

# IBM Support Assistant Simplified Problem Determination

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IBM

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# WebSphere Application Server on z/OS Sessions



Day	Time	Room	#	Title	Speaker
Monday	9:30	203	13597	Getting Started with WebSphere Liberty Profile on z/OS	David Follis
Monday	4:30	203	13600	Managing Server Output from WAS on z/OS	Mike Loos
Tuesday	9:30	203	13644	Using WAS Optimized Local Adapters (WOLA) to migrate your COBOL to zAAP-able Java	Jim Mulvey
Tuesday	11:00	203	13640	Need A Support Assistant? Check Out IBM's! (ISA)	Mike Stephen
Tuesday	3:00	203	13641	zWAS: In Real Life	Rod Feak
Wed.	1:30	202	13601	Lab: WebSphere Liberty Profile on z/OS	everybody
Thursday	11:00	203	13598	Getting Started With Compute Grid	John Hutchinson
Thursday	3:00	203	13645	Configuring Security for Liberty	Mike Loos

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# The Big Picture – how does IBM provide support



- Modes of Support interaction
- Problem types and classification
- Key components of the Serviceability Strategy
  - Serviceability Framework / Delivery Platforms
  - Knowledge and Education
  - Problem Determination tools
  - Serviceability features in the product runtimes

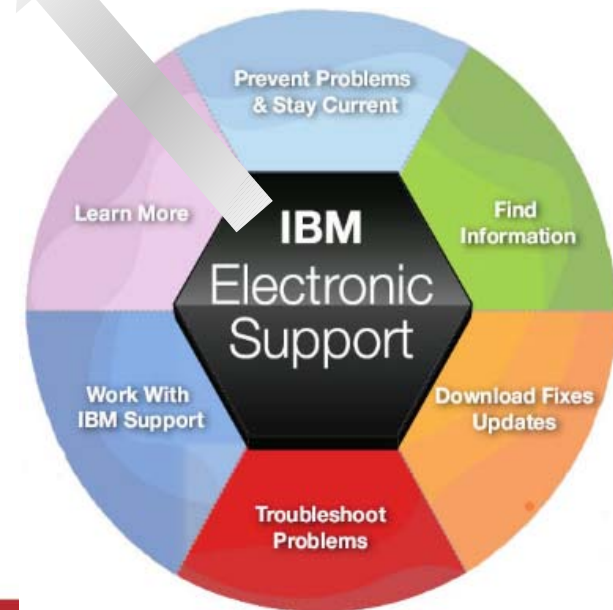
# Modes of Support Interaction

Automation

- Product or System self-healing
- Client Self-assist using electronic means
- Interact with IBM Support through electronic means

- Standard “phone” support
- Accelerated Value Program
- Critical Situations – “SWAT” teams
- Special IBM Services Engagements

Direct personal intervention



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# Key Components of the Serviceability Strategy



- **Serviceability Framework / Delivery Platforms**
  - Web-based eSupport resources, Support Portal, **IBM Support Assistant (ISA), ISA Data Collector**, Fix Central, Archive Explorer, ...
- **Knowledge and Education**
  - Technotes, Knowledge Engineering, IBM Education Assistant, WAS Support Technical Exchange, Problem Determination Courses, ...
- ~~**Problem Determination Tools**~~
  - Java Health Center, Memory Analyzer, Automated Analysis, Cross-component Trace Viewer, Trace and Request Analyzer, WebSphere Config Visualizer, ...
- **Serviceability features in the product**
  - Log/trace, FFDC, hung thread detection, serviceability defect process, ...

- **Metrics and PMR Causal Analysis**

Many deliverables are the result of collaboration between many WSR employees. They save all discussion logs with a return to origin

**RETAIN** statistics, **OPC**, **Aged PMR reviews**, **SWAT debriefs**, **ad-hoc PMR reviews**,

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# Addressing Common Challenges

## Collecting Key Data

### Challenge:

To resolve software issues, analyzing key data is essential, but it is often hard to locate and collect in a timely manner

### Shorten time to resolution

Quickly collect diagnostic files or run traces that are predefined for products. View files easily and, optionally, send to IBM swiftly.



## Troubleshooting Problems

### Challenge:

Complexity of certain problems and configurations requires specialized tooling

### Discover root cause

Problem determination tooling that allows diagnostics and analysis for problem resolution.





# Troubleshooting problems

- Application coding errors
- Environment variables
- Performance tuning
- Configuration problems

Complex problems

Symptom/solution  
discovery

- Many diagnostic files
- Many messages
- Importance of message

- Goal:
  - Discover root cause
- Challenges:
  - Complexity – certain problems and configurations require specialized tooling
  - Discovery - symptoms can be difficult to uncover and match to knowledge

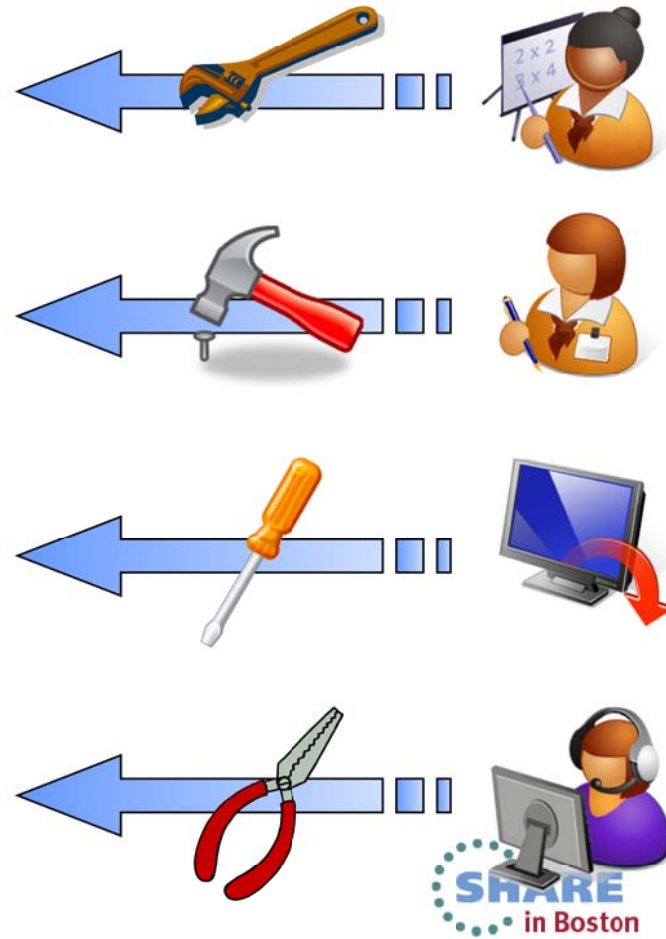
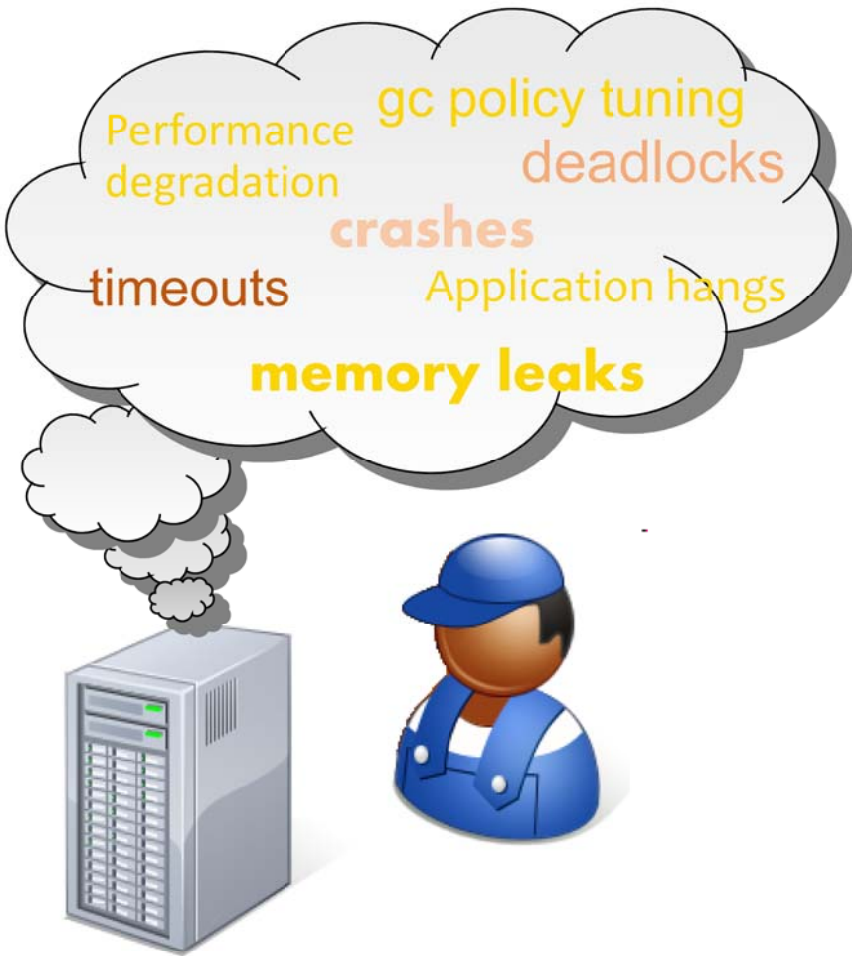
# Some Notes about Problem Determination Tools



- **The development of Problem Determination tools within IBM is not centralized**
  - Various product teams, support teams and individuals create their own tools
  - The Serviceability Tools Team coordinates these various offerings and manages the platform
  - Trying to centralize as many tools as possible in IBM Support Assistant or integrated in a Product
- **Sometimes there will be several tools with overlapping functions**
  - Various individuals may have their preferences for one tool over another
  - The Serviceability Tools Team will help clarify and designate the tool(s) that are officially “preferred” by IBM for its Clients
- **Tools evolve over time**
  - Today’s “best-of-breed” tool may be replaced by an even better one someday
  - The Serviceability Tools Team manages the orderly deprecation and withdrawal of older tools when appropriate
  - In this presentation, we will use tags “**(New)**” or “**(Phasing out)**” to indicate current trends, but keep in mind that these are subject to change
- **The current strategic push is towards server-based tools**
  - To facilitate deployment in cloud-type environments, such as IBM Support Assistant 5.0

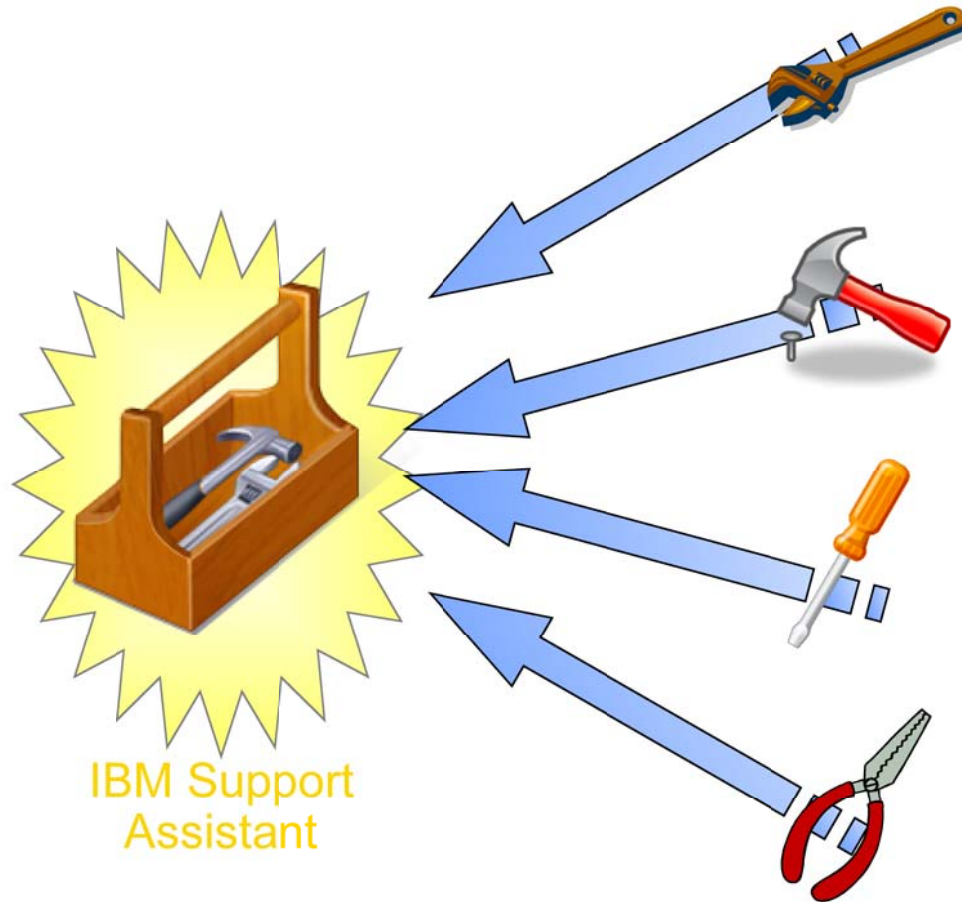
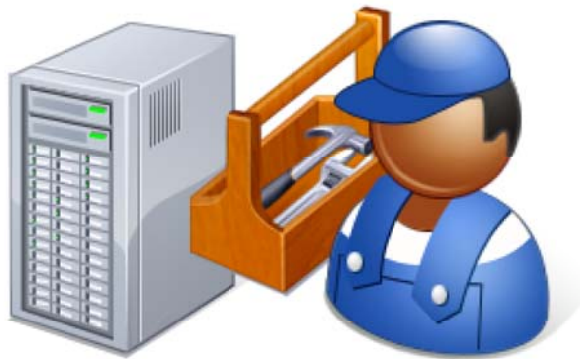
# IBM Support Assistant Workbench 4.1

# Specialized tool sources



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# IBM Support Assistant – One-stop toolbox



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# Today – IBM Support Assistant (ISA) Workbench



## ISA Workbench 4.1

- Eclipse-based client
- Workbench is installed on each desktop (single user)
- Collect and organize diagnostic data (logs, traces, etc.)
- Find and use Problem Determination tools
  - Search and browse support-related information about IBM products
- Open and manage PMRs (*phasing out*)



ISA WB



ISA WB



ISA WB



ISA WB





# IBM Support Assistant Workbench 4.1



Desktop serviceability application

Provides you with the function and tools to analyze and diagnose your software problems

Over one hundred “add-ons” available for various IBM products

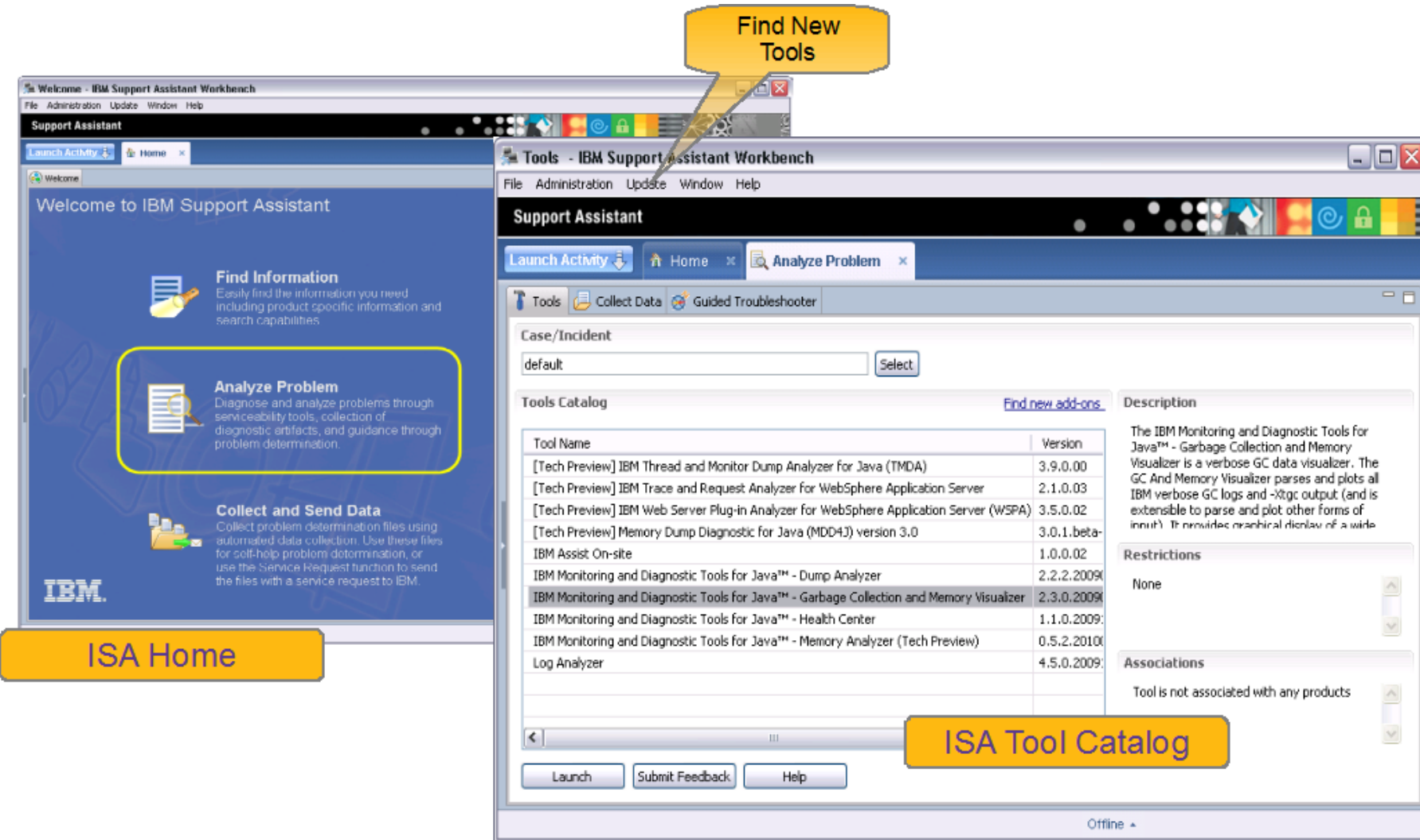
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# ISA Workbench – Launching Tools



The screenshot shows the IBM Support Assistant Workbench interface. On the left is the 'ISA Home' window with three main sections: 'Find Information', 'Analyze Problem', and 'Collect and Send Data'. The 'Analyze Problem' section is highlighted with a yellow box. On the right is the 'Tools - IBM Support Assistant Workbench' window, which is also highlighted with a yellow box. A yellow callout bubble points to the 'Find New Tools' button in the top right corner of the Tools window. The Tools window displays a 'Tools Catalog' table with columns for 'Tool Name' and 'Version'. The 'IBM Monitoring and Diagnostic Tools for Java™ - Garbage Collection and Memory Visualizer' is selected and highlighted in the table. To the right of the table is a 'Description' panel for the selected tool, and below that are 'Restrictions' and 'Associations' panels. At the bottom of the Tools window are 'Launch', 'Submit Feedback', and 'Help' buttons.

**Find New Tools**

**ISA Home**

**ISA Tool Catalog**

Tool Name	Version
[Tech Preview] IBM Thread and Monitor Dump Analyzer for Java (TMDA)	3.9.0.00
[Tech Preview] IBM Trace and Request Analyzer for WebSphere Application Server	2.1.0.03
[Tech Preview] IBM Web Server Plug-in Analyzer for WebSphere Application Server (WSPA)	3.5.0.02
[Tech Preview] Memory Dump Diagnostic for Java (MDD4J) version 3.0	3.0.1.beta
IBM Assist On-site	1.0.0.02
IBM Monitoring and Diagnostic Tools for Java™ - Dump Analyzer	2.2.2.2009
<b>IBM Monitoring and Diagnostic Tools for Java™ - Garbage Collection and Memory Visualizer</b>	<b>2.3.0.2009</b>
IBM Monitoring and Diagnostic Tools for Java™ - Health Center	1.1.0.2009
IBM Monitoring and Diagnostic Tools for Java™ - Memory Analyzer (Tech Preview)	0.5.2.2010
Log Analyzer	4.5.0.2009

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# ISA Workbench – Diagnostic Tools



**Cross-product Environment Troubleshooting**

- Log Analyzer
- Guided Troubleshooter
- Visual Configuration Explorer
- Port Scanner Tool
- Processor Time Analysis Tool for Linux

**Java Troubleshooting**

- ★ Memory Analyzer
- ★ IBM Thread and Monitor Dump Analyzer
- Performance Analysis Tool
- Memory Dump Diagnostic for Java
- Heap Analyzer
- ★ Health Center
- Multicore Software Development Kit for Java
- ★ Garbage Collection and Memory Visualizer
- ★ Interactive Diagnostic Data Explorer
- IBM Pattern Modeling and Analysis Tool

**WebSphere Troubleshooting**

- Web Server Plug-in Analyzer for WAS
- IBM Trace and Request Analyzer for WAS
- Database Connection Pool Analyzer for WAS
- WAS Analysis Module for Dump Analyzer
- IBM Web Services Validation Tool

**Lotus Troubleshooting**

- Lotus Notes Diagnostic
- Domino Configuration Tuner

**IM / FileNet Troubleshooting**

- FileNet OSAR Cable Tool

**Remote assistance**

- Assist on-site

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# IBM Recommended Java Troubleshooting Tools



- IBM Monitoring and Diagnostic Tools for Java
  - Garbage Collection and Memory Visualizer (GCMV)
  - Memory Analyzer (MAT)
  - Health Center
  - Interactive Diagnostic Data Explorer *(new)*
- IBM Thread and Monitor Dump Analyzer for Java (TMDA) [Tech Preview]

# IBM Support Assistant 5 Beta 3

# IBM Support Assistant 5



- **What is IBM Support Assistant 5?**

- Application targeted toward users responsible for diagnostics and root cause analysis
- A long-range strategy to produce a **collaborative problem determination platform**
- A **convergence** and **next generation** of several tools

- **Benefit Focus areas**

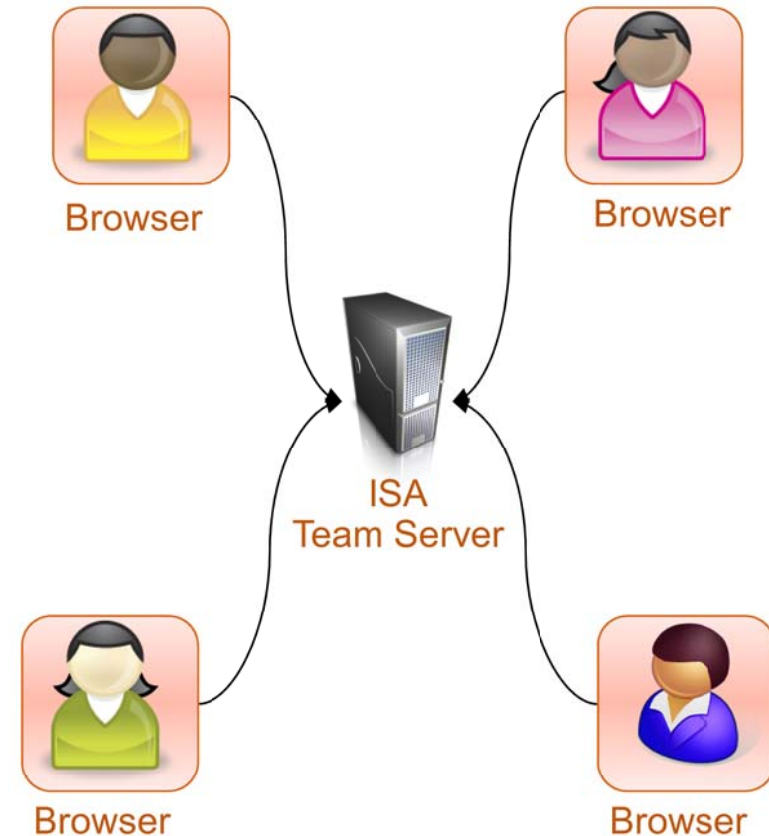
- **Cost avoidance** through reduction in time to resolution and PMR avoidance
- **Saves time** installing/updating client software: click “refresh” to get the latest version
- **Saves time, ensures completeness and consistency** when trudging through large volumes of diagnostic data to find that “needle in a haystack”
- **Saves desktop resources** by off-loading heavyweight tools to shared servers
- **Saves time** communicating with customers and collaborating between Support Engineers



Beta 3  
– May 2013

## ISA 5.0 Team Server

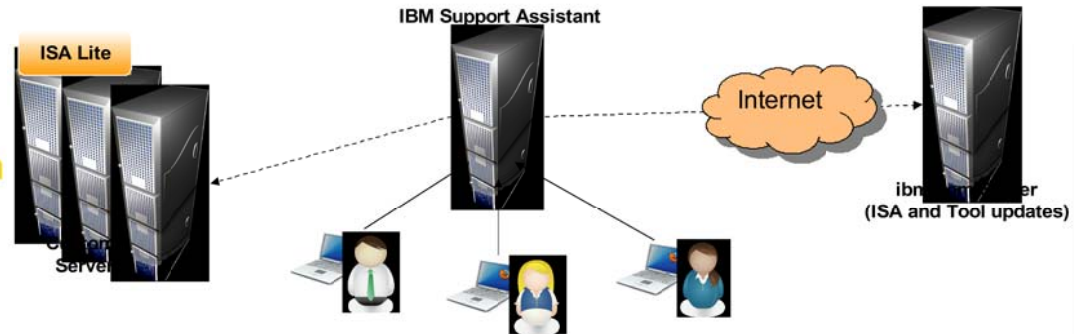
- Server-based model
- Install once - shared by many team members via browser
- Web 2.0 browser interface
- Remote execution of PD tools
- Off-load analysis processing
- Collaboration on PD
- Case Management
- Tool Management
- Single-user option available



# IBM Support Assistant 5.0 – Deployment options

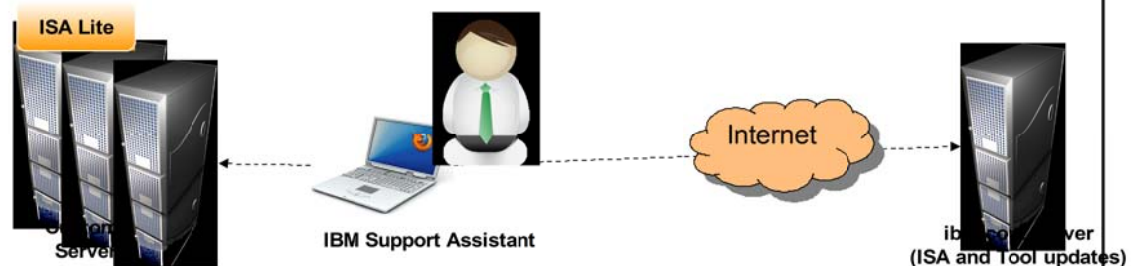
## Team Server

- Single install
- Multiple end users
- Leverages resources of ISA server system
- Shared investigation



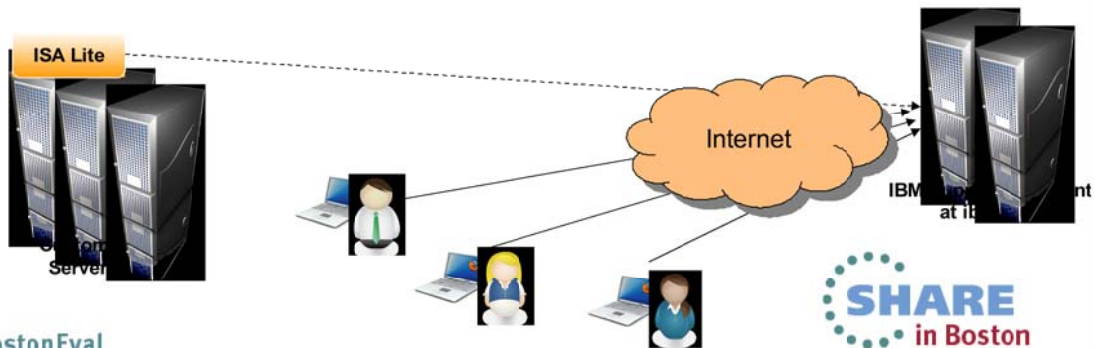
## Standalone

- Single user
- Local install
- User administered



## Cloud (future?)

- Zero install
- Multiple end users
- Leverages resources of ISA at ibm.com
- Shared investigation



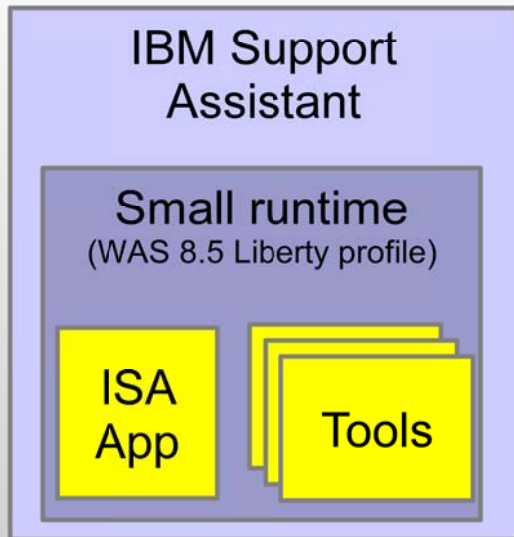
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# IBM Support Assistant 5.0 – Installation options



## Installation Manager

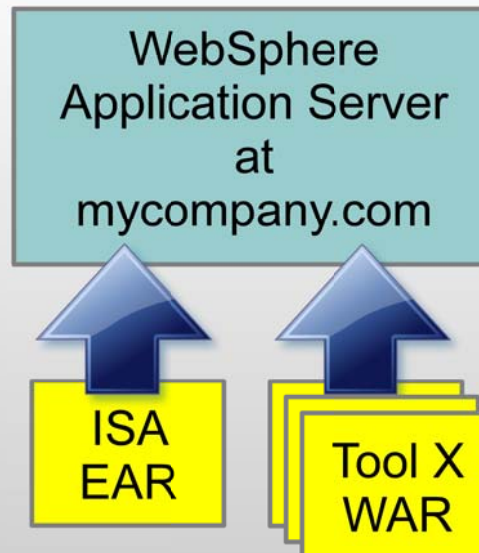
- *Managed install, uninstall and update*
- *Selective install of tools*
- *All-in-one solution – includes lightweight runtime*



optional

EAR:

- *Deploy into existing Application Server*
- *Tools deployed as JEE web modules*



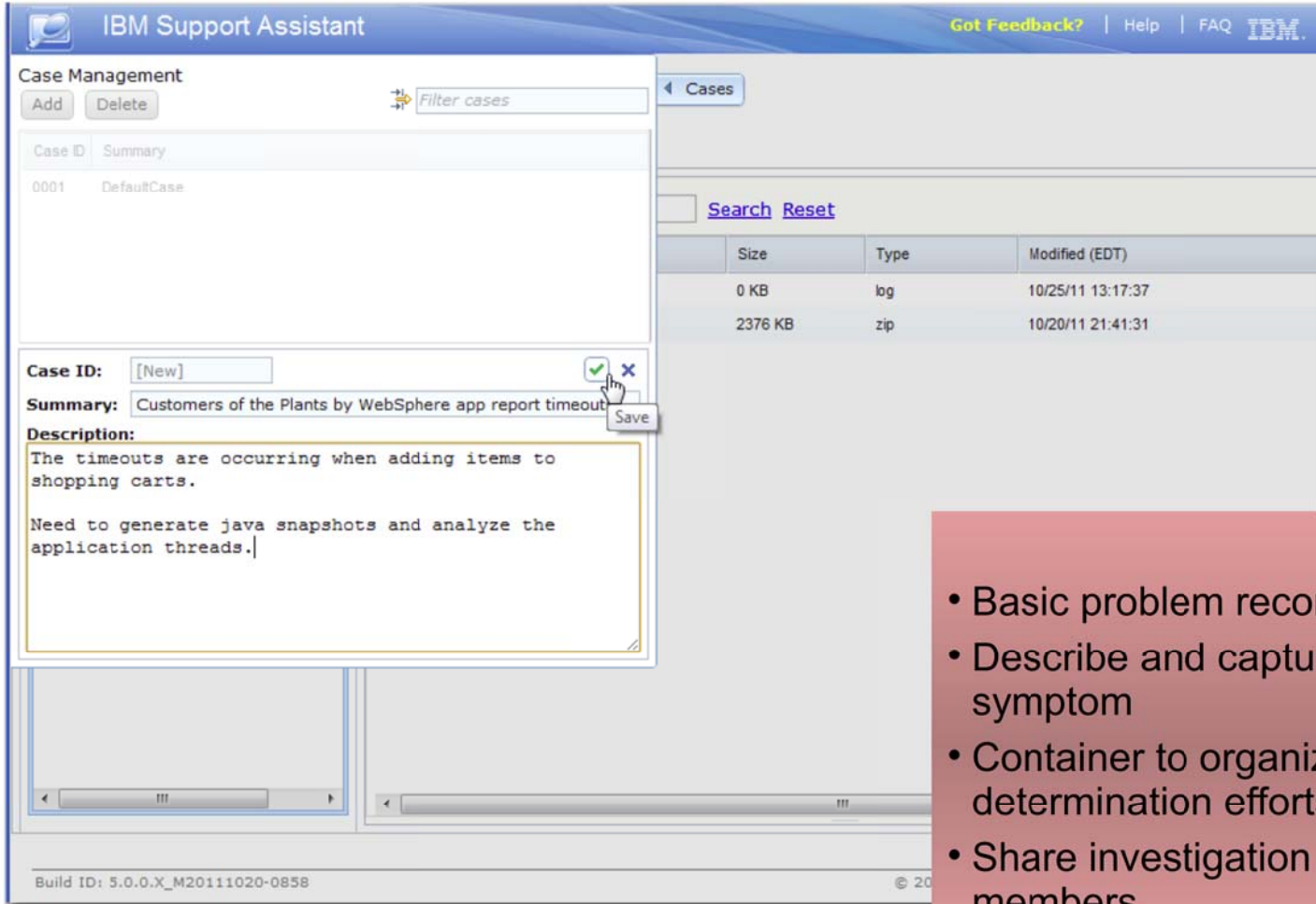
## Compressed zip

- *Easy startup*
- *Unzip and go*
- *All tools included*
- *No update capabilities*



# Case Management

## Simplified organization



The screenshot shows the IBM Support Assistant Case Management interface. The top bar includes 'IBM Support Assistant', 'Got Feedback?', 'Help', 'FAQ', and the 'IBM' logo. The main area is divided into a left sidebar and a main content area. The sidebar contains 'Case Management' with 'Add' and 'Delete' buttons, a 'Filter cases' search box, and a table with columns 'Case ID' and 'Summary'. The main content area has a 'Cases' tab, a 'Search Reset' button, and a table with columns 'Size', 'Type', and 'Modified (EDT)'. The table lists two entries: '0 KB log 10/25/11 13:17:37' and '2376 KB zip 10/20/11 21:41:31'. A 'Case ID' field with '[New]' and a 'Summary' field with 'Customers of the Plants by WebSphere app report timeout' are visible. A 'Description' field contains the text: 'The timeouts are occurring when adding items to shopping carts. Need to generate java snapshots and analyze the application threads. |'. A 'Save' button is located below the description field.


Case ID	Summary
0001	DefaultCase

Size	Type	Modified (EDT)
0 KB	log	10/25/11 13:17:37
2376 KB	zip	10/20/11 21:41:31

Case ID: [New]

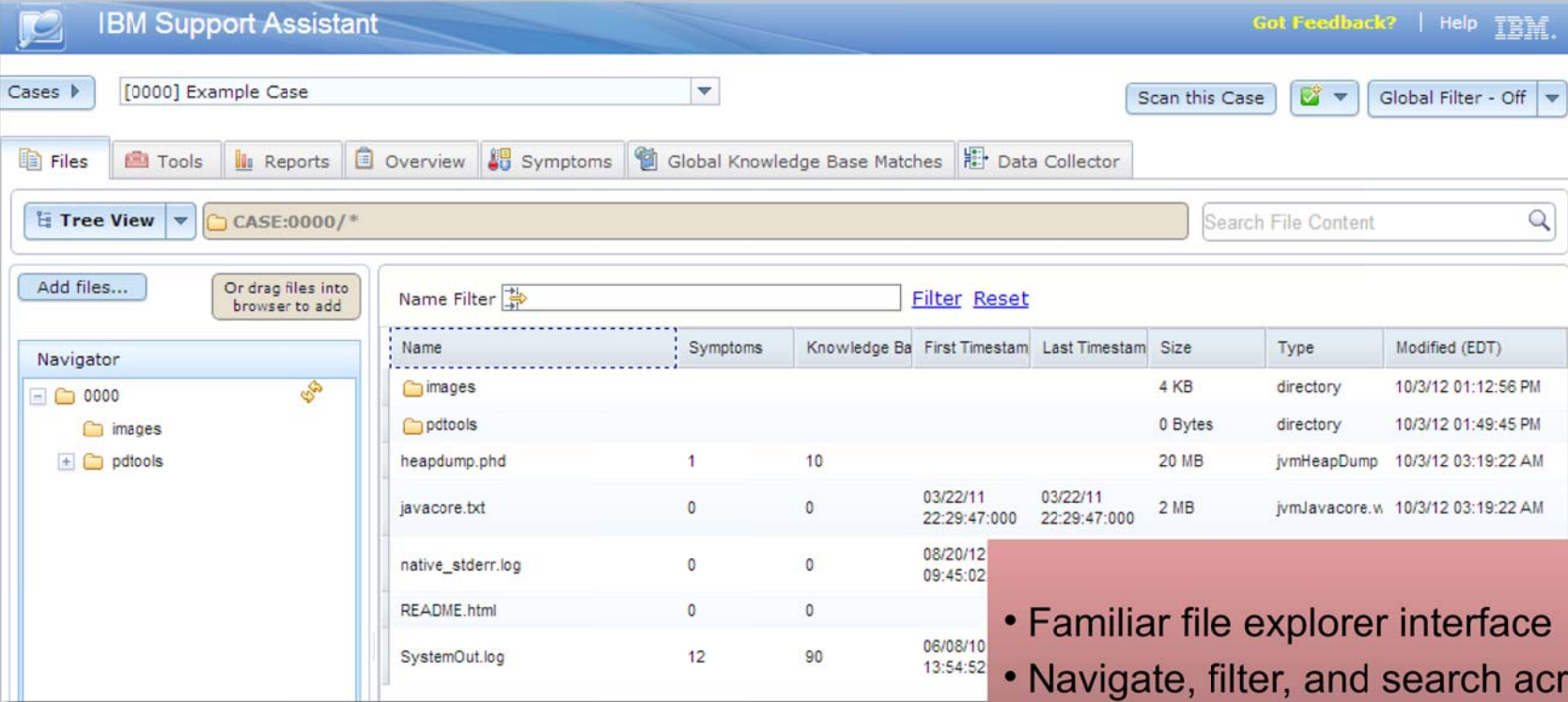
Summary: Customers of the Plants by WebSphere app report timeout

Description:  
The timeouts are occurring when adding items to shopping carts.  
Need to generate java snapshots and analyze the application threads. |

- 
- Basic problem record capabilities
  - Describe and capture notes about a symptom
  - Container to organizer problem determination efforts
  - Share investigation with other team members




# File Management and File Actions

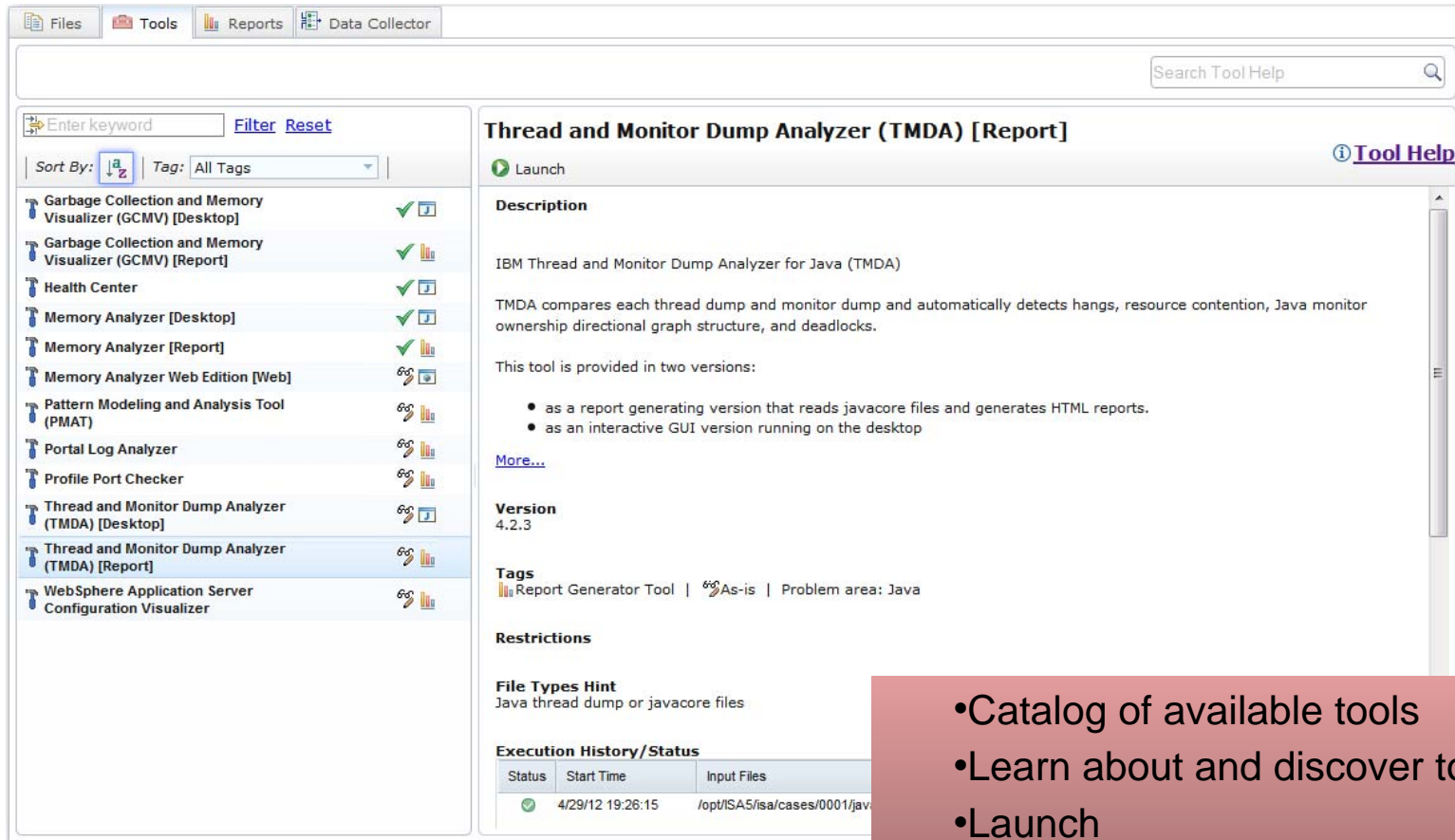


The screenshot shows the IBM Support Assistant interface. At the top, there's a header with 'IBM Support Assistant' and 'Got Feedback? | Help IBM.'. Below that, a 'Cases' dropdown menu shows '[0000] Example Case'. To the right are buttons for 'Scan this Case' and 'Global Filter - Off'. A navigation bar includes 'Files', 'Tools', 'Reports', 'Overview', 'Symptoms', 'Global Knowledge Base Matches', and 'Data Collector'. Below the navigation bar, there's a 'Tree View' dropdown and a breadcrumb path 'CASE:0000/\*'. A search box labeled 'Search File Content' is on the right. On the left, a 'Navigator' pane shows a folder tree with '0000', 'images', and 'pdtools'. The main area features a 'Name Filter' and a table of files.

Name	Symptoms	Knowledge Ba	First Timestam	Last Timestam	Size	Type	Modified (EDT)
images					4 KB	directory	10/3/12 01:12:56 PM
pdtools					0 Bytes	directory	10/3/12 01:49:45 PM
heapdump.phd	1	10			20 MB	jvmHeapDump	10/3/12 03:19:22 AM
javacore.txt	0	0	03/22/11 22:29:47:000	03/22/11 22:29:47:000	2 MB	jvmJavacore.w	10/3/12 03:19:22 AM
native_stderr.log	0	0	08/20/12 09:45:02				
README.html	0	0					
SystemOut.log	12	90	06/08/10 13:54:52				

- 
- Familiar file explorer interface
  - Navigate, filter, and search across large numbers of files
  - Invoke common actions against files and directories
  - Easy upload and transfer

# Tools – Toolbox



The screenshot shows the SHARE toolbox interface. On the left is a list of tools with search filters. On the right, the details for 'Thread and Monitor Dump Analyzer (TMDA) [Report]' are displayed, including a description, version, tags, and execution history.

**Thread and Monitor Dump Analyzer (TMDA) [Report]**

**Description**

IBM Thread and Monitor Dump Analyzer for Java (TMDA)

TMDA compares each thread dump and monitor dump and automatically detects hangs, resource contention, Java monitor ownership directional graph structure, and deadlocks.

This tool is provided in two versions:

- as a report generating version that reads javacore files and generates HTML reports.
- as an interactive GUI version running on the desktop

**Version**

4.2.3

**Tags**

Report Generator Tool | As-is | Problem area: Java

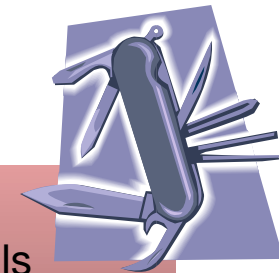
**Restrictions**

**File Types Hint**

Java thread dump or javacore files

**Execution History/Status**

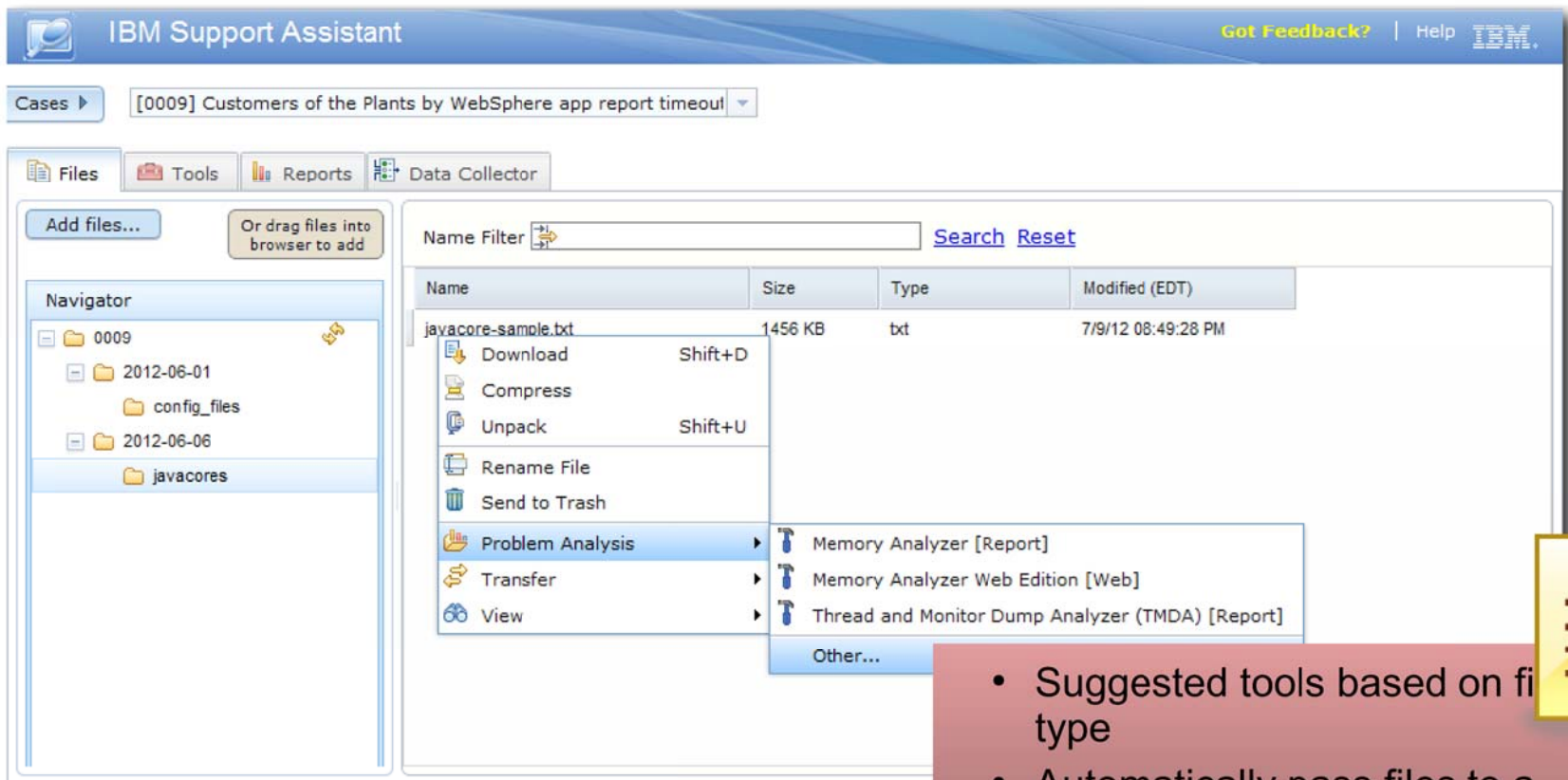
Status	Start Time	Input Files
✓	4/29/12 19:26:15	/opt/ISA5/isa/cases/0001/jav



- Catalog of available tools
- Learn about and discover tools
- Launch
- Tool Help
- Execution History



# Files – Launch tools



IBM Support Assistant

Got Feedback? | Help IBM

Cases ▾ [0009] Customers of the Plants by WebSphere app report timeout ▾

Files Tools Reports Data Collector

Add files... Or drag files into browser to add

Name Filter  Search Reset

Name	Size	Type	Modified (EDT)
javacore-sample.txt	1456 KB	txt	7/9/12 08:49:28 PM

Download Shift+D

Compress

Unpack Shift+U

Rename File


Send to Trash

Problem Analysis ▶

Transfer

View

- Memory Analyzer [Report]
- Memory Analyzer Web Edition [Web]
- Thread and Monitor Dump Analyzer (TMDA) [Report]
- Other...

- 
- Suggested tools based on file type
  - Automatically pass files to a tool
  - All tools available from the “Other...” menu

# ISA 5 Beta - Tools



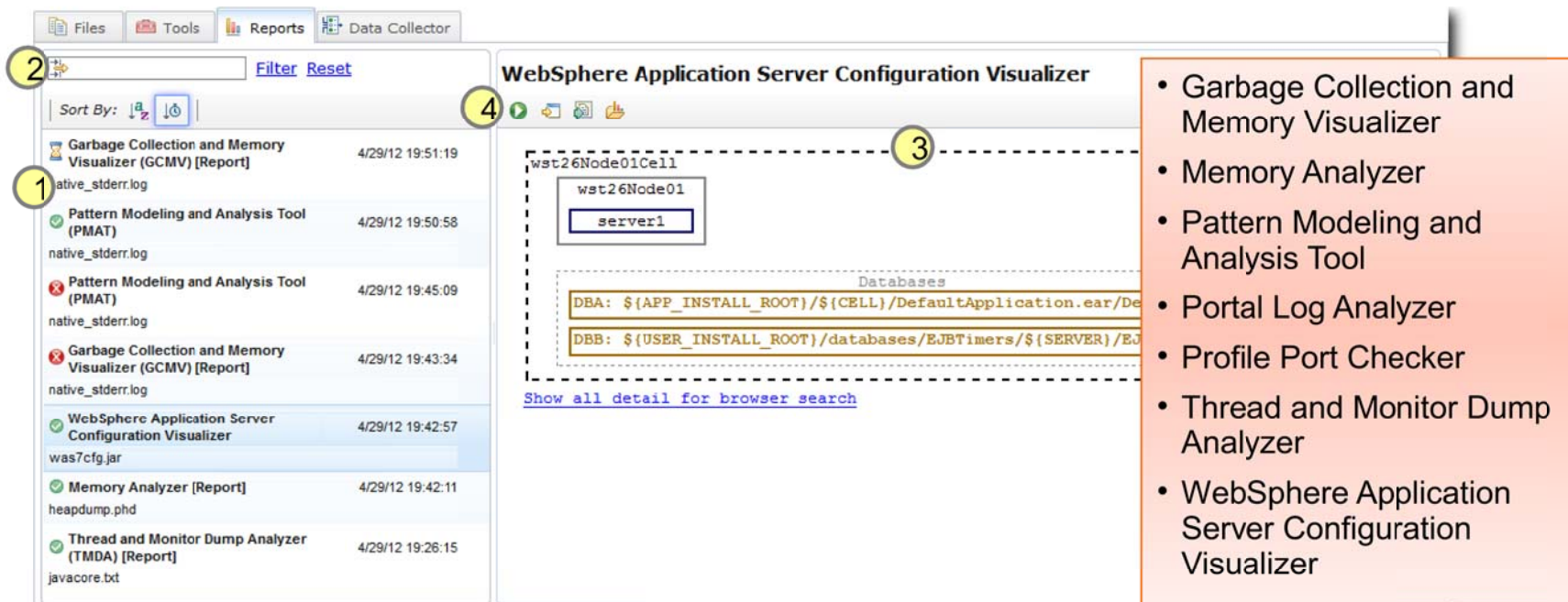
Strategic direction

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# Tooling Platform – Reports View

The Reports Tab provides a single view into all reports generated by tools within a case

- 1) Full list of reports
- 2) Filter and sort to easily locate reports
- 3) View reports directly in IBM Support Assistant
- 4) Relaunch tools and navigate directly to the report's input and output



**WebSphere Application Server Configuration Visualizer**

Sort By: [Filter] [Reset]

1) Garbage Collection and Memory Visualizer (GCMV) [Report] 4/29/12 19:51:19 native\_stderr.log

2) Pattern Modeling and Analysis Tool (PMAT) 4/29/12 19:50:58 native\_stderr.log

3) Pattern Modeling and Analysis Tool (PMAT) 4/29/12 19:45:09 native\_stderr.log

4) Garbage Collection and Memory Visualizer (GCMV) [Report] 4/29/12 19:43:34 native\_stderr.log

WebSphere Application Server Configuration Visualizer 4/29/12 19:42:57 was7cfg.jar

Memory Analyzer [Report] 4/29/12 19:42:11 heapdump.phd

Thread and Monitor Dump Analyzer (TMDA) [Report] 4/29/12 19:26:15 javacore.txt

Garbage Collection and Memory Visualizer (GCMV) [Report]

Memory Analyzer

Pattern Modeling and Analysis Tool

Portal Log Analyzer

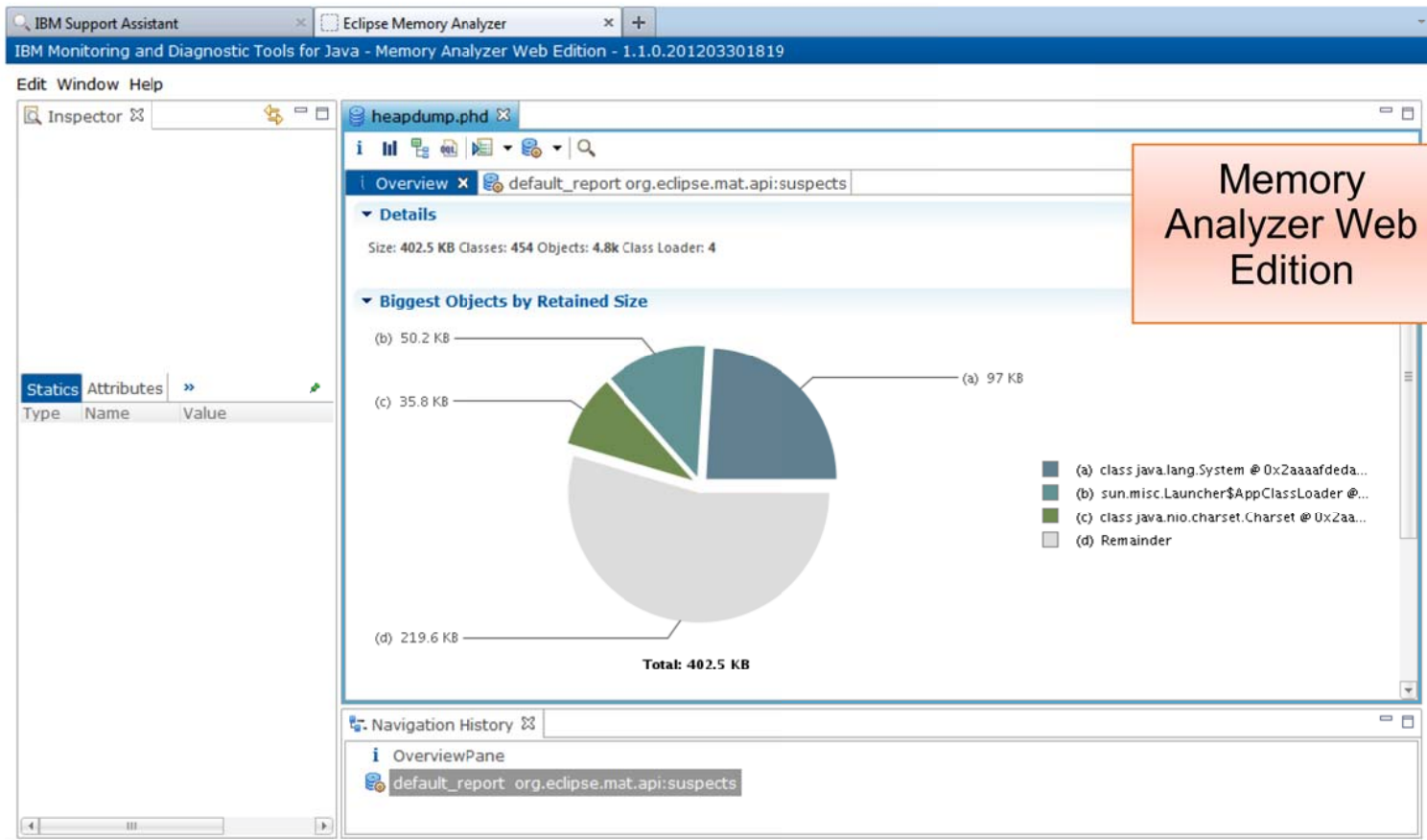
Profile Port Checker

Thread and Monitor Dump Analyzer

WebSphere Application Server Configuration Visualizer

# Web-based Tool Support

Tool processing runs on the server and the rich, interactive UI runs in the browser



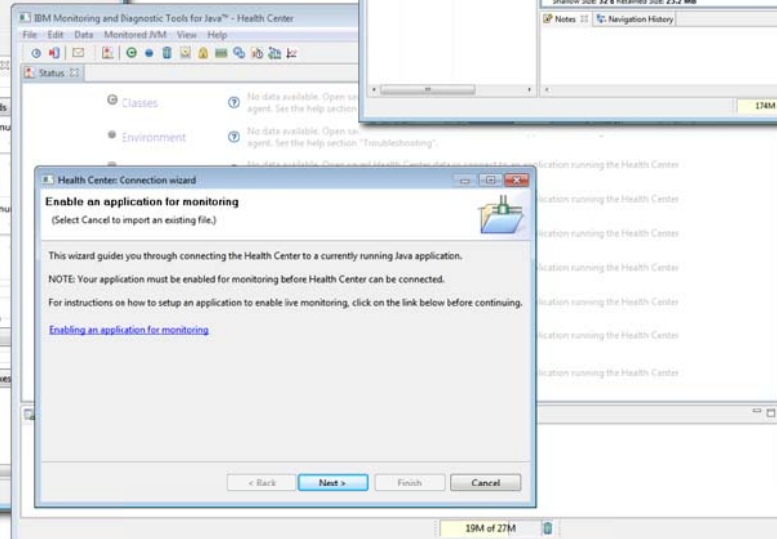
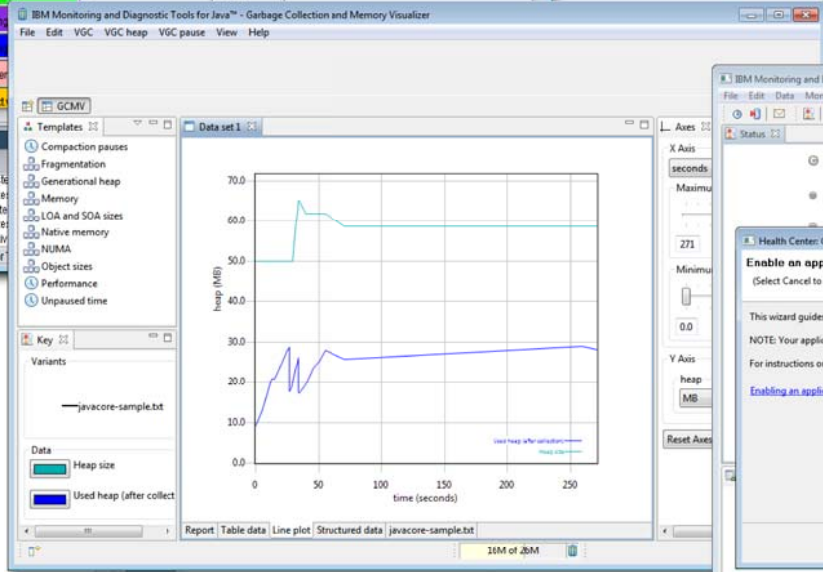
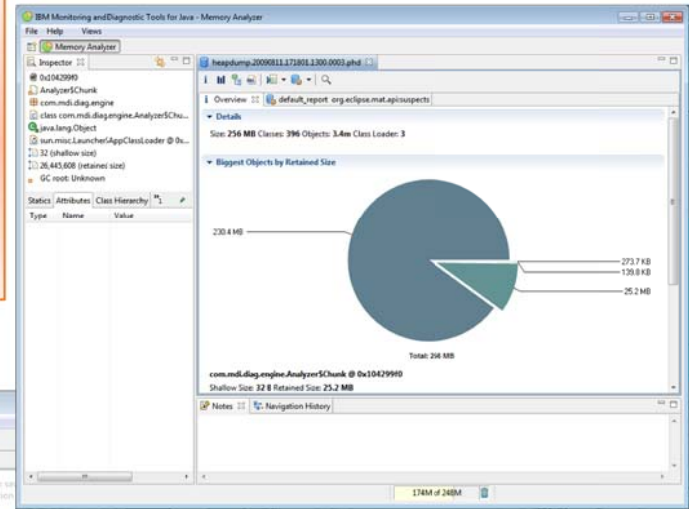
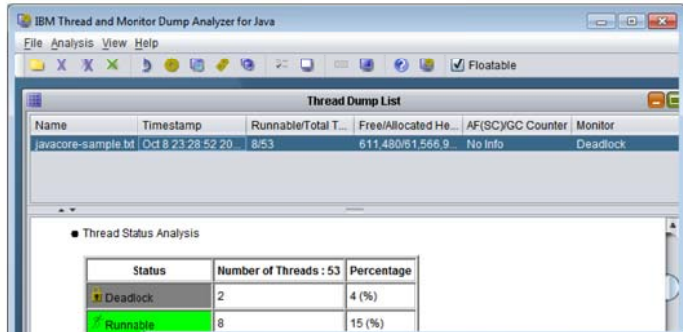
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# Desktop Tool Support

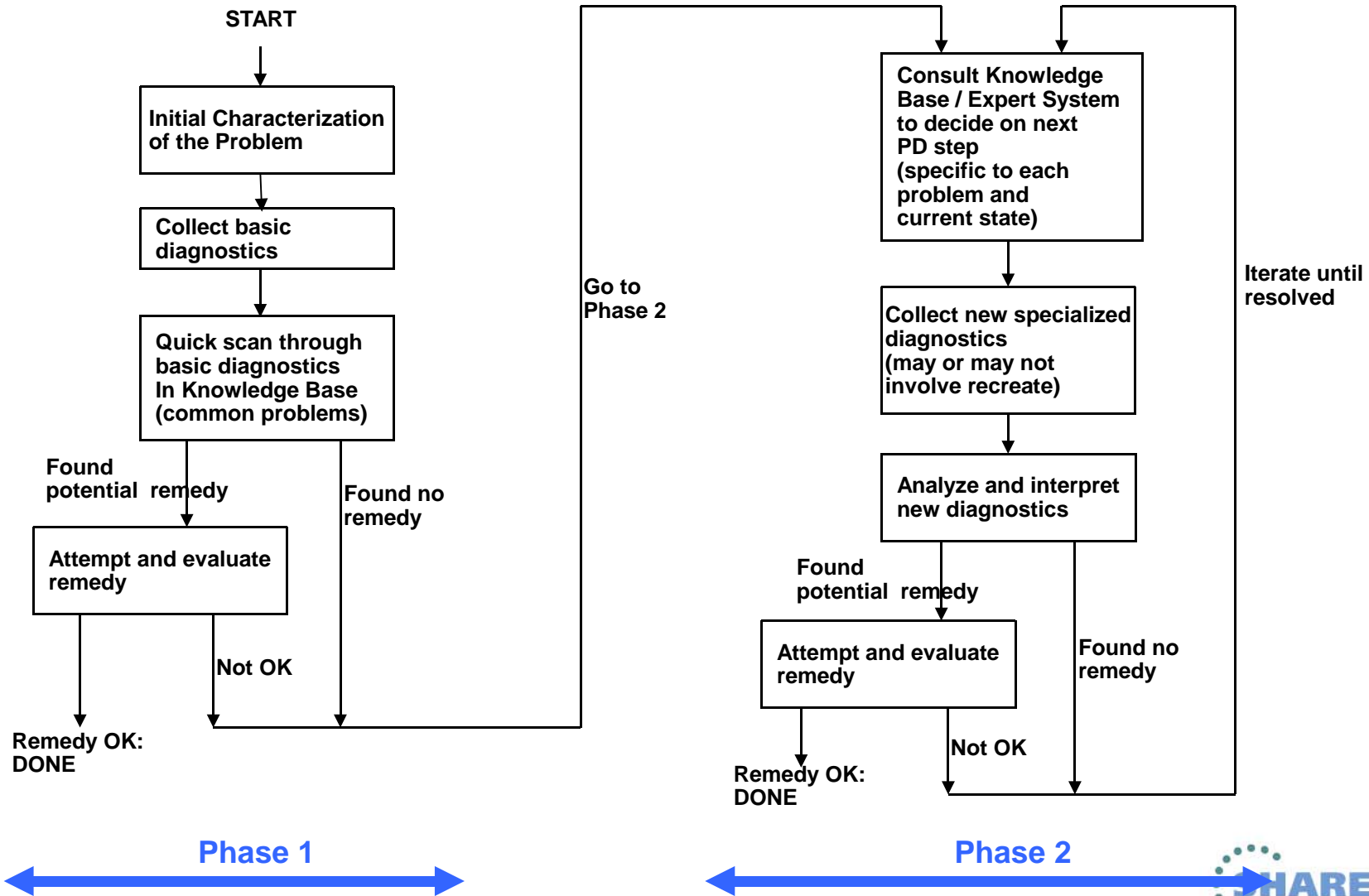
Client tools can be launched directly from the browser in IBM Support Assistant through Java WebStart

- Garbage Collection and Memory Visualizer
- Health Center
- Memory Analyzer
- Thread and Monitor Dump Analyzer



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# “Solve a Problem” Flow – Big picture





# Automated Analysis (phase 1)



- Common tasks performed during a “first look”
  - Scan logs and other files looking for anomalies – “What stands out?”
  - Mentally rank symptoms
  - Use keywords to search known repositories
  - Review search hits and decide which seem “most likely”
- IBM Support Assistant automates steps that would probably be done by hand
  - Faster
  - More thorough
- Simplify the process of getting to root cause

Files Overview Symptoms Global Knowledge Base Matches

Symptoms Filter  Search Reset

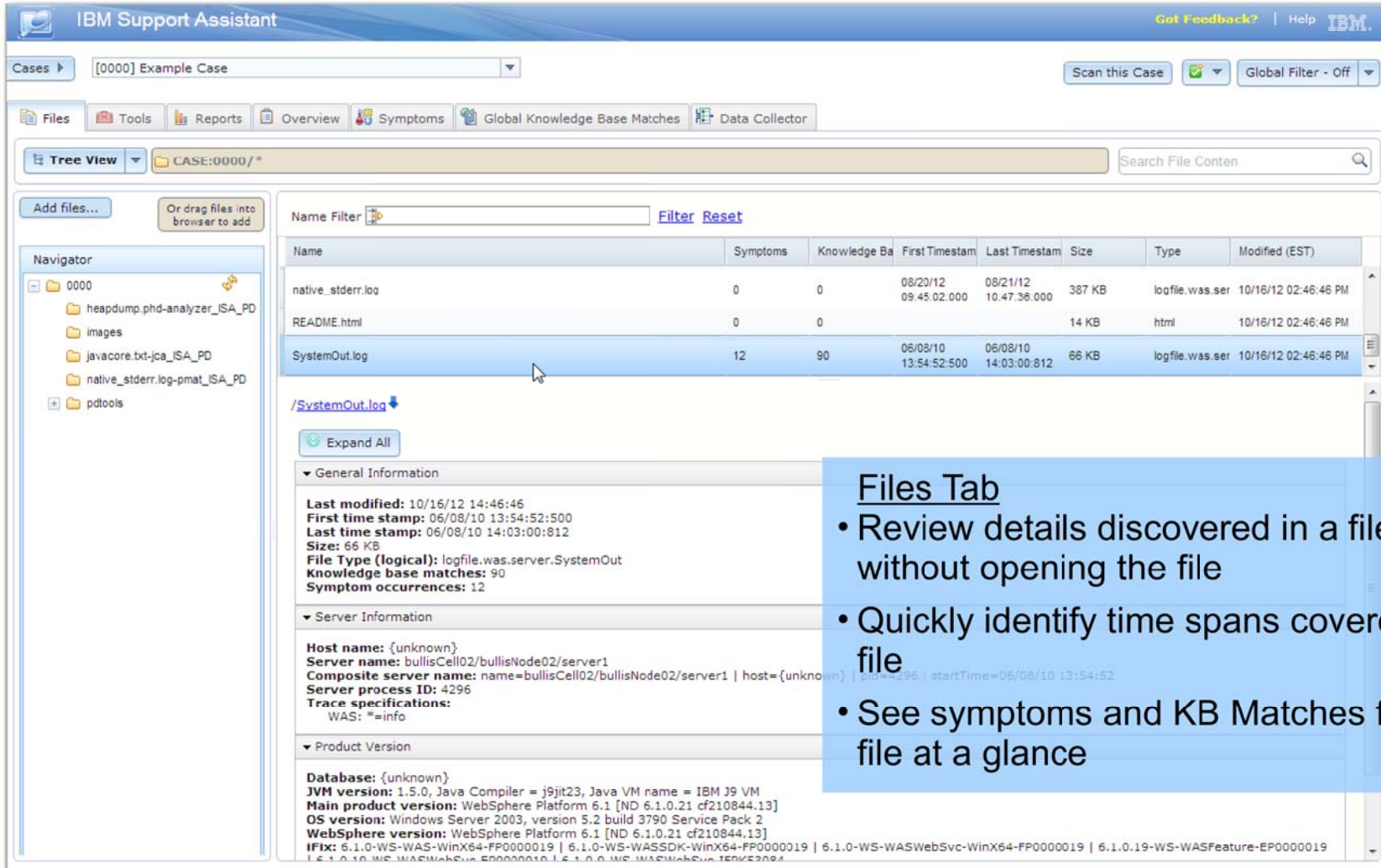
Global Sc	Type	Symptom	Symptom Oc
	Exception	Exception during user authentication: com.ibm.websphere.security.auth.WSLoginFailedException: Username and/or password is null. [variant-1]	1
	Exception	Exception during user authentication: com.ibm.websphere.security.auth.WSLoginFailedException: Username and/or password is null [variant-2]	1
	ErrorMsg	SECJ0055E: Authentication failed for cn=UKLPP_WP_CellAdmin... users ou=PRD dc=ne-commerce dc=com. The user id or password might have been entered incorrectly or misspelled... the account could have expired or disabled. The password might have expired	2
	ErrorMsg	EJPEI0096E	4

Knowledge Base Matches Symptom Occurrences Symptom Details Containing Files

Expand All

- APAR PK75163 WSLOGINFAILEXCEPTION SEEN WHEN COM.IBM.CSI.RMINBOUNDMAPPINGENABLED=TRUE [Webpage]
- Technote: Search for LDAP based users or groups through TCR "Manage Users" GUI fails [Webpage]
- PMR: Symptom found in PMR 66527.999.000.009/11/24 [Webpage]
- PMR: Symptom found in PMR 87670.49R.000.011/02/13 [Webpage]
- PMR: Symptom found in PMR 06621.227.000.009/01/23 [Webpage]

# Enhanced Files View



The screenshot shows the IBM Support Assistant interface. At the top, it says "IBM Support Assistant" and "Got Feedback? | Help IBM". Below that, there's a "Cases" dropdown menu with "[0000] Example Case". To the right, there are buttons for "Scan this Case" and "Global Filter - Off".

The main area is titled "Files" and has a "Tree View" dropdown. Below it, there's a search bar for "Search File Content".

On the left, there's a "Navigator" pane showing a folder structure under "0000":

- 0000
  - heapdump.phd-analyzer\_ISA\_PD
  - images
  - javacore.txt-jca\_ISA\_PD
  - native\_stderr.log-pmat\_ISA\_PD
  - pdtools

The main table lists files with columns: Name, Symptoms, Knowledge Ba, First Timestam, Last Timestam, Size, Type, and Modified (EST). The file "SystemOut.log" is selected and highlighted.

Name	Symptoms	Knowledge Ba	First Timestam	Last Timestam	Size	Type	Modified (EST)
native_stderr.log	0	0	08/20/12 09:45:02.000	08/21/12 10:47:36.000	387 KB	logfile.was.ser	10/16/12 02:46:46 PM
README.html	0	0			14 KB	html	10/16/12 02:46:46 PM
SystemOut.log	12	90	06/08/10 13:54:52.500	06/08/10 14:03:00.812	66 KB	logfile.was.ser	10/16/12 02:46:46 PM

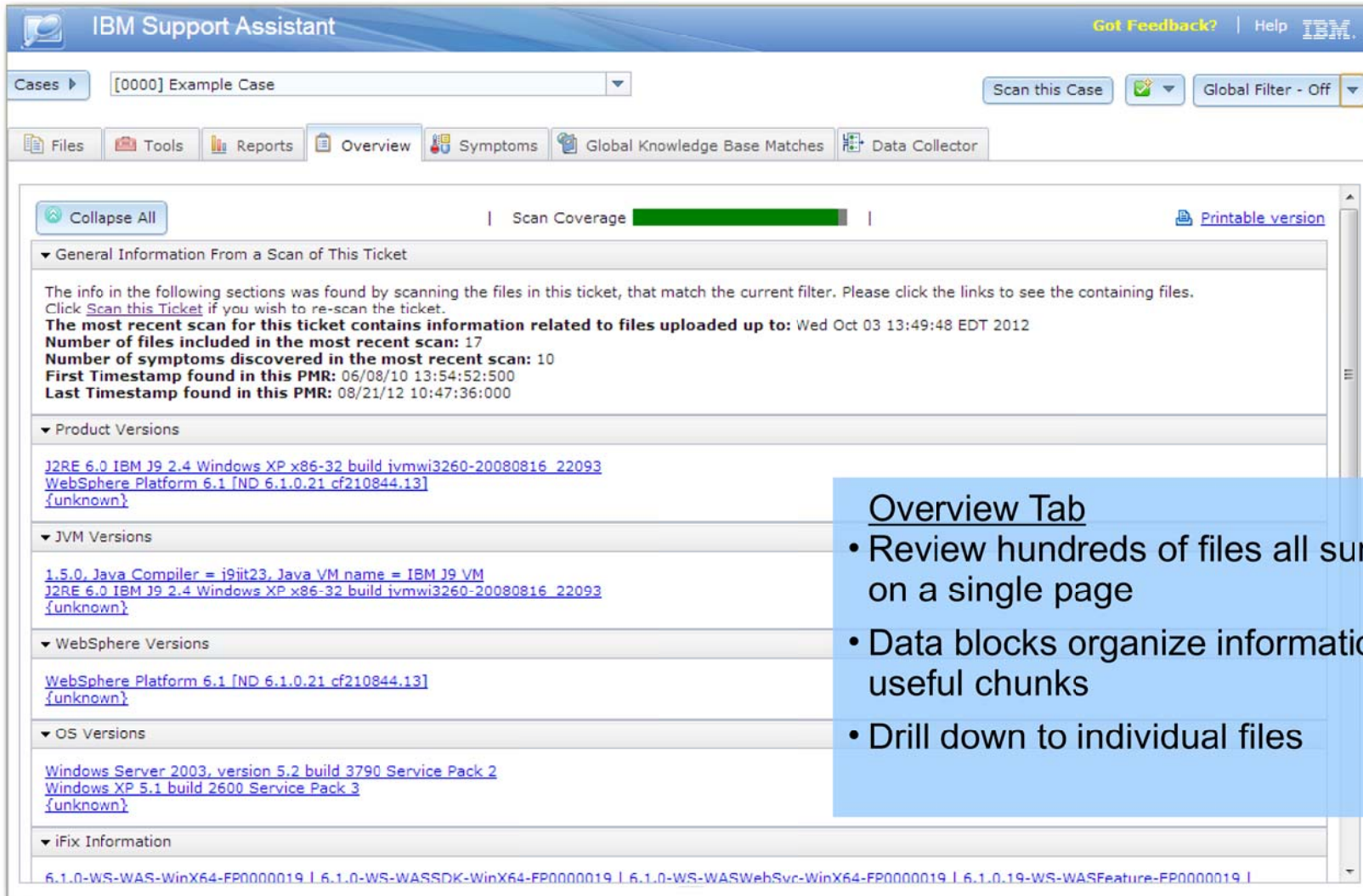
Below the table, there's a section for "/SystemOut.log" with an "Expand All" button. The details are organized into sections:

- General Information**
  - Last modified: 10/16/12 14:46:46
  - First time stamp: 06/08/10 13:54:52:500
  - Last time stamp: 06/08/10 14:03:00:812
  - Size: 66 KB
  - File Type (logical): logfile.was.server.SystemOut
  - Knowledge base matches: 90
  - Symptom occurrences: 12
- Server Information**
  - Host name: {unknown}
  - Server name: bullisCell02/bullisNode02/server1
  - Composite server name: name=bullisCell02/bullisNode02/server1 | host={unknown} | pid=296 | startTime=06/08/10 13:54:52
  - Server process ID: 4296
  - Trace specifications: WAS: \*=info
- Product Version**
  - Database: {unknown}
  - JVM version: 1.5.0, Java Compiler = j9jit23, Java VM name = IBM J9 VM
  - Main product version: WebSphere Platform 6.1 [ND 6.1.0.21 cf210844.13]
  - OS version: Windows Server 2003, version 5.2 build 3790 Service Pack 2
  - WebSphere version: WebSphere Platform 6.1 [ND 6.1.0.21 cf210844.13]
  - IFix: 6.1.0-WS-WAS-WinX64-FP0000019 | 6.1.0-WS-WASSDK-WinX64-FP0000019 | 6.1.0-WS-WASWebSvc-WinX64-FP0000019 | 6.1.0.19-WS-WASFeature-EP0000019

**Files Tab**

- Review details discovered in a file without opening the file
- Quickly identify time spans covered in a file
- See symptoms and KB Matches for a file at a glance

# Automated Analysis – Overview



The screenshot displays the IBM Support Assistant interface. At the top, the title bar reads "IBM Support Assistant" with a "Got Feedback?" link and "Help IBM." text. Below the title bar, there's a "Cases" dropdown menu showing "[0000] Example Case". To the right, there are buttons for "Scan this Case", a green checkmark icon, and "Global Filter - Off". A navigation bar contains tabs for "Files", "Tools", "Reports", "Overview" (which is active), "Symptoms", "Global Knowledge Base Matches", and "Data Collector".

The main content area shows a "Collapse All" button and a "Scan Coverage" progress bar. Below this, there's a section titled "General Information From a Scan of This Ticket" with a "Printable version" link. The text in this section reads: "The info in the following sections was found by scanning the files in this ticket, that match the current filter. Please click the links to see the containing files. Click [Scan this Ticket](#) if you wish to re-scan the ticket. **The most recent scan for this ticket contains information related to files uploaded up to: Wed Oct 03 13:49:48 EDT 2012**  
**Number of files included in the most recent scan: 17**  
**Number of symptoms discovered in the most recent scan: 10**  
**First Timestamp found in this PMR: 06/08/10 13:54:52:500**  
**Last Timestamp found in this PMR: 08/21/12 10:47:36:000**

Below this are several expandable sections:

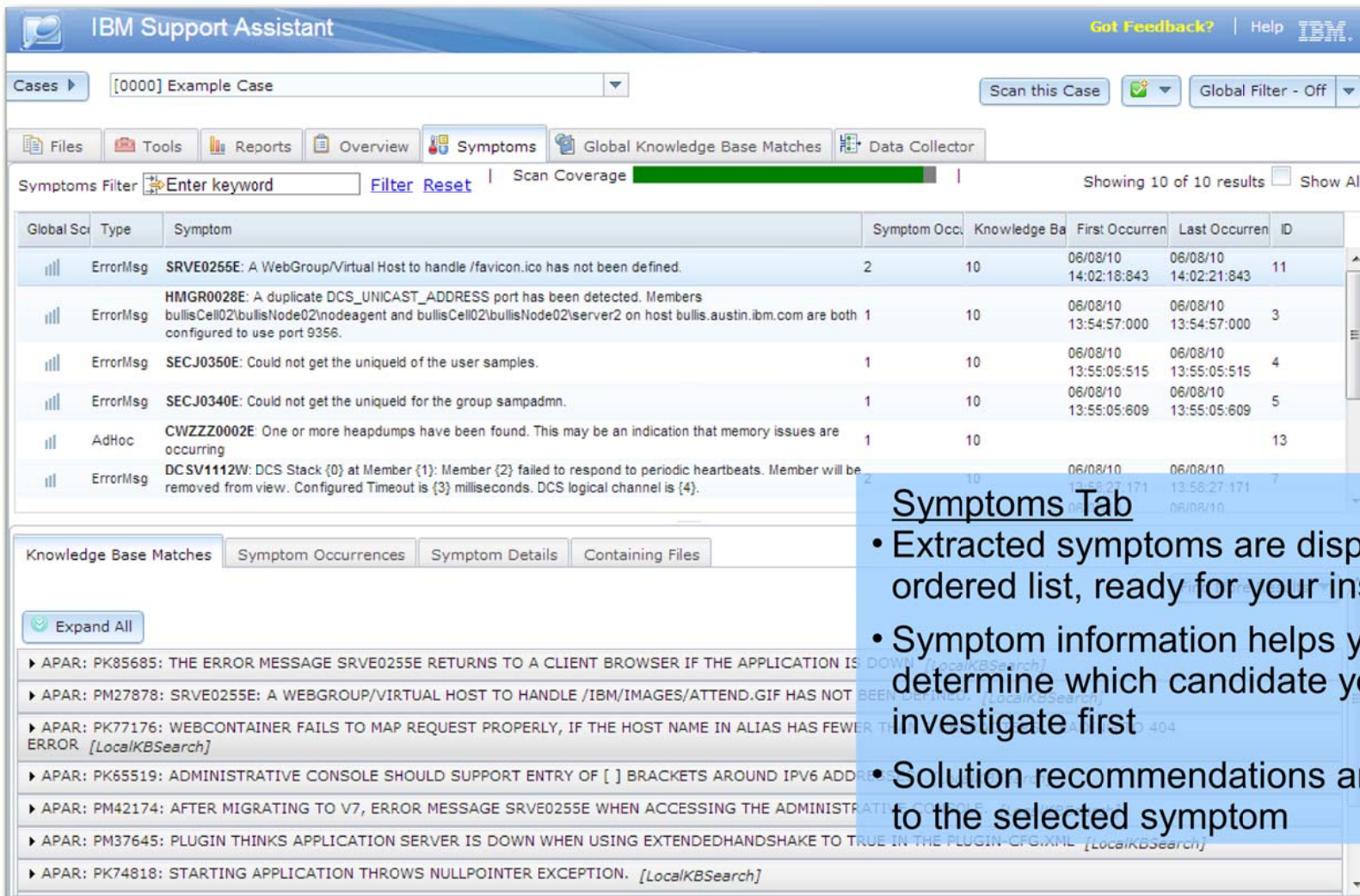
- Product Versions**
  - [J2RE 6.0 IBM J9 2.4 Windows XP x86-32 build ivmwi3260-20080816\\_22093](#)
  - [WebSphere Platform 6.1 \[ND 6.1.0.21 cf210844.13\]](#)
  - {unknown}
- JVM Versions**
  - [1.5.0, Java Compiler = i9iit23, Java VM name = IBM J9 VM](#)
  - [J2RE 6.0 IBM J9 2.4 Windows XP x86-32 build ivmwi3260-20080816\\_22093](#)
  - {unknown}
- WebSphere Versions**
  - [WebSphere Platform 6.1 \[ND 6.1.0.21 cf210844.13\]](#)
  - {unknown}
- OS Versions**
  - [Windows Server 2003, version 5.2 build 3790 Service Pack 2](#)
  - [Windows XP 5.1 build 2600 Service Pack 3](#)
  - {unknown}
- iFix Information**
  - [6.1.0-WS-WAS-WinX64-FP0000019](#) | [6.1.0-WS-WASSDK-WinX64-FP0000019](#) | [6.1.0-WS-WASWebSvc-WinX64-FP0000019](#) | [6.1.0.19-WS-WASFeature-FP0000019](#) |

## Overview Tab

- Review hundreds of files all summarized on a single page
- Data blocks organize information into useful chunks
- Drill down to individual files



# Automated Analysis – Symptoms



The screenshot shows the IBM Support Assistant interface. At the top, there's a header with 'IBM Support Assistant' and 'Got Feedback? | Help IBM.'. Below that, a search bar contains '[0000] Example Case'. A navigation bar includes 'Files', 'Tools', 'Reports', 'Overview', 'Symptoms', 'Global Knowledge Base Matches', and 'Data Collector'. The 'Symptoms' tab is active, showing a table of symptoms. The table has columns for 'Global Sc', 'Type', 'Symptom', 'Symptom Occ', 'Knowledge Ba', 'First Occurren', 'Last Occurren', and 'ID'. Below the table, there are tabs for 'Knowledge Base Matches', 'Symptom Occurrences', 'Symptom Details', and 'Containing Files'. The 'Symptom Details' tab is selected, showing a list of knowledge base matches with details like 'APAR: PK85685: THE ERROR MESSAGE SRVE0255E RETURNS TO A CLIENT BROWSER...'. A blue callout box is overlaid on the right side of the screenshot, containing text and bullet points.

Global Sc	Type	Symptom	Symptom Occ	Knowledge Ba	First Occurren	Last Occurren	ID
	ErrorMsg	SRVE0255E: A WebGroup/Virtual Host to handle /favicon.ico has not been defined.	2	10	06/08/10 14:02:18:843	06/08/10 14:02:21:843	11
	ErrorMsg	HMGR0028E: A duplicate DCS_UNICAST_ADDRESS port has been detected. Members bullisCell02\bullisNode02\nodeagent and bullisCell02\bullisNode02\server2 on host bullis.austin.ibm.com are both configured to use port 9356.	1	10	06/08/10 13:54:57:000	06/08/10 13:54:57:000	3
	ErrorMsg	SECJ0350E: Could not get the uniqeud of the user samples.	1	10	06/08/10 13:55:05:515	06/08/10 13:55:05:515	4
	ErrorMsg	SECJ0340E: Could not get the uniqeud for the group sampadmn.	1	10	06/08/10 13:55:05:609	06/08/10 13:55:05:609	5
	AdHoc	CWZZZ0002E: One or more heapdumps have been found. This may be an indication that memory issues are occurring	1	10			13
	ErrorMsg	DCSV1112W: DCS Stack {0} at Member {1}: Member {2} failed to respond to periodic heartbeats. Member will be removed from view. Configured Timeout is {3} milliseconds. DCS logical channel is {4}.	2	10	06/08/10 13:58:27:171	06/08/10 13:58:27:171	7

**Symptoms Tab**

- Extracted symptoms are displayed in an ordered list, ready for your inspection...
- Symptom information helps you determine which candidate you should investigate first
- Solution recommendations are matched to the selected symptom

Complete your sessions evaluation online at [SHARE.org/BostonEval](https://www.share.org/BostonEval)

# Automated Analysis – Knowledge Base Matches



IBM Support Assistant Got Feedback? | Help IBM.

Cases ▾ [0000] Example Case Scan this Case  Global Filter - Off ▾

Files Tools Reports Overview Symptoms **Global Knowledge Base Matches** Data Collector

Symptoms Filter  [Filter](#) [Reset](#) | Scan Coverage  | Showing 74 of 75 results  Show All

Global Score	Type	Knowledge Base Entry	Symptom	Tool	ID
	APAR	PK75700: DCS_UNICAST_ADDRESS PORT CONFLICT RESULTS IN HMGR0028E, DCSV1036W AND EVENTUALLY JAVA OUTFOFMEMORYERROR IN THE SERVER.	Multiple symptoms (3) matched by this entry	LocalKBSei	11
	APAR	PK85685: THE ERROR MESSAGE SRVE0255E RETURNS TO A CLIENT BROWSER IF THE APPLICATION IS DOWN	SRVE0255E: A WebGroup/Virtual Host to handle /favicon.ico has not been defined.	LocalKBSei	41
	APAR	PM27878: SRVE0255E: A WEBGROUP/VIRTUAL HOST TO HANDLE /IBM/IMAGES/ATTEND.GIF HAS NOT BEEN DEFINED.	SRVE0255E: A WebGroup/Virtual Host to handle /favicon.ico has not been defined.	LocalKBSei	42
	APAR	PK77176: WEBCONTAINER FAILS TO MAP REQUEST PROPERLY, IF THE HOST NAME IN ALIAS HAS FEWER THAN 2 CHARACTERS, LEADING TO 404 ERROR	SRVE0255E: A WebGroup/Virtual Host to handle /favicon.ico has not been defined.	LocalKBSei	43
	APAR	PK25445: ERROR: COULD NOT CREATE LTPA TOKEN	Multiple symptoms (2) matched by this entry	LocalKBSei	21
		PK65519: ADMINISTRATIVE CONSOLE SHOW D			

Knowledge Base Matches  Symptom Occurrences  Symptom Details  Containing Files

**Type:** APAR  
**Found by Tool:** LocalKBSearch  
**Global Score:** 2717  
**Label:** PK75700: DCS\_UNICAST\_ADDRESS PORT CONFLICT RESULTS IN HMGR0028E, DCSV1036W AND EVENTUALLY JAVA OUTFOFMEMORYERROR IN THE SERVER.  
**Match ID:** 11  
**Symptom IDs associated with this Match:** 3,6,10  
**Description:**

Click on the link for more references:  
<http://www.ibm.com/Search/?q=PK75700>

**Abstract:**  
DCS\_UNICAST\_ADDRESS PORT CONFLICT RESULTS IN HMGR0028E, DCSV1036W AND EVENTUALLY JAVA OUTFOFMEMORYERROR IN THE SERVER.

**Error description:**  
When running a configured new server with an already 'in-use' port for the DCS\_UNICAST\_ADDRESS, the HA manager will detect the port conflict by issuing HMGR0028E messages.

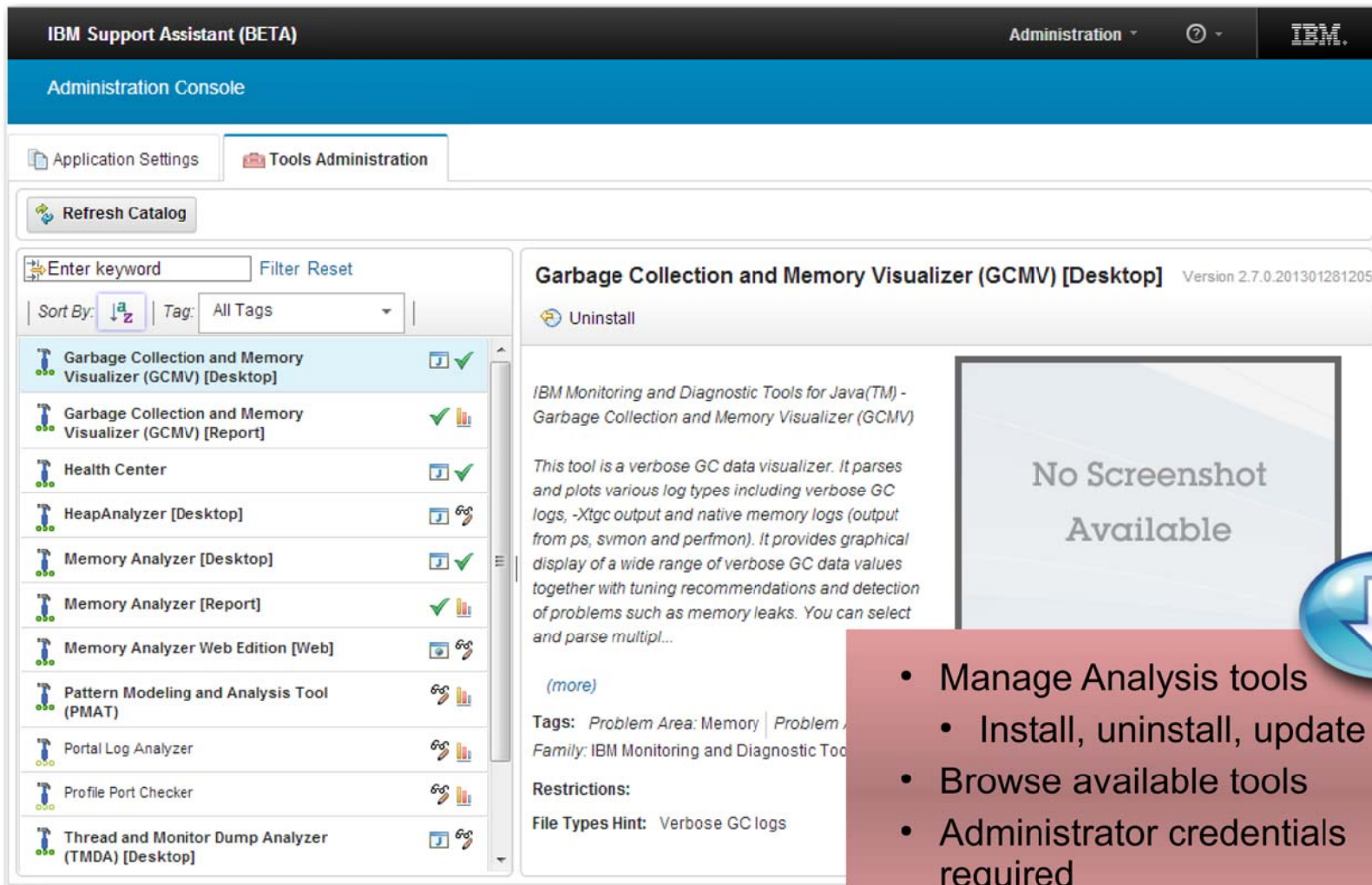
- KB Matches Tab**
- Suggested solutions – front and center
  - Recommended solutions float to the top and get better over time
  - Details help you decide if this is the solution you're looking for

Complete your sessions evaluation online at [SHARE.org/BostonEval](http://SHARE.org/BostonEval)





# Tool Administration



IBM Support Assistant (BETA) Administration Console

Administration Console

Application Settings Tools Administration

Refresh Catalog

Enter keyword Filter Reset

Sort By: [a-z] Tag: All Tags

- Garbage Collection and Memory Visualizer (GCMV) [Desktop] ✓
- Garbage Collection and Memory Visualizer (GCMV) [Report] ✓
- Health Center ✓
- HeapAnalyzer [Desktop] ⚙️
- Memory Analyzer [Desktop] ✓
- Memory Analyzer [Report] ✓
- Memory Analyzer Web Edition [Web] ⚙️
- Pattern Modeling and Analysis Tool (PMAT) ⚙️
- Portal Log Analyzer ⚙️
- Profile Port Checker ⚙️
- Thread and Monitor Dump Analyzer (TMDA) [Desktop] ⚙️

### Garbage Collection and Memory Visualizer (GCMV) [Desktop] Version 2.7.0.201301281205

Uninstall

IBM Monitoring and Diagnostic Tools for Java(TM) - Garbage Collection and Memory Visualizer (GCMV)

This tool is a verbose GC data visualizer. It parses and plots various log types including verbose GC logs, -Xtgc output and native memory logs (output from ps, svmon and perfmon). It provides graphical display of a wide range of verbose GC data values together with tuning recommendations and detection of problems such as memory leaks. You can select and parse multipl...

(more)

Tags: Problem Area: Memory | Problem Family: IBM Monitoring and Diagnostic Tools

Restrictions:

File Types Hint: Verbose GC logs

No Screenshot Available

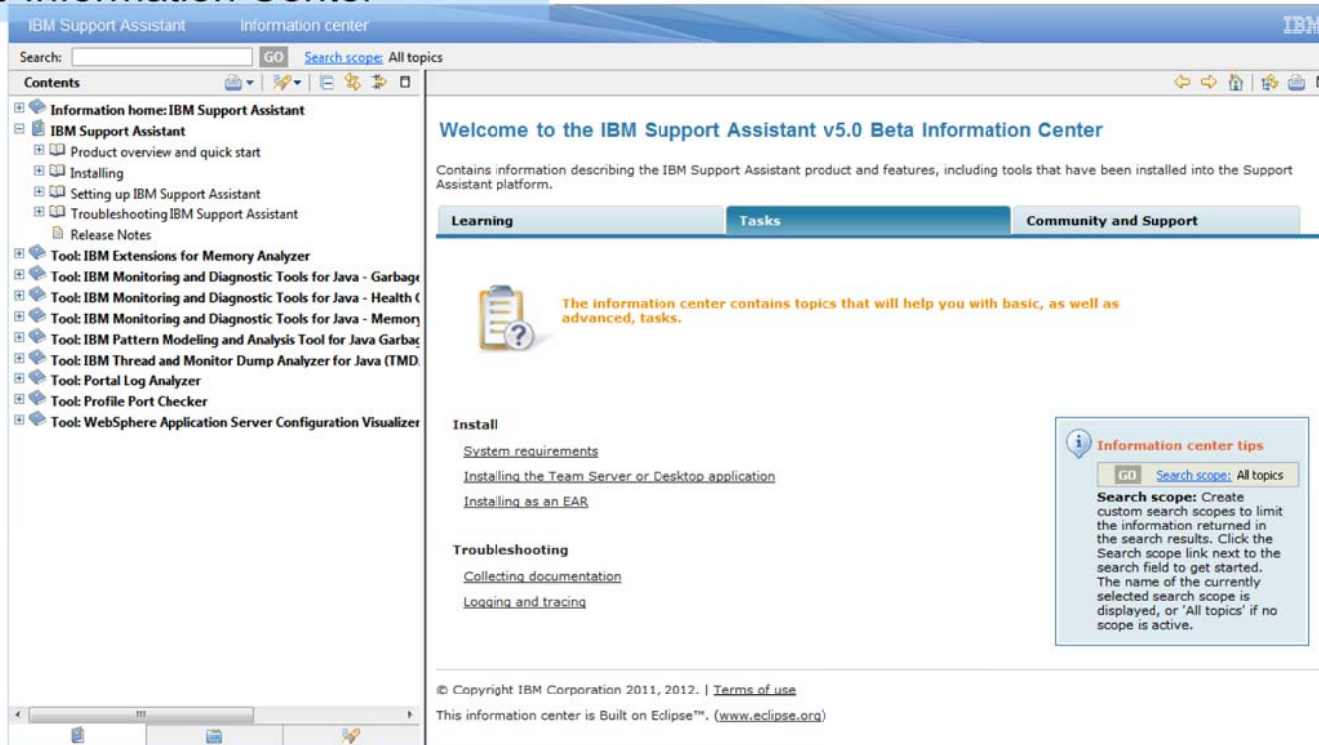
- Manage Analysis tools
- Install, uninstall, update
- Browse available tools
- Administrator credentials required

# User Assistance



## Help System

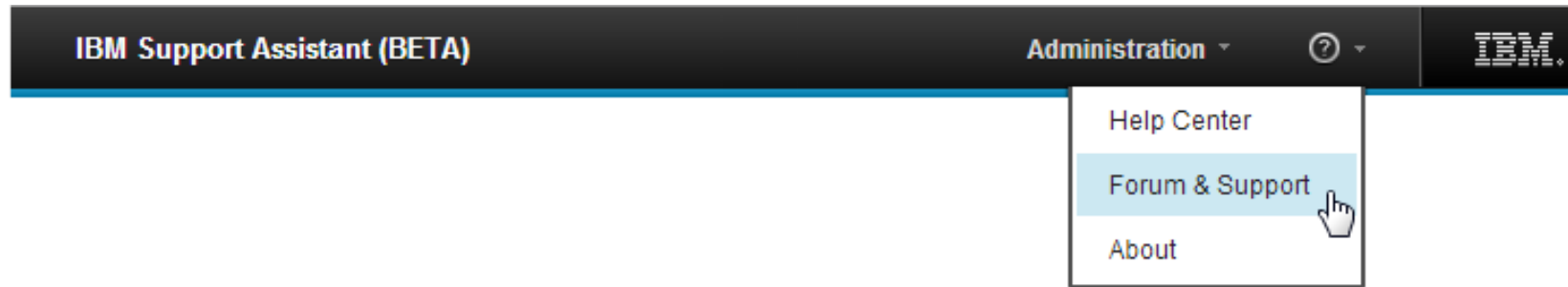
- 1) Full help documentation available from banner
- 2) Search Tool help from Tools tab
- 3) Searchable Information Center



Complete your session



# Contact Information



**Support or questions about Beta?**

**See our forum:**

<https://www.ibm.com/developerworks/community/forums/html/forum?id=11111111-0000-0000-0000-000000000935>

**IBM Support Assistant web page**

<http://www.ibm.com/software/support/isa>

# Thank you

# Questions or Comments

# Backup Slides



Complete your sessions evaluation online at [SHARE.org/BostonEval](https://www.share.org/BostonEval)





# Education



- Many problems can be resolved or avoided by ensuring that the Users have the opportunity to learn the appropriate skills
- But Education is hard to deliver efficiently – who has time to go through thousands of hours of education materials on every subject that can possibly be useful to them
  - Hence we need a rich a flexible set of education channels to suit each User’s needs
- Education is necessary both for a general range of topics about how to use various aspects of each product, but also specifically about how to perform Problem Determination tasks

Tools and Resources	
Items	Notes
WebSphere Education Services	Formal courses, both in-class and online, for a wide range of subjects. Typically for a fee. Two courses of particular interest for Problem Determination: <ul style="list-style-type: none"> <li>• WebSphere Application Server Problem Determination (WU582)</li> <li>• WebSphere Process Server Problem Determination (WB225)</li> </ul>
IBM Education Assistant (IEA)	Online, easy-to-consume, small granular education materials on common questions and problems encountered by Customers. Available for free. Some of the contents of the WAS Problem Determination course above are also available in IEA for self-study. Accessible directly through the web, or through the <i>Media Viewer</i> tool in ISA (allows offline viewing)



# Education



Tools and Resources (continued)	
Items	Notes
WebSphere Support Technical Exchange	Ongoing series of webcasts on topics of interest for WebSphere Support
IBM developerWorks	Ongoing series of articles on all technical topics, published through the web
<i>Support Authority</i> column on developerWorks	Semi-monthly column on topics of interest for WebSphere Support Published as part of the WebSphere Technical Journal
IBM Redbooks	Extensive collection of books and papers, written by IBM experts



# Reference Information



- The investigation of most problems involves finding the appropriate information in a global *knowledge base* containing instructions about how to troubleshoot each specific problem, and entries about specific known issues and APARs

Tools and Resources (continued)	
Items	Notes
Search engine on the eSupport web sites/portal	Searches through a broad range of online resources, including Information Centers, Technotes, APAR database, developerWorks, Redbooks, forums, ... Results can be filtered by type and product, and organized in tabs for different types of results.
Product Information Centers	The primary reference documentation for each product. Most Information Centers contain a section on troubleshooting tools and techniques for the associated product.. Searchable directly or through the eSupport web sites/portal or through ISA.
Technotes and related documents	Collection of notes on known issues, APARs, troubleshooting tips, how-to's. Stored in association with each product's eSupport web site/portal Managed by the IBM Support Engineers and Knowledge Engineers. Most products have a special collection of Technotes with instructions on how to troubleshoot each type of problem: <i>MustGather</i> and <i>Troubleshooting Documents</i> .
Diagnostic Guides	Some products (e.g. IBM Java) have a special <i>Diagnostic Guide</i> document, or other forms of troubleshooting guides.

# Reference Information



Tools and Resources	
Items	Notes
Automated search during the automated analysis in ISA 5.0 <i>(New)</i>	While performing automated analysis, ISA 5.0 automatically performs a number of standardized searches in a custom Knowledge Base derived from Technotes, APARs, etc.
Search function in ISA 4.1 <i>(Phasing out)</i>	Contains a search engine that aggregates (and filters) results from many sources (similar to the eSupport web sites/portal, but with additional configurable search targets) Results are organized according to the set of product add-ons installed in the user's ISA workbench
<i>Product Information</i> function in ISA 4.1 <i>(Phasing out)</i>	A set of links and RSS feeds for recommended information sources for each product add-on configured in the workbench.
IBM Guided Troubleshooter, a.k.a. IBM Guided Activity Assistant (IGAA) <i>(Phasing out)</i>	Provides step-by-step guidance while performing many troubleshooting tasks. Contains many " <i>flows</i> " for common problems in several products Integrated in ISA



# Operational Preparation



- Preparation is at least 50% of the battle: define, review and enhance a complete set of procedures to follow and associated resources to use to facilitate problem determination.
- Focus initially on how to best take advantage of the existing tools and techniques, and how to be as efficient as possible in problem determination.
- Several published articles can be used as a starting point for this activity:
  - The Support Authority: 12 ways you can prepare for effective production troubleshooting ([link](#))
  - The Support Authority: A systematic approach to problem solving ([link](#))
  - The Support Authority: Choosing the right WebSphere diagnostic tool ([link](#))
- Your Accelerated Value Program contact can help you with some of these tasks, or in some cases this may warrant a special IBM Services engagement



# Operational Preparation



Special Activities (continued)	
Items	Notes
Prepare a detailed <b>Architecture Diagram</b>	Used to identify key monitoring and diagnostic points, to communicate effectively during troubleshooting, and to help identify unexpected changes in configuration.
Prepare a <b>Diagnostic Data Collection Plan</b>	To avoid loss of time and loss of information when a problem does occur. Take advantage of automated data collection facilities in ISA.
Prepare a <b>Monitoring Plan</b>	To effectively detect problems as soon as they occurs, or preferably while they are still emerging
Prepare a <b>Relief and Recovery Plan</b>	For mission-critical systems, to minimize down-time when a problem occurs
Prepare a <b>Maintenance Plan</b>	To minimize disruptions and problems due to delayed or improper maintenance
Collect <b>baselines</b> of all major diagnostic data sources	To compare when a problem occurs and detect anomalies. May be part of a regular practice to perform <i>health checks</i> .
Document the most likely <b>failure scenarios</b> and the diagnostic collection and analysis procedure for each	To ensure that the necessary diagnostic resources (including tools and knowledge) are ready before they are needed
Maintain a <b>Change Log</b> of all significant changes in the environment	To prevent or help diagnose newly-emerged problems. Perform regular checks to ensure the change log remains current.

# Collecting Diagnostic Data



- Most troubleshooting scenarios consist of one or more iterations of collecting diagnostic data from a failed system then analyzing that data
- IBM Support has formalized this process and the set of diagnostic data to be collected for each of many types of problems that occur with each product
- The standardized set of collected diagnostic data is an important part of the exchange of information when working with IBM Support to resolve a PMR, and also when using the procedures and tools developed by IBM Support in a self-help situation at the Client's site

Tools and Resources	
Items	Notes
<b>MustGather</b> documents	A collection of special Technotes, each describing the exact set of diagnostics to collect for one particular problem type in one particular product.
ISA Lite / ISA Data Collector – downloadable edition	An alternative for using the same automated data collections scripts provided with ISA 4.1, but without requiring the installation of an agent on each remote system. The user must run the ISA DC tool manually on each target system.
ISA Data Collector – Web-enabled edition <i>(New)</i>	Similar to the downloadable ISA Lite, but run directly as an applet from a browser, without explicit download and installation. Available in ISA 5.0 and directly from the ISA web page on <a href="http://ibm.com/support/isa">ibm.com/support/isa</a>
ISA Data Collectors bundled with products <i>(New)</i>	More and more, the ISA DC or other sophisticated data collectors are bundled with the individual products to which they apply (for example in <was-install>/bin/isadc.bat or isadc.sh

# Collecting Diagnostic Data



Tools and Resources (continued)	
Items	Notes
Automated data collection function in ISA 4.1 ( <i>Phasing out</i> )	<p>ISA includes a collection of collection scripts that correspond to many of the most common MustGathers for each product</p> <p>Each script performs all the necessary actions with minimal user intervention, and packages the result as a jar file that can be sent directly to IBM Support, or analyzed locally.</p> <p>The ISA workbench can connect to an agent on each system in the Client's environment to collect the data from a remote system.</p>
ECuRep file repository	<p>A special repository hosted by IBM, to which Clients upload their diagnostic artifacts in connection with a PMR (normally via FTP)</p> <p>IBM Support has special tools to facilitate the management and analysis of artifacts on this repository.</p>
Case Manager function in ISA	<p>A function in ISA to help keep track and manage the various diagnostic artifacts collected during a troubleshooting sessions.</p> <p>Includes the capability to easily examine the contents of collection archive files created by the automated data collection facilities.</p>
IBM Java Diagnostic Collector Tool	<p>A special utility that can be installed with a IBM JDK to facilitate the generation and collection of diagnostics when that JDK crashes.</p>



# Collecting Diagnostic Data



Special Activities	
Items	Notes
Create specialized collection scripts customized for the Client's environment	



# High-level log analysis and “Phase 1 Problem Determination”



- A very substantial fraction of all problems encountered by Customers are relatively readily identifiable by examining logs and recognizing a key symptom in a database of known problems
- We have defined a process called “Phase 1 PD” to take advantage of this situation

Runtime Features	
Items	Notes
Standard logs, dumps and config files from each product	

Tools and Resources	
Items	Notes
Automated analysis in ISA 5.0 <i>(New)</i>	ISA 5.0 contains a feature to perform a scan of all the files present in a ISA case and flag many anomalies found in these files
Server Logs Viewer in WebSphere Application Server admin console (including HPEL viewer) <i>(New)</i>	The WSAS admin console contains various functions to view and filter through the server logs
Cross Component Trace Viewer (XCT) <i>(New)</i>	Can be used to quickly scan through multiple logs and highlight high-severity errors (ignoring of the full trace analysis functions)
Log Analyzer (LA) and Symptom Databases <i>(Phasing out)</i>	Consolidates and visualizes many logs from many products. Easily flag anomalies within the large quantity of log data.
Server Logs Viewer in WebSphere Integration Developer	Can be used to quickly scan WPS logs for exceptions and errors (the core of Phase 1 PD)



Complete your sessions evaluation online at [SHARE.org/BostonEval](http://SHARE.org/BostonEval)



# Working with Java and WebSphere Trace



Tools and Resources	
Items	Notes
Cross Component Trace Viewer (XCT) <i>(New)</i>	Viewer for cross-component trace (XCT)
IBM Trace and Request Analyzer	Specialized tool for analysis of delays in request processing
IBM Database Connection Pool Analyzer	Specialized tool for analysis of problems related to the WebSphere connection pool
Trace Analyzer for WebSphere Application Server	General-purpose tool to facilitate sophisticated trace analysis by experts
Server Logs Viewer in WebSphere Integration Developer	Currently used for WPS only. Viewer for cross-component trace (XCT)

Special Activities	
Items	Notes
Document the process for diagnosing common problems in the Client's environment from examination of traces	Collect baseline traces during normal operation for comparison
Write specialized trace analysis scripts for common problems	

# Working with Java and WebSphere Dumps



- Dump analysis is complementary to trace analysis; it focuses on taking a snapshot of the state of system, and trying to determine if anything is abnormal and how we got to that state.
- There are many different types of “dumps”, with varying degrees of completeness and cost

Runtime Features	
Items	Notes
Javacore / thread dumps	Most common JVM artifact; simple text file with most commonly-used information. No detailed information about individual objects.
Heap dumps	Special dump used to diagnose memory conditions; smaller than system dump but less complete information
System dumps / svcdump	Most expensive but most comprehensive dump; an effort is underway to standardize on this type of dump for most cases.
Diagnostic Tooling Framework for Java (DTFJ)	Runtime support and API for producing and analyzing system dumps from a JVM
WebSphere Diagnostic Providers ( <i>Phasing out</i> )	Provides specialized dumps, tests of individual components

# Working with Java and WebSphere

## Dumps



### Tools and Resources

Items	Notes
IBM Thread and Monitor Dump Analyzer (TMDA)	Analyzes javacores/thread dumps
Memory Analyzer (MA or MAT)	Expert tool for analyzing heap dumps and system dumps, with special focus on issues related to memory usage
Heap Analyzer (HA)	Analyzes heap dumps, with strong heuristics for memory leaks
Interactive Diagnostic Data Explorer (IDDE) <i>(New)</i>	Expert tool for analyzing system dumps; lighter-weight and more extensible than Memory Analyzer
Dump Analyzer (DA) <i>(Phasing out)</i>	Analyzes system dumps; extensible collection of analysis modules to diagnose different problems.
WebSphere Application Server modules for Dump Analyzer, Memory Analyzer and/or IDDE <i>(New)</i>	Specialized modules to examine WSAS-level information
IBM Whole-system Analysis of Idle Time Tool (WAIT) <i>(New)</i>	Cloud-based tool for analyzing a sequence of javacores, with special emphasis on performance issues
Memory Dump Diagnostic for Java (MDD4J) / Yeti <i>(Phasing out)</i>	Analyzes heap dumps; positioned as tool for non-experts..

### Special Activities

Items	Notes
Promote and organize the systematic collection of dumps during incidents	
Implement specialized modules for Memory Analyzer, or IDDE for the Client's environment	



# Working with WebSphere Performance Sensors



- Performance sensors are not typically thought of for problem determination, but they can be used to detect various anomalies that are important clues for diagnostics

Runtime Features	
Items	Notes
Performance Monitoring Infrastructure (PMI)	Many sensors/counters for key performance indicators
Advanced Request Metrics	Allows fine-grained tracing of the progress of a transaction
WebSphere Runtime Performance Advisor	Dynamically monitors PMI metrics and warns of anomalies

Tools and Resources	
Items	Notes
Tivoli Performance Viewer	Basic viewer for PMI data Embedded in the WebSphere Admin Console
Performance Tuning Toolkit (PTT) <i>(New)</i>	Advanced viewer for PMI data; can perform live monitoring and alerting and guide tuning activities
Advanced Tivoli tooling, esp. ITCAM	Sophisticated analysis of PMI and ARM data
Monitoring/health facilities in WS VE, XS	



# Working with WebSphere Performance Sensors



Special Activities	
Items	Notes
Collect baselines and review PMI sensors during normal operation, to help recognize common problems	



# Using “pings” for Monitoring and Diagnostics



- Most troubleshooting techniques are based on observing and extracting information that already exists in the system as part of its normal (or abnormal) operation.
- Another technique, which is used relatively rarely but which can be extremely powerful, consists of actively exercising parts of the system with known inputs to observe the resulting outputs.
  - For example, by injecting artificial requests at regular intervals, whose processing is completely predictable if the system is healthy. By observing how the actual processing of these requests happens, we can learn a lot about what is going on in the system.
  - By carefully choosing different requests that each exercise only a portion of the overall system, we can also identify which portions of the system are currently healthy or un-healthy.

Runtime Features	
Items	Notes
Advanced Request Metrics	Use primarily for performance, but can also be used in some cases for “ping” style health checks

Tools and Resources	
Items	Notes
Tivoli tooling	Tivoli has a collection of tools that monitor systems through synthetic transactions
Ad-hoc scripts	Often, Clients implement their own ad-hoc “ping” scripts based on specific understanding of their particular system architecture

# Using “pings” for Monitoring and Diagnostics



Special Activities	
Items	Notes
Design and implement a collection of ad-hoc “ping” scripts for the Client’s environment	

# Specialized runtime features for common problems



- The WebSphere runtime is steadily being enhanced to include special diagnostics for common problems
- This type of feature makes it most easy to detect a particular problem, but they typically can only be implemented with new product releases, i.e. on a relatively long cycle

Runtime Features	
Items	Notes
Database connection test function	Simple function in the WebSphere Admin Console to test that a database connection is currently working
Hung Thread Detection	Notifies when threads have been unresponsive
Connection Leak Detection	Notifies when database connections are “leaked”
Session data crossover detection	Runtime checks that warns when it appears that information is unintentionally “leaking” between two HTTP sessions
First Failure Data Capture (FFDC)	Captures information for all unexpected exceptions
ClassLoader Viewer	Captures information about how classes are loaded in WebSphere Viewer is embedded in the WebSphere Admin Console
Memory leak detection and protection <i>(New)</i>	Detect/fix common causes of leaks associated with app stop
... others ...	