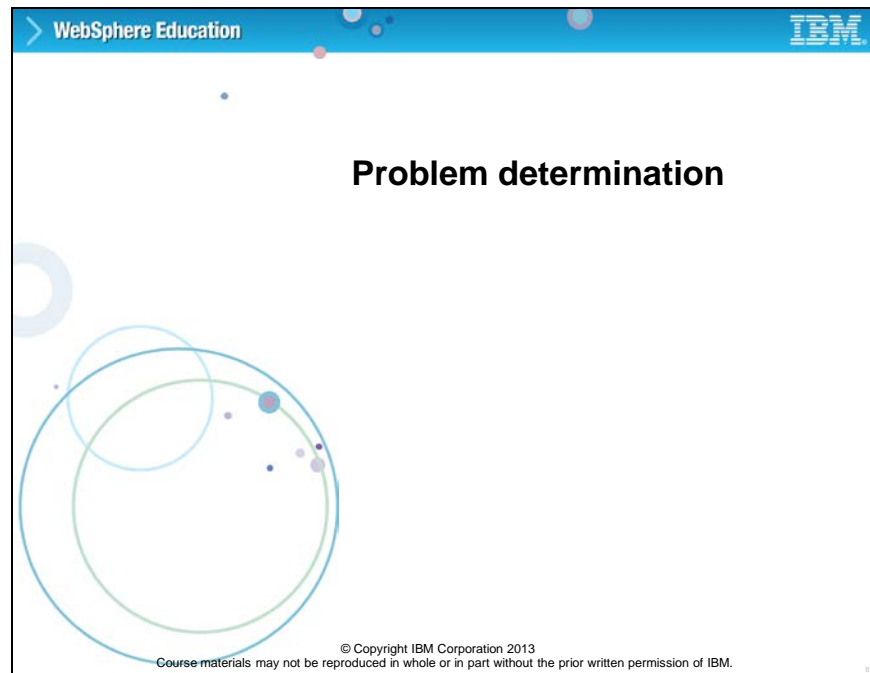


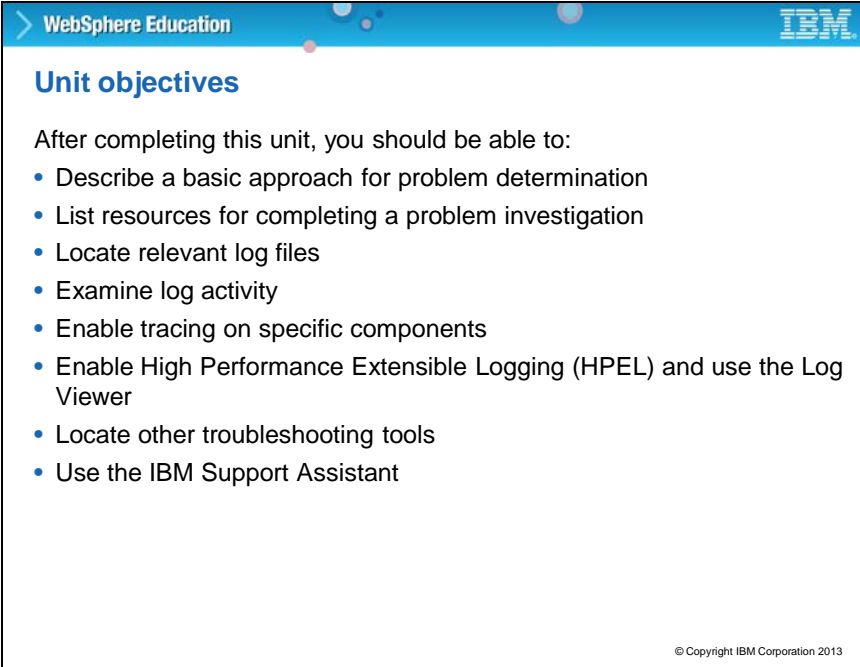
Slide 1



Unit 11: Problem determination

This unit describes the tools available to the administrator for investigating problems and gathering diagnostic data.

Slide 2



The slide is titled 'Unit objectives' and is part of a WebSphere Education presentation. It lists eight objectives for completing the unit. The IBM logo is in the top right corner, and a copyright notice is at the bottom right.

WebSphere Education

Unit objectives

After completing this unit, you should be able to:

- Describe a basic approach for problem determination
- List resources for completing a problem investigation
- Locate relevant log files
- Examine log activity
- Enable tracing on specific components
- Enable High Performance Extensible Logging (HPEL) and use the Log Viewer
- Locate other troubleshooting tools
- Use the IBM Support Assistant

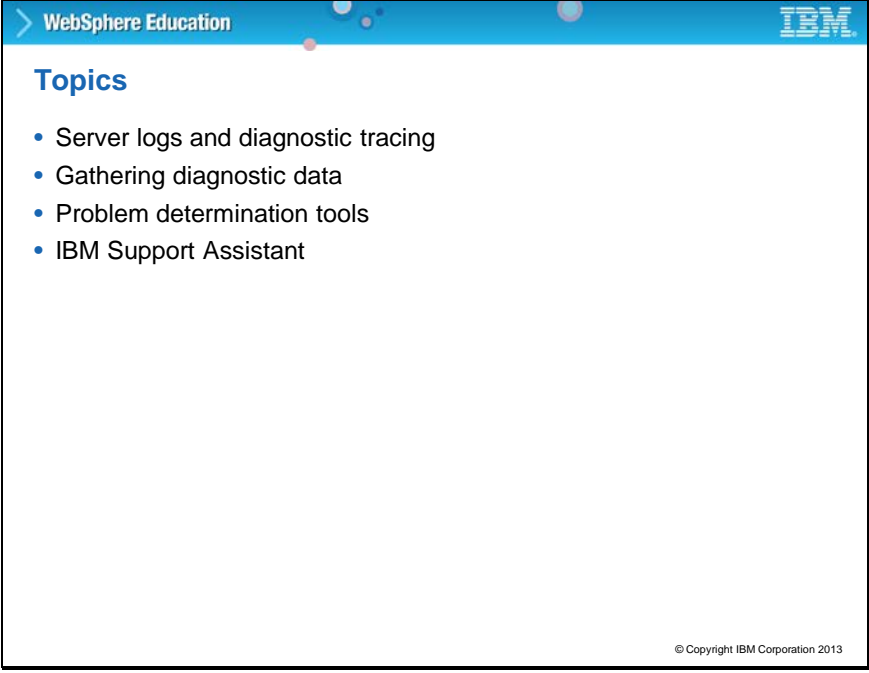
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Title: Unit objectives

After completing this unit, you should be able to:

- Describe a basic approach for problem determination
- List resources for completing a problem investigation
- Locate relevant log files
- Examine log activity
- Enable tracing on specific components
- Enable High Performance Extensible Logging (HPEL) and use the Log Viewer
- Locate other troubleshooting tools
- Use the IBM Support Assistant

Slide 3



WebSphere Education

IBM

Topics

- Server logs and diagnostic tracing
- Gathering diagnostic data
- Problem determination tools
- IBM Support Assistant

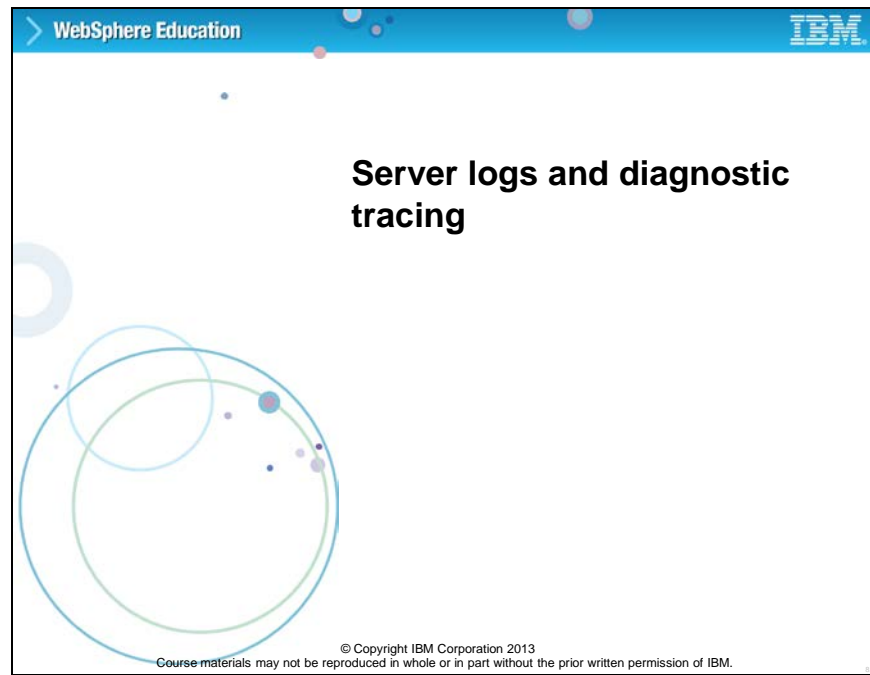
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Topics:

The unit covers the following topics:

- Server logs and diagnostic tracing
- Gathering diagnostic data
- Problem determination tools
- IBM Support Assistant

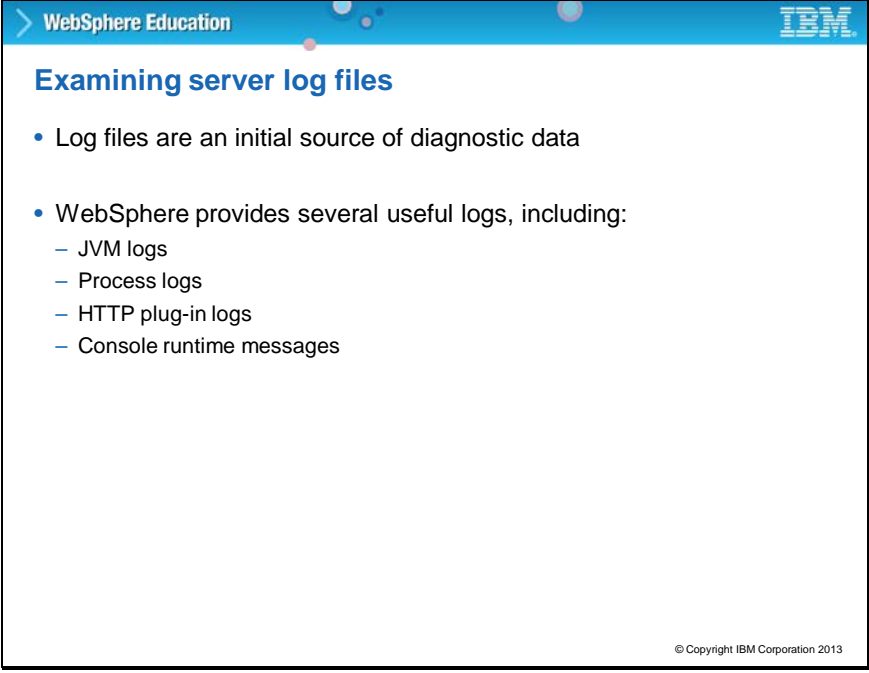
Slide 4



Topic: Server logs and diagnostic tracing

This unit describes the different server log files and diagnostic tracing facilities.

Slide 5



The slide features a blue header bar with the text 'WebSphere Education' on the left and the 'IBM' logo on the right. Below the header, the title 'Examining server log files' is displayed in blue. The main content area contains a bulleted list: 'Log files are an initial source of diagnostic data' and 'WebSphere provides several useful logs, including:' followed by a sub-list of 'JVM logs', 'Process logs', 'HTTP plug-in logs', and 'Console runtime messages'. A small copyright notice '© Copyright IBM Corporation 2013' is located in the bottom right corner of the slide frame.

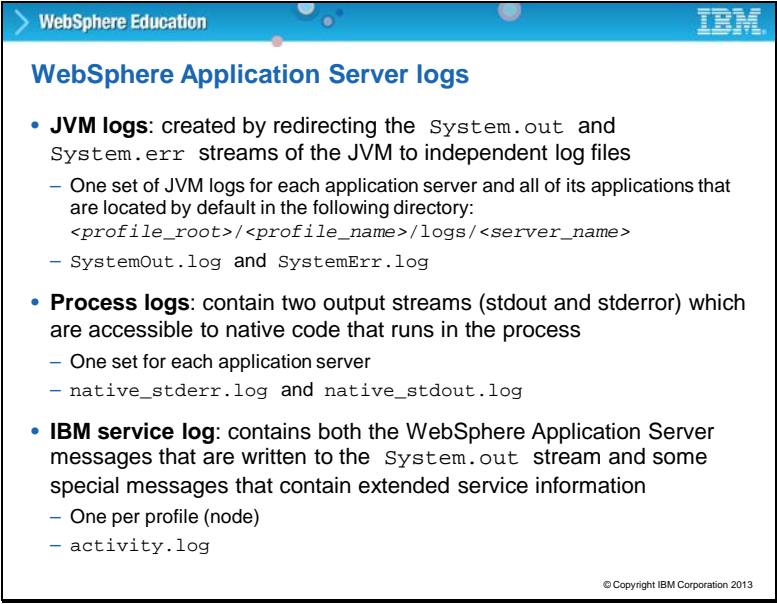
- Log files are an initial source of diagnostic data
- WebSphere provides several useful logs, including:
 - JVM logs
 - Process logs
 - HTTP plug-in logs
 - Console runtime messages

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Title: Examining server log files

WebSphere provides several useful logs and messaging facilities, including JVM logs, HTTP plug-in logs, and console runtime messages.

Slide 6



The slide is titled "WebSphere Application Server logs" and is part of a "WebSphere Education" presentation. It contains a bulleted list of three types of logs: JVM logs, Process logs, and IBM service log. Each type includes a brief description and a list of specific log files or their locations. The IBM logo is in the top right corner, and a copyright notice is at the bottom right.

- **JVM logs:** created by redirecting the `System.out` and `System.err` streams of the JVM to independent log files
 - One set of JVM logs for each application server and all of its applications that are located by default in the following directory:
`<profile_root>/<profile_name>/logs/<server_name>`
 - `SystemOut.log` and `SystemErr.log`
- **Process logs:** contain two output streams (`stdout` and `stderr`) which are accessible to native code that runs in the process
 - One set for each application server
 - `native_stderr.log` and `native_stdout.log`
- **IBM service log:** contains both the WebSphere Application Server messages that are written to the `System.out` stream and some special messages that contain extended service information
 - One per profile (node)
 - `activity.log`

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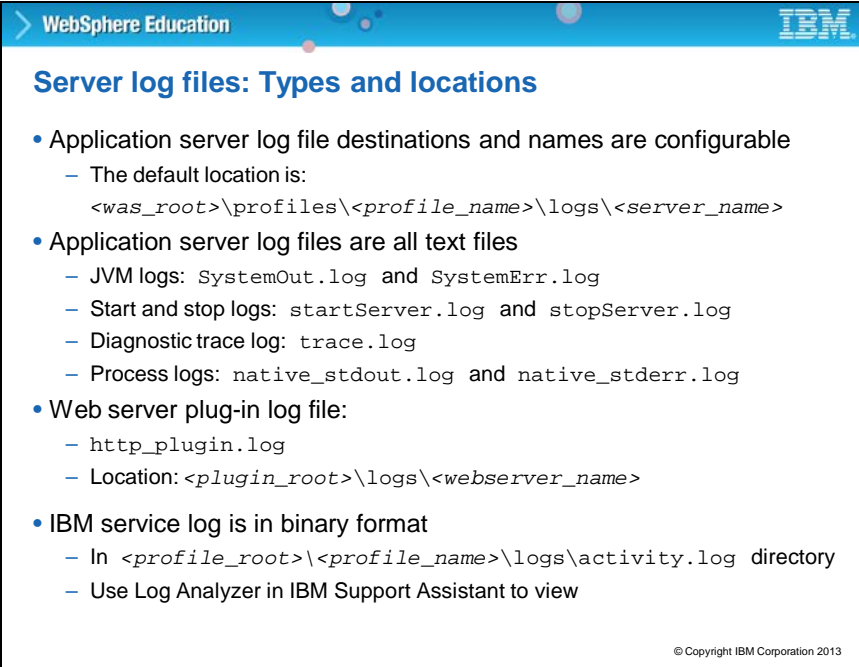
Title: WebSphere Application Server logs

The JVM logs are created by redirecting the `system.out` and `system.err` streams of the Java virtual machine to independent log files. There is one set of JVM logs for each application server and all of its applications. They are located, by default, in the directory shown.

Applications and other code can write to these streams by using the `print()` and `println()` methods of those streams. In a network deployment configuration, JVM logs are also created for the deployment manager and each node agent.

The process logs include two output streams, standard out and standard error, which is accessible to local code that is running in the process. There is one set of logs for each application server. The IBM service log contains the WebSphere Application Server messages that are written to the `system.out` stream. It also contains some special messages that contain extended service information. There is a single log file for each WebSphere profile named `activity.log`.

Slide 7



The slide is titled "Server log files: Types and locations" and is part of the "WebSphere Education" series, as indicated by the header. It contains a bulleted list of information about log files. The list includes application server log file destinations, application server log file types (JVM logs, start/stop logs, diagnostic trace log, process logs), web server plug-in log file, and IBM service log. The slide also includes a copyright notice for IBM Corporation 2013.

- Application server log file destinations and names are configurable
 - The default location is:
`<was_root>\profiles\<profile_name>\logs\<server_name>`
- Application server log files are all text files
 - JVM logs: `SystemOut.log` and `SystemErr.log`
 - Start and stop logs: `startServer.log` and `stopServer.log`
 - Diagnostic trace log: `trace.log`
 - Process logs: `native_stdout.log` and `native_stderr.log`
- Web server plug-in log file:
 - `http_plugin.log`
 - Location: `<plugin_root>\logs\<webserver_name>`
- IBM service log is in binary format
 - In `<profile_root>\<profile_name>\logs\activity.log` directory
 - Use Log Analyzer in IBM Support Assistant to view

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Title: Server log files: Types and locations

The names and destinations of the log files can be configured. The default names and locations are listed here. The application server logs are in the **WebSphere root > profiles > profile name > logs** directory, by default. The web server plug-in log file is in the **plug-in root > logs > web server name** directory, by default.

Slide 8

WebSphere Education
IBM

Configuring JVM logs

- From the administrative console, select **Troubleshooting > Logs and Trace > server_name > JVM Logs**
- SystemOut and SystemErr logs can be configured from this page
- Logs are self-managing
 - Can roll over based on time or file size
 - Number of historical log files is configurable
- To view logs through the console, use the runtime tab

Configuration Runtime

General Properties

System.out

* File Name: `${SERVER_LOG_ROOT}/SystemOut`

File Formatting: Basic (Compatible)

Log File Rotation

☒ File Size
 ☐ Time

Maximum Size: 3 MB
 Start Time: 24
 Repeat Time: 24 hours

Maximum Number of Historical Log Files: 2

Installed Application Output

☒ Show application print statements
 ☒ Format print statements

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Title: Configuring JVM logs

This screen shows the configuration tab in the administrative console where you can configure the location and names of the JVM log files.

For both log files, systemOut and systemErr, you can specify the path to their location, file formatting (basic or advanced), and log file rotation (by file size or time interval). The maximum number of historical files to store on the file system can also be configured.

Slide 9

WebSphere Education
IBM

Viewing runtime messages in the console (1 of 2)

- Runtime events are grouped according to severity: error, warning, information
- To view, select: **Troubleshooting > Runtime Messages >**
 - Runtime Error
 - Runtime Warning
 - Runtime Information
- Runtime events are disabled by default
 - None
- Select **Info** to enable all runtime events

Runtime Events

Runtime Events

Use this page to view runtime events that propagate from the server.

Runtime Events have been disabled by default ("None"). To enable a event level please select from the list. "Error" would enable only Error runtime events. "Warning" would enable both Error and Warning runtime events. Info would enable all runtime events.

None
Error
Warning
Info
Preferences

+
-

+
-

Timestamp	Message Originator	Message
None		
Total 0		

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Title: Viewing runtime messages in the console (1 of 2)

You can view runtime messages in the console by selecting **Troubleshooting > Runtime Messages**. The system displays runtime messages that are grouped according to severity levels: error, warning, and information. From the drop-down menu, select **Info** to enable all runtime events.

When viewing runtime messages, first select the **Error**, **Warning**, or **Info** category link (a count of zero means that nothing is available). Then, the details for the selected category are shown.

Selecting one of these links gives you detailed information (see next slide).

You can have several pages of messages; the button on the bottom of the page allows you to view and read all of them.

9

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Viewing runtime messages in the console (2 of 2)

- Runtime events details include:
 - Message code and text
 - Brief explanation of the event
 - Action for the user to take
 - What server component issued the message
- Other details include:
 - Timestamp
 - Thread ID
 - Node name
 - Server name

Runtime Events

Runtime Events > Message Details

Use this page to view runtime events that propagate from the server.

General Properties

Message

SRVE0255E: A WebGroup/Virtual Host to handle /PlantsByWebSphere has not been defined.

Message type

Runtime error

Explanation

Could not find a web group (web module) or virtual host to handle the request. This is an application error.

User action

Be sure the web group and virtual host is defined and deployed.

Message Originator

com.ibm.ws.webcontainer

Source object type

RasLoggingService

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Title: Viewing runtime messages in the console (2 of 2)

Click a message in the runtime messages view to see more details about that message. The runtime events details shown here include: the message code and text, a brief explanation of the event, and other information.

Most runtime messages are designed with improved message text. A message code, for example SRVE0255E, can be used to look up the message in the information center. Information is shown on the detail screen for the event, and sometimes a user action is provided to resolve the problem.

Slide 11

WebSphere Education
IBM

HTTP plug-in logs and tracing

- To configure plug-in logs and tracing from the administrative console, click **Servers > Web Servers > web_server_name > Plug-in Properties > Configuration tab > Plug-in logging**
- Default location:
`<plugin_root>/logs/<web_server_name>/http_plugin.log`
- Set the Log level to **Trace** to trace all the steps in the HTTP request process (caution: this trace produces much log data)

Plug-in logging:

* Log file name
c:\Program Files\IBM\HTTPServer\Plugins\logs\webserver1\http_plugin.log

Log level
Error

Trace
Stats
Warn
Error
Debug
Detail

Apply Reset Cancel

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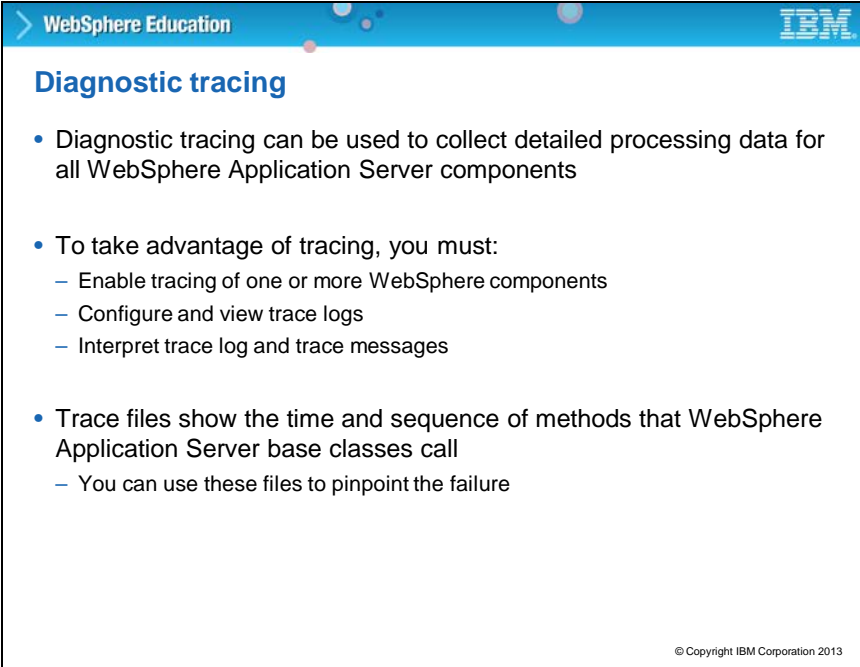
Title: HTTP plug-in logs and tracing

The web server plug-in log file can be configured from the administrative console by selecting **Servers > Web Servers > web server name > Plug-in Properties > Configuration tab > Plug-in logging**.

The default location of the web server plug-in log file is in the **plug-in root > logs > web server name** directory.

By setting the log level to trace, all steps in an HTTP request are recorded in the log file. This setting can produce a large amount of log data.

Slide 12



The slide is titled "WebSphere Education" in the top left corner and features the IBM logo in the top right corner. The main title "Diagnostic tracing" is centered at the top of the content area. Below the title, there are three bullet points. The first bullet point states that diagnostic tracing can be used to collect detailed processing data for all WebSphere Application Server components. The second bullet point states that to take advantage of tracing, you must: enable tracing of one or more WebSphere components, configure and view trace logs, and interpret trace log and trace messages. The third bullet point states that trace files show the time and sequence of methods that WebSphere Application Server base classes call, and that you can use these files to pinpoint the failure. A small copyright notice "© Copyright IBM Corporation 2013" is located in the bottom right corner of the slide.

WebSphere Education


Diagnostic tracing

- Diagnostic tracing can be used to collect detailed processing data for all WebSphere Application Server components
- To take advantage of tracing, you must:
 - Enable tracing of one or more WebSphere components
 - Configure and view trace logs
 - Interpret trace log and trace messages
- Trace files show the time and sequence of methods that WebSphere Application Server base classes call
 - You can use these files to pinpoint the failure

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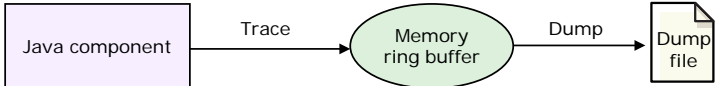
Title: Diagnostic tracing

Diagnostic tracing provides another level of log data and can be used to collect detailed processing information for WebSphere Application Server components. Tracing is not enabled by default, but can be enabled and configured in the administrative console. WebSphere Application Server base classes call trace data to capture the time and sequence of methods. You can use this information to troubleshoot problems with the application server.

WebSphere Education 

Using diagnostic tracing

- Tracing can be started:
 - While the server is running, by using Runtime Diagnostic Trace
 - When the server is starting and running, by using Configuration Diagnostic Trace
- Trace output can be directed to:
 - File (default)
 - Memory ring buffer, and dumped after trace stops
- Tracing has a significant affect on performance
 - Enable temporarily for problem determination
 - Tracing to a file is slower than tracing to a memory ring buffer



```
graph LR; A[Java component] -- Trace --> B((Memory ring buffer)); B -- Dump --> C[Dump file];
```

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Title: Using diagnostic tracing

Tracing can be enabled while the server is running by using the Runtime Diagnostic trace settings in the administrative console. Tracing can also be configured to start when the server is started.

Trace output allows administrators to examine processes in the application server and diagnose various issues. On an application server, trace output can be directed either to a file or to an in-memory circular buffer. If trace output is directed to the in-memory circular buffer, it must be dumped to a file before it can be viewed. On an application client or stand-alone process, trace output can be directed either to a file or to the process console window. In all cases, trace output is generated as plain text in either basic or advanced formats, or in binary log analyzer format as the user chooses. The basic and advanced formats for trace output are similar to the basic and advanced formats that are available for the JVM message logs.

WebSphere Education
IBM

Enable and configure tracing

- Troubleshooting > Logs and Trace > `server_name` > Diagnostic Trace
- Configure Trace Output
 - None
 - Memory buffer
 - File (default)
- Configure Trace Output Format
 - Basic (IBM Support preference)
 - Advanced
- **Note:** Configure Log Detail Level to get trace output

Configuration Runtime

General Properties

Trace Output

☐ None
 ☐ Memory Buffer

Maximum Buffer Size
 thousand entries

☒ File

Maximum File Size
 MB

Maximum Number of Historical Files

File Name

Trace Output Format

Apply OK Reset Cancel

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Title: Enable and configure tracing

The Diagnostic Trace Service box looks almost the same as it did in previous versions. The configuration and runtime tabs behave as they always have. The configuration changes affect the configuration repository and take effect at the next startup. The run time takes effect immediately but is only optionally persisted to the server configuration.

Trace strings must be configured on a separate panel (Log Detail Level).

View and dump options are available in the runtime tab of diagnostic trace. The Log Analyzer can be used to analyze trace output, but you can use your favorite editor. Before you can view or dump a trace, you must specify the log detail level.

WebSphere Education
IBM

Setting the log detail level (1 of 2)

- **Logs and trace > server_name > Change Log Detail Level**
- Log detail level affects tracing **and** regular logging
 - Setting levels below **info** reduces the amount of data in logs
 - ***=off** disables logging altogether
- Trace levels (**fine**, **finer**, **finest**) are not displayed in the trace file unless logging is enabled
- Use the graphical menu to type in or set the log string
 - Default is ***=info**
- User-created applications can be instrumented too, and be included in the trace output

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Title: Setting the log detail level (1 of 2)

You can set the log detail level in the administrative console by selecting **Logs and Trace > server name > Change Log Detail Level**.

By setting the log detail level to info, you can reduce the amount of output in the logs.

By setting the log detail level above info, you increase the amount of output in the logs and trace data.

Trace levels are fine, finer, and finest. You can specify the log detail level by entering a trace string, or by selecting components from the graphical menu. The default trace string is ***=info**.

As you select components from the menu, they are added to the trace string. Applications can be instrumented for tracing, and the data they produce is included in the trace output.

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Setting the log detail level (2 of 2)

- Select component
- Select one of
 - No Logging
 - Messages Only
 - All Messages and Traces
- Or select **Message and Trace Levels** and select **Message Levels**

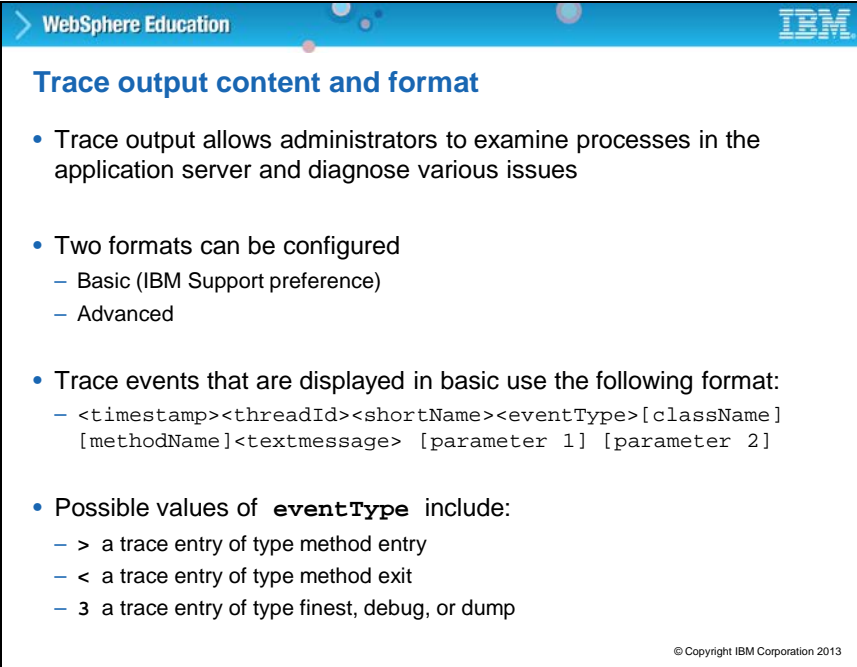
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Title: Setting the log detail level (2 of 2)

This graphic shows how to set the log detail level from the graphical menu. You can right-click the components and select:

- No Logging
- Messages only
- All Messages and Traces

From the **Message and Trace Levels** menu, you can select a message level of fatal, severe, warning, audit, info, config, or detail. You can select a trace level of fine, finer, or finest.



WebSphere Education 

Trace output content and format

- Trace output allows administrators to examine processes in the application server and diagnose various issues
- Two formats can be configured
 - Basic (IBM Support preference)
 - Advanced
- Trace events that are displayed in basic use the following format:
 - `<timestamp><threadId><shortName><eventType>[className]`
`[methodName]<textmessage> [parameter 1] [parameter 2]`
- Possible values of **eventType** include:
 - `>` a trace entry of type method entry
 - `<` a trace entry of type method exit
 - `3` a trace entry of type finest, debug, or dump

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Title: Trace output content and format

Trace output includes events that administrators can analyze to diagnose problems. The basic format for trace messages is shown here. A basic trace message includes a time stamp, thread ID, short name, event type, class name, message name, message text, and one or two parameters. The symbols that are shown here represent an event type. A greater than (`>`) symbol represents a method entry. The less than symbol (`<`) represents a method exit. The number three indicates an entry of type finest, debug, or dump.

WebSphere Education
IBM

Reading a log or trace file (1 of 2)

- Example log record format
- [5/9/11 12:27:56:237 EDT] 00000000 PMIImpl A CWPMI1001I:
PMI is enabled
 - Timestamp = [5/9/11 12:27:56:237 EDT]
 - Thread ID = 00000000
 - Logger = PMIImpl
 - Message type = A
 - Message code = CWPMI1001I
 - Message = PMI is enabled

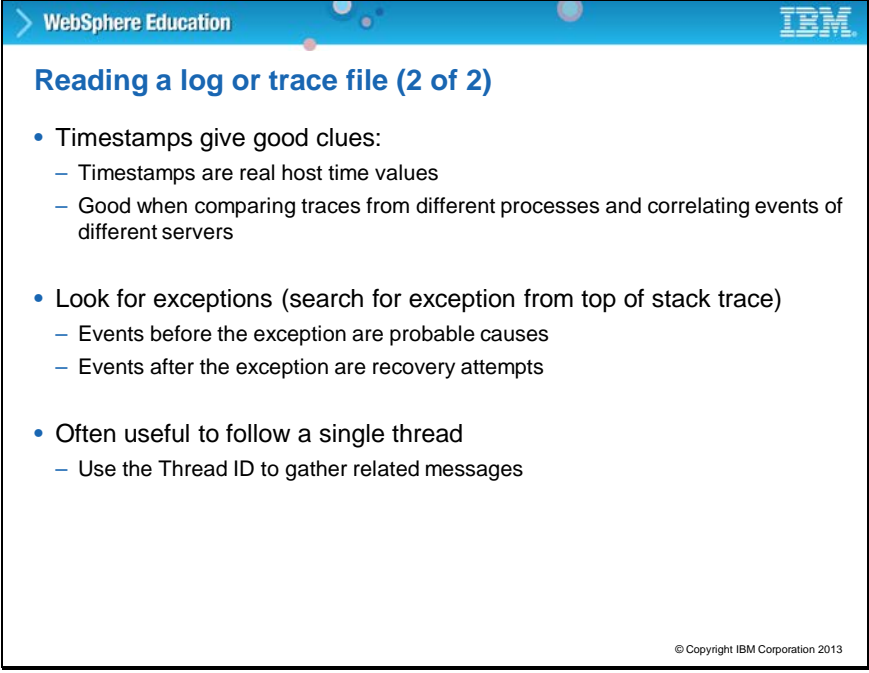
Message type	Description
1,2,3	Trace information: fine, finer, finest
A	Audit
W	Warning
Z	Type was not recognized
E	Error
D	Detail
C	Configuration
F	Fatal (exits process)
I	Information
O	Program output (system.out)
R	Program output (system.err)

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Title: Reading a log or trace file (1 of 2)

Interpreting trace data takes some practice, but after you get some experience, you learn to recognize familiar messages and patterns. A log record consists of a time stamp, thread ID, name of the component that logged the message, message type, message code, and the text of the message.

The chart that is shown here lists the codes for each message type and their meaning. Some of the message type codes are simple: A stands for audit and W for warning..



The slide is titled "Reading a log or trace file (2 of 2)" and is part of a WebSphere Education presentation. It contains three main bullet points: 1. Timestamps give good clues, with sub-points that timestamps are real host time values and are good for comparing traces from different processes and correlating events of different servers. 2. Look for exceptions (search for exception from top of stack trace), with sub-points that events before the exception are probable causes and events after the exception are recovery attempts. 3. Often useful to follow a single thread, with a sub-point that the Thread ID is used to gather related messages. The IBM logo is in the top right corner, and the copyright notice "© Copyright IBM Corporation 2013" is in the bottom right corner.

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Reading a log or trace file (2 of 2)

- Timestamps give good clues:
 - Timestamps are real host time values
 - Good when comparing traces from different processes and correlating events of different servers
- Look for exceptions (search for exception from top of stack trace)
 - Events before the exception are probable causes
 - Events after the exception are recovery attempts
- Often useful to follow a single thread
 - Use the Thread ID to gather related messages

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Title: Reading a log or trace file (2 of 2)

When reading log or trace data, it is helpful to take note of the time stamps. They can provide clues as to when a problem occurred and what events led up to it. Look for exception messages in the data. Events that occur before the exceptions are probably causes. Events that occur after the exception are recovery attempts. The thread ID indicates messages that are related to a specific thread.

While it is possible to read logs and trace files by using a text editor; it is suggested that you use a tool such as Log Analyzer, which is available in the IBM Support Assistant.

WebSphere Education **IBM**

High Performance Extensible Logging (HPEL)

- HPEL can be enabled on any server in the cell
 - Deployment manager
 - Node agent
 - Application server
- Click **Troubleshooting > Logs and trace > server_name**
 - Click **Switch to HPEL mode**

Logging and tracing > server1

Logging and tracing > server1

It is recommended that you switch to High Performance Extensible Logging (HPEL) if you have no existing procedures that prevent you from taking advantage of it.

(Advised for most installations)

Use this page to select a system log to configure, or to specify a log detail level for components and groups of components. Use log levels to control which events are processed by Java logging.

General Properties

- [Diagnostic Trace](#)
- [JVM Logs](#)
- [Process Logs](#)
- [IBM Service Logs](#)
- [Change log detail levels](#)
- [NCSA access and HTTP error logging](#)


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Title: High Performance Extensible Logging (HPEL)

High Performance Extensible Logging, or HPEL, was a new feature in version 8.0. It provides an alternative way of collecting and viewing log data. It replaces the activity.log file. HPEL can be enabled on all servers in the cell, including the deployment manager, node agents, and stand-alone application servers.

To enable HPEL, in the administrative console, select **Troubleshooting > Logs and trace > server_name** and click “Switch to HPEL mode”.

After the log level is switched to HPEL mode for a server, there is a new list of links in the **General Properties** section. One new link is **Change log and trace mode**, which allows you to switch back to basic logging.

WebSphere Education 

HPEL logging and tracing configuration

- Use this page to configure HPEL logging and tracing

Logging and tracing

[Logging and tracing > server1](#)

General Properties

[Configure HPEL logging](#)

Directory	/opt/IBM/WebSphere/AppServer/profiles/p1/logs/server1
For cleanup, delete records older than	Disabled
For cleanup, maximum size of logs	50 Megabytes

[Configure HPEL trace](#)

Directory	/opt/IBM/WebSphere/AppServer/profiles/p1/logs/server1
For cleanup, delete records older than	Disabled
For cleanup, maximum size of trace	50 Megabytes

[Configure HPEL text log](#)

Current status:	Enabled
Directory	/opt/IBM/WebSphere/AppServer/profiles/p1/logs/server1
For cleanup, delete records older than	Disabled
For cleanup, maximum size of text log	50 Megabytes

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Title: HPEL logging and tracing configuration

This screen capture shows the default configuration for HPEL logging and tracing. To modify the configuration, click any of the links on this page.

After HPEL is enabled for a server, it is suggested that you disable the HPEL text logs. Disabling text logs improves server performance.

WebSphere Education
IBM

Configure HPEL logging

- Clicking the **Configure HPEL logging** link starts the configuration page
- Changes that are made on the **Configuration** tab require you to restart the server
- Changes that are made on the **runtime** tab take effect immediately

Logging and tracing

Logging and tracing > server1 > HPEL Log Configuration

Configuration
Runtime

General Properties

* Directory path
\$(SERVER_LOG_ROOT)

☒ Enable log record buffering

☒ Start new log file daily at: 12 AM

Log record purging policies

☒ Begin cleanup of oldest records
when log size approaches maximum

Log record age limit
48 Hours old

Maximum log size
20 Megabytes

* Out of space action
Stop logging

Apply OK Reset Cancel

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Title: Configure HPEL logging

Clicking the **Configure HPEL logging** link starts the configuration page. Changes that are made on the **Configuration** tab require a server restart. Changes that are made on the runtime tab take effect immediately.

The HPEL Log Viewer

- Click **Troubleshooting > Logs and trace > server_name > View HPEL logs and trace**
 - There are numerous filtering options to modify which records are displayed

Logging and tracing

[Logging and tracing > server1 > Log Viewer](#)

Content and Filtering Details

Refresh View Show Only Selected Threads Show All Threads Select Columns ... Export ... Copy

Viewing log records from server instance June 3, 2011 09:55:44

Number of records to show: 20 First Page

TimeStamp	Thread ID	Logger	Level	Message
6/3/11 09:55:44.896	00000000	com.ibm.ejs.ras.ManagerAdmin	INFO	TPAS0017 : The startup trace state is *info.
6/3/11 09:55:44.940	00000000	com.ibm.ejs.ras.ManagerAdmin	INFO	TPAS0111 : The message IDs that are in use are c
6/3/11 09:55:45.094	00000000	com.ibm.ws.config.ModelMgr	INFO	WSVP0800 : Initializing core configuration models

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Title: The HPEL Log Viewer

Since HPEL data is stored in binary format, you must view HPEL logs by using a log viewer. In the administrative console, select **Troubleshooting > Logs and trace > server name > View HPEL logs and trace** to view HPEL data. The console provides many options for sorting and filtering the data.

The log view section lists the records. Use the **First Page**, **Previous Page**, **Next Page**, and **Last Page** buttons to move through the list of records. Optionally, you can specify filter criteria in the Content and Filtering Details section to limit the rows that are shown. Records are always listed in the order that the server recorded them. By default, the log view has five columns.


Time Stamp: The time when the event was recorded.

Thread ID: The identity of the thread that recorded the event in hexadecimal notation.


Logger: The logger that recorded the event.

Level: The type of event that was recorded.

Message: The message from the recorded event. If the message has a message ID, the message ID is underlined. Click the message ID to get an explanation and suggested user action for the message.



The slide is titled "LogViewer command-line tool (1 of 2)" and is part of a WebSphere Education presentation. It contains two bullet points describing the use of the `logViewer` command. The first bullet point states that the command can be used to query the contents of the High Performance Extensible Logging (HPEL) log and trace repositories, with the command `logViewer.sh/bat` listed below it. The second bullet point states that the command can also be used to view new log and trace repository entries as the server writes content to them, with the command `logViewer.sh/bat -monitor [interval]` listed below it. The IBM logo is visible in the top right corner, and a copyright notice for IBM Corporation 2013 is in the bottom right corner.

WebSphere Education 

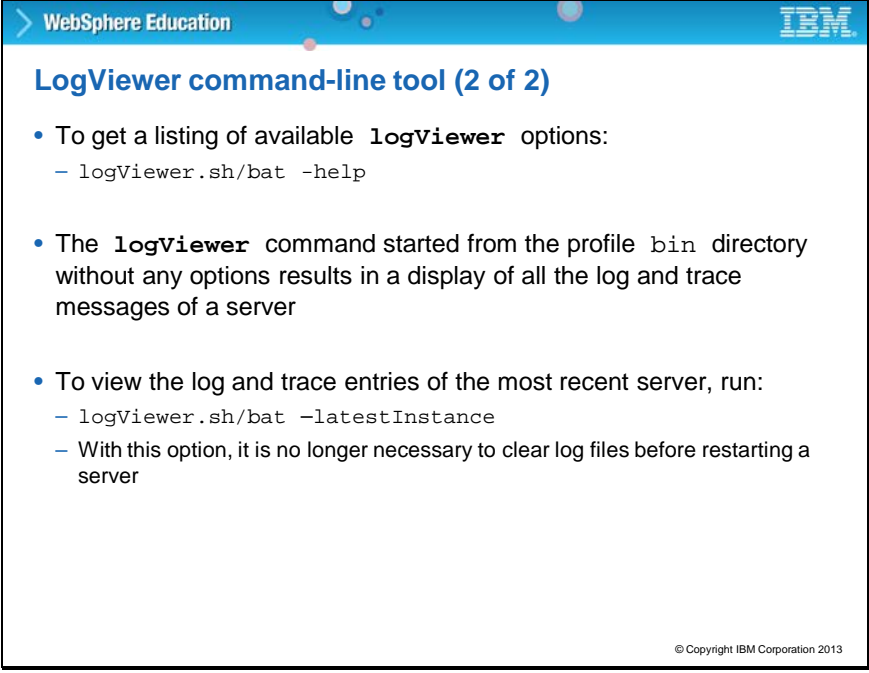
LogViewer command-line tool (1 of 2)

- Use the `LogViewer` command to query the contents of the High Performance Extensible Logging (HPEL) log and trace repositories
 - `logViewer.sh/bat`
- You can also use the `LogViewer` command to view new log and trace repository entries as the server writes content to them
 - `logViewer.sh/bat -monitor [interval]`

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Title: LogViewer command-line tool (1 of 2)

You can also query the contents of HPEL log and trace data by using the `logViewer` command that is shown here. By using the `monitor` option with the command, you can view new log and trace messages as they are written, similar to the way the `tail` function works in Linux and UNIX.



The slide is titled "LogViewer command-line tool (2 of 2)" and is part of a WebSphere Education presentation. It contains three bullet points with associated command-line examples:

- To get a listing of available `logViewer` options:
– `logViewer.sh/bat -help`
- The `logViewer` command started from the profile `bin` directory without any options results in a display of all the log and trace messages of a server
- To view the log and trace entries of the most recent server, run:
– `logViewer.sh/bat -latestInstance`
– With this option, it is no longer necessary to clear log files before restarting a server

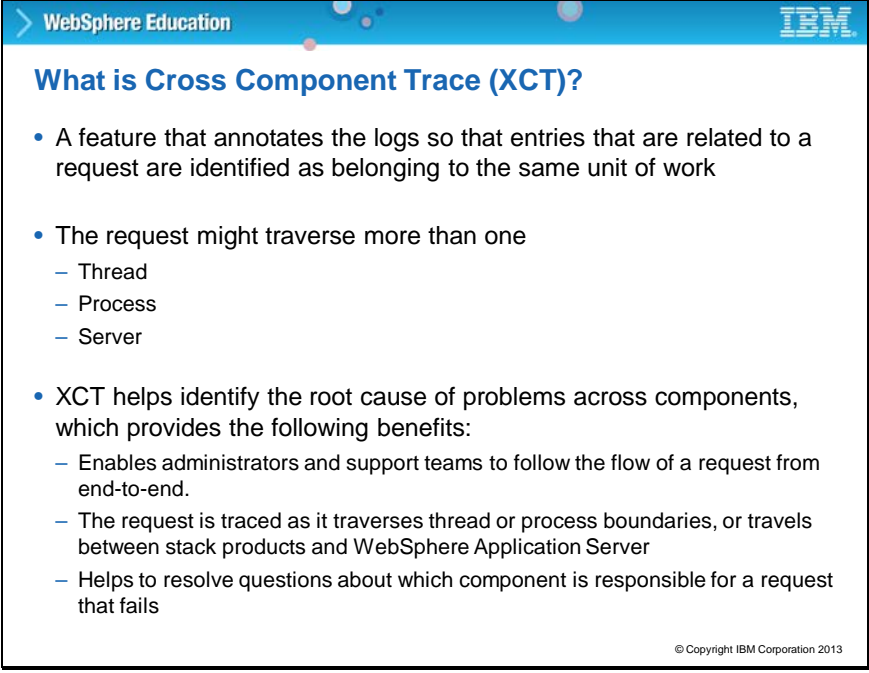
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Title: LogViewer command-line tool (2 of 2)

To get a listing of available LogViewer options, use the `-help` option.

LogViewer can be started from the `bin` directory of a profile without any options, and a listing of all the entries of a server is shown. If there are multiple servers in a profile, the user is first prompted to select the server for viewing.

If you start the log viewer from the profile `bin` directory of a server without specifying any options, it displays all of the log and trace messages for that server. Use the `latestInstance` option to view the log and trace entries for the most recent server runtime log files. With this option, it is no longer necessary to clear old log files before restarting the server.



The slide is titled "What is Cross Component Trace (XCT)?" and is part of a WebSphere Education presentation. It features a blue header with the "WebSphere Education" logo on the left and the "IBM" logo on the right. The content is organized into a bulleted list. The first bullet point states that XCT is a feature that annotates logs to identify entries related to a request as belonging to the same unit of work. The second bullet point states that a request might traverse more than one unit, with sub-bullets for Thread, Process, and Server. The third bullet point states that XCT helps identify the root cause of problems across components, providing several benefits: enabling administrators and support teams to follow the flow of a request from end-to-end, tracing the request as it traverses thread or process boundaries or travels between stack products and WebSphere Application Server, and helping to resolve questions about which component is responsible for a request that fails. A small copyright notice "© Copyright IBM Corporation 2013" is located in the bottom right corner of the slide.

WebSphere Education IBM

What is Cross Component Trace (XCT)?

- A feature that annotates the logs so that entries that are related to a request are identified as belonging to the same unit of work
- The request might traverse more than one
 - Thread
 - Process
 - Server
- XCT helps identify the root cause of problems across components, which provides the following benefits:
 - Enables administrators and support teams to follow the flow of a request from end-to-end.
 - The request is traced as it traverses thread or process boundaries, or travels between stack products and WebSphere Application Server
 - Helps to resolve questions about which component is responsible for a request that fails

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Title: What is Cross Component Trace (XCT)?

Depending on the nature of your applications, multiple threads within an application server might be used to handle requests, such as HTTP requests or JMS requests. More than one application server handles some requests, such as when one application server makes a request to another application server for a web service.

Applications that are built by using distributed architectures, such as service-oriented architecture, can benefit from XCT, since XCT helps facilitate problem determination across multiple services on different systems.

WebSphere Education
IBM

Administering XCT

- A server must have HPEL enabled before XCT can be enabled
- Click **Troubleshooting > Logs and trace > server_name > Change log detail levels**
- Check **Enable log and trace correlation**

Correlation

Enable log and trace correlation so entries that are serviced by more than one thread, process, or server will be identified as belonging to the same unit of work.

☒ Enable log and trace correlation

☒ Include request IDs in log and trace records

☐ Include request IDs in log and trace records and create correlation log records

☐ Include request IDs in log and trace records, create correlation log records, and capture data snapshots

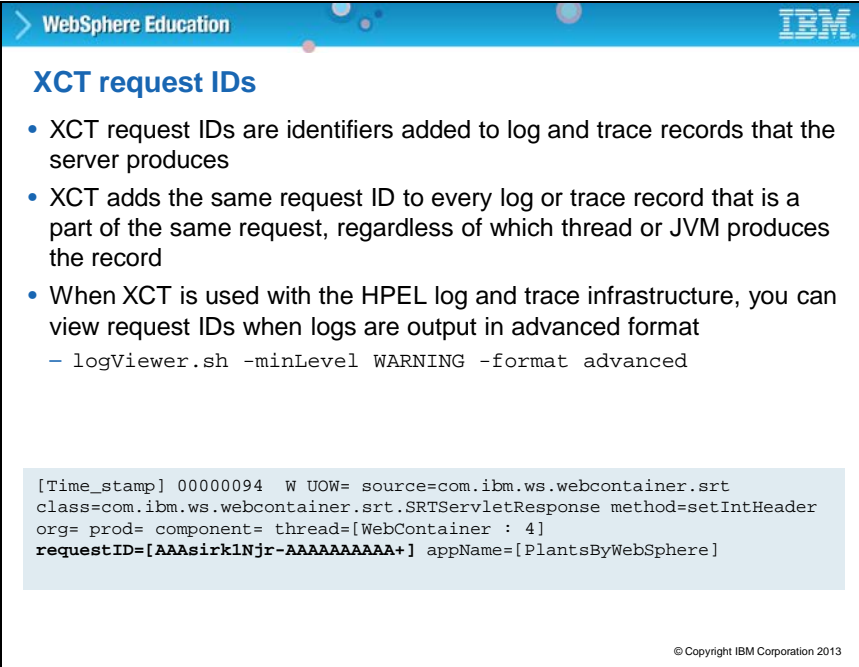
- Select option for including request IDs, creating correlation logs, capturing data snapshots

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Title: Administering XCT

Enable XCT to include request IDs in log and trace files when you want to see which log and trace entries, in all threads and application server processes, are related to the same request. Request IDs are only recorded when using HPEL log and trace mode and can be seen or used for filtering when using the logViewer command.

Select the option “Enable XCT to create correlation log records” when you want to log how requests branch between threads and processes, and see extra information about each request. Enabling XCT to create correlation log records might significantly affect performance on your system, so is best suited for test and development environments.



The slide is titled "XCT request IDs" and is part of a "WebSphere Education" presentation. It contains three bullet points explaining the purpose and usage of XCT request IDs. A sample log entry is shown in a light blue box, demonstrating the format of the request ID. The IBM logo is in the top right corner, and the copyright notice "© Copyright IBM Corporation 2013" is at the bottom right.

XCT request IDs

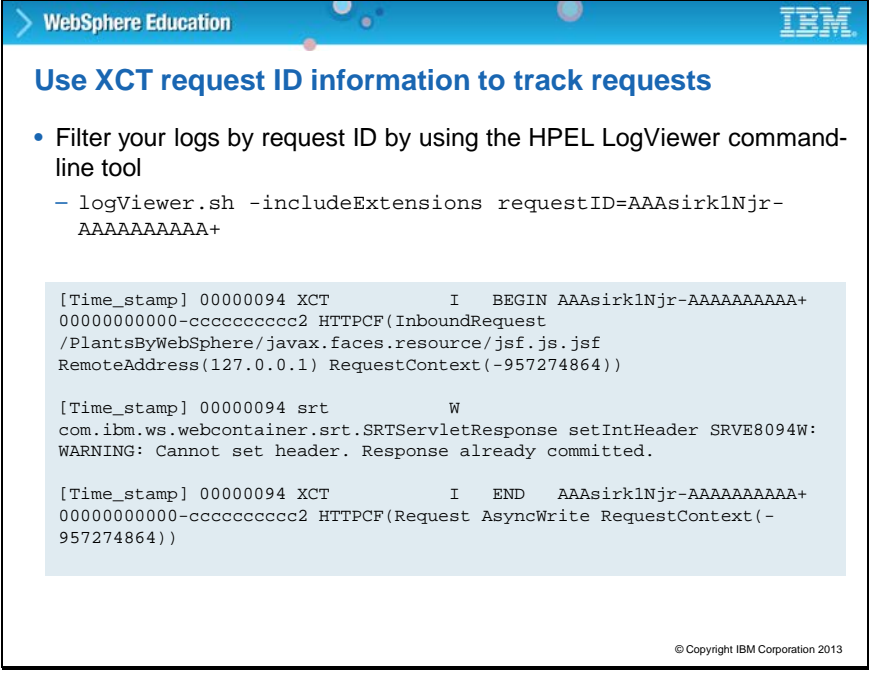
- XCT request IDs are identifiers added to log and trace records that the server produces
- XCT adds the same request ID to every log or trace record that is a part of the same request, regardless of which thread or JVM produces the record
- When XCT is used with the HPEL log and trace infrastructure, you can view request IDs when logs are output in advanced format
 - `logViewer.sh -minLevel WARNING -format advanced`


```
[Time_stamp] 00000094 W UOW= source=com.ibm.ws.webcontainer.srt
class=com.ibm.ws.webcontainer.srt.SRTServletResponse method=setIntHeader
org= prod= component= thread=[WebContainer : 4]
requestID=[AAAsirk1Njr-AAAAAAAAAA+] appName=[PlantsByWebSphere]
```

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Title: XCT request IDs

You can use XCT to augment your log and trace files with correlation information. This correlation information clarifies which threads and which application server processes participated in the handling of each request.



WebSphere Education 

Use XCT request ID information to track requests

- Filter your logs by request ID by using the HPEL LogViewer command-line tool

```
logViewer.sh -includeExtensions requestID=AAAsirk1Njr-
AAAAAAAAAA+
```

```
[Time_stamp] 00000094 XCT          I   BEGIN AAAsirk1Njr-AAAAAAAAAA+
00000000000-cccccccccc2 HTTPCF(InboundRequest
/PlantsByWebSphere/javax.faces.resource/jsf.js.jsf
RemoteAddress(127.0.0.1) RequestContext(-957274864))

[Time_stamp] 00000094 srt          W
com.ibm.ws.webcontainer.srt.SRTServletResponse setIntHeader SRVE8094W:
WARNING: Cannot set header. Response already committed.

[Time_stamp] 00000094 XCT          I   END   AAAsirk1Njr-AAAAAAAAAA+
00000000000-cccccccccc2 HTTPCF(Request AsyncWrite RequestContext(-
957274864))
```

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Title: Use XCT request ID information to track requests

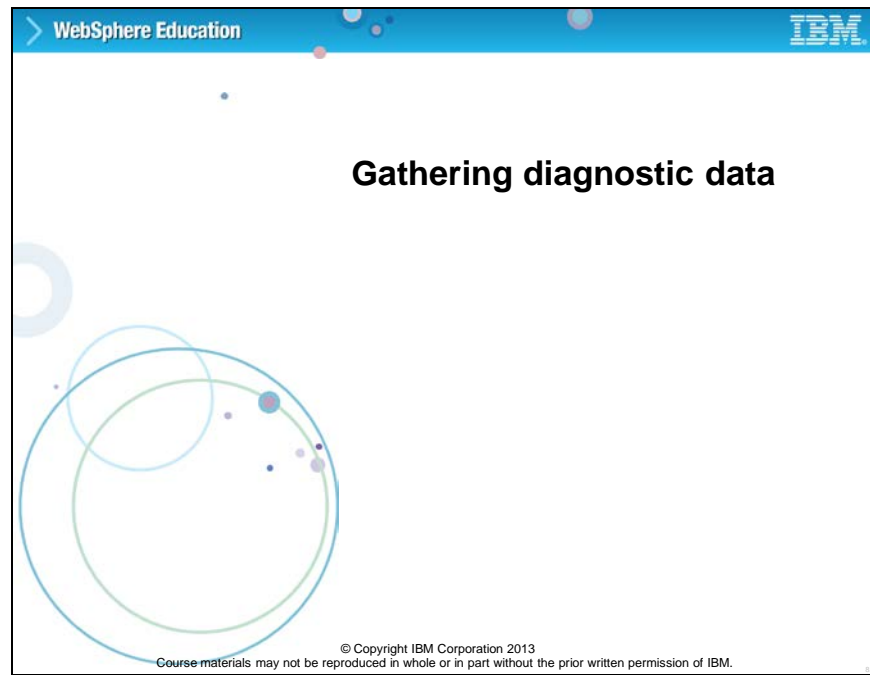
XCT log records are typically added to the logs to:

- Demarcate the beginning and ending of work for a particular request on a particular thread.
- Demarcate when work is transferred to another thread or process, or to indicate when work returned from another thread or process.
- Demarcate when work moves from major component to major component, even if work continues on the same thread; for example to show transfer of control from application server code to application code.

The HPEL logViewer tool is able to filter log and trace records by request ID.

Tools, such as the XCT Log Viewer, can also take advantage of XCT log records or XCT request IDs, or both, when rendering log and trace content. The XCT Log Viewer is available as a tool add-on for the IBM Support Assistant.

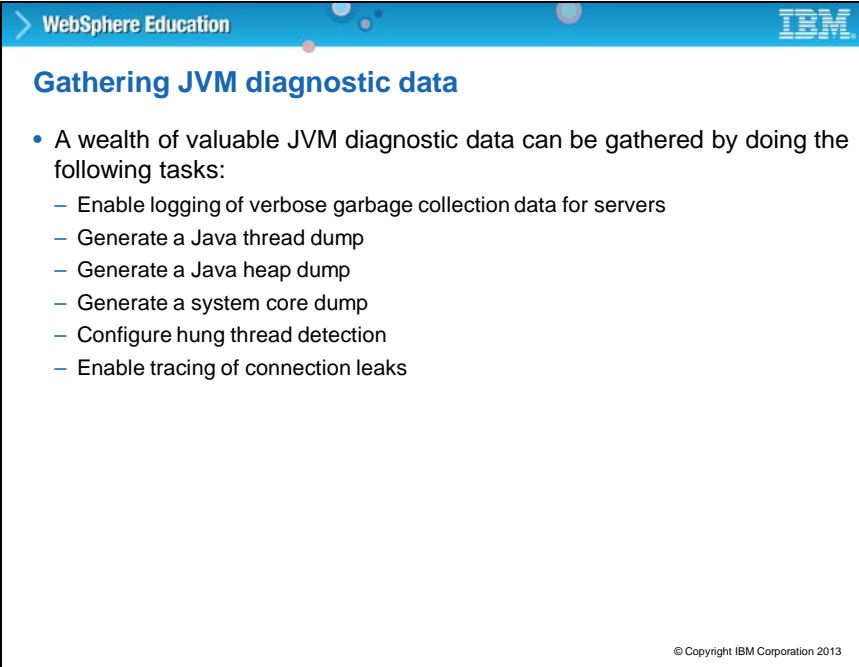
Slide 30



Topic: Gathering diagnostic data

This topic describes how to gather diagnostic data.

Slide 31



The slide is titled "Gathering JVM diagnostic data" and is part of a WebSphere Education presentation. It lists several tasks for gathering JVM diagnostic data. The IBM logo is in the top right corner, and the copyright notice "© Copyright IBM Corporation 2013" is in the bottom right corner.

Gathering JVM diagnostic data

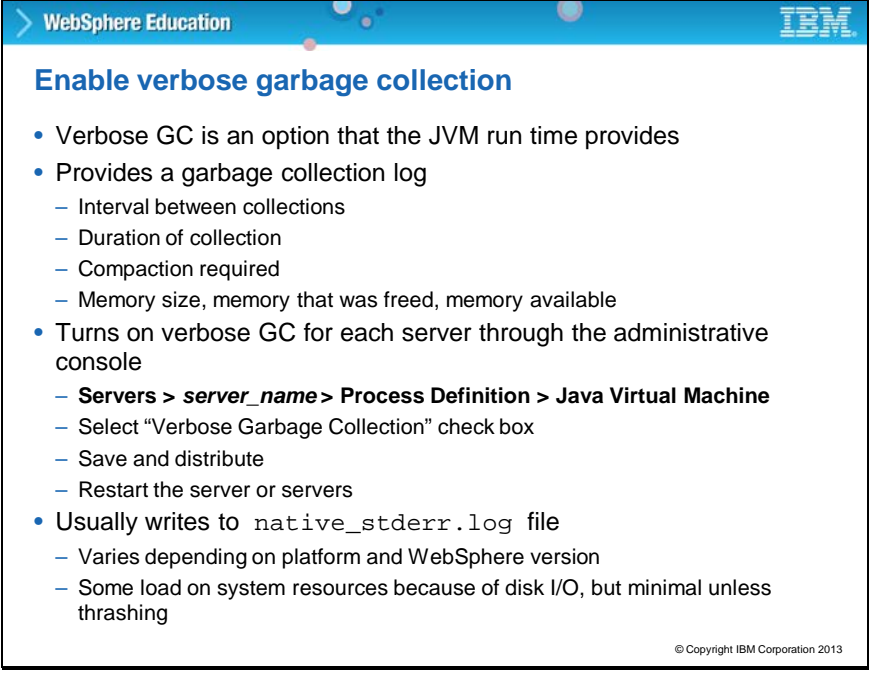
- A wealth of valuable JVM diagnostic data can be gathered by doing the following tasks:
 - Enable logging of verbose garbage collection data for servers
 - Generate a Java thread dump
 - Generate a Java heap dump
 - Generate a system core dump
 - Configure hung thread detection
 - Enable tracing of connection leaks


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Title: Gathering JVM diagnostic data

When investigating a problem related to a JVM, you can gather data by using these techniques:

- Enable verbose garbage collection
- Generate a Java thread dump
- Generate a Java heap dump
- Generate a system dump
- Configure hung thread detection
- Enable diagnostic capability to detect connection leaks



WebSphere Education 

Enable verbose garbage collection

- Verbose GC is an option that the JVM run time provides
- Provides a garbage collection log
 - Interval between collections
 - Duration of collection
 - Compaction required
 - Memory size, memory that was freed, memory available
- Turns on verbose GC for each server through the administrative console
 - **Servers > server_name > Process Definition > Java Virtual Machine**
 - Select “Verbose Garbage Collection” check box
 - Save and distribute
 - Restart the server or servers
- Usually writes to `native_stderr.log` file
 - Varies depending on platform and WebSphere version
 - Some load on system resources because of disk I/O, but minimal unless thrashing

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Title: Enable verbose garbage collection

You can enable garbage collection (GC) for each server by using the administrative console. Select **Servers > server name > Process Definition > Java virtual machine** and select the check box for “verbose garbage collection”. This action requires a server restart.

The garbage collection log records the interval between collections, duration of collection, compaction requirements, memory size, memory that was freed, and memory available. The cost of enabling verbose garbage collection is minimal. The benefits of having it on the first time something happens are considerable because then there is no need to reproduce the problem. It is also a good practice to monitor the verbose GC regularly as a way to determine the health of the system.

As in previous versions, verbose GC is not enabled by default. When you enable verbose GC for a server in V8.5, the default garbage collection policy is generational-concurrent (gencon). The data is written to the `native_stderr.log` or `native_stdout.log` depending on the operating system of the server.

It is often suggested that you have verbose GC enabled permanently in production. The cost on a reasonably well-tuned JVM is small. The benefits of having it on the first time something happens are considerable (no need to reproduce the problem a second time after enabling). It is also good to keep an eye on the verbose GC regularly as a way to monitor the health of the system, even when nothing bad is noticed.

WebSphere Education

Java memory dumps and cores

- New feature in the Troubleshooting section is **Java dumps and cores**

Troubleshooting

- Logs and trace
- Configuration problems
- Class loader viewer
- Java dumps and cores**
- Configuration Validation
- Diagnostic Provider
- Runtime Messages

Heap dump **Java core** **System dump**

Select **Server** **Node**

You can administer the following resources:

<input type="checkbox"/>	dmgr	was8hostCellManager01
<input type="checkbox"/>	myserver1	was8hostNode01
<input type="checkbox"/>	nodeagent	was8hostNode01
<input type="checkbox"/>	nodeagent	was8hostNode02
<input type="checkbox"/>	server1	was8hostNode01
Total 5		

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Title: Java memory dumps and cores

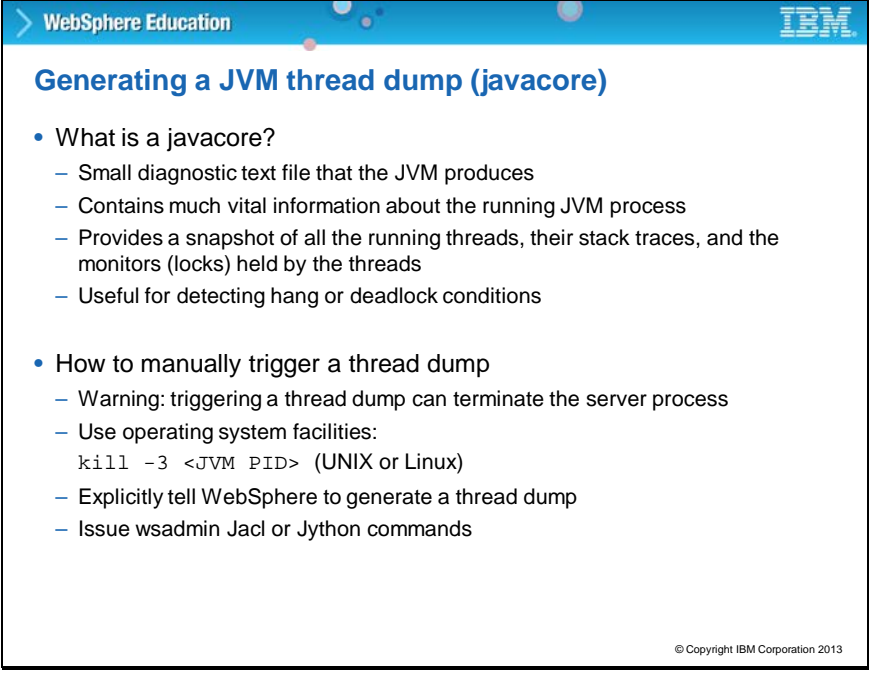
Java dumps and cores is a new feature in version 8. Clicking the **Java dumps and cores** link opens the panel that is shown. Use this panel to generate heap dumps, Java cores, or system dumps for a running process. Select the server and click the appropriate button. The files that result from these operations are placed on the local file system in the profile root directory, by default.

A **heap dump** is a snapshot of JVM memory. It shows live objects in the memory and references between them. Use the heap dump to investigate how applications use memory and to troubleshoot out of memory exceptions.

Use the **Java core** button to generate a thread dump. A thread dump is used to investigate why a server is hanging or investigate messages in the logs that indicate a thread did not complete its work in the expected amount of time.

Use the **System dump** button to generate system dumps of the server process. These dumps can be large, but no other dumps might be available when a server crashes.

Slide 34



The slide is titled "Generating a JVM thread dump (javacore)" and is part of a WebSphere Education presentation. It contains two main bullet points. The first bullet point, "What is a javacore?", has four sub-points: it is a small diagnostic text file produced by the JVM, it contains vital information about the running JVM process, it provides a snapshot of all running threads, their stack traces, and the monitors (locks) held by the threads, and it is useful for detecting hang or deadlock conditions. The second bullet point, "How to manually trigger a thread dump", has four sub-points: a warning that triggering a thread dump can terminate the server process, the use of operating system facilities with the command `kill -3 <JVM_PID>` (UNIX or Linux), explicitly telling WebSphere to generate a thread dump, and issuing `wsadmin` `Jacl` or `Jython` commands. The IBM logo is in the top right corner, and the copyright notice "© Copyright IBM Corporation 2013" is in the bottom right corner.

- What is a javacore?
 - Small diagnostic text file that the JVM produces
 - Contains much vital information about the running JVM process
 - Provides a snapshot of all the running threads, their stack traces, and the monitors (locks) held by the threads
 - Useful for detecting hang or deadlock conditions
- How to manually trigger a thread dump
 - Warning: triggering a thread dump can terminate the server process
 - Use operating system facilities:
`kill -3 <JVM_PID>` (UNIX or Linux)
 - Explicitly tell WebSphere to generate a thread dump
 - Issue `wsadmin` `Jacl` or `Jython` commands


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Title: Generating a JVM thread dump (javacore)

A javacore is a small diagnostic text file that the JVM produces. It contains vital information about JVM processes and provides a snapshot of all the threads, their stack traces, and locks held by the threads. A javacore can be used to detect hung threads or deadlock condition.

Thread dumps can also help in detecting performance problems. One method is to take at least three snapshots about 2-3 minutes apart, and then analyze the javacore files to see what different threads are doing in each snapshot.

You can trigger a thread dump by using the operating system command that is shown here, but be aware that triggering a thread dump can crash the server. You can also use `wsadmin` commands to generate a thread dump.

WebSphere Education


Generating a JVM heap dump

- JVM heap dump is created in the `<profile_root>` directory when an `OutOfMemoryError` exception is thrown
 - Heap dump is in phd (portable heap dump) format by default
 - Different locations and formats can be configured by using command-line arguments
- Use the `-Xdump` generic JVM arguments to configure heap dumps
- For example:
 - `Xdump:heap:file=/dumps/heapdump.%Y%m%d.%H%M%S.%pid.%seq.phd` specifies the location and format of the heap dump file name
 - `Xdump:heap,opts=PHD+CLASSIC` enables heap dump creation and creates the file in both binary and text format
 - `Xdump:heap:none` disables heap dump creation
- Can also trigger heap dumps by using `wsadmin` Jython commands
 - `AdminControl.invoke(AdminControl.completeObjectName("type=JVM, process=<server_name>,*"), "generateHeapDump")`

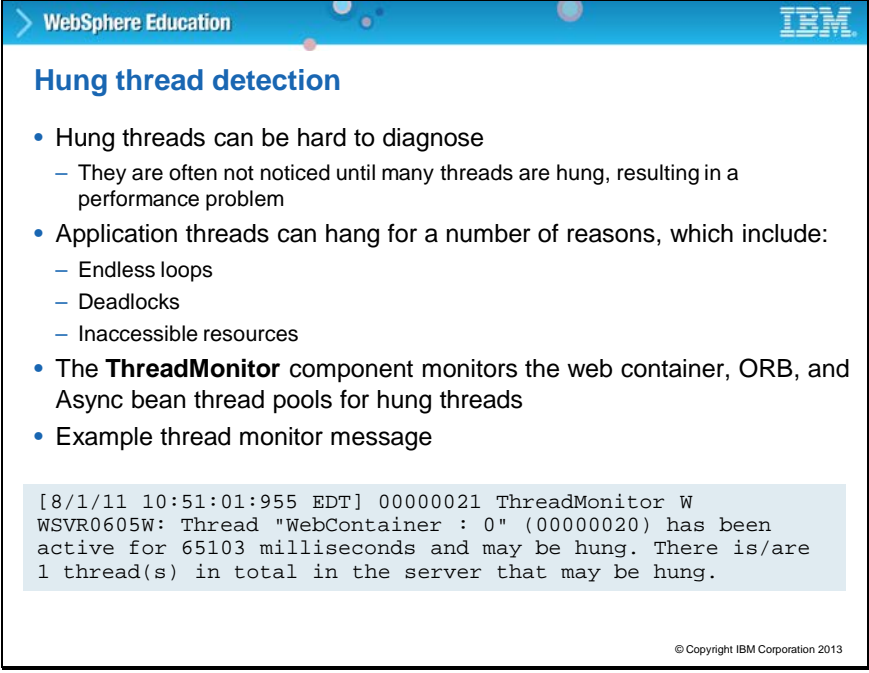
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Title: Generating a JVM heap dump

The default location for a JVM heap dump is the profile root directory. You can change this location by using a generic JVM argument (`-Xdump`). A JVM heap dump is created when an out of memory exception is thrown. This action can be disabled by using the generic JVM argument that is shown here.

The heap dump uses portable heap dump format (phd) – a more compact format that newer tools use. You can also format the heap dump as text by using a generic JVM argument. You can trigger a heap dump by using `wsadmin` commands that are shown here.

IBM Support Assistant includes a tool for inspecting Java memory dumps, called the Memory Analyzer. You can start it from the IBM Support Assistant workbench. This tool can analyze several Java heap dump formats, including the standard dump formats from both the IBM and Sun Java runtime environments, and also z/OS SVC dumps. It lists and analyzes the data structures in the heap and their relationships, helping you identify the structures that are most likely responsible for memory leakage.



Hung thread detection

- Hung threads can be hard to diagnose
 - They are often not noticed until many threads are hung, resulting in a performance problem
- Application threads can hang for a number of reasons, which include:
 - Endless loops
 - Deadlocks
 - Inaccessible resources
- The **ThreadMonitor** component monitors the web container, ORB, and Async bean thread pools for hung threads
- Example thread monitor message

```
[8/1/11 10:51:01:955 EDT] 00000021 ThreadMonitor W
WSVR0605W: Thread "WebContainer : 0" (00000020) has been
active for 65103 milliseconds and may be hung. There is/are
1 thread(s) in total in the server that may be hung.
```

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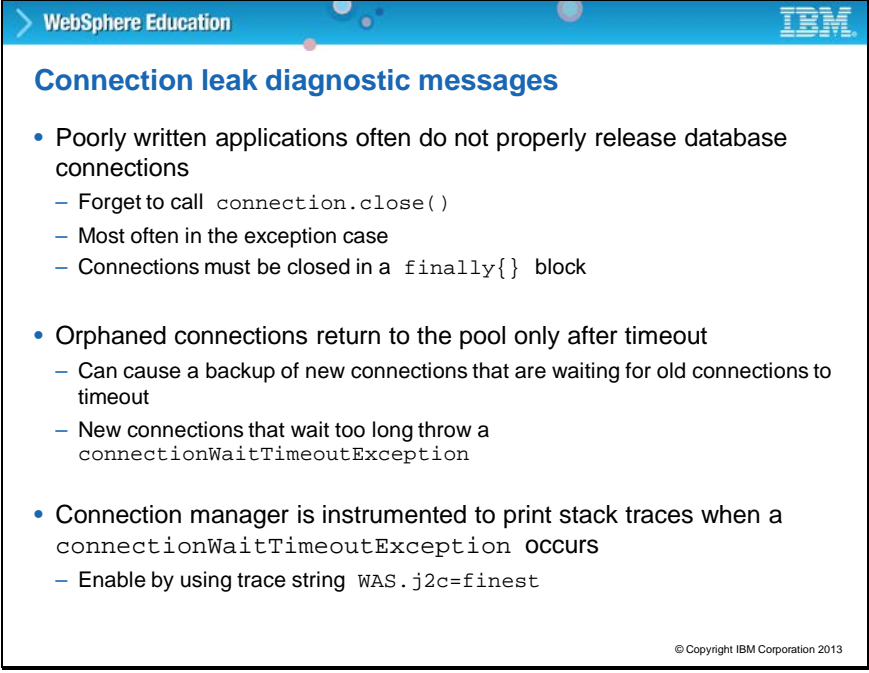
Title: Hung thread detection


Application threads can hang for a number of reasons, including resource contention, infinite loops, and deadlocks.

A component that is known as the ThreadMonitor monitors the web container, ORB, and Async bean thread pools for hung threads.

The thread monitor does not try to deal with the hung threads; it just issues notifications so that the administrator or developer can deal with the issues. When a hung thread is detected, three notifications are sent: a JMX notification is sent for JMX listeners, PMI Thread Pool data is updated for tools like the Tivoli Performance Viewer, and a message is written to the SystemOut log.

When the thread pool gives work to a thread, it notifies the thread monitor. The thread monitor notes the thread ID and time stamp. The thread monitor compares active threads to time stamps. Threads that are active longer than the time limit are marked "potentially hung" and notifications are sent. The performance affect on the server is minimal (less than 1%).



WebSphere Education 

Connection leak diagnostic messages

- Poorly written applications often do not properly release database connections
 - Forget to call `connection.close()`
 - Most often in the exception case
 - Connections must be closed in a `finally{}` block
- Orphaned connections return to the pool only after timeout
 - Can cause a backup of new connections that are waiting for old connections to timeout
 - New connections that wait too long throw a `connectionWaitTimeoutException`
- Connection manager is instrumented to print stack traces when a `connectionWaitTimeoutException` occurs
 - Enable by using trace string `WAS.j2c=finest`

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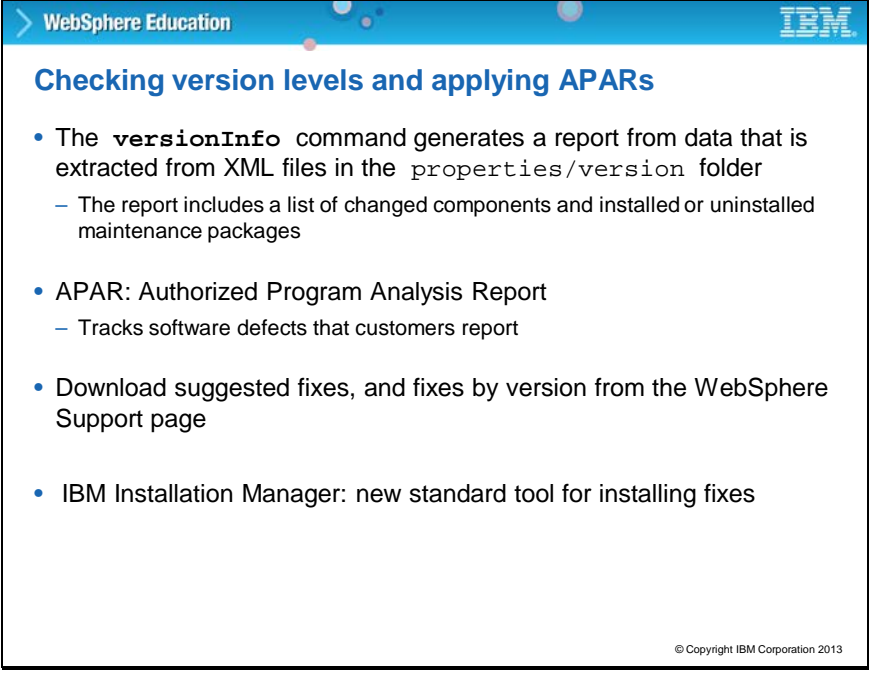
Title: Connection leak diagnostic messages

Applications can suffer from performance problems and even "hang" if they do not close their connections properly. Not properly using the `connection.close()` method often causes a connection leak. To ensure that connections are closed properly, they must be closed in a `finally{}` block.

WebSphere eventually times out orphaned connections and returns them to the pool, but for an application that makes frequent use of database connections, this timeout might not be enough. New connections can get queued up waiting for the database while old connections are waiting to be timed out. This behavior can halt the application, and you might see several `connectionWaitExceptions` in the server logs.

The leak detection that the connection manager provides has lower performance impact than tracing the connection manager. When leak detection is activated, it enables a connection manager wrapper that holds the stack trace of all `getConnection()` calls in a throwable object. When an exception is thrown due to waiting on a full connection pool, stack traces of **all** open connections are printed. This behavior enables you to significantly narrow your search area when you look at the application source code in an attempt to find the responsible code.

Connection leaks are difficult to diagnose because the error messages do not usually provide enough specific information about the source of the problem. Usually a source code review is needed to find points in the code where connections are not properly closed. The connection manager makes this task much easier.



The slide is titled "Checking version levels and applying APARs" and is part of a WebSphere Education presentation. It contains a bulleted list of four items. The first item describes the `versionInfo` command and its output. The second item defines APAR and its purpose. The third item suggests downloading fixes from the WebSphere Support page. The fourth item mentions the IBM Installation Manager. The slide includes the IBM logo in the top right corner and a copyright notice at the bottom right.

- The **versionInfo** command generates a report from data that is extracted from XML files in the `properties/version` folder
 - The report includes a list of changed components and installed or uninstalled maintenance packages
- APAR: Authorized Program Analysis Report
 - Tracks software defects that customers report
- Download suggested fixes, and fixes by version from the WebSphere Support page
- IBM Installation Manager: new standard tool for installing fixes

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Title: Checking version levels and applying APARs

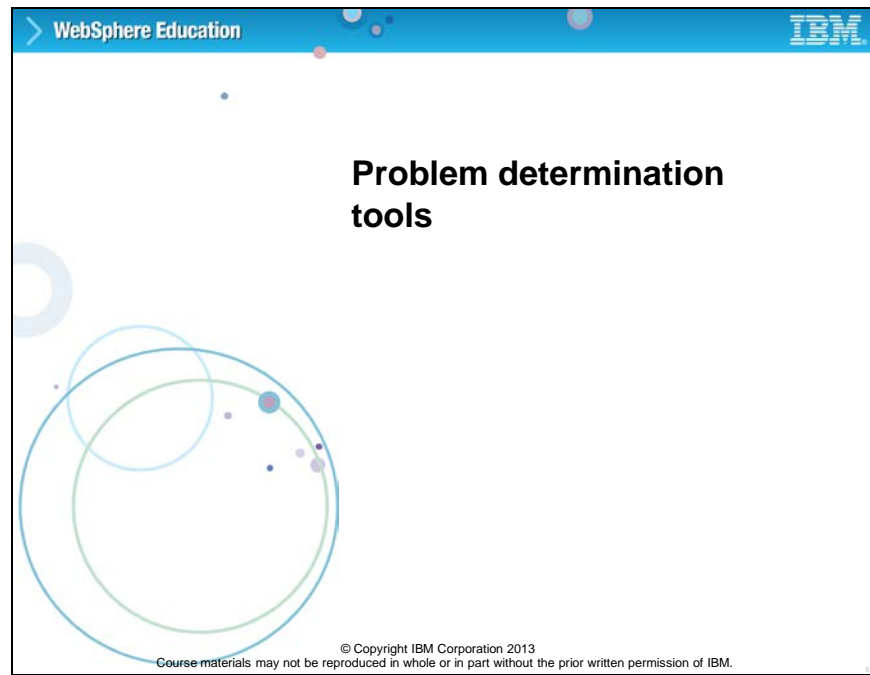
The **versionInfo** command generates a report from data that is extracted from XML files in the `properties/version` folder. The report includes a list of changed components and installed or uninstalled maintenance packages.

An APAR is an Authorized Program Analysis Report; it tracks software defects that customers report.

It is a good idea to download suggested fix packs for your version of the product from the WebSphere Support website.

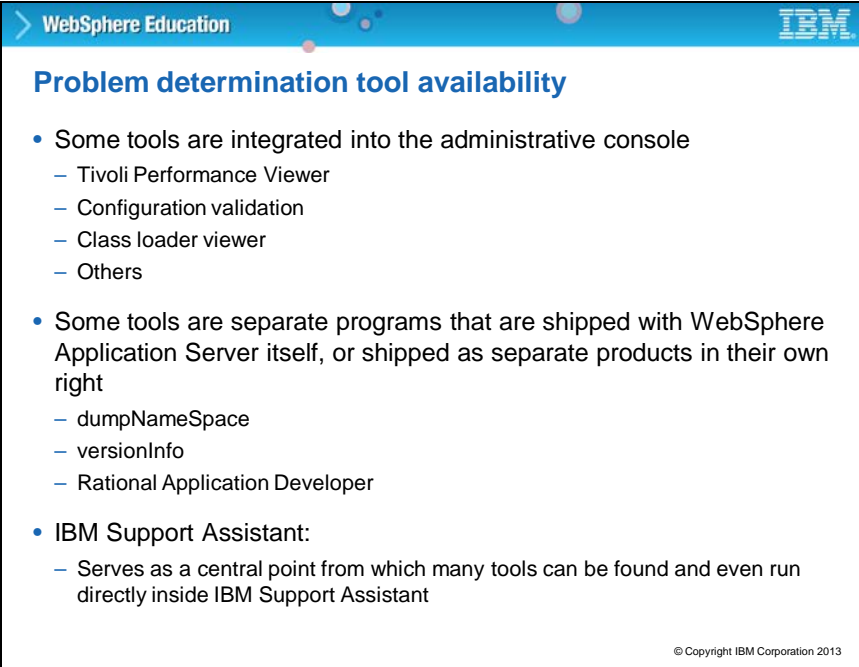
The IBM Installation Manager is the new standard tool for installing fixes.

Slide 39



Topic: Problem determination tools

This topic describes some of the tools that can be used for problem determination.



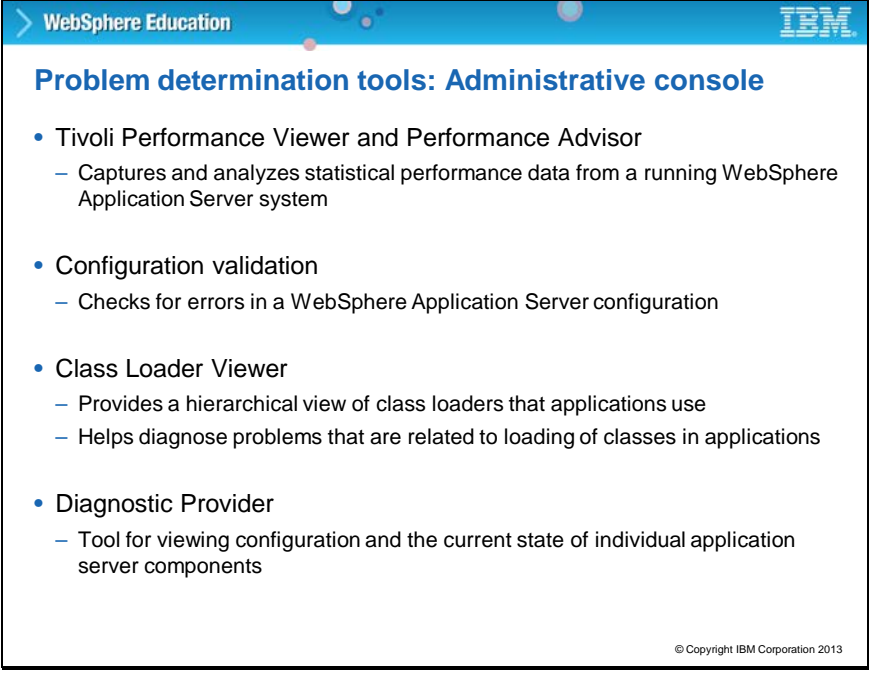
The slide is titled "Problem determination tool availability" and is part of a "WebSphere Education" presentation. It features a blue header with the IBM logo. The content is organized into three bullet points, each with sub-points. The first bullet point lists tools integrated into the administrative console: Tivoli Performance Viewer, Configuration validation, Class loader viewer, and Others. The second bullet point lists separate programs shipped with WebSphere Application Server or as separate products: dumpNameSpace, versionInfo, and Rational Application Developer. The third bullet point describes the IBM Support Assistant as a central point for finding and running tools. A small copyright notice "© Copyright IBM Corporation 2013" is located at the bottom right of the slide.

- Some tools are integrated into the administrative console
 - Tivoli Performance Viewer
 - Configuration validation
 - Class loader viewer
 - Others
- Some tools are separate programs that are shipped with WebSphere Application Server itself, or shipped as separate products in their own right
 - dumpNameSpace
 - versionInfo
 - Rational Application Developer
- IBM Support Assistant:
 - Serves as a central point from which many tools can be found and even run directly inside IBM Support Assistant

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Title: Problem determination tool availability

In the overall process of problem determination, diagnostic data must be collected or generated, and the data must be analyzed. Various tools are available to help you collect and analyze diagnostic data for solving problems that are related to the JVM, server and application configuration, performance, and namespace issues.



The slide is titled "Problem determination tools: Administrative console" and is part of a WebSphere Education presentation. It lists four tools available in the administrative console:



- **Tivoli Performance Viewer and Performance Advisor**
 - Captures and analyzes statistical performance data from a running WebSphere Application Server system
- **Configuration validation**
 - Checks for errors in a WebSphere Application Server configuration
- **Class Loader Viewer**
 - Provides a hierarchical view of class loaders that applications use
 - Helps diagnose problems that are related to loading of classes in applications
- **Diagnostic Provider**
 - Tool for viewing configuration and the current state of individual application server components

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Title: Problem determination tools: Administrative console

Several useful problem determination tools are available in the administrative console.

- **Tivoli Performance Viewer and Performance Advisor:** Captures and analyzes statistical performance data from a running WebSphere Application Server system.
- **Configuration validation** checks for errors in a WebSphere Application Server configuration.
- The **Class Loader Viewer** examines a hierarchical view of class loaders that applications use and helps diagnose problems that are related to loading of classes in applications.
- The **Diagnostic Provider** is a tool for viewing configuration and the current state of individual application server components.



Dumping the JNDI namespace

- The `dumpNameSpace` utility shows JNDI directory content
- Useful to ensure correct association of named objects:
 - JDBC resources
 - EJBs
 - JMS resources
 - Other resources
- Syntax and some of the options:

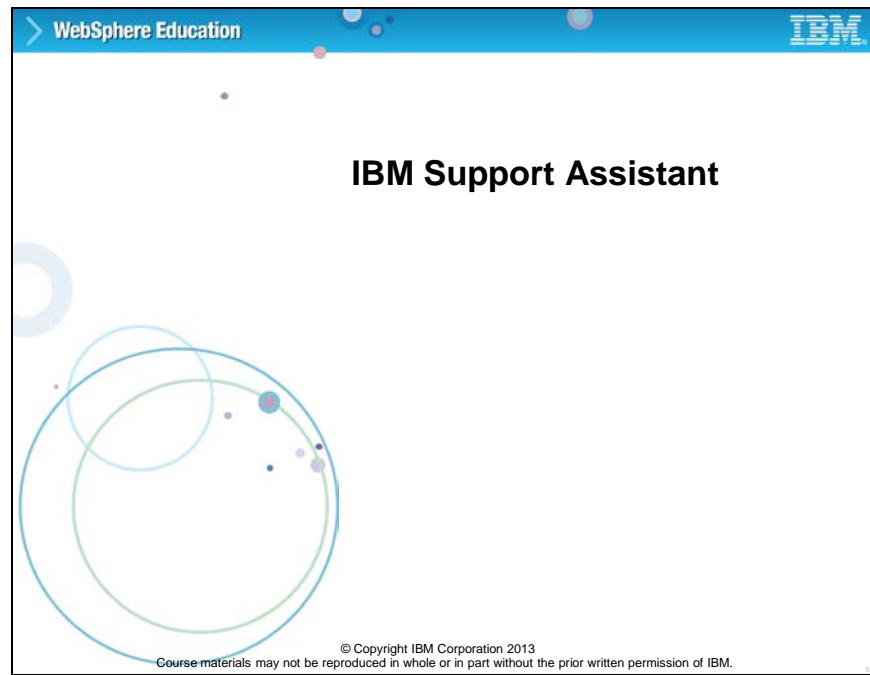
```
<was_root>\bin\dumpNameSpace  
  [-host bootstrap_host_name (defaults to localhost)]  
  [-port bootstrap_port_number (defaults to 2809)]  
  [-startAt subcontext/in/the/tree]
```
- Output can be redirected to a file and inspected

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Title: Dumping the JNDI namespace

The `dumpNameSpace` utility shows the content of the JNDI name space. You can use it to verify the names of objects that are registered in the name space. The syntax for the command is shown here.

Slide 43



Topic: IBM Support Assistant

This topic describes how to use the IBM Support Assistant.

WebSphere Education


What is the IBM Support Assistant?

- The IBM Support Assistant workbench is a free, stand-alone application that is installed on any workstation
- It can also be enhanced by installing plug-in modules for the IBM products you use
 - The IBM Support Assistant workbench is supported on Windows and Linux
 - The IBM Support Assistant Agent manager and Assistant agent must be configured to support other platforms such as AIX and Solaris
- Benefits of IBM Support Assistant include:
 - Saves time in searching product, support, and educational resources
 - Helps with opening a problem management report (PMR)
 - Allows for easy location and installation of useful product support tools by using a support tool framework
 - Easily downloaded from
<http://www.ibm.com/software/support/isa/>

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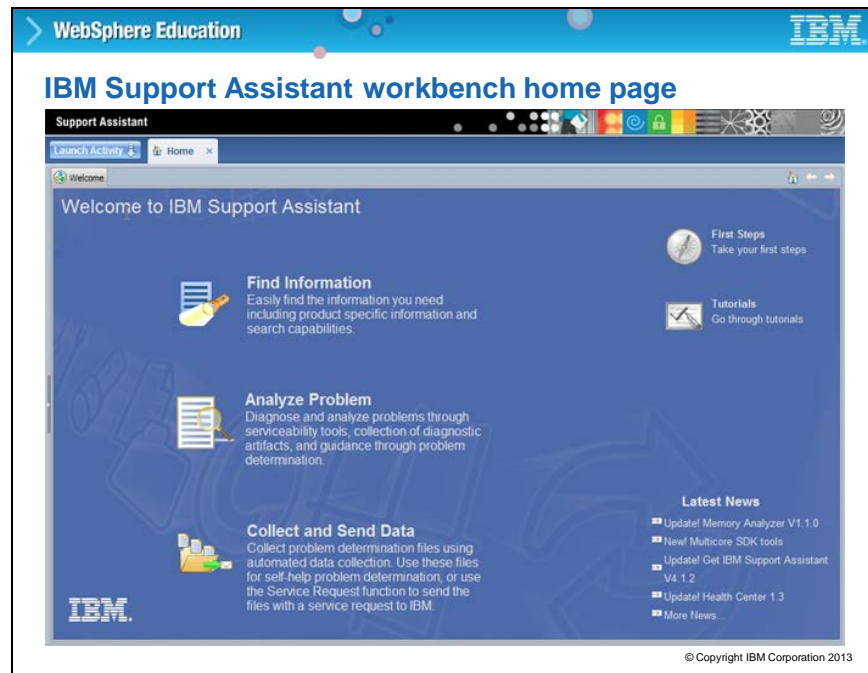
Title: What is the IBM Support Assistant?

The IBM Support Assistant is a free, stand-alone application that can be installed on any workstation. It can also be enhanced by installing plug-in modules for the IBM products you use. IBM Support Assistant provides the following benefits.

- It improves your ability to locate IBM support, development, and educational information through a federated search interface (one search: multiple resources).
- It provides quick access to the IBM Education Assistant and key product education roadmaps.
- It simplifies access to IBM product home pages, product support pages, and product forums or newsgroups, through convenient links.
- It saves time in submitting problems to IBM Support by collecting key information, then electronically creating a problem management record (PMR) from within IBM Support Assistant. If a problem management record (PMR) must be opened, IBM Support Assistant helps with:
 - Gathering support information that is based on problem type
 - Creating and updating the problem report
 - Tracking your electronic problem report
- It includes a support tool framework, allowing for the easy installation of support tools that are associated with different IBM products.

- It provides a framework for IBM software products to deliver customized self-help information into the different tools within it. You can customize your IBM Support Assistant client by using the built-in update capability to find and install new product features or support tools.

Slide 45

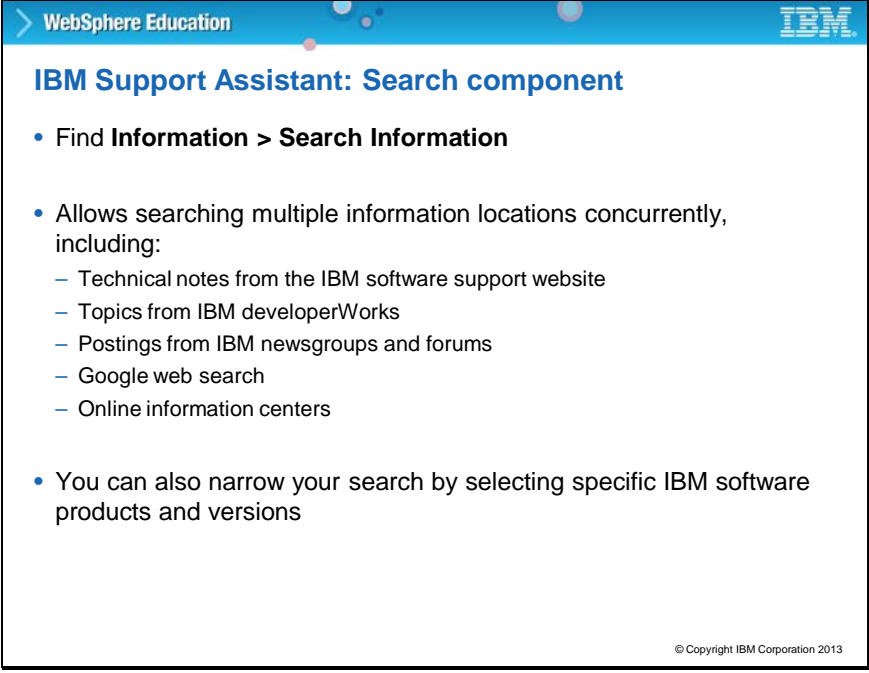


Title: IBM Support Assistant workbench home page

To download and install ISA, go to the IBM software support portal and choose the IBM Support Assistant download link for your platform. Log in by using your IBM ID. If you do not already have an IBM ID, you can register for one. After downloading the compressed archive files, extract the archive to a temporary directory and then run the installer program.

This screen shows the ISA workbench home page.

Slide 46

A presentation slide titled "IBM Support Assistant: Search component". The slide has a blue header bar with "WebSphere Education" on the left and the "IBM" logo on the right. The main content area is white with a blue title. It contains a bulleted list of search capabilities. The first bullet point is "Find Information > Search Information". The second bullet point is "Allows searching multiple information locations concurrently, including:", followed by a sub-list of five search locations: "Technical notes from the IBM software support website", "Topics from IBM developerWorks", "Postings from IBM newsgroups and forums", "Google web search", and "Online information centers". The third bullet point is "You can also narrow your search by selecting specific IBM software products and versions". A small copyright notice "© Copyright IBM Corporation 2013" is in the bottom right corner.

> WebSphere Education IBM

IBM Support Assistant: Search component

- Find **Information > Search Information**
- Allows searching multiple information locations concurrently, including:
 - Technical notes from the IBM software support website
 - Topics from IBM developerWorks
 - Postings from IBM newsgroups and forums
 - Google web search
 - Online information centers
- You can also narrow your search by selecting specific IBM software products and versions

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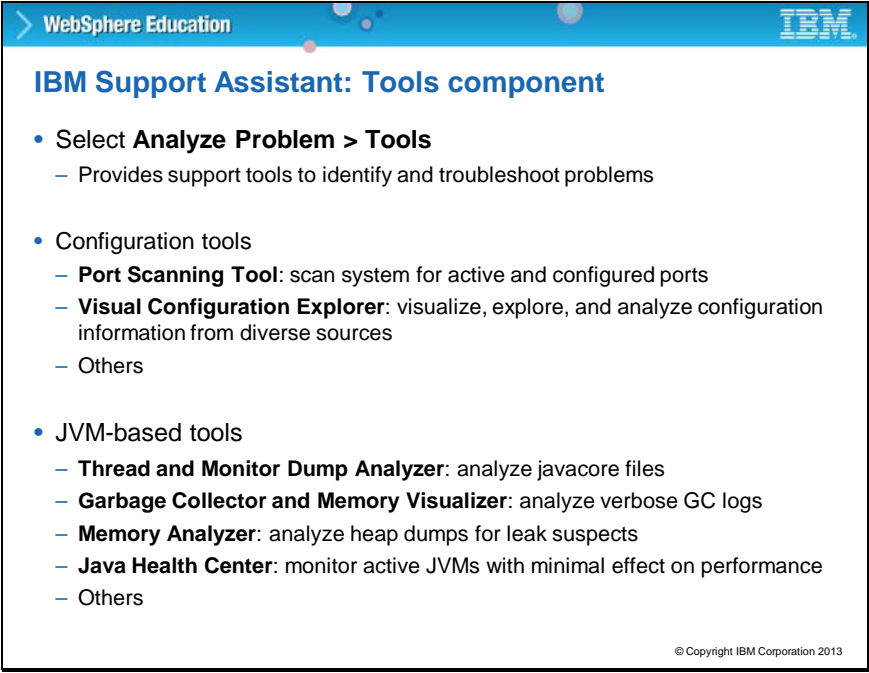
Title: IBM Support Assistant: Search component

In ISA, search options are provided to help you narrow the scope of your search. The search location that you choose determines what search options are available. For example, if you select Google web search, search options do not apply. The **IBM developerWorks** and **IBM newsgroups and forums** search locations allow you to narrow your search to specific product areas.

The **IBM software support documents** search location offers the most options. You can select specific products and versions, and you can select specific types of documents.

The online information centers are only available for products that enable this feature. Most IBM software products have an information center to search.

Slide 47



The slide is titled "IBM Support Assistant: Tools component" and is part of a "WebSphere Education" presentation. It lists three main categories of tools: "Analyze Problem > Tools", "Configuration tools", and "JVM-based tools". Each category has a list of sub-points describing specific tools and their functions. The slide also includes the IBM logo and a copyright notice for 2013.

- Select **Analyze Problem > Tools**
 - Provides support tools to identify and troubleshoot problems
- Configuration tools
 - **Port Scanning Tool**: scan system for active and configured ports
 - **Visual Configuration Explorer**: visualize, explore, and analyze configuration information from diverse sources
 - Others
- JVM-based tools
 - **Thread and Monitor Dump Analyzer**: analyze javacore files
 - **Garbage Collector and Memory Visualizer**: analyze verbose GC logs
 - **Memory Analyzer**: analyze heap dumps for leak suspects
 - **Java Health Center**: monitor active JVMs with minimal effect on performance
 - Others

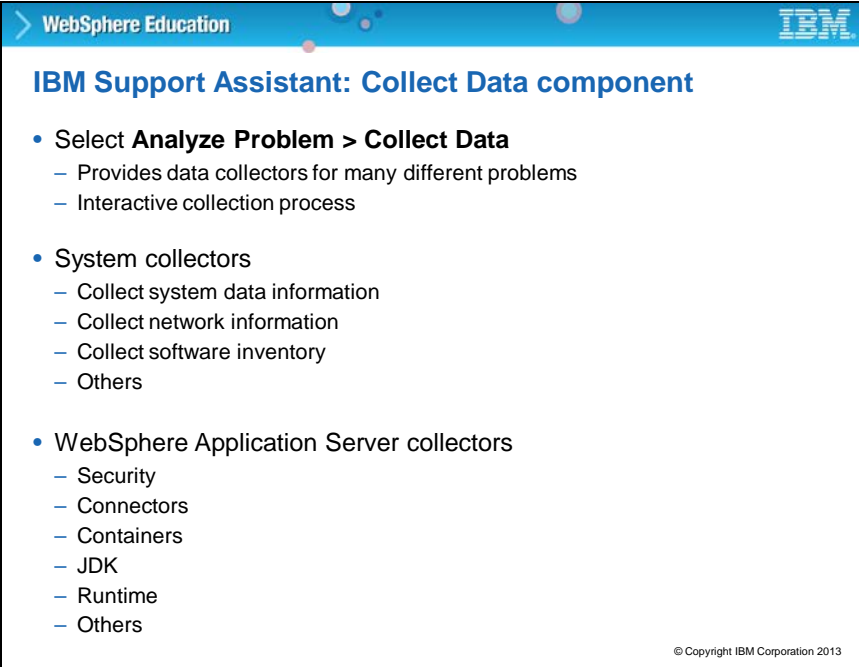
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Title: IBM Support Assistant: Tools component

The tools component is a way to provide support tools to you. These tools can be used diagnostically to identify problems you are having. Some tools can also be used as a preventive measure to stop a problem before it occurs.

The component provides a way to use support-related tools to identify problems or health-checking tools to prevent problems. Tools are installed by using the Updater component of IBM Support Assistant. A tool is started in a new window by clicking its name.

Slide 48



WebSphere Education **IBM**

IBM Support Assistant: Collect Data component

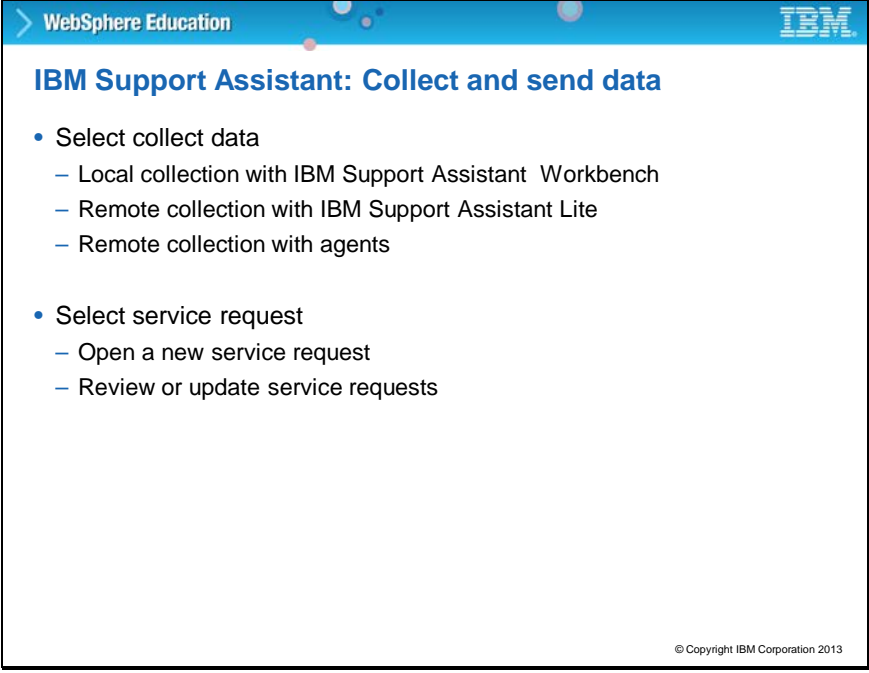
- Select **Analyze Problem > Collect Data**
 - Provides data collectors for many different problems
 - Interactive collection process
- System collectors
 - Collect system data information
 - Collect network information
 - Collect software inventory
 - Others
- WebSphere Application Server collectors
 - Security
 - Connectors
 - Containers
 - JDK
 - Runtime
 - Others

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Title: IBM Support Assistant: Collect Data component

Collecting data is optional, but proactive collection of diagnostic data can help you troubleshoot problems with IBM software and help IBM resolve your service requests faster. If you are troubleshooting a problem on your own or intend to submit a service request, collect data first. You can store the collected data in a case (a placeholder for all the items that are related to a particular issue) by using the Case Manager. Using a case helps to organize your problem determination efforts and allows you to send the collected data to IBM when you create a service request.

Slide 49

The image is a screenshot of a presentation slide titled "IBM Support Assistant: Collect and send data". The slide has a blue header bar with "WebSphere Education" on the left and the "IBM" logo on the right. The main content area is white and contains two bullet points. The first bullet point is "Select collect data" with three sub-bullets: "Local collection with IBM Support Assistant Workbench", "Remote collection with IBM Support Assistant Lite", and "Remote collection with agents". The second bullet point is "Select service request" with two sub-bullets: "Open a new service request" and "Review or update service requests". In the bottom right corner of the slide, there is a small copyright notice: "© Copyright IBM Corporation 2013".

WebSphere Education IBM

IBM Support Assistant: Collect and send data

- Select collect data
 - Local collection with IBM Support Assistant Workbench
 - Remote collection with IBM Support Assistant Lite
 - Remote collection with agents
- Select service request
 - Open a new service request
 - Review or update service requests

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Title: IBM Support Assistant: Collect and send data

Collecting data is an important part of submitting a problem report because IBM can use it to resolve your problem report more quickly.

When you click **Collect Data**, you are asked to select the product for which you would like to collect data. You are prompted to select a problem type as well.

Depending on the product you select, you might be asked for other information. When you select a product and provide the required information, press **Collect**.

For most problem types, IBM Support Assistant collects data for the product you select and stores it in a JAR file. For some problem types, the information that is collected results in a report file or a simple message to the user. You can collect data for more than one product at a time if wanted.

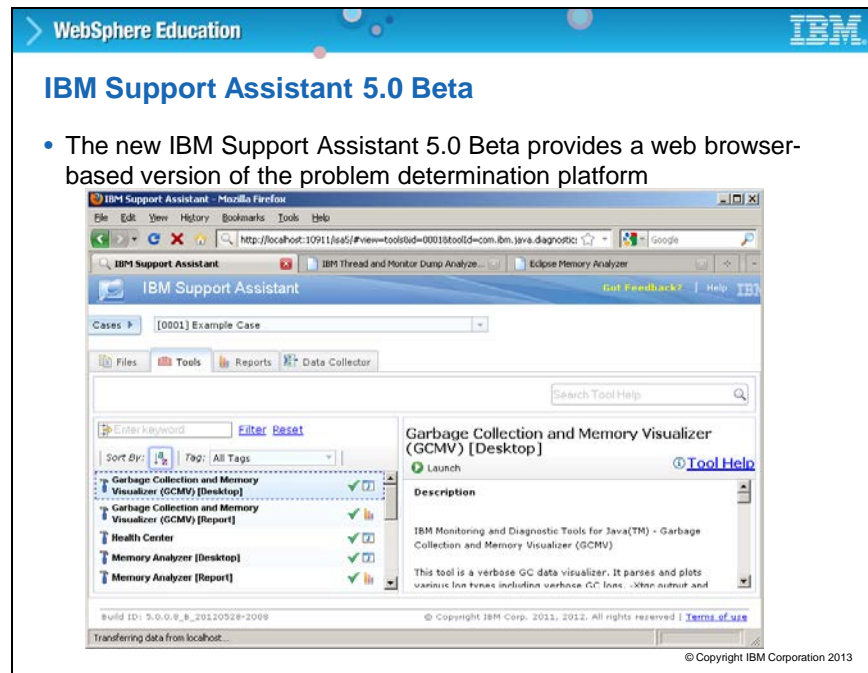
To manage problem reports, you must log in. After you are logged in, you can:

- Open a new problem report
- View existing problem reports
- Attach a file to a new or existing problem report

To log in, you must provide your IBM ID, password, IBM customer number, and country. The login process also verifies that you have an IBM service contract and that your ID is on the Authorized Callers list.

After you log in, the service component shows you any problem reports that you submitted. You can see these problem reports at any time by clicking **List Problem Reports**.

Slide 50



Title: IBM Support Assistant 5.0 Beta

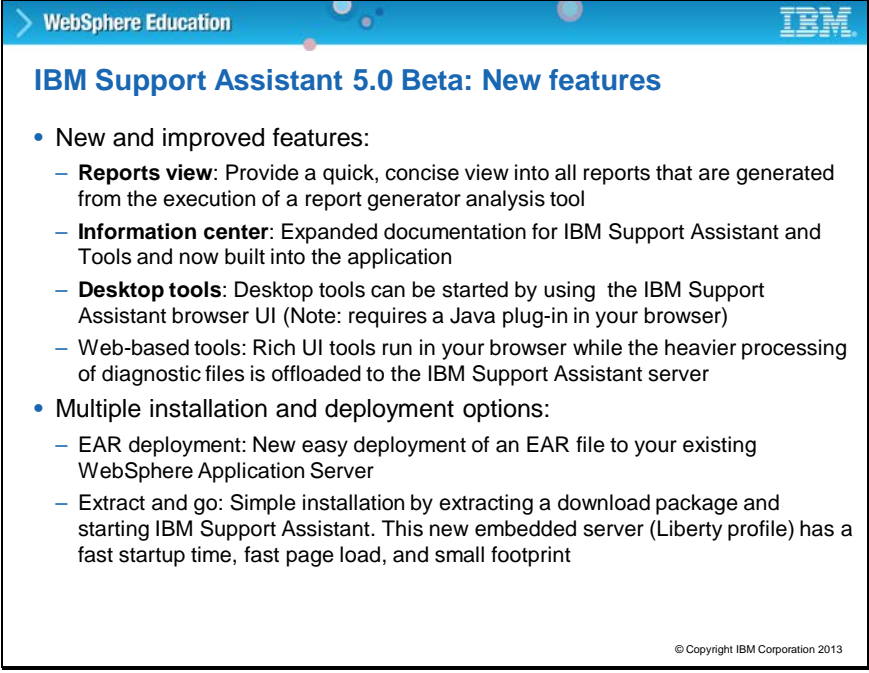
You can download IBM Support Assistant 5.0 Beta from ISA website.

In this Beta release, new problem determination tools are included and the number of tools will continue to grow in future releases. Report-generating tools from the technology preview, along with the new addition of Desktop tools (by using Java Webstart) and web-based tools, include the following tools:

- Garbage Collection and Memory Visualizer (GCMV)
- Health Center
- Memory Analyzer
- Thread and Monitor Dump Analyzer (TMDA)
- WebSphere Application Server Configuration Visualizer
- And several others

To learn more about the tools in this release, select the Help link in the IBM Support Assistant UI to access the new information center documentation.

Slide 51



WebSphere Education **IBM**

IBM Support Assistant 5.0 Beta: New features

- New and improved features:
 - **Reports view:** Provide a quick, concise view into all reports that are generated from the execution of a report generator analysis tool
 - **Information center:** Expanded documentation for IBM Support Assistant and Tools and now built into the application
 - **Desktop tools:** Desktop tools can be started by using the IBM Support Assistant browser UI (Note: requires a Java plug-in in your browser)
 - Web-based tools: Rich UI tools run in your browser while the heavier processing of diagnostic files is offloaded to the IBM Support Assistant server
- Multiple installation and deployment options:
 - EAR deployment: New easy deployment of an EAR file to your existing WebSphere Application Server
 - Extract and go: Simple installation by extracting a download package and starting IBM Support Assistant. This new embedded server (Liberty profile) has a fast startup time, fast page load, and small footprint

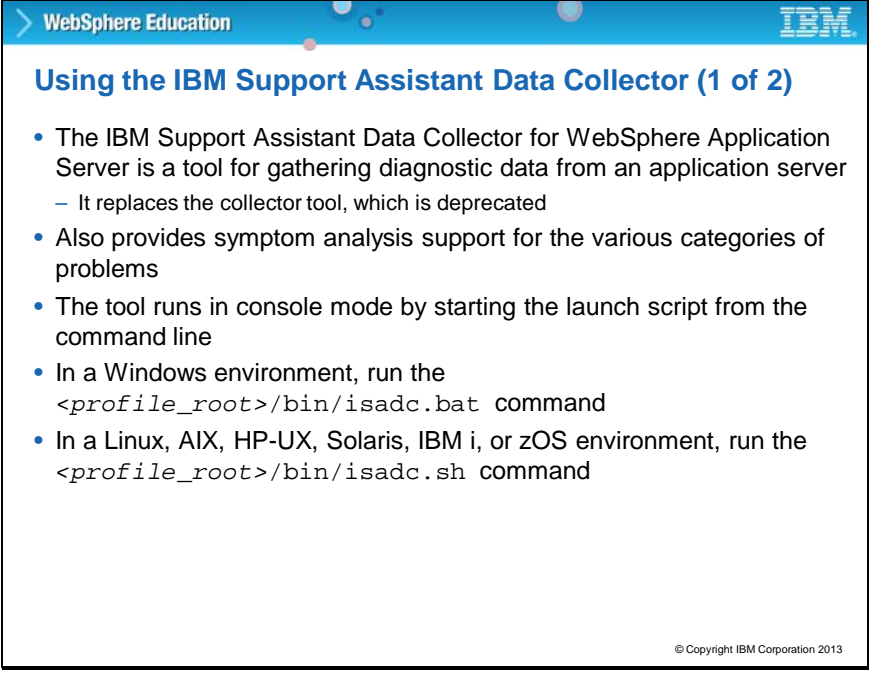
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Title: IBM Support Assistant 5.0 Beta: New features

IBM Support Assistant is provided with two deployment options to meet your needs:

If you have an existing WebSphere Application Server, you can install IBM Support Assistant as an enterprise application (EAR) module. Tools are provided as Java Platform, Enterprise Edition web modules.

IBM Support Assistant 5.0 Beta is also provided with an embedded server if you are looking for an all-in-one package that allows you to extract and go.



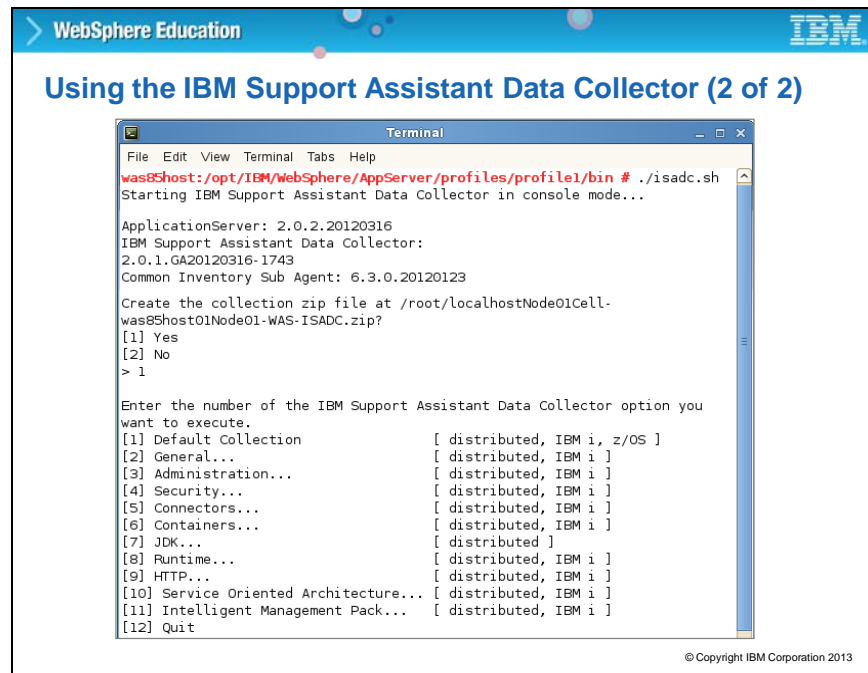
The slide is titled "Using the IBM Support Assistant Data Collector (1 of 2)" and is part of a WebSphere Education presentation. It lists five bullet points describing the tool's functionality and usage across different operating systems. The IBM logo is in the top right corner, and a copyright notice for 2013 is at the bottom right.

- The IBM Support Assistant Data Collector for WebSphere Application Server is a tool for gathering diagnostic data from an application server
 - It replaces the collector tool, which is deprecated
- Also provides symptom analysis support for the various categories of problems
- The tool runs in console mode by starting the launch script from the command line
- In a Windows environment, run the
`<profile_root>/bin/isadc.bat` command
- In a Linux, AIX, HP-UX, Solaris, IBM i, or zOS environment, run the
`<profile_root>/bin/isadc.sh` command

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Title: Using IBM Support Assistant Data Collector (1 of 2)

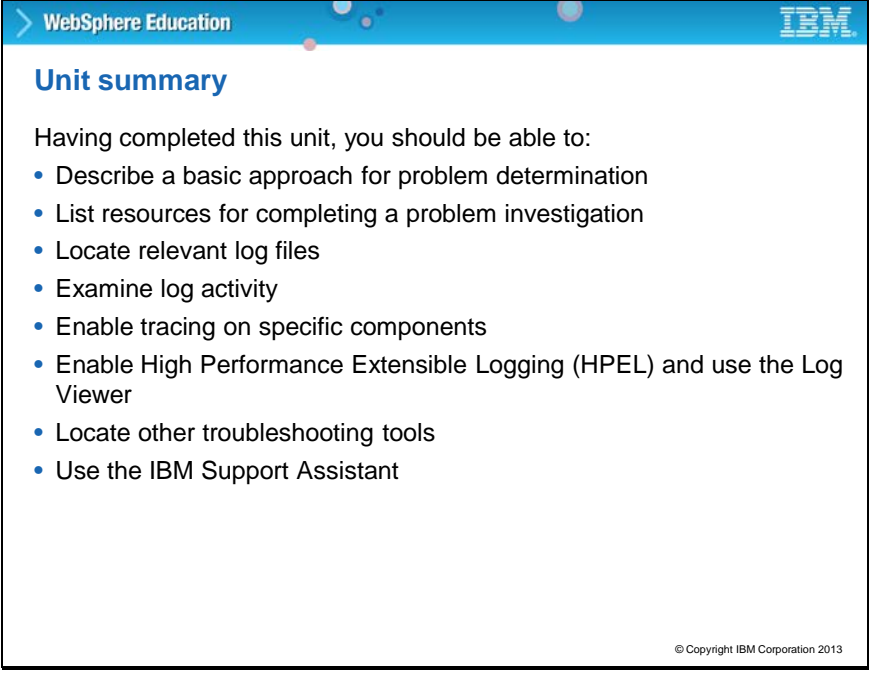
The IBM Support Assistant Data Collector for WebSphere Application Server tool focuses on automatic collection of problem data. It also provides symptom analysis support for the various categories of problems that by IBM software products encounter. Information pertinent to a type of problem is collected to help identify the origin of the problem under investigation. The tool assists customers by reducing the amount of time it takes to reproduce a problem with the proper RAS tracing levels set. Also, the tool helps customers by reducing the effort that is required to send the appropriate log information to IBM Support.



Title: Using IBM Support Assistant Data Collector (2 of 2)

Run the IBM Support Assistant Data Collector tool with the user ID for which you configured your WebSphere Server instance. Depending on what collector you are running, you might be asked for more information to complete the data collection activities. A script might require more configuration information, information about the sequence of events that leads up to the problem you are dealing with, or for your preferences about how it completes the collection. At each step, the choices are presented as numbered lists and you input the number of your selection and press the enter key. When input is required, prompts are displayed at which you enter your response and press the enter key. You can find collection details for each WebSphere Application Server problem type in their corresponding MustGather documents.

Slide 54



The slide is titled 'Unit summary' and is part of a WebSphere Education presentation. It lists the following learning objectives:

- Describe a basic approach for problem determination
- List resources for completing a problem investigation
- Locate relevant log files
- Examine log activity
- Enable tracing on specific components
- Enable High Performance Extensible Logging (HPEL) and use the Log Viewer
- Locate other troubleshooting tools
- Use the IBM Support Assistant

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Title: Unit summary

Having completed this unit, you should be able to:

- Describe a basic approach for problem determination
- List resources for completing a problem investigation
- Locate relevant log files
- Examine log activity
- Enable tracing on specific components
- Enable High Performance Extensible Logging (HPEL) and use the Log Viewer
- Locate other troubleshooting tools
- Use the IBM Support Assistant