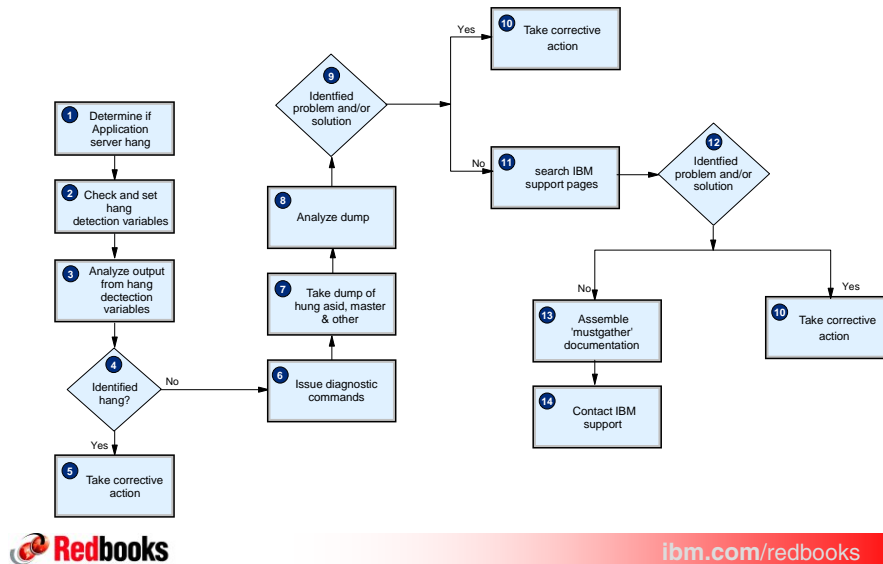
Job failed flowchart



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Hang flowchart



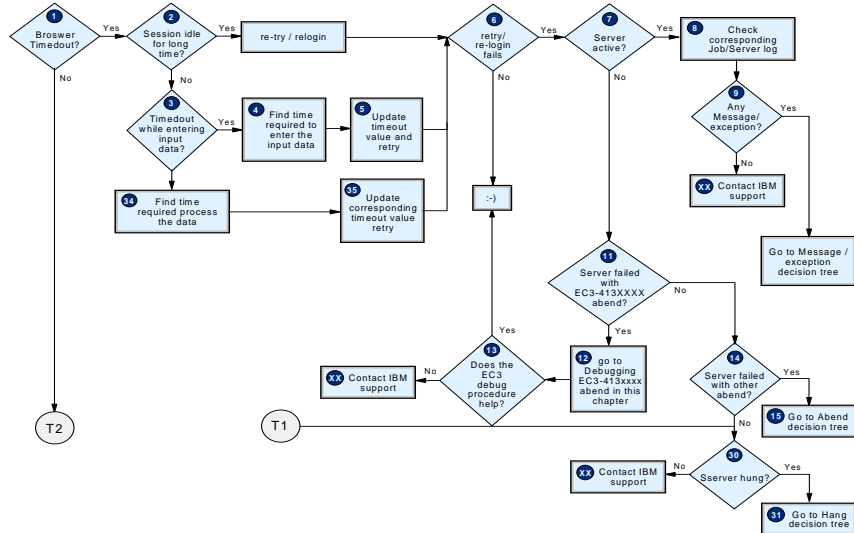
Hang and Loops

A loop will not always mean that a function stops working. In some cases things will continue to work fine.

Nevertheless it means that some tasks within the address space will continue to consume system resources without producing the expected result.

Without a trace, loops can be hard to find unless the looping task blocks other processes.

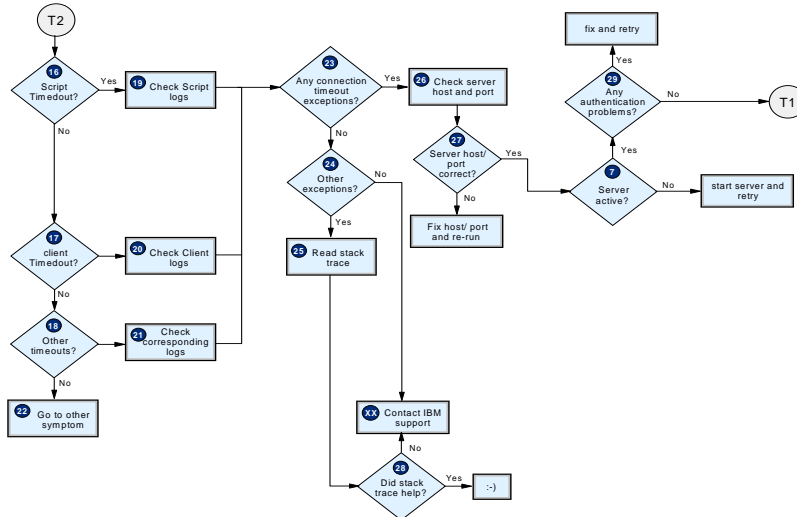
Timeout



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Timeout 2



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Troubleshooting application server timeout

A **timed out application server** is a **common problem** with a wide variety of causes. Although you can alter time-out values, this usually will only lead to postponing the problem occurrence or lower system or application performance.

Abend reason code	Explanation
04130002	A transaction time-out
04130003	Hung while servant currently still copying the request from controller
04130004	WLM queue time-out
04130005	A transaction time-out but no current request associated with the transaction
04130006	Controller thread encountered a problem while processing a request
04130007	An HTTP output time-out
04130008	MDB request time-out



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Troubleshooting application server timeout

Get a **good understanding of a time-out scenario** prior to any action such as increasing the time-out values. Ask yourself the following questions:

- Has the request been **dispatched by WLM** queue and placed into the servant region?
- **Did the thread wait** for an external operation to complete, such as networking, file IO, DB2, MQ, etc.?
- worker threads...?
- Are **resources constrained**, like a shortage of CPU or memory?



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Troubleshooting application server timeout

In order to **determine the cause for the time-out problem** follow these steps:

- 1. Gather information** in the joblogs of servant and controller regions:
 - – Abend code and reason code
 - – The time when the time-out occurs
 - – STC numbers, ASIDs of controller and servant regions
 - – Any other symptom messages from subsystems and infrastructure
- 2. Gather the SVC dump** that accompanies the abend EC3.



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Troubleshooting application server timeout

- Use **IPCS** to analyze the **SVC** dump
 - Use IPCS to **find out which TCB** and TCB pointer has the ABENDEC3 by issuing:
 - IP SUMM format asid(x"###")
 - With the TCB pointer, use IPCS again to **find out date and time** stamps:
 - IPVERBX CBDATA 'ASID(xxx) TCB(yyyyyy)'
 - • Time request was received in controller region.
 - • Time request was queued to WLM queue.
 - • Time request will be expired.
 - • Time request was received in servant region.

From these timestamps items you can **determine how long the request was queued** in WLM, prior to be dispatched into a servant region.



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Troubleshooting application server timeout

4. If the request was queued in WLM for a long period of time, you need to **inquire why it took so long** for the thread to get dispatched into the servant region. This could be a throughput problem or not enough threads or not enough servant instances.
 - You need to **look at system status**, RMF data, WLM classification of work
 - Based on the findings, you may need to **do performance tuning and monitoring**.
 - **Review the application workload characteristics** to determine the peak load.
 - **Review the number of total worker threads** if there are enough threads for handling the peak load.
 - **Review the system resources**, such as CPU, memory, etc.



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Troubleshooting application server time-outs

5. If the request was dispatched into the servant region, you need to **inquire what was the thread doing**. Use the following tools to investigate what the timed out thread was doing:
 - **IP VERBX LEDATA 'ASID(xxx) TCB(yyyyyy) CEEDUMP'**
 - **IP VERBX LEDATA 'ASID(xxx) NTHREADS(*)'**
6. Use the **svcdump.jar** tool to analyze the SVC dump. This tool formats all ASID in the SVC dump and searches for TCB that timed out (in the ASID). This will give you the Java perspective of the thread that timed out.



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Troubleshooting application server timeout

7. Check if the thread got stuck in a wait for some time due to an external operation by DB2, WebSphere MQ, networking, file IO, etc. Or if it is looping inside, as during **JVM garbage collection**, processing application code or class library code, etc.

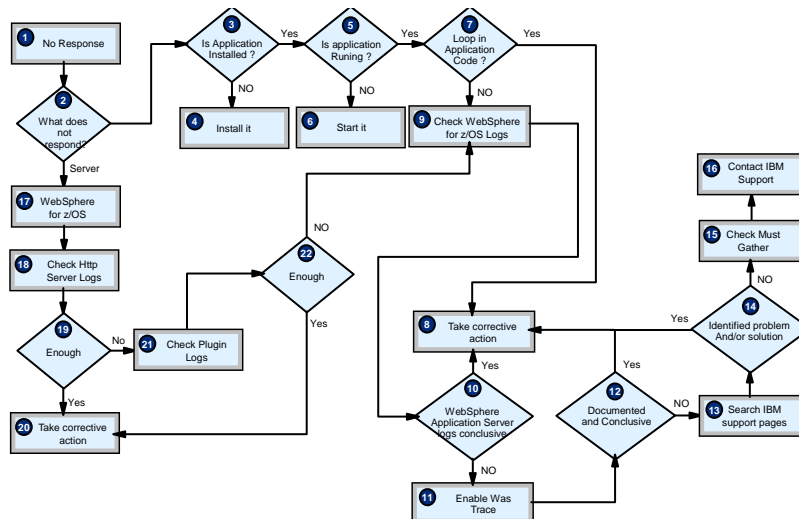
Check if it is in a wait or **spinning for a JVM lock (monitor)** or a class library java level lock (synchronized method) which would imply that it is contending for resources with other threads.



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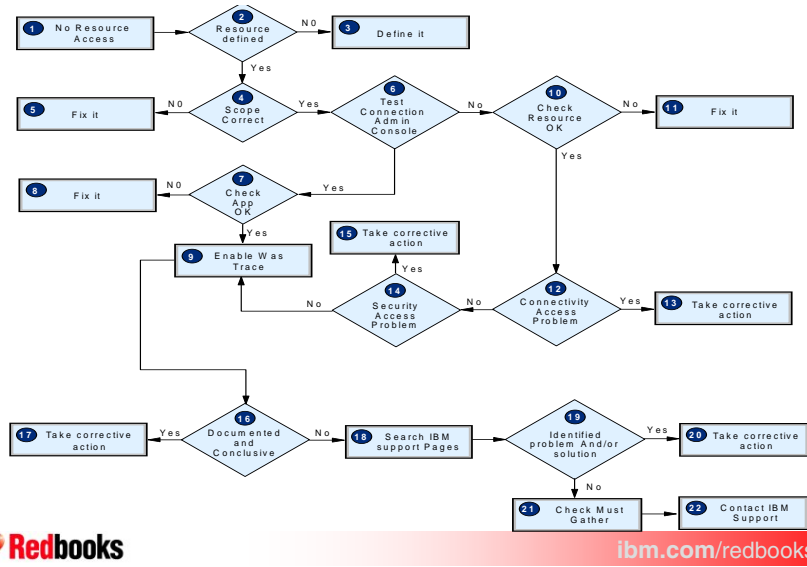
No response



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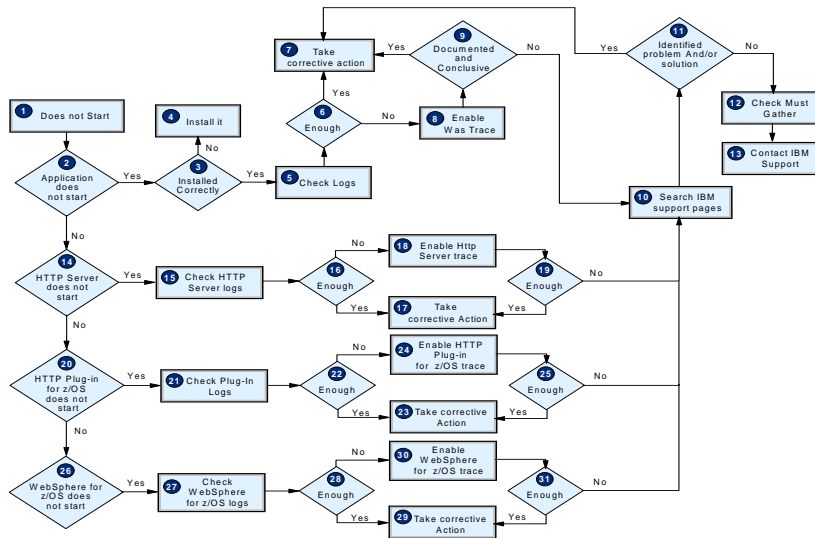
No resource access



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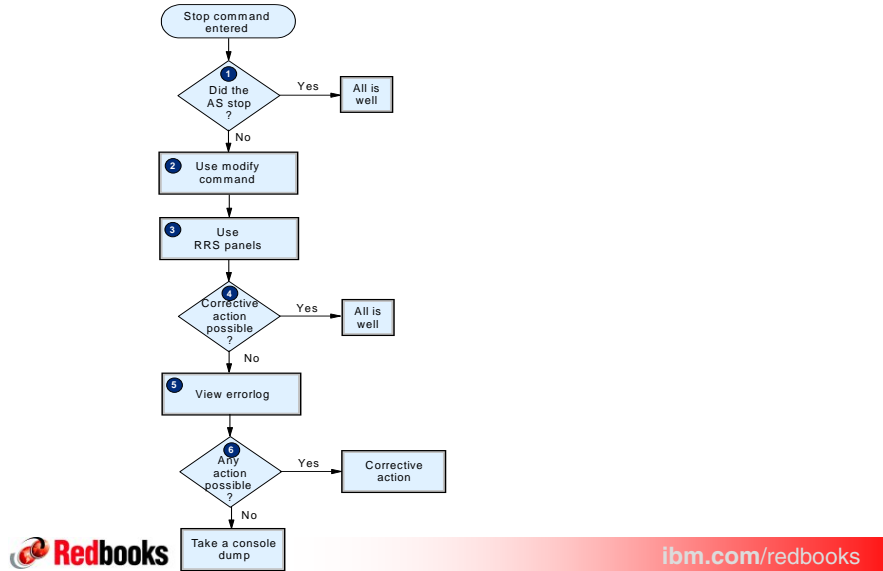
Does not start



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Does not stop



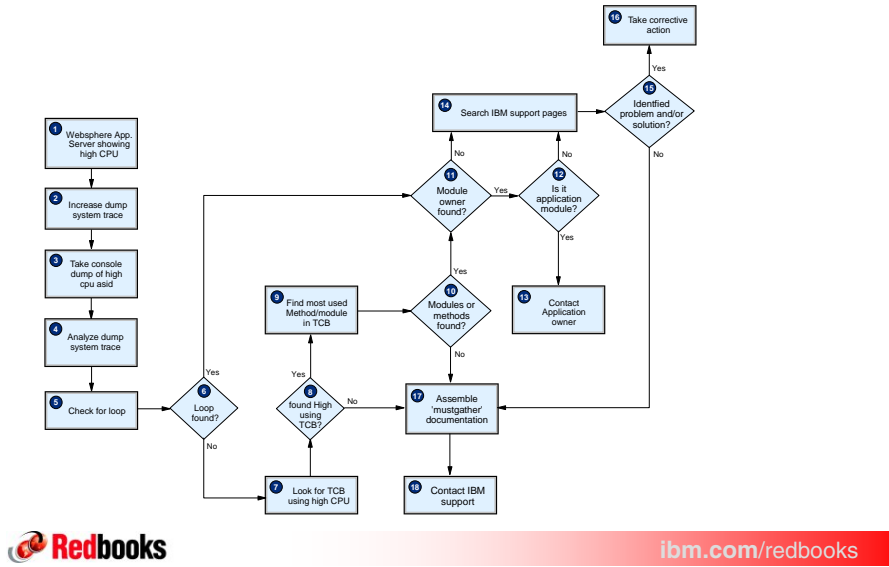
**High CPU,
Slow response,
Performance issues**

Redbooks

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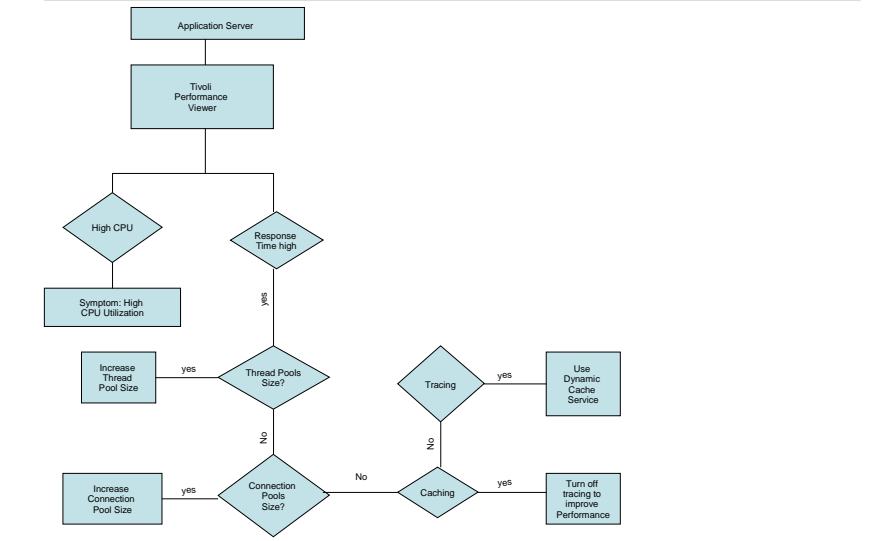
High CPU



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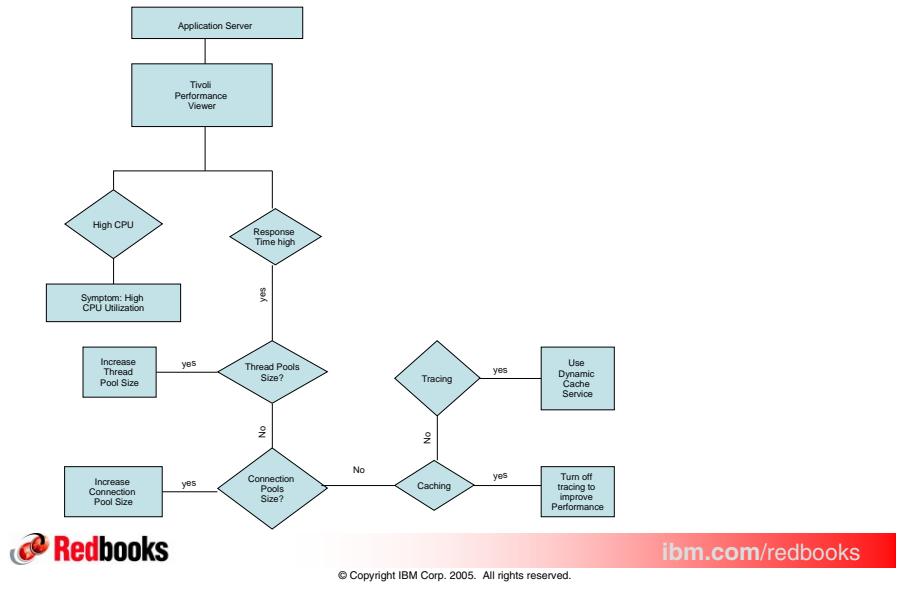
Increased response time 1



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Increased response time 2



Performance Problems

The analysis of **performance problems** in the complex WebSphere environment easily fills a book on its own.

Suggested reading: “**Monitoring performance**” and “**Tuning**” in the **WebSphere for z/OS InfoCenter** at:

<http://publib.boulder.ibm.com/infocenter/ws51help/index.js>

[P](#)

or “**WebSphere Application Server for z/OS: V5.1 Performance Tuning and Monitoring, SA22-7963**” at:

http://www.ibm.com/software/webservers/appserv/zos_os390/library/



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What is the workshop about?

1. Problem Determination Methodology
2. Skills needed for PD
3. Contacting IBM
4. Problem areas and concerns in production
5. Typical problem symptoms
6. Diagnostic flowcharts for PD

Part I
before lunch break



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What is the workshop about?

7. Means and tools for PD
 - WebSphere commands
 - Logs, traces and dumps
 - Other diagnostic tools
8. Problem avoidance in phases:
 - Installation and Configuration
 - Migration and Coexistence
 - Application Deployment
 - Applications in Production
9. Information Sources

Part II
after lunch break



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BREAK



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after

BREAK



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Commands



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Command-line tools to administer WebSphere

These tools only work on local servers and nodes. They cannot operate on a remote server or node. To use:

1. Open a system command prompt.
2. Change to the bin directory.
3. Issue one of the following commands:
 - START appserver_proc_name STOP appserver_proc_name
 - START dmgr_proc_name STOP
dmgr_proc_name
 - START nodeagent_proc_name STOP
nodeagent_proc_name
 - addNode serverStatus
 - removeNode cleanupNode
 - syncNode backupConfig
 - restoreConfig EARExpander
 - GenPluginCfg

For more information search for the “Using command line tools” topic in the WebSphere for z/OS Information Center at:

<http://publib.boulder.ibm.com/infocenter/wasinfo/v6r0/index.jsp>



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z/OS MODIFY commands

- to send requests to the controller region
- use server name, not started task name (STC)

MODIFY <Server NAME>,DISPLAY,<Options>

- Server NAME Server name as specified in JCL
- DISPLAY Fixed keyword
- Options HELP,SERVERS,TRACE,WORK

returns this information:

- STC/server name Started task name and server name
- Status ACTIVE
- System name SYSID of your system with active WebSphere for z/OS
- Level Build level of your WebSphere server



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MODIFY <Server Name>,DISPLAY,HELP

Result of (short version): F DSR01A,DISPLAY,HELP

BBOO0178I THE COMMAND DISPLAY, MAY BE FOLLOWED BY ONE OF THE FOLLOWING 042 KEYWORDS:

BBOO0179I SERVERS - DISPLAY ACTIVE CONTROL PROCESSES

BBOO0179I SERVANTS - DISPLAY SERVANT PROCESSES OWNED BY THIS CONTROL 044 PROCESS

BBOO0179I SESSIONS - DISPLAY INFORMATION ABOUT COMMUNICATIONS SESSIONS

BBOO0179I TRACE - DISPLAY INFORMATION ABOUT TRACE SETTINGS

BBOO0179I JVMHEAP - DISPLAY JVM HEAP STATISTICS

BBOO0179I WORK - DISPLAY WORK ELEMENTS

BBOO0179I ERRLOG - DISPLAY THE LAST 10 ENTRIES IN THE ERROR LOG

BOO0188I END OF OUTPUT FOR COMMAND DISPLAY,HELP



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DISPLAY WLM,DYNAPPL= *

To list all the dynamic application environment names

Result:

IWM029I 08.39.26 WLM DISPLAY 854

<u>DYNAMIC APPL. ENVIRON. NAME</u>	<u>STATE</u>	<u>STATE</u>
------------------------------------	--------------	--------------

PDSR01	AVAILABLE	
--------	-----------	--

ATTRIBUTES: PROC=PDASR SUBSYSTEM TYPE: CB

SUBSYSTEM NAME: PDSR01A NODENAME: PDCELL

PDDMGR	AVAILABLE	
--------	-----------	--

ATTRIBUTES: PROC=PDASR SUBSYSTEM TYPE: CB

SUBSYSTEM NAME: PDDMGR NODENAME: PDCELL

CLU491	AVAILABLE	
--------	-----------	--

ATTRIBUTES: PROC=WS5491S SUBSYSTEM TYPE: CB

SUBSYSTEM NAME: WS491 NODENAME: CL491



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Tracing on IBM request

To turn tracing to SYSPRINT on and off:

F <server_name>,TRACETOSYSPRINT=YES | NO

To change the overall trace level

F <server_name>,TRACEALL=0 | 1 | 2 | 3

To turn on basic or detailed tracing for specified components (non-Java):

F <server_name>,TRACEBASIC=(0,1,2...)

F <server_name>,TRACEDETAIL=(0,1,2..)

To turn off all tracing:

F <server_name>,TRACENONE



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Dynamic Java TRACE

The z/OS MODIFY command does not require the server to be recycled.

To turn on Java tracing for specified components such as com.ibm.ws.security, enter:

F <server_name>,TRACEJAVA=
'com.ibm.ws.security.yyy.*=all=enabled

To reset to trace settings in your configuration (such as in was.env), enter:

F <server_name>,TRACEINIT

To turn off all tracing, enter:

F <server_name>,TRACENONE



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Logs, Traces and Dumps



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Logs

1. Joblogs and Syslog
2. WebSphere error log (BBORBLOG)
3. First Failure Data Capture (FFDC)
4. Java Logging API
5. IBM HTTP Server logs and trace



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Joblogs and Syslog

The syslog is **a record of the console messages.**

WebSphere messages issued to syslog also show up in the job log.

In most problem cases, **these logs show information** about exceptions, abnormal situations, or simply warning messages in the system.

These are normally **the first logs that you should examine** when software problems occur.




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Joblogs and Syslog

The **job log** may have a variety of information based on environment variable settings. As a default, it gets information about the job itself, such as **life cycle messages** (when it started, finished initiating, and so on), **the JCL** used to run the job, **data set** utilization, and other typical **JES messages**.

There are also **WebSphere messages**, which start with the **BBO prefix**. The messages appearing on the console (what we are referring to as syslog messages) are typically related to configuration failures of other products, unrecoverable WebSphere configuration errors, and WebSphere life cycle messages.

Messages written explicitly to the job log are more general failure and warning-type message. The more detailed messages supporting these can be found in the  ibm.com/redbooks

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WebSphere error log (BBORBLOG)

- The WebSphere for z/OS **error log** is a **logstream data** set that uses the system logger to record messages. These messages are **typically more detailed** than you would see on the system console or in the job output of the server's address space.

```
2004/09/28 17:00:48.629 01 SYSTEM=SC49 SERVER=PDSR01A
PID=0X05080121 TID=0X217D6900 0X000009 c=UNK
./bbooejsb.cpp+2579 ... BBO0011W The function
ORBEJSBridge::invoke_request(JNIEnv *, bboojorb *, char *,
CORBA::Boolean, CORBA::Request
*&, void *)+2579 received CORBA system exception
CORBA::UNKNOWN. Error code is C9C25790
```

- For example, you might see a message in the **joblog** of an application server saying that naming registration has failed, while the **error log** is more likely to have a message indicating why it failed.

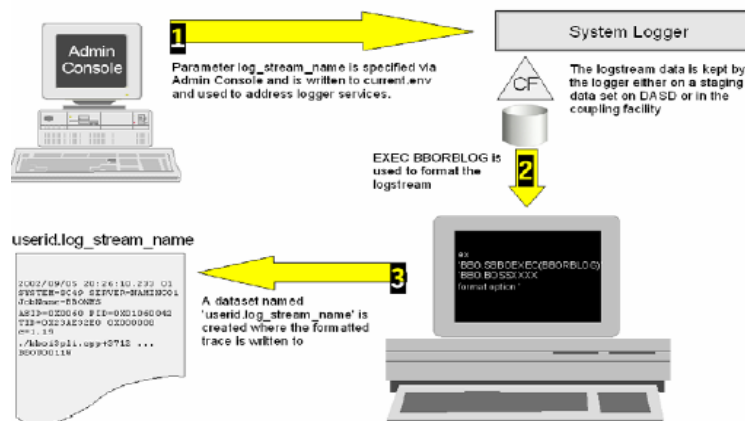


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WebSphere error log (BBORBLOG)

An EXEC BBORBLOG is used to read the unformatted **error log**



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First Failure Data Capture (FFDC)

- In WebSphere for z/OS V5.x, **FFDC** is set to a log level of '0' by default. As a result, **FFDC is essentially disabled** and not able to provide the same information as WebSphere on distributed environments.
- By **reconfiguring the logging level of FFDC** on WebSphere Application Server for z/OS, the benefits of runtime capture of exceptions through FFDC can be realized on z/OS.

```
# Level of processing to perform
# 0 - none
# 1 - monitor exception path
# 2 - dump the call stack, with no advanced processing
# 3 - 2, plus object interspecting the current object
# 4 - 2, plus use DM to process the current object
# 5 - 4, plus process the top part of the call stack with DMs
# 6 - perform advanced processing the entire call stack
```



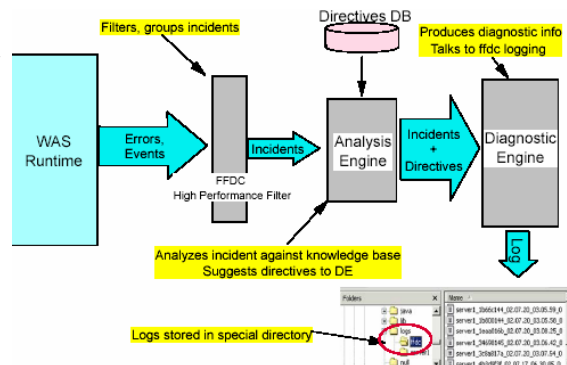
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First Failure Data Capture (FFDC)

The **servant regions** of WebSphere for z/OS **have been instrumented** with calls to FFDC. When an exception occurs, the event is passed through the error filter to the diagnostic engine. If the Analysis Engine is

enabled, the Analysis Engine will retrieve any information that relates to the event from the symptom database.



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First Failure Data Capture (FFDC)

When the **Analysis Engine Tool** is run against an **exception log**, the symptom database, *ffdcdb.xml* is used in attempt to provide a solution to the exceptions captured by FFDC.

The Analysis Engine **uses** the **exception name, the source ID, and the probe ID** from the exception as the key into the symptom database.

If a match exists, the solution is displayed as a result of running the Analysis Engine.



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Java Logging API

Java logging is a standard logging API for your applications provided by the `java.util.logging` package.

Internally WebSphere for z/OS still uses **JRas** in conjunction with Java Logging, although that functionality is deprecated in version 6.

Messages produced by these Java applications are written to the MVS master console, the error log stream, and the component trace (CTRACE) data set.

Java application trace entries also appear in the same CTRACE data set. Logging the messages in these system resources can help you diagnose application processing-related errors.



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Java Logging API

The **Logging** output is different **depending on the parameters** that you set in the Admin Console.

The trace has a heading (first line) and a brief description (second line) in each entrance of the trace.

```
Trace: 2005/08/03 13:43:44.723 01 t=7CB4F8 c=UNK key=P8 (0000000A)
Description: Log Boss/390 Error
from filename: ./bborjtr.cpp
at line: 932
error message: BB000222I: TRAS0018I: The trace state has changed. The new
trace state is *=config.
```



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Java Logging API

Level	Consequence
Fatal	Task cannot continue and component cannot function
Severe	Task cannot continue but component can still function
Warning	Potential error or impending error
Audit	Significant event affecting server state or resources
Info	General information outlining overall task progress
Config	Configuration change or status
Detail	General information detailing subtask progress
Fine	Trace information - General trace
Finer	Trace information - Detailed trace
Finest	Trace information - A more detailed trace - Includes all the detail needed to debug problems
All	All events are logged. Inclusive custom logs.

**Log Details
Level**



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HTTP Server logs and trace

The IBM **HTTP Server** (IHS) writes various kinds of logs into Hierarchical File System (HFS) files. Depending on the specific function various logs are provided:

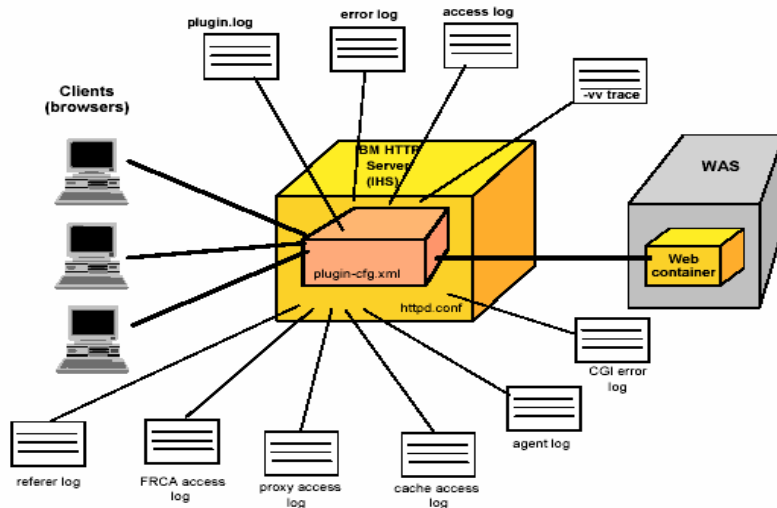
1. error log
2. access log
3. Fast Response Cache Accelerator (FRCA) access log
4. proxy and cache access logs
5. agent log
6. referer log
7. CGI error log



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HTTP Server logs and trace



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HTTP Server error log

The HTTP server **error log** displays all requests that experienced any kind of problem.

You can configure the path and the name of this file to where you want to log internal server errors by using a logging directive in the server configuration file (**httpd.conf**) by default. The name of the directive is **ErrorLog**.

ErrorLog /web/logs/errorlog

When creating the file, the server uses the file name you specify and appends a date suffix.




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HTTP Server error log

```
[30/Sep/2004:11:47:26+0400] [MM/0193] OK [host: 9.12.6.160] /
[30/Sep/2004:11:47:38+0400] [MM/0210E] MULTI FAILED [host: 9.12.6.160] /mytest
[30/Sep/2004:11:58:41+0400] [MM/0210E] MULTI FAILED [host: 9.12.6.160] /testapp
[30/Sep/2004:12:00:44+0400] [MM/0210E] MULTI FAILED [host: 9.12.6.160] /myTest/
[30/Sep/2004:13:01:43+0400] [MM/0193] OK [host: 9.12.6.160] /IBM/ods/testapp
[30/Sep/2004:13:02:32+0400] [MM/0210E] MULTI FAILED [host: 9.12.6.160] /IBM/ods/testapp
[30/Sep/2004:13:08:49+0400] [MM/0193] OK [host: 9.12.6.160] referer: http://wso49.itso.ibm.com/9508/IBM/ods/ /IBM/ods/EBz4-ItCount
[30/Sep/2004:13:08:59+0400] [MM/0193] OK [host: 9.12.6.160] referer: http://wso49.itso.ibm.com/9508/IBM/ods/ /IBM/ods/EBz4SuperShoos
```



1. Date and time when the entry of the request was recorded in the server.
2. Error message.
3. The IP address of the client that accessed the server.
4. The Uniform Resource Locator (URL) that the client requested.



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HTTP Server access log

The server records activities in the **access log** files and stores them each day.

Every midnight, the server closes the current access log and creates a new access log file for the following day. The access log contains entries for page requests made to the server.

For each access request your server receives, an entry is made in the access log showing:

- What was requested
- When it was requested
- Who requested it
- The method of the request
- The type of file that your server sent in response to the request
- The return code, indicates whether the request was honored

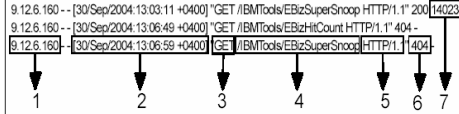


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HTTP Server access log

```
9.12.6.160 -- [30/Sep/2004:11:47:26 +0400] "GET / HTTP/1.1" 403 282
9.12.6.160 -- [30/Sep/2004:11:47:36 +0400] "GET /mytest HTTP/1.1" 404 375
9.12.6.160 -- [30/Sep/2004:11:51:45 +0400] "GET /BMTools/ HTTP/1.1" 500 310
9.12.6.160 -- [30/Sep/2004:11:51:53 +0400] "GET /BMTools/ HTTP/1.1" 304 0
9.12.6.160 -- [30/Sep/2004:11:51:53 +0400] "GET /BMTools/rhome.gif HTTP/1.1" 304 0
9.12.6.160 -- [30/Sep/2004:11:57:49 +0400] "GET /BMTools/EBizHitCount HTTP/1.1" 200 1070
9.12.6.160 -- [30/Sep/2004:11:59:41 +0400] "GET /testapp HTTP/1.1" 404 375
9.12.6.160 -- [30/Sep/2004:12:00:02 +0400] "GET /BMTools HTTP/1.1" 500 308
9.12.6.160 -- [30/Sep/2004:12:00:44 +0400] "GET /myTest/ HTTP/1.1" 404 375
9.12.6.160 -- [30/Sep/2004:12:01:06 +0400] "GET /BMTools/EBizHitCount HTTP/1.1" 200 1175
9.12.6.160 -- [30/Sep/2004:13:01:43 +0400] "GET /BMTools/testapp HTTP/1.1" 404 -
9.12.6.160 -- [30/Sep/2004:13:02:32 +0400] "GET /BMTools/testapp HTTP/1.1" 404 375
9.12.6.160 -- [30/Sep/2004:13:03:11 +0400] "GET /BMTools/EBizSuperSnoop HTTP/1.1" 200 14023
9.12.6.160 -- [30/Sep/2004:13:06:49 +0400] "GET /BMTools/EBizHitCount HTTP/1.1" 404 -
9.12.6.160 -- [30/Sep/2004:13:06:59 +0400] "GET /BMTools/EBizSuperSnoop HTTP/1.1" 404 -
```



1. The IP address of the client that made the request.
2. The date and time of the request.
3. The method of the request.
4. The file that the client requested.
5. The protocol and version.
6. The value of the HTTP return code
7. The size of the file (in bytes) being requested.



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-vv trace

The server trace has **several levels of debugging** (verbose, much too verbose, verbose cache and debug), most common is the -vv trace.

Note: Activation of the **-vv trace** results in a large amount of information which is recorded in the joblog. It directly impacts server performance.

The **-vv trace** provides more detailed information than the server error log or the access log. For this reason, the trace is more helpful if you determine that the problem occurred inside the IBM HTTP Server and you need detail step-by-step processing information in order to rectify the problem.



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-vv trace

```
[21646c48 30/Sep/2004:14:06:12.854728]: 30Sep04 14:06:12: IMW3518I Second level tracing (-vv)
enabled.
[21660778 30/Sep/2004:14:06:22.556968]: Read 460 bytes from socket 10.
[21660778 30/Sep/2004:14:06:22.557027]: After AcceptEx nAcceptThds: 75 and nSSLAcceptThds: 0.
[21660778 30/Sep/2004:14:06:22.557046]: server_loop... Accepted socket: 10.
[21660778 30/Sep/2004:14:06:22.557131]: KEEPALIVE... set.
[21660778 30/Sep/2004:14:06:22.557156]: HTSession... starting for socket=10; STHD=21932DD8
[21660778 30/Sep/2004:14:06:22.557187]: Keep-Alive... Starting HTTPD 1.1 loop.
[21660778 30/Sep/2004:14:06:22.557218]: HTTimer... setting timer off->set (1) on socket 10.
[21660778 30/Sep/2004:14:06:22.557236]: HTTimer... set, old=0, cur=0, new=1
[21660778 30/Sep/2004:14:06:22.557314]: Client sez... [GET] //IBMTools/EBizSuperSnoop [HTTP/1.1]
[21660778 30/Sep/2004:14:06:22.557340]: Protocol version... 1.1
[21660778 30/Sep/2004:14:06:22.557355]: Persistent Connection has been established
[21660778 30/Sep/2004:14:06:22.557378]: Client sez... Accept: /*/* 1
[21660778 30/Sep/2004:14:06:22.557395]: Accept..... /*/* (q=1.00,mbx=0.0,mxs=0.0)
[21660778 30/Sep/2004:14:06:22.557437]: Client sez... Referer:
http://wtsc49.itso.ibm.com:9508/IBMTools/
[21660778 30/Sep/2004:14:06:22.557456]: Referer..... http://wtsc49.itso.ibm.com:9508/IBMTools/
[21660778 30/Sep/2004:14:06:22.557476]: Client sez... Accept-Language: en-us
[21660778 30/Sep/2004:14:06:22.557492]: Language.... en-us (q=1.00)
```

1. The method of the request
2. The file requested (GET //IBMTools/EBizSuperSnoop)
3. The protocol and version (HTTP/1.1)
4. The IP address and port of the host (wtsc49.itso.ibm.com:9508)



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HTTP plug-in log

The **HTTP plug-in log** usually contains error messages regarding forward requests to WebSphere z/OS and configuration errors in the plugin-cfg.xml. In addition, in the **plugin-cfg.xml** file, you can turn on tracing to provide more details on routing of a request, like:


- URL and URI matching
- Virtual host matching
- Request header and session affinity cookie



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HTTP plug-in log


[Wed Sep 22 16:27:59 2004] 01080073 216b31b000000053 - TRACE: ws common | websphere-handleRequest Request
is: host=wts049.itso.ibm.com; uri=/IBMTools/EBizHitCount'

The server records one line per request that arrives.

1. Process ID
2. PThread thread ID
3. IBM Software source code file name
4. function name



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HTTP plug-in log

You may specify one of the following:

Trace All of the steps in the request process are logged in detail.

Stats The server selected for each request and other load balancing information relating to request handling is logged.

Warn All warning and error messages resulting from abnormal request processing are logged.

Error Only error messages resulting from normal request processing are logged.

Note: Specifying LogLevel="Trace" generates a large amount of data which may impact performance.

We recommend that you specify LogLevel="Error".



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Traces and dumps

1. CTRACE for WebSphere
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6. Javadump
7. Heapdump

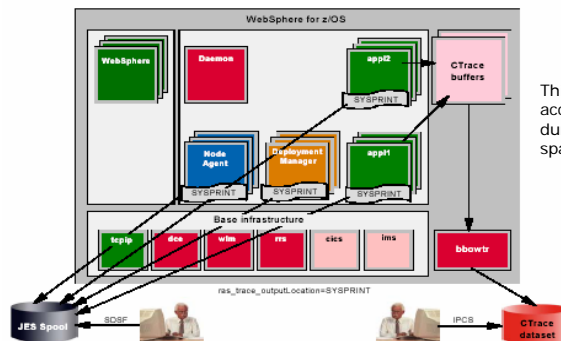


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CTRACE for WebSphere

WebSphere for z/OS uses z/OS **CTRACE** facilities to manage the collection and storage of trace data. Unless you configure specific CTRACE controls, WebSphere Application Server for z/OS records its trace data in address space buffers in private (pageable) storage.



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CTRACE for WebSphere

When to use **CTRACE**

Although **CTRACE** data is primarily output for IBM service personnel to use, exploiting CTRACE capabilities in your environment allows you to have additional trace data available when a problem first occurs.

Because **CTRACE efficiently uses system resources**, you can collect valuable trace data with minimal impact on performance.



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CTRACE for WebSphere

```
SY1 OBOAT008 04000002 00:14:57.268258 Dispatch Method
ASID.... 0039
TCB..... 009E34A0 PSW1.... 078D2400 SESS.... 00000008 REQI.... 0000006C
Class Name = JPolicyEmSQLMO
Method Name = _get_policyNo
object = 0x260ED1F8
objectPtr refcount = 3 0x00000003
objectPtr classname= JPolicyEmSQLMO
An entry contains an undefined ID: 13007002 , hex format will be used.
SY1 N/A 13007002 00:14:57.272682 N/A
0002009E 34A0078D 24000039 00000008 | ..... |
0000006C 000C0302 97969389 83A8D596 | ...%....policyNo |
00120402 6DD1D796 938983A8 C2D6C994 | ..._JPolicyBOIm |
97930009 0A02C1E4 C4C9E300 2E0B02C2 | pl....AUDIT....B |
C2D6D1F0 F0F0F240 D7969389 83A84095 | BOJ0002 Policy n |
A4948285 9940F3F3 6BF3F3F3 409682A3 | umber 33,333 obt |
81899585 844B4040 40 | ained. |
Trace: 2004/10/12 00:14:57.268 01 t=9E34A0 c=8.6C key=P8 (04000002)
Description: Dispatch Method
Class Name: JPolicyEmSQLMO
Method Name: _get_policyNo
object: 260ED1F8
objectPtr refcount: 3
objectPtr classname: JPolicyEmSQLMO
Trace: 2004/10/12 00:14:57.272 01 t=9E34A0 c=8.6C key=P8 (13007002)
FunctionName: policyNo
SourceId: _JPolicyBOImpl
Category: AUDIT
ExtendedMessage: BBOJ0002 Policy number 33,333 obtained.
```



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Traces and dumps

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JDBC trace

This section describes the trace for the Java Database Connector (JDBC). The **JDBC is the connector** between the WebSphere for z/OS and the database. There are 2 trace methods.

The first is based in Logging Java for WebSphere for z/OS and is a JVM trace.

<code>com.ibm.ws.database.logwriter</code>	Trace string for databases that use the GenericDataStoreHelper. You can also use this trace string for unsupported databases.
<code>com.ibm.ws.db2.logwriter</code>	Trace string for DB2 databases
<code>com.ibm.ws.oracle.logwriter</code>	Trace string for Oracle databases
<code>com.ibm.ws.cloudscape.logwriter</code>	Trace string for Cloudscape™ databases
<code>com.ibm.ws.informix.logwriter</code>	Trace string for Informix® databases
<code>com.ibm.ws.sqlserver.logwriter</code>	Trace string for Microsoft SQL Server databases
<code>com.ibm.ws.sybase.logwriter</code>	Trace string for Sybase databases



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JDBC trace

The other **JDBC trace** is useful for diagnosing problems in the DB2 Structured Query Language for Java and Java Database Connector (SQLJ/JDBC). The output will go to an HFS file specified in the JDBC properties file.

This trace is useful if you think there is a problem connecting to DB2.

JDBC trace information is helpful, especially for IBM Support. It shows Java methods, database names, plan names, user names, or connection pools.

```
Timestamp> <Trace Point> <Method Name> <Class/ObjectId> <Thread Name> <Optional Parms>
<2004.10.04 20:15:02.810> <Entry> <printHeader> <COM.ibm.db2os390.sqlj.util.DB2SQLJTrace> <P=253767:0=0:CT>
-- <p#1=Start of DB2 SQLJ/JDBC Tracing <2004.10.04 20:15:02.810>>
-- <p#2=DB2 for OS/390 SQLJ/JDBC Driver build version is: DB2 7.1 U085384 JDBC 2.0>

<2004.10.04 20:15:02.949> <Entry> <Constructor> <COM.ibm.db2os390.sqlj.jdbc.DB2SQLJConnection05254a29a>
P=253767:0=0:CT>
-- <p#1=source=DSN7>
-- <p#2=parser=COM.ibm.db2os390.sqlj.jdbc.parser.DB2JDBCParser05c10229d>
-- <p#3=planname=DSNJDBC>
-- <p#4=pooledConnection=com.ibm.db2.jcc.DB2PooledConnection06c54e29a>
```



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JDBC trace

JDBC trace formatted with the **flw** subcommand.

```
Trace Version      : DB2 7.1
Driver Build Version : DB2 7.1 U085384 JDBC 2.0
Trace Captured at  : Mon Oct 4 20:15:02 2004
Trace buffer size  : 262144 bytes
Records to keep    : LAST
Trace truncated    : NO
Trace wrapped      : NO
Shared Memory Address : 0x1E5CA568
First empty slot   : 7604
Trace Table Address : 0x1E681030
Size of trace      : 7592 bytes
Records in trace   : 134
1  SQLJ fnc_entry  sqlj_JDBC_Driver DB2SQLJ_sqlj_driver_native_init (2.1.7.1)
   pid 0x007fb620; tid 0x007fb620; time 1096935302; tpoint 0
   0000 0000      ....
2  SQLJ fnc_entry  sqlj_JDBC_AttachMgr sqlj_Attach_Global_Init (2.1.14.1)
   pid 0x007fb620; tid 0x007fb620; time 1096935302; tpoint 0
   0000 0000      ....
3  SQLJ fnc_data   sqlj_JDBC_AttachMgr sqlj_Attach_Global_Init (2.3.14.1)
   pid 0x007fb620; tid 0x007fb620; time 1096935302; tpoint 1
   0000 0001 0000 0004 37ac 75d0      .....
4  SQLJ fnc_entry  sqlj_Native_Util sqlj_memAllloc (2.1.3.1)
   pid 0x007fb620; tid 0x007fb620; time 1096935302; tpoint 0
   0000 0000      ....
```



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Traces and dumps

1. CTRACE for WebSphere
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SVC Dumps

- **SVC dump** is a **core dump** initiated by the operating system generally when a programming exception occurs. SVC dump processing stores data in dump data sets that you pre-allocate, or that the system allocates automatically as needed.
- Alternatively, you can initiate an SVC dump through the MVS console, to gather diagnostic data for a “hang” condition for example. SVC dumps initiated this way are called **console dumps**.



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SVC Dumps

The standard **SDATA** expected in a **SVC dump** is:

SDATA=(ALLNUC,CSA,GRSQ,LPA,LSQA,PSA,RGN,SQA,SUM,SWA,TRT),

When you suspect a particular servant region to be the source of a problem you should initiate a **console dump**.

When you want an SVC dump of a servant region. Also request a dump of the servant controller region.



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Traces and dumps

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CEEDUMP

- **CEEDUMP** can help you to identify the failing module in the “**Traceback**” section of the dump. Search for the term “**Traceback**” at the top of the CEEDUMP.
- The last modules in action are at the top, and under those are the oldest, in order. You need to look for the term “**Exception**” in the Status column.
- Usually an exception is in one of the last modules in action, so look for it near the top of the Status column.
- The name of the entry with the exception (**JNI_CreateJavaVM** in the Entry column) is the most important string in this CEEDUMP, because it is the search argument you use for researching known problems and their solutions



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CEEDUMP

CEEDUMP V1 R3.0: Condition processing resulted in the unhandled condition. 09/18/02
5:19:06 PM Page: 1

Information for enclave main

Information for thread 23B00F1000000000

Traceback:

DSA Addr	Program	Unit	PU Addr	PU Offset	Entry	E Addr	E Offset	Statement
Load Mod	Service	Status						
236D4768			06CB6B48	+00000806	__zerros	06CB6B48	+00000806	
CEEEV003		Call						
236D3C08	CEEHDSP		06E7C2B0	+00002BE6	CEEHDSP	06E7C2B0	+00002BE6	
CEEPLPKA		Call						
					/src/share/java/runtime/jni.c			
236D37B8			26D91830	+00000528	JNI_CreateJavaVM	26D91830	+00000528	4432
*PATHNAM		Exception						
236D32C0			1C2FBEE0	+00001270	loadAndInitVM(JavaVM **,JNIEnv **,SOMException*)	1C2FBEE0	+00001270	411
BB0LRT	CB30038	Call						
236D3210			1C301E88	+000002BE	getJavaEnv(SOMException*)	1C301E88	+000002BE	1679
BB0LRT	CB30036	Call						
236D30F8			1C302860	+00000092	buildJavaClass(const char*,SOMException*)	1C302860	+00000092	1921
BB0LRT	CB30036	Call						
236D3030			1C30A5F0	+000001A4	__cdecl _NewObject(SOMClassRef*,SOMException*)			



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What is the workshop about?

7. Means and tools for PD
 - WebSphere commands
 - Logs, traces and dumps
 - Other diagnostic tools
8. Problem avoidance in phases:
 - Installation and Configuration
 - Migration and Coexistence
 - Application Deployment
 - Applications in Production
9. Information Sources



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Other diagnostic tools



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Diagnostic Tools

1. JVM dump and heap analysis tools
2. Memory Dump Diagnostic Tool for Java
3. Trace Analyzer for WebSphere for z/OS
4. Java Garbage Collection Formatter
5. dumpNameSpace tool
6. Jad
7. Rational Application Developer 6
8. Tivoli Performance Viewer
9. Omegamon XE for WebSphere



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JVM dump and heap analysis tools



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Memory Dump Diagnostic Tool for Java



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Trace Analyzer for WAS

Reading a trace log in raw format can be a tedious task. **Trace Analyzer** for WebSphere Application Server eases the process of reading diagnostic information from WebSphere for z/OS's trace logs. It provides:

- Visual trace presentation
- Search and filter capabilities
- Trace highlighting and mark-up
- Entry and exit record pairing

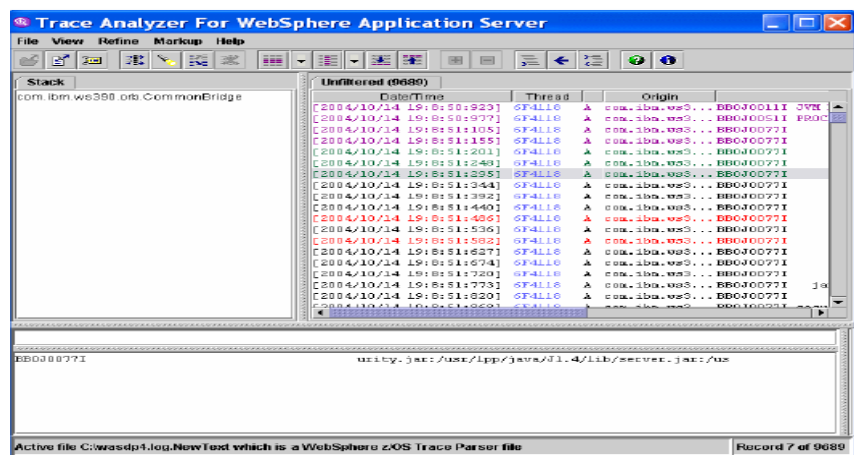
You can **Filter** and **Search** through the **Refine** menu. By electing any entry from the trace pane, you can see its full contents in the bottom console. This information is just another representation of the data discussed in the JVM trace and JVM method trace sections.



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Trace Analyzer for WAS



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Diagnostic Tools

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Java Garbage Collection Formatter

The JVM's heap stores all objects created by a running Java application, and Garbage Collection is the process of automatically freeing objects that are no longer referenced by the program. **This tool displays the Java Garbage Collection** statistics in a tabular format.

Run transactions through your server for some time, and you will get a log file like the one shown on the next foil



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Java Garbage Collection Formatter

```
<AF[1]: Allocation Failure. need 32 bytes, 0 ms since last AF>
<AF[1]: managing allocation failure, action=1 (0/31812992) (1674368/1674368)>
<GC(1): GC cycle started Thu Jun 6 19:15:44 2002
<GC(1): freed 26914256 bytes, 85% free (28588624/33487360), in 46 ms>
<GC(1): mark: 38 ms, sweep: 7 ms, compact: 1 ms>
<GC(1): refs: soft 0 (age >= 32), weak 6, final 83, phantom 0>
<AF[1]: completed in 46 ms>
<GC[1]: Expanded System Heap by 65536 bytes
<AF[2]: Allocation Failure. need 32784 bytes, 55949 ms since last AF>
<AF[2]: managing allocation failure, action=1 (1118544/31812992)
(1674368/1674368)>
<GC(2): GC cycle started Thu Jun 6 19:16:40 2002
<GC(2): freed 20537712 bytes, 69% free (23330624/33487360), in 77 ms>
<GC(2): mark: 69 ms, sweep: 8 ms, compact: 0 ms>
<GC(2): refs: soft 0 (age >= 32), weak 0, final 1819, phantom 0>
<AF[2]: completed in 77 ms>
```



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Java Garbage Collection Formatter

Using a REXX or AWK script, **format the output of** the Java Garbage Collection Trace to get a semicolon-delimited condensed file like the following example.

```
afnum; timeSinceLastAF; aftime; aFSIZE; gcstart; gcfreed; freespace; heapsize;
gctime;
marktime; sweeptime; compacttime;
1;0;46;32;19:15:44;26914256;33487360;46;;;38;7;1;
2;55949;77;32784;19:16:40;20537712;33487360;77;;;69;8;0;
3;15471;84;4112;19:16:56;21288264;33487360;84;;;77;7;0;
4;12899;79;4112;19:17:09;22578536;33487360;79;;;71;8;0;
5;11009;78;4112;19:17:20;22450976;33487360;77;;;70;7;0;
6;12566;81;4112;19:17:33;22427552;33487360;80;;;70;10;0;
```

There is a **Java Garbage Collection Formatter** script, called **VGC131v7.awk** (written by John Rankin) in the Techdoc TD101216, that you can download from the IBM Support Web site.



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Java Garbage Collection Formatter

FTP the output file (in ASCII) to your workstation and **import into a spreadsheet**; it will look something like

afnum	TimeSince LastAF	aftime	afsize	gcstart	gcfreed	heapsize	gctime	mark time	sweep time	compact time
1	0	46	32	19:15.44	26914256	33487360	46	38	7	1
2	55949	77	32784	19:16.40	20537712	33487360	77	69	8	0
3	15471	84	4112	19:16.56	21288264	33487360	84	77	7	0
4	12899	79	4112	19:17.09	22578536	33487360	79	71	8	0
5	11009	78	4112	19:17.20	22450976	33487360	77	70	7	0
6	12566	81	4112	19:17.33	22427552	33487360	80	70	10	0

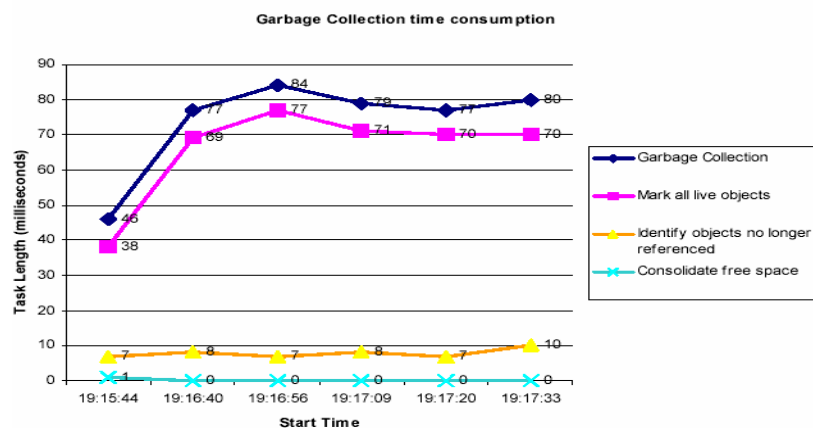
With garbage collection data now in a spreadsheet, you can **sort, filter, and graph data** to better understand the garbage collection processes.



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Java Garbage Collection Formatter



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Diagnostic Tools

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4. Java Garbage Collection Formatter
5. [dumpNameSpace tool](#)
6. Jad
7. Rational Application Developer 6
8. Tivoli Performance Viewer
9. Omegamon XE for WebSphere



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dumpNameSpace tool

Problems can surface when accessing resources through the namespace. **The name space is a collection of references** to resources such as connection pools, EJBs, and message listeners. In the WebSphere for z/OS environment, the name space is federated among all servers in the cell, with each server process containing its own name server.

The **dumpNameSpace tool obtains the contents of a name space** within a name server. The tool can be invoked through a UNIX shell script or through its interface in the WebSphere Application Server API. It can only dump name spaces **from remote name servers**, not local to the server process.

The dumpNameSpace tool generates a list of all resources and their type. This can be **useful in diagnosing problems when resources are referenced and not found in an application**. This information can also help



message of the type **ClassCastException**

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dumpNameSpace tool

```
=====
Name Space Dump
Provider URL: corbaloc:iiop:localhost:9552
Context factory: com.ibm.websphere.naming.WsnInitialContextFactory
Requested root context: cell
Starting context: (top)=pdcell
Formatting rules: jndi
Time of dump: Wed Oct 13 15:55:22 EDT 2004
=====
```

```
=====
Beginning of Name Space Dump
=====
```

```
1 (top)
2 (top)/clusters                javax.naming.Context
3 (top)/cell                    javax.naming.Context
3   Linked to context: pdcell
4 (top)/cellname                java.lang.String
5 (top)/persistent              javax.naming.Context
6 (top)/persistent/cell        javax.naming.Context
6   Linked to context: pdcell
7 (top)/deploymentManager       javax.naming.Context
```



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Jad (decompile Java class files)

Jad is a **Java decompiler**, i.e. program that reads one or more Java class files and **converts them into Java source** files which can be compiled again. You can download this decompiler from this site:

<http://kpdus.tripod.com/jad.html>

Jad is a command line tool that can be used on a number of different platforms including Linux, UNIX, and Windows. It is a 100% pure C++ program and it generally works several times faster than decompilers written in Java.

Jad can be used:

- For recovering lost source codes
- For exploring the sources of Java runtime libraries
- As a Java disassembler



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Jad (decompile Java class files)

The **output from the Jad tool is simply Java code.**

This code can be recompiled or imported into a development environment if need be. This can be useful when diagnosing problems by giving you the ability to follow the code that is running.

A **Graphical User Interface** (GUI) for the Jad tool is available from the Jad website called **FrontEnd Plus** for Jad. Download the Windows installer file and double-click on it to install FrontEnd Plus.

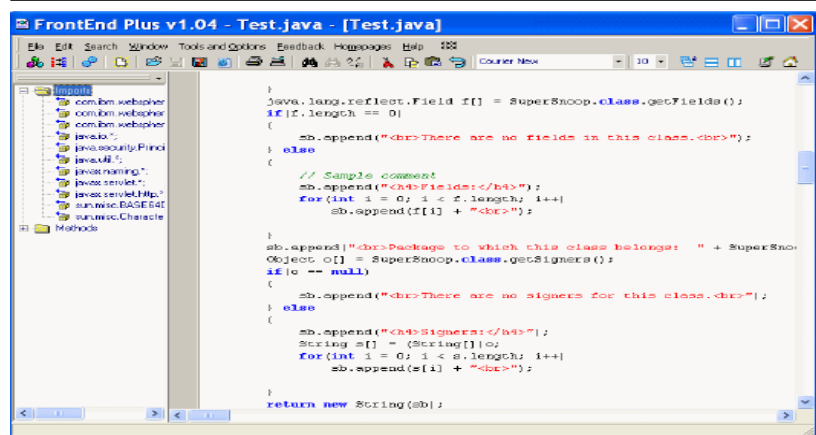
You can now access FrontEnd Plus directly from your Start menu. Open it and decompile a class file selecting **File Decompile** and choosing the class file you wish to decompile.



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Jad (decompile Java class files)



```
java.lang.reflect.Field f[] = SuperSnoop.class.getFields();
if (f.length == 0)
{
    sb.append("<br>There are no fields in this class.<br>");
}
else
{
    // Sample comment
    sb.append("<b4>Fields:</b4>");
    for (int i = 0; i < f.length; i++)
        sb.append(f[i] + "<br>");
}
sb.append("<br>Package to which this class belongs: " + SuperSnoop.
Object o[] = SuperSnoop.class.getSigners();
if (o == null)
{
    sb.append("<br>There are no signers for this class.<br>");
}
else
{
    sb.append("<b4>Signers:</b4>");
    String s[] = (String[])o;
    for (int i = 0; i < s.length; i++)
        sb.append(s[i] + "<br>");
}
return new String(sb);
```



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Rational Application Developer v6.0

Rational Application Developer V6.0 (**RAD**) is a very comprehensive development environment. We only provide you with information about problem determination-related tools in **RAD**.

The **Debug** perspective is used for testing and debugging Java applications, XSL transforms, and other components developed within RAD. You may debug applications locally on a test server or remotely on a server such as WebSphere for z/OS.

The debugger allows you to control the execution of your program by setting breakpoints, suspending launches, stepping through your code, and examining the contents of variables.

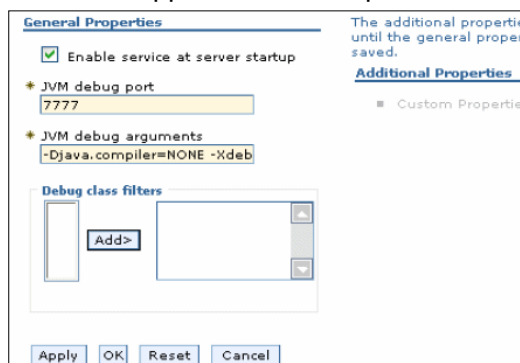


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Rational Application Developer v6.0

- Configuring Rational Application Developer for remote debugging requires changes in the WebSphere for z/OS environment and a connection to the remote application server from Rational Application Developer.

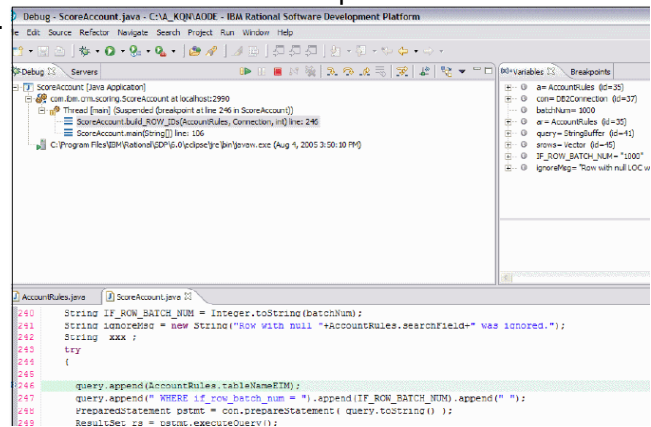


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The kinds of information you get

To start a program in debug mode, select the debug icon, and the **Debug** perspective will open. The **Rad Debug** perspective contains different views to provide different information.



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Tivoli Performance Viewer - TPV

- **TPV** can be used to fine-tune the performance of an enterprise system by optimizing resources.
- **TPV** enables administrators and programmers to monitor the current health of WebSphere Application Server. Because the collection and viewing of data occurs in the application server, performance is affected.
- To minimize performance impacts, monitor only those servers whose activity you want to monitor.



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Tivoli Performance Viewer - TPV

Modules and description to verify in **TPV**:

Modules:	Description:
Average response time	Includes statistics such as servlet or enterprise beans response time
Number of request	Enables understanding of how much traffic is processed by WebSphere for z/OS, thus helping determine the capacity to manage
Web and EJB Thread Pools Database and connection pool size	Interpret these metrics together. These thread pools might constrain performance due to their size.
JVM Memory	Use the JVM memory metric to understand the JVM heap dynamics, including the frequency of garbage collection.

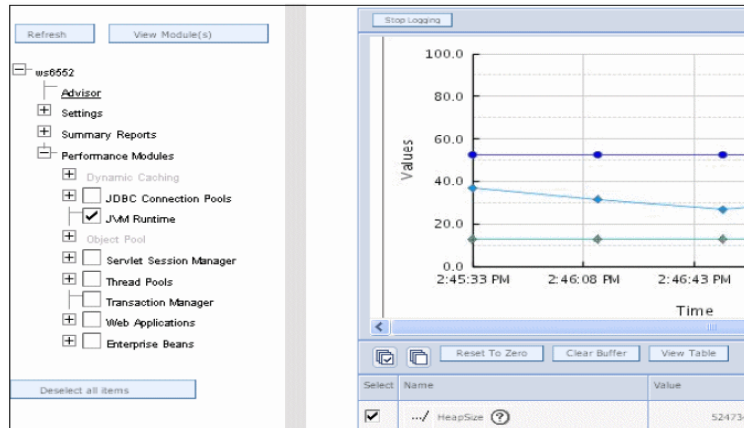


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Tivoli Performance Viewer - TPV

Tivoli Performance Viewer integrated in Administrative Console



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Omegamon XE for WebSphere



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- Migration and Coexistence
- Application Deployment
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Module 7: Problem avoidance in phases



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Installation, Customization, and Configuration Problem Avoidance Checklist



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Installation and configuration Concerns

Before you install you need to prepare all necessary z/OS subsystems and **complete the planning** for customizing your WebSphere Application Server environment.

Go through **PSP bucket** and make sure all the HIPER and important WebSphere fixes applied

You also **need to collect and determine important information** about **your specific setup** for components of WebSphere Application Server for z/OS.



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Installation and configuration Concerns

Search for “**Planning to install and customize** WebSphere Application Server for z/OS” in the WebSphere for z/OS **InfoCenter** at:

<http://publib.boulder.ibm.com/infocenter/ws60help/index.jsp>

or “**Planning for Installation**” in chapter 4 of *WebSphere Application Server - z/OS V6.0 Installing your application serving environment*, GA22-7957-03 from the WebSphere for **z/OS product documentation** at:

http://www.ibm.com/software/webservers/appserv/zos_os390/library/

This gives you a basic understanding of what is involved with the product, skills requirements and the planning required to execute the installation configuration processes.



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Installation and configuration Concerns

To assist in planning and customization see “**Customization Dialog Worksheet**” in the WebSphere for z/OS **InfoCenter** at:

<http://publib.boulder.ibm.com/infocenter/ws60help/index.jsp>

For planning related to naming conventions, TCP port allocation, shared HFS and clustering - **a white paper** and Excel spreadsheet are available at the following website:

<http://www-1.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1331>



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Checklist for installation and configuration

This list is based upon “**best practices**” and summarizes tasks that you might want to verify before installing your WebSphere for z/OS system.

- Contact your security administrator to **set up a RACF user ID** and authorize it to have read/write access to the WebSphere Application Server for z/OS files (BBO.* data sets and HFS files).
- **Increase your paging** by one 3390-3 volume if your storage is constrained, two if your system does any paging of the WebSphere Application Server address spaces.
- The **recommended size allocations** for the Hierarchical File System is 250 cylinders(3390) for primary and a secondary allocation in of 100 cylinders(3390)



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Checklist for installation and configuration

- Make certain your **address space** is large enough, some WebSphere Application Servers might require a **1GB virtual region** to run any workload.
- If you are running in a **sysplex**, setup your TCP/IP with Sysplex Distributor to make **use of dynamic virtual IP** addresses (DVIPAs).
- It may be necessary to re-size your system dump data sets due to the size of WebSphere address spaces and where possible evaluate the **use of dynamic dump data sets**.



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Checklist for installation and configuration

- If Automatic Restart Management (ARM) is enabled you may want to **disable ARM** for the WebSphere Application Server address spaces **during installation** and customization to avoid unnecessary restarts of address spaces. After installation and customization are complete, you should consider re-enabling ARM.
- Your installation may limit (control) the specification of REGION=, usually through the JES2 EXIT06 exit or the JES3 IATUX03 exit. If so, **relax this restriction** for the WebSphere Application Server for z/OS JCL procedures.



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Checklist for installation and configuration

- Where possible **use the default names** the first time you install WebSphere Application Server to make the installation instructions easier to follow.
- To minimize problems based on system settings during installation and configuration **fill in the “Customization Dialog worksheets”**. Worksheets are provided for each task in the Dialog to help you determine what values you should enter in the Define Variables stage of customization.



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Checklist for installation and configuration

- If possible, set up your HFSs such that the **root HFS is shared** among all processors and the deployment manager's configuration is in a configuration HFS on a system-generic mount point.
- Make sure the product code HFS are mounted at the directories you have chosen in the planning session.



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Checklist for installation and configuration

- Navigating the configuration HFS with a **UID of 0 can alter files** or their ownership and permission attributes, thus **making them inaccessible** to the WebSphere Application Server for z/OS runtime servers and administrators. It is better to use the WebSphere Application Server for z/OS administrator's user ID.
- **Understand the Hierarchical File Structure (HFS)** for the application servers, the nodes, the daemons, and the cells.
- **For Information** about USS/HFS configurations, SMP/E tasks, ISPF dialogs, TCP/IP configurations and security information visit the WebSphere Application Server V6.0 **InfoCenter** at:

<http://publib.boulder.ibm.com/infocenter/wasinfo/v6r0/index.jsp>

Select WebSphere Application Server for z/OS, and search for "**errors encountered during the installation**".



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Checklist for installation and configuration

- When selecting server, cell, or node names, always **avoid special non-alphanumeric characters** because they are used as HFS directory names and are parsed in XML files that may have problems with special characters such as blanks, slashes, dashes, tildes, question marks, or underscores.
- If you plan on using **DB2** see the WebSphere Application Server V6.0 **Information Center** at:
<http://publib.boulder.ibm.com/infocenter/wasinfo/v6r0/index.jsp>
Select "WebSphere Application Server for z/OS, Version 6.0x", and search for "**Plan to Prepare your DB2**".
- Before running the BBOWCHFS job make sure CONFIG HFS mount point **did not have** any other HFS mounted.
- During install if BBOWPPFA fails with **INSTCONFFAILED** then fix the root cause, clean up all the created profiles manually and restart install from scratch



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Migration and Coexistence Problem Avoidance Checklist



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Migration Concerns

Migration is an activity in which you take advantage of existing materials. **Migration tasks and tools** help you upgrade the product and its prerequisites, reuse existing application components when feasible, and transfer administrative configurations from your past version to a current one.

A **white paper on migration** can be found at

<http://www.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/WP1005>
[59](#)



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Checklist for migration

- **Update prerequisites** to the levels required by V6. Prior levels of WebSphere Application Server for z/OS will generally continue to run at the higher prerequisite levels.
- We highly recommend you are at **maintenance level W602100** before initiating the migration process.
- **Be aware of the other versions** of WebSphere for z/OS that you might have running on your system when going through the Dialog, as the Customization Dialog does not detect them for you.



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Checklist for migration

- Before you run any migration jobs, **ensure** that every appl.server node in the 6.0 system has a **WebSphere Admin ID and password** in its soap.client.props file.
- If you are running other versions of WebSphere Application Server for z/OS, **watch out for LPA issues** due to different versions in one system.
- **Review the ports** that have been defined to ensure that the V6 installation does not conflict. In particular, when installing to coexist with V4.01 or V5.x **NOTE:** that default daemon port definitions for V5, V4.0.1 and V6.0x are



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Checklist for migration

- **A return code of zero means nothing** in a migration job. Be sure to review the.err and .out logs carefully for diagnostic information.
- **A migration cannot be restarted** once the process is started. If something fails part way through the process you must start from scratch.



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Coexistence Concerns

If you already have a prior version of WebSphere Application Server for z/OS installed and customized, you can configure WebSphere Application Server for z/OS V6.x to coexist with it.

Upgrading of WebSphere Application Server Version 3.5SE or WebSphere Application Server for z/OS Version **4.0.1 to V6.0x is not supported.**

However, **V6.0x can coexist** with prior levels of WebSphere Application Server for z/OS on a z/OS image or Sysplex.



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Checklist for coexistence

- If the load modules are in **LPA** for one system, make sure the load modules are in the **STEPLIB** for the other system.
- In V6.0x, Java 1.4.2 is **embedded** in WebSphere product and we highly recommend not to modify your configuration to use any other Java to get through problems. This will lead into other unwanted problems.
- Make sure the **ports** are **unique** between the two WebSphere levels.
- Make sure that the "**daemon_group_name**" are **unique** between the two systems. This is a known cause of the ABENDEC3 with Reason code 02060018.
- Don't **hand edit** any WebSphere system management files to make it work with other releases when running mixed release level in same cell.



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- **Application Deployment**
- Applications in Production

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Application Deployment Problem Avoidance Checklist



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Application Deployment

Deployment phase includes application **assembly and deployment**.

According to the **J2EE EJB architecture**, the application is assembled from the WARs, JARs, and classes files.

The EAR can be assembled and exported directly from the WebSphere Application Developer (**WSAD**) and then deployed to the z/OS using the web-enabled **Administration console**.

You can also create the EAR using the Application Server Toolkit (ASTK).

The **Deployer is also responsible for mapping** the external references in the EJBs.



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Checklist for Deployment Concerns

The following list is taken from a **best practices** point of view to minimize the number of problems during the deployment phase and increase your chances of success. When you **assemble** an application:

- Ensure the application is at least **J2EE 2.0 - compliant**.
- The **bean names must be unique** within a given JAR file.
- Generate deployment code for the enterprise beans using the **EJBDeploy** tool or the **Application Server Toolkit** (ASTK). For detailed information on EJBDeploy and the ASTK, see the WebSphere for z/OS topic "Migration and Installation" at:

[http://www-](http://www-1.ibm.com/servers/eserver/zseries/zos/installation/zos_migration.html)



[1.ibm.com/servers/eserver/zseries/zos/installation/zos_migration.html](http://www-1.ibm.com/servers/eserver/zseries/zos/installation/zos_migration.html)

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Checklist for Deployment Concerns

- Check that the **Java heap is large enough**.

A good place to start is to let the initial heap size be 25% of the maximum heap size. The JVM will then try to adapt the size of the heap to the working set size of the application.

The best way to determine the necessary size is to run a series of tests, each time increasing the initial size.



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Checklist for Deployment Concerns

When deploying an application, ensure:

- On the first Preparing for application install page, **specify the context root** if you are installing a stand-alone .war file.
- On the first Preparing for application install page, specify whether or not to **generate default bindings** for any incomplete bindings you may have.
- You must specify if you want to **precompile JSP files** on the Provided options to perform the installation panel. The default is not to precompile.



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Checklist for Deployment Concerns

- For Distribute Application, you must specify whether WAS expands or deletes application binaries in the installation destination. The **default is to enable** application distribution.
If you **disable this option**, you must ensure that the binaries are expanded in the directories of all nodes where the application is expected to run.
- If the application uses **Web modules**, **each module must map to a virtual host**. Failure to specify all virtual hosts will result in an error.



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Runtime/Production Problem Avoidance Checklist



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Runtime Problems avoidance checklist

The system **runtime** environment maps exactly back to a specific configuration.

For that reason it is impossible to provide a complete checklist for all configuration options.

It is however easy to get a copy of your running configuration via backup copy and try to recreate the problem in a test environment when needed.



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Runtime Problems avoidance checklist

The **most overlooked preventive measure of runtime** problem is proper testing.

- It is so subtle that it's easy to ignore
- Know your configuration
- Always keep a backup before changing your configuration
- By knowing your configuration you would also know how many components your request/response has to go through to make it way back to the client.



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Checklist for Runtime Concerns

A Websphere application running on z/OS has additional complexities in the work load management and performance areas because Websphere leverages the native environment to implement these sets of components.

Again knowing your environment and knowing how far a request has made is critical in efficient troubleshooting.

Consider the following hints and tips when testing and running applications in WebSphere for z/OS:

- Start with a **simple configuration** that does *not* include firewalls, intermediate Web servers, or back-end resource managers.



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Checklist for Runtime Concerns

- Use the **HTTP Protocol Handler** instead of the IHS and Websphere plug-in.
- Practice with **a simple known application** such as the Policy IVP and/or Trade2. Don't try an application with many servlets and JSPs, do not even use of EJBs, and many different J2EE resources.
- That way you know which component works and which doesn't so you can eliminate them as quickly as you follow the along the path of the request.



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Checklist for system infrastructure

- **Check if files were transferred correctly** to the host (ASCII vs. Binary transfer mode)
- If using **ISHELL**, make sure **directory names** do not end/start with underscore (`_`), or space, or single quotation marks.
- **Check the permissions** of files (configuration files, HTML files, resource bundles, classes, etc.). For configuration files, the RACF userid or group of the WebSphere for z/OS control region must have execute permission bits on every directory in the underlying file structure and read permissions on the actual file.



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Checklist for system infrastructure

- Check WLM panels, SDSF Enclave panels, or RMF III reports to **validate that WLM classification** rules are working as designed to avoid performance problems.
- Make sure the browser can reach WebSphere for z/OS J2EE servers using the **ping, nslookup, netstat, tracer** etc... commands.
Use a simple DOS window to **check communication** using these Commands.



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Checklist for security issues

There are a wide variety of Websphere security configurations and options. Problems with security settings can occur rather easily if they have not been set up properly.

- Check **SYSLOG** to make sure that **security service has started** successfully.
- Check **SYSLOG** for **other security messages** during initialization.

You are very likely to see problems there first, if the problem is configuration related.



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Checklist for security issues

As most security problems fall under the two categories: **authentication** and **authorization**,
Check:

- The **authentication protocol**, authentication mechanism or user registry **if authentication** (the process of determining who the caller is) **fails**.
- The **application bindings** from assembly and deployment and the caller's identity who is accessing the method and the roles required by the method, **if authorization** (the process of validating that the caller has the proper authority to invoke the requested method) **fails**.



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Checklist for HTTP Server

- **Verify that your HTTP server is up** and running if you try to access the resource through the HTTP server instead of directly through the Application Server.
- **Verify that WebSphere Plug-in does initialize** - what you should look for as an evidence of the Plug-in's initialization is the "smiley face" in the SYSOUT.
- **Understand the Trusted Proxy**: This property allows the application server to trust inbound requests from a web server acting as a reverse proxy typically using the WebSphere V5 Plug-in (of course this includes any platform that supports the V5 Plug-in).
By default, TrustedProxy is not set and **defaults to false**.



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Checklist for HTTP Server

• **Understand the Trusted Proxy:** This property allows the application server to trust inbound requests from a web server acting as a reverse proxy typically using the Websphere V5 Plug-in (of course this includes any platform that supports the V5 Plug-in). By default, Trusted Proxy is not set and **defaults to false**

• **Use `http://<hostname:port>/snoop`**

• **Your snoop Servlet to list details about your configuration for verification.**



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Checklist for DB2

- **Check** to see if you have the **db2sqljjdbc.properties** file which indicates the location of the **DSNJDBC_JDBCProfile.ser** file for z/OS JDBC provider for DB2 and creation of a DataSource for z/OS.
- Also, **check** to see if your WebSphere environment variable have the **path to directories** so the WebSphere server can locate the DB2 home directory and the JDBC driver can locate the **db2sqljjdbc.properties** file.



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Checklist for DB2

- Check that **the correct versions** of all application JAR files, utility classes and JARs were packaged, and JDKs and WebSphere for z/OS runtime JARs are being used (may cause Marshal Exceptions when application runs)
- Or deprecated classes can be loaded at runtime
- **Plan enough time for testing** on the z/OS platform!
- **Profiling** identifies how much time the CPU is spending in certain methods and can be used to reduce bottlenecks and optimize the application code.



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Runtime Problems avoidance checklist

- **Verify** that your **change management procedure** for WebSphere for z/OS is properly implemented.
- That means test cases must be claimed for any and all applicable changes before the changes can be released.
 - Problems due to **mismatched levels** between z/OS load libraries and HFS files can happen after maintenance has been applied.

Typically, this occurs because the SMP/E **SBOLIB DDDEF** statement points to a service HFS, such as `/service/WebSphere390`, or because of a failure to remount the service HFS to the production HFS.



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Runtime Problems avoidance checklist

- Since the DM server extends its reach of control via node agent servers, **make sure any modification to DM** server is also **reflected in node agent** servers that they work in tune with.
- **Make sure node agents are up and running prior** to any application deployment or configuration changes. This will ensure the changes are effectively synchronized across all nodes. Look out for the message:

Configuration synchronization completed successfully
in the node agent job log around the time of changes.



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Runtime Problems avoidance checklist

- To **prevent time-out abends** for the DM server, check that the values for
 - **ConnectionIOTimeout**
 - **ConnectionResponseTimeout0**
 - **ConnectionKeepAliveTimeout0**are disabled or set to higher values for both SSL and non-SSL HTTP transport.
- **Check that the WLM dispatch time-out value** in the DM server is disabled or set to a higher value for the ORB service advanced settings:
control_region_wlm_dispatch_timeout=0



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Runtime Problems avoidance checklist

- In order to handle large ear files, make sure the **HTTP buffers** for both the deployment manager and node agents are **set to larger numbers**:
 - `protocol_http_large_data_inbound_buffer`
 - `protocol_http_large_data_response_buffer`
- Make sure you **provide a large file system** for the WebSphere for z/OS configuration and leave a large spare space for your file system.

This is always needed due to adding applications, upgrading to new application versions, upgrading to a new WebSphere for z/OS maintenance level with a new version of the Administration Console application, etc.
- Monitor and archive old EAR files, reclaim unused space.



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Runtime Problems avoidance checklist

- **Make sure the DM has plenty of disk space** for work area and tmp area during application deployment, otherwise it causes unpredictable and obscure outcomes.
- **Verify** that the **/dev/null** file is a character special file.
- Check your configuration to **avoid having WLM over-initiate** the number of servers when a lot of requests are coming in at server startup time.



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Runtime Problems avoidance checklist

- Verify that the error log formatting CLIST is **allocating enough space** to contain all the error messages. If you have a busy environment, the default value might not work. Check the allocation space in the lines 44 & 45 in the BBORBEXEC in <WAS5>.SBBOEXEC.
- In the Administration Console definition for the J2EE servers, **verify that the remote debug service is not turned on**, which means JVM property -Xdebug is not set, and allow Server Region Recycling, unless you only have one server region.



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Runtime Problems avoidance checklist

- For each of the J2EE servers **verify that the following** attributes and properties are set correctly.
 - **protocol_http_timeout_persistentSession**
 - **protocol_http_timeout_input**
 - **protocol_http_timeout_output**
 - **transaction_maximumTimeout**
 - **wlm_dynapplenv_single_server=1**
 - **wlm_maximumSRCCount=1**
 - **wlm_minimumSRCCount=1**
 - **ras_trace_defaultTracingLevel=1**



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Runtime Problems avoidance checklist

- For each of the J2EE servers **verify that the following** attributes and properties are set correctly.

Use the Administration Console, the servant region JES job log or the servant.jvm.options file to check them.

- – **verbosegc is enabled**
- – **JVM maximum heap size is set**
- – **JVM minimum heap size is set**
- – **-Xdebug is turned off**



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What is the workshop about?

7. Problem avoidance in phases:

- Installation and Configuration
- Migration and Coexistence
- Application Deployment
- Applications in Production

8. Means and tools for PD

- WebSphere commands
- Logs, traces and dumps
- Other diagnostic tools

9. Information Sources



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Information Sources



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WebSphere for z/OS home page

The **WebSphere for z/OS home page** can be found at:

http://www.ibm.com/software/webserver/appserv/zos_os390/



Figure 1-5 WebSphere for z/OS Home Page



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WebSphere for z/OS InfoCenter

WebSphere for z/OS InfoCenter



<http://publib.boulder.ibm.com/infocenter/ws51help/index.jsp>

- This **Information Center** displays documentation for several WebSphere Application Server products.
- **Click** the product name WebSphere Application Server for z/OS **V5.1** listed in the information center navigation to display the welcome page containing information that is specific to this product.



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- 2. [WebSphere Application Server V5 Architecture](#), REDP-3721-00 *Redpaper*, published 21 August 2003, last updated 19 August 2004, Rating: **★★★★★** (based on 12 reviews)
- 3. [BPFAWS Business Processes with WebSphere Business Integration: Understanding, Modeling, Migration](#), SG24-6260-00 *Redbook*, published 17 December 2004, last updated 22 December 2004, Rating: **★★★★★** (based on 3 reviews)
- 4. [WebSphere Application Server V5 Technical Overview](#), REDP-3918-00 *Draft Redpaper*, last update 16 December 2004, Rating: **★★★★★** (based on 2 reviews)
- 5. [Keeping Commerce Applications Updated: WebSphere Commerce 5.4 to 5.6 Migration Guide](#), SG24-6320-00 *Redbook*, published 24 August 2004, last updated 8 December 2004, Rating: **★★★★★** (based on 1 review)
- 6. [IBM WebSphere Portal for Multiplatforms vs Redbooks](#), SG24-6996-00 *Redbook*, published 18 March 2004, Rating: **★★★★★** (based on 26 reviews)
- 7. [WebSphere Product Overview](#), REDP-3749-00 *Redpaper*, published 23 October 2003, last updated 20 September 2004, Rating: **★★★★★** (based on 9 reviews)
- 8. [IBM WebSphere Portal V4.4 Handbook: Volume 3](#), SG24-6923-00 *Redbook*, published 3 February 2003, Rating: **★★★★★** (based on 3 reviews)



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Developers' source of information

Java

you will find many **hints and tips** of how to code J2EE applications on the Java community process web page.

<http://jcp.org/>



JAVA documentation web site for information and downloads about

- J2EE Software Development Kits (SDK)
- J2EE API Documentation
- J2EE Platform Specification



<http://java.sun.com/j2se/download.html>



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Don't give up – Help is on the way



The discipline of doing PD for WebSphere is not a simple task. It requires some level of comfort from working with and knowing about your system over a period of time. The complexity increases as you add more components to your system.

There is help.

If all else fails, you can always contact IBM.



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