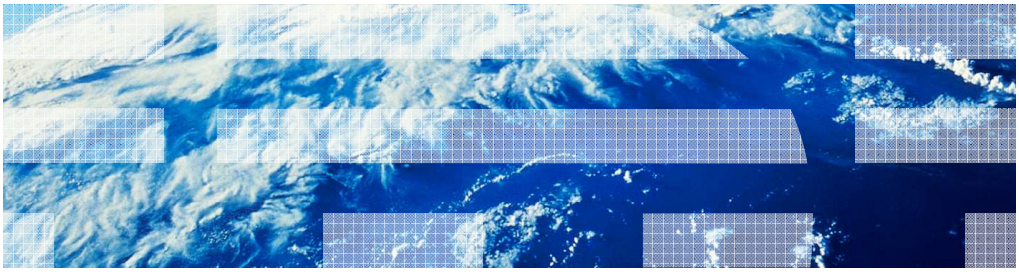
IBM WebSphere DataPower XC10 Appliance

Troubleshooting



WebSphere software

This presentation will discuss different aspects of problem determination in IBM WebSphere® DataPower® XC10 appliance.

Overview

- Troubleshooting
- Gathering log files
- Component logs in trace.zip
- Trace and audit
- Hardware and network
- Command line shell
- Summary

This presentation will discuss the different options available for problem determination.

Section

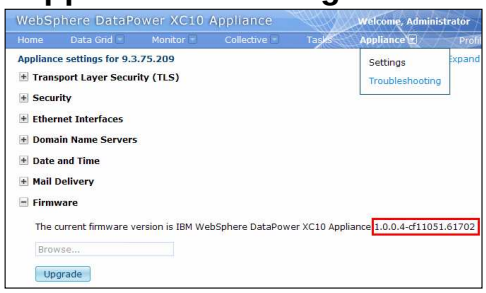
Troubleshooting

This section will discuss troubleshooting for the DataPower XC10 appliance.

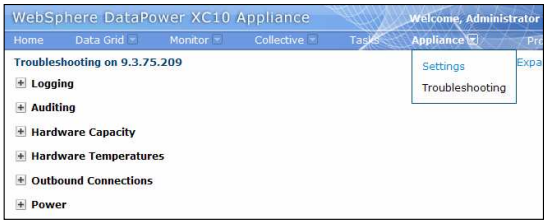
Troubleshooting categories – DataPower XC10 appliance

- If suspected problem is within DataPower XC10 (appliance or firmware)
  - Take snapshot if you see the error within DataPower XC10 administrative console
  - Report firmware level of appliance
    - **Appliance → Settings → Firmware**
  - Use troubleshooting tools to gather information
    - **Appliance → Troubleshooting**

Appliance → Settings → Firmware



Appliance → Troubleshooting



When troubleshooting problems that you suspect are related to the DataPower XC10 appliance, you should consider first taking a snapshot of the screen where the error becomes apparent and record the firmware level of the appliance, available from the **Settings → Firmware** menu. The next step typically involves using the **Troubleshooting** tools in the appliance administrative console. You can access the **Troubleshooting** page from the **Appliance** tab in the DataPower XC10 administrative console. The **Troubleshooting** page will allow you to gather more detailed information about the state of the DataPower XC10 appliance.

Troubleshooting categories – eXtreme Scale client

- If suspected problem is in the IBM WebSphere eXtreme Scale client software
  - Any issue – take snapshot of error if possible
  - WebSphere Application Server environment problems:
    - Use basic operating system diagnostic approach
    - Gather WebSphere Application Server logs
    - Install problems – gather logs: **<was_install_root>/logs/wxs_client/install**
  - Standalone client problems:
    - Java runtime logs
    - Helpful if you have a test application to re-create the problem
    - Install problems – gather logs: **<client_install_root>/logs/wxs_client/install**

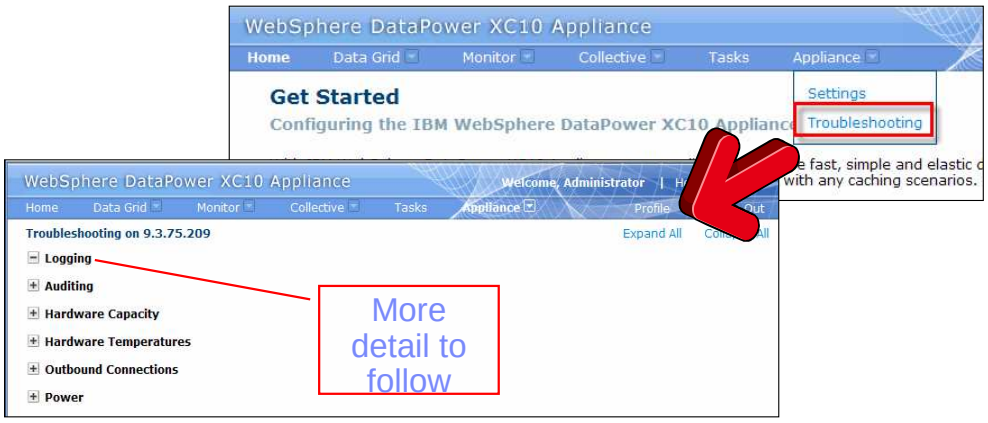
If the error occurs within a WebSphere eXtreme Scale client (either stand-alone or WebSphere), take a snapshot of the error if possible, or record the error message or symptoms you see. If the client software is installed in the WebSphere environment, then save a copy of the WebSphere Application Server logs.

For the stand-alone Java client environment, you might need to gather the client Java runtime logs. It is very helpful if you can provide a test application that re-creates the problem.

For installation problems, gather the eXtreme Scale client software installation logs, located in the WebSphere Application Server or client installation directory, within subdirectory logs/wxs_client/install.

DataPower XC10 Appliance troubleshooting

- **Troubleshooting** link in **Appliance** tab
  - Download and examine log and audit files
  - Review appliance memory and disk capacity and usage
  - Check appliance temperatures
  - Test network connections
  - Power off or restart the hardware



You can access the **Troubleshooting** page from the **Appliance** tab in the DataPower XC10 web console. The Troubleshooting page has several tools to help you diagnose appliance and network problems. You can download and examine log and audit files, review the appliance memory and disk capacity and usage, check internal appliance temperatures, test outbound connections, and power off or restart the appliance. The **Logging** topic is discussed in more detail in subsequent slides.

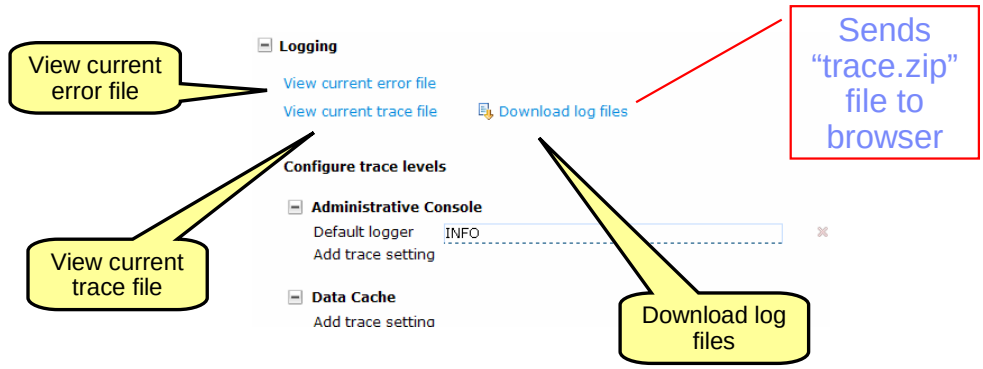
Section

Gathering log files

This section will discuss gathering log files for the DataPower XC10 appliance.

Logging – error, trace and log files

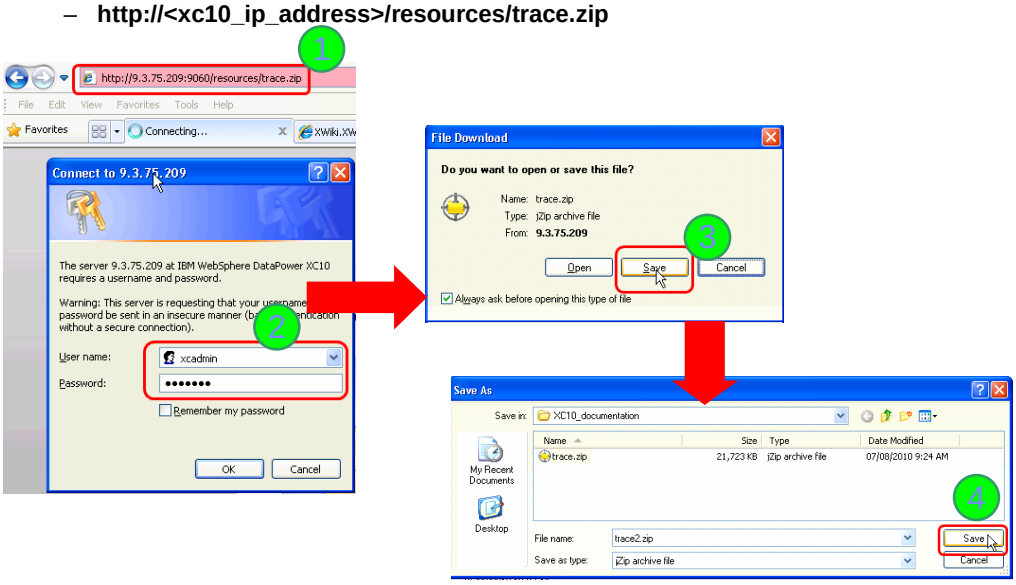
- **Appliance → Troubleshooting → Logging**
- View current error and trace file
  - Typically not as helpful as just downloading the entire set of log files
- Download log files
  - Log logs files are the most commonly needed documentation for support



Within the logging page, you have the option to view the current error file, view the current trace file and download the log files. You can also configure trace levels, as shown on a later slide. You can review the current error file or current trace file for obvious errors. For problems you submit to IBM support, you must provide the log files. You can download a complete set of log files from the appliance by clicking **Download log files**. This action temporarily suspends the processes on the appliance, gathers all the logs from all internal processes, and places them into a single "trace.zip" file. This file is then provided to the browser to store on your local computer.

Gathering logs if the web console is unavailable

- You can collect logs from the appliance if the web console is not working properly
  - **http://<xc10_ip_address>/resources/trace.zip**



The DataPower XC10 allows you to retrieve the appliance logs if the web console is not available. In your web browser, access the appliance with the URI shown on this slide. When prompted, provide an administrator's credentials and save the file to a location on your computer. The file size can range up to several hundred megabytes in some cases.

Gathering Java cores or heap dumps (V1 only)

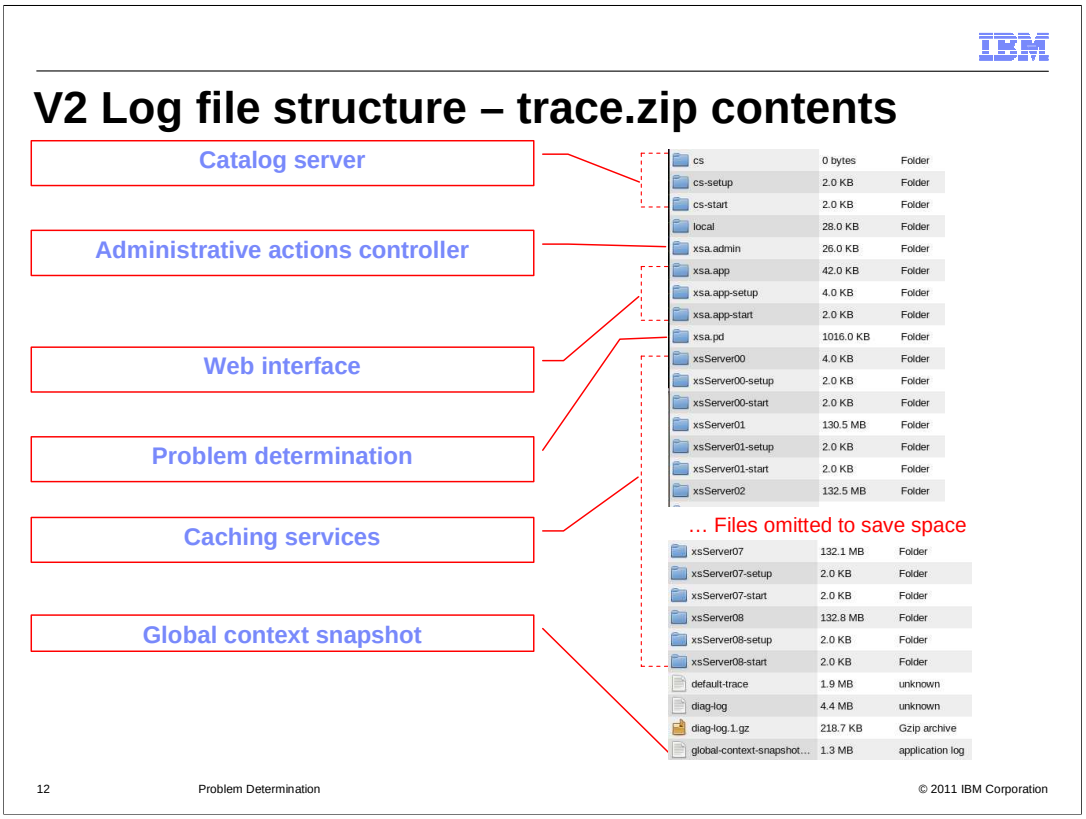
- Produce a Java core or heap dump using the web browser
  - Useful in the event that the web console is not responding
  - Locks the other processes and produces the trace.zip through your browser
  - **http://<xc10_ip_address>/resources/trace.zip?jdump**
    - produces Java core and then collect trace.zip
  - **http://<xc10_ip_address>/resources/trace.zip?jdump&hdump**
    - produces Java core and heap dump and then collect trace.zip

You can request Java cores or heap dumps using special browser URIs, as shown on this slide. The first example suspends all other processes, produces a Java core file, and then packages all files in a trace.zip file which is downloaded using the browser. The second example produces a heap dump along with the Java core within the trace.zip file. These requests are processed by the problem determination process and do not use the web console, so they can be used even when the web console is not responding.

Section

Component logs in trace.zip

This section will discuss the component logs found in the trace.zip file for the DataPower XC10 appliance.



After you've downloaded the trace.zip file onto your local computer, you can review the log files. The component logs include several pieces. The pieces included are the catalog server, a global context snapshot, the administrative actions controller, the web console, the problem determination process, and caching service processes. Other files are intended for IBM support and will be of minimal interest to system administrators.

Log file structure – trace.zip contents by function name

Here are the trace.zip log files organized by function name and importance. The log file name in bold letters in the left column are the more important logs to review.

Note that the CVS statistics files are a collection of files - one for JVM statistics, one for objectgrid statistics and one for statistics on the maps

Logs – Administrative actions controller – xsa.admin

- Process that performs many of the “actions” that are initiated on the DataPower XC10 appliance
  - Good place to start your review if no component is obvious
- Logs
  - **xsa.admin** – trace and error logs
  - xsa.admin_firstBoot.log – first boot success – typically very little information
  - xsa.admin_setup.log – file system setup messages
  - xsa.admin_start.log – process start messages – typically very little information
- Symptoms that might indicate an analysis of these logs is important
  - Failures in basic functionality
    - Actions hang
    - Áctions aren’t initiated
- Clues in these logs might lead into other component logs

The administrative actions controller log files are prefixed with “xsa.admin”. The actions controller perform many of the actions that are initiated on the DataPower XC10 appliance. The “xsa.admin” directory is a good place to start diagnosis if no specific component is apparent based on the problem symptoms. You should review these logs first if the symptoms are “actions that hang or aren’t completed” or “actions that don’t start”. Clues within these logs might point you to other components to investigate.

The “firstBoot”, “setup” and “start” logs are less important for general problem determination unless you experience problems during the first boot or starting the appliance.

Logs – Web interface – xsa.app

- Process that supports the graphical user interface for the DataPower XC10 appliance
- Logs
  - **xsa.app** – trace and error logs
  - xsa.app-setup – trace of setup operations for user interface
  - xsa.app-start – UI start command – typically very little information
- Symptoms that might indicate an analysis of these logs is important
  - Incorrectly formatted screens within the administrative console user interface
  - Failures, hangs, or slow response time within the web console
  - Monitor failures, monitor errors, or incorrectly formatted charting data

The web interface process files are prefixed with “xsa.app”. This process supports the web console for the DataPower XC10 appliance. Analyze these log files if the suspected problem affects the web console, such as incorrectly formatted screens, failures, hangs, or slow response in the web console, or problem with monitoring functions. Typically, the most important file to analyze is the “xsa.app” directory, which contains trace, error, and audit information.

Logs – Catalog server – cs

- Process that retain topology information for all the data cache containers
- Logs
  - **cs** – trace, ffdc, error, audit, and systemOut/SystemErr logs for catalog server process
  - cs-setup – file system setup messages
  - cs-start – catalog server start command - typically very little information
- Symptoms that might indicate an analysis of these logs is important
  - Inability to connect to the appliance from WebSphere Application Server or from an application
  - Data replication issues
  - Issues involving availability of data from data caches

The catalog server process files are prefixed with “cs”. This process supports the catalog server on the DataPower XC10 appliance. Analyze these log files if the suspected problem relates to issues associated with catalog server failures. Symptoms of catalog server failures include inability to connect to the appliance, data replication problems, or issues involving availability of data from data caches. Generally the most important file to analyze is the “cs” directory, which contains trace, error, ffdc, audit, and server SystemOut and SystemErr log information.

Logs – Caching service processes – xsServer*NN*

- Processs that perform the data caching function
  - Nine (9004) or 17(9005) of these processes are launched within each appliance
- Logs – ***NN*** ranges from “00” to “16”
  - **xsServer*NN***
    - trace, ffdc, error, audit and systemOut/systemErr logs for each caching service process
  - xsServer***NN***-setup - file system setup messages
  - xsServer***NN***-start - start command - typically very little information
- Symptoms that might indicate an analysis of these logs is important
  - Slow response times retrieving data
  - Hung or failing API calls
  - Review xsa.admin (actions controller) logs first to see if they point to one particular server process that has issues

The caching service process files are prefixed with “xsServer*NN*”, where *NN* ranges from 00 to 16 on 9005 hardware. These processes implement the caching service processes on the DataPower XC10 appliance. Analyze these log files if the suspected problem relates to issues associated with caching service process failures. Symptoms of caching service process failures include slow response times retrieving data or hung or failing API calls. Generally the most important file to analyze is the “xsServerNN” directory, which contains trace, error, ffdc, audit, and server SystemOut and SystemErr log information.

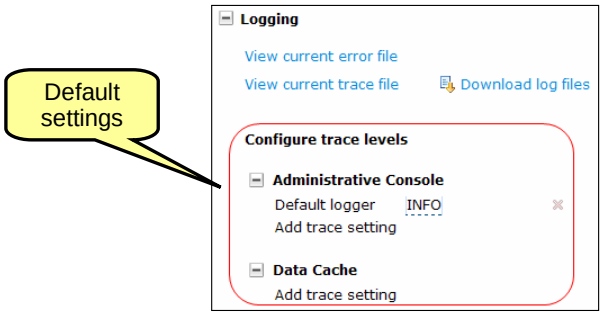
Section

Trace and audit

This section will discuss trace and audit settings for the DataPower XC10 appliance.

Trace

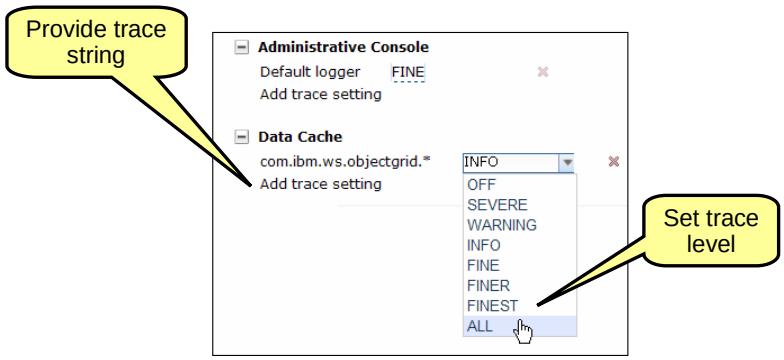
- **Appliance → Troubleshooting → Logging**
- Trace controls are below the log file controls, under **Configure trace levels** header
- Default trace settings are normally sufficient unless IBM support provides specific directions for tracing
- Default levels are shown below



The WebSphere DataPower XC10 includes a default logger for the web console and data caching service. The default log level setting is INFO as shown in this slide. You cannot modify the default level for data caching service. You should have specific instructions from IBM support before modifying the trace levels.

Trace caveats

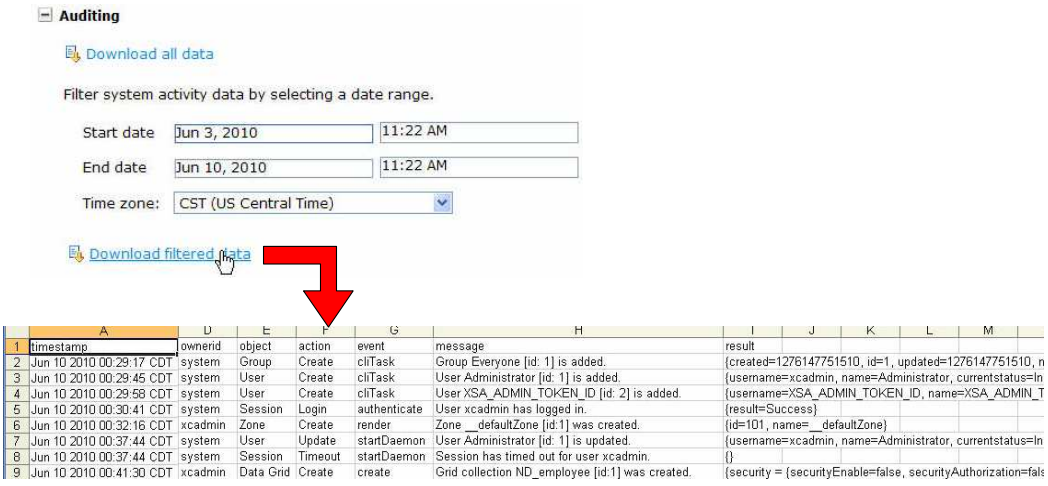
- Tracing can generate significant overhead
  - Do not enable unless you are advised to do so by IBM support
- 'Do not type "=all" at the end of the package name when specifying trace strings



To add a trace string you click **Add trace setting** under **Administrative console** or under **Data Cache**, and type the package name. Unlike other WebSphere products, you do NOT type any additional information after the package name, such as "=all". Instead, you select the granularity of the tracing with the pulldown to the right of the package name.

Auditing

- Gathers CSV data according to date/time range
- Shows activities occurring on the appliance



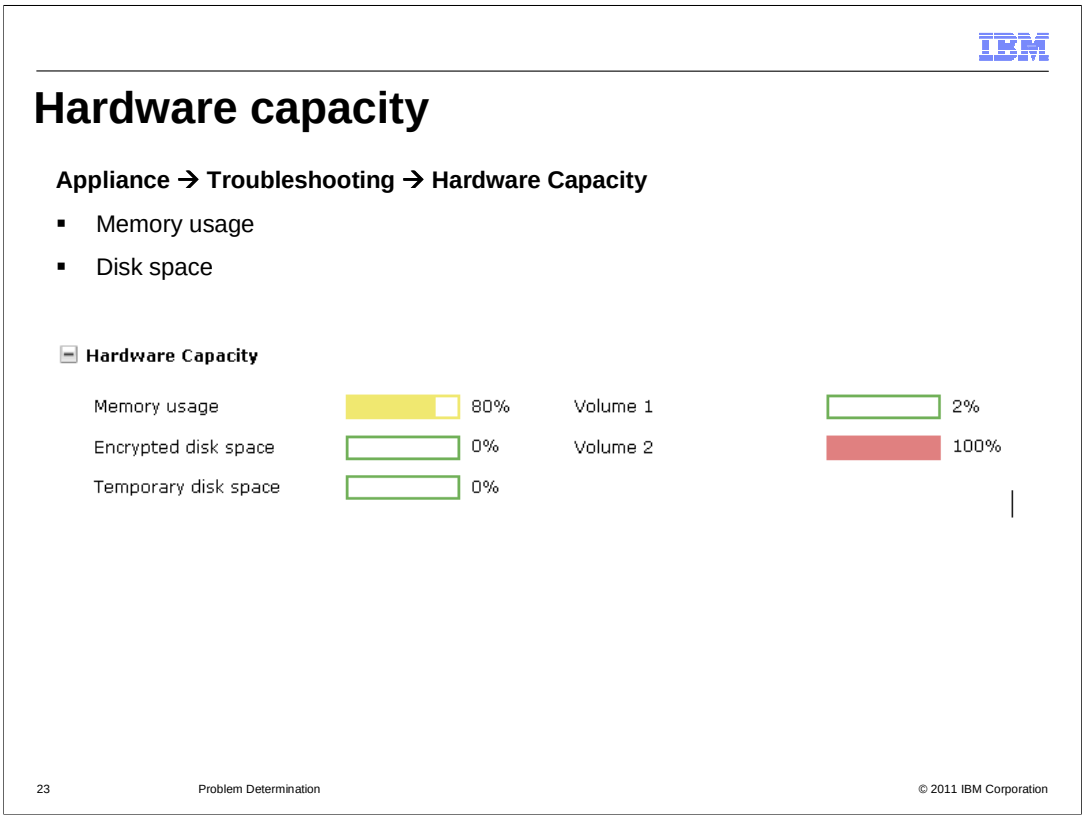
	A	D	E	F	G	H	I
1	timestamp	ownerid	object	action	event	message	result
2	Jun 10 2010 00:29:17 CDT	system	Group	Create	cliTask	Group Everyone [id: 1] is added.	{created=1276147751510, id=1, updated=1276147751510, n
3	Jun 10 2010 00:29:45 CDT	system	User	Create	cliTask	User Administrator [id: 1] is added.	{username=xcadmin, name=Administrator, currentstatus=In
4	Jun 10 2010 00:29:58 CDT	system	User	Create	cliTask	User XSA_ADMIN_TOKEN_ID [id: 2] is added.	{username=XSA_ADMIN_TOKEN_ID, name=XSA_ADMIN_T
5	Jun 10 2010 00:30:41 CDT	system	Session	Login	authenticate	User xcadmin has logged in.	{result=Success}
6	Jun 10 2010 00:32:16 CDT	xcadmin	Zone	Create	render	Zone __defaultZone [id:1] was created.	{id=101, name=__defaultZone}
7	Jun 10 2010 00:37:44 CDT	system	User	Update	startDaemon	User Administrator [id: 1] is updated.	{username=xcadmin, name=Administrator, currentstatus=In
8	Jun 10 2010 00:37:44 CDT	system	Session	Timeout	startDaemon	Session has timed out for user xcadmin.	{}
9	Jun 10 2010 00:41:30 CDT	xcadmin	Data Grid	Create	create	Grid collection ND_employee [id:1] was created.	{security = {securityEnable=false, securityAuthorization=fals

The audit data contains records of user activity for auditable objects stored on the appliance and events, such as when a user ID logs on, when a data cache was created, and when security was set or changed on various objects. Click **Download all data** to retrieve all audit data that exists on the appliance. Alternatively, set a date and time range, and then click **Download filtered data** to retrieve audit data within the specified date and time range. Audit data is provided as a comma separated variable (CSV) file.

Section

Hardware and network

This section will discuss hardware and network diagnostic information available from the DataPower XC10 appliance web console.



Hardware capacity shows you the memory usage and disk space statistics for the appliance. If the usage is below 80 percent, the graphs will display in green. If the usage is 80 percent or greater, the graphs will display in red. If the usage is unexpectedly high or critically high, you should open a problem to IBM support, including a snapshot of the screen image.

Hardware temperatures

Appliance → Troubleshooting → Hardware Temperatures

- Reports the temperature of internal components
  - A check mark in a green square indicates safe range
  - An exclamation mark on a yellow triangle indicates unsafe range
  - 9004 hardware

Hardware Temperatures

System 1	91.4°F	System 2	96.8°F
CPU package 1	98.6°F	CPU package 2	89.6°F
Memory 1	132.8°F	Memory 2	136.4°F
Memory 3	132.8°F	Memory 4	134.6°F

  - 9005 hardware

Hardware Temperatures

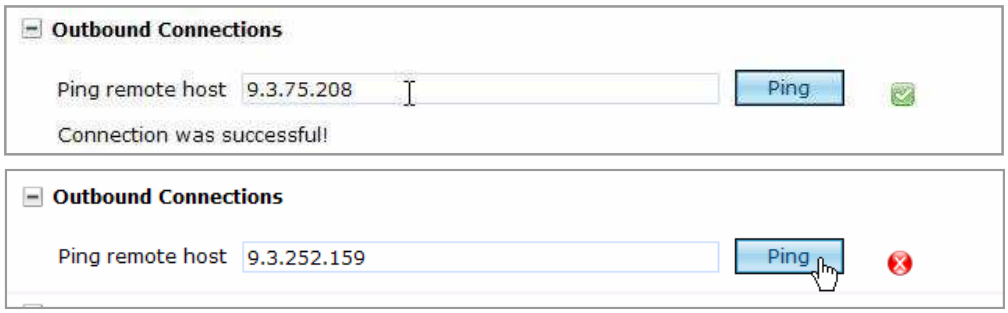
CPU package 1	87.8°F	CPU package 2	93.2°F
Inlet 1	75.2°F	Inlet 2	80.6°F
Outlet 1	79.5°F	Outlet 2	86.0°F
System ambient	78.8°F		

The **Hardware Temperatures** page shows the temperature of internal components within the DataPower XC10 appliance. The green check icon is displayed if the temperature is within the safe range, and the yellow exclamation mark icon is displayed if the temperature is outside the safe range.

Outbound connections

Appliance → Troubleshooting → Outbound Connections

- Test connectivity
  - Other appliances in collective
  - Back to clients
- Remember to ping the appliance from the client system as well
  - WebSphere Application Server
  - Stand-alone



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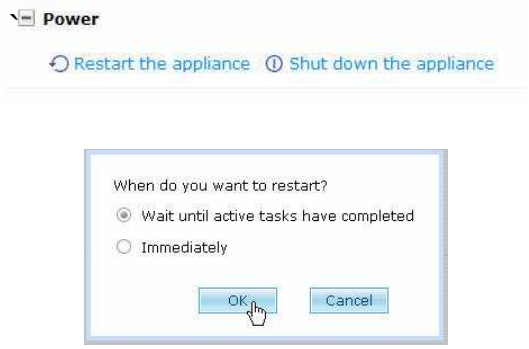
The **Outbound Connections** page allows you to ping a remote host using the IP address or using the host name. If the ping is successful, you will see a green box with a check mark to the right of the **Ping** button and a confirmation message as in the first example. If it is unsuccessful, you will see a red circle with an “X” to the right of the **Ping** button as in the second example. If you suspect a Domain Name Server issue or communication issue, you should also ping the appliance from the remote host as well, first using the appliance IP address and again using the appliance host name.

Power

Appliance → Troubleshooting → Power

- Allows you to restart or shut down the appliance
- Provides a delayed or immediate option for restart or shutdown



The Power administration options allow you to restart the appliance or to shut down the appliance. Both actions require confirmation so that the action is not accidentally invoked. You can have the action occur immediately, or the action can be delayed until all current appliance tasks have completed.

Section

Command line shell

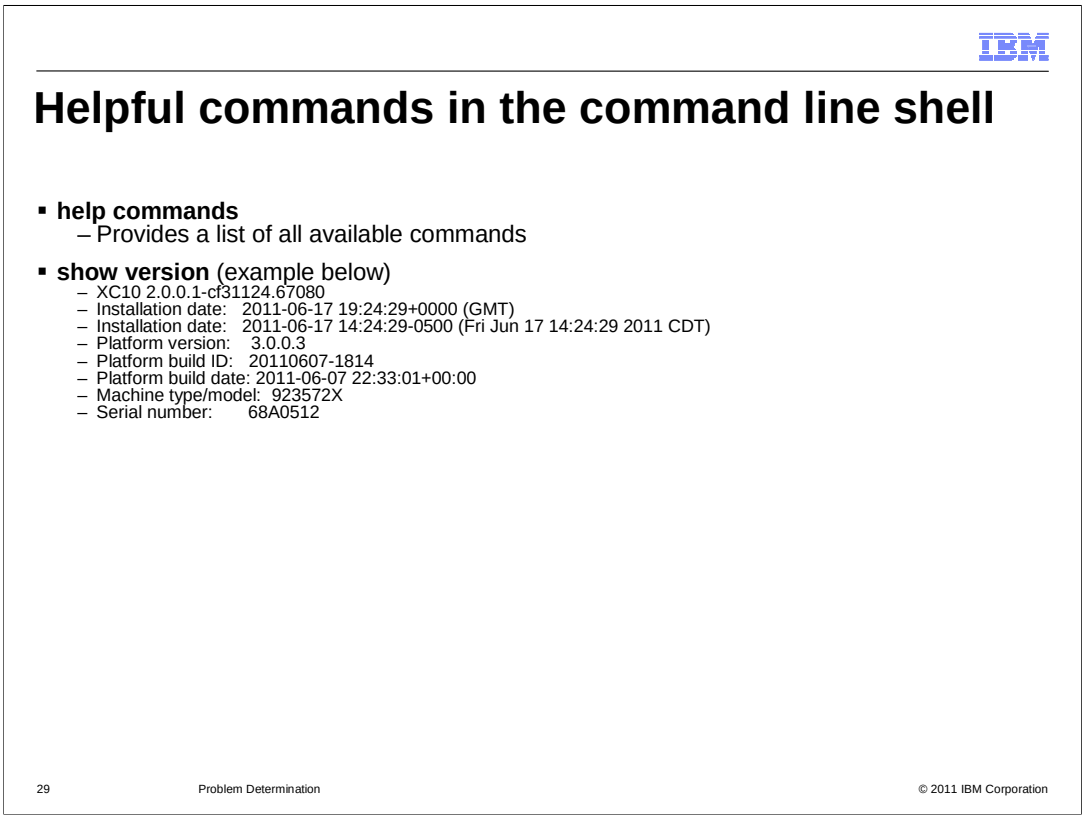
This section will discuss some of the troubleshooting commands available through the DataPower XC10 appliance command line shell.

SSH sessions

- Use OpenSSH, putty, or similar facility to open a remote session to the appliance
  - Example1: **ssh –l xcadmin <my.appliance.host.name.com>**
  - Example2: **ssh xcadmin@<appliance_ip>**
  - After initiating the session as xcadmin, login with the administrator password
  - Successful logon places you in a command-line shell

```
$ ssh xcadmin@myxc10.aimcp.ibm.com
password: *******
Last login: Wed Jul 13 09:32:49 CDT 2011 from
dyn19216803.austin.ibm.com on pts/0
Welcome to WebSphere Datapower XC-10 Appliance
Console>
```


The DataPower XC10 appliance provides the ability to connect remotely through telnet or SSH. You must authenticate using the “master” administrator user ID: xcadmin. A successful login places you in a command line console “shell” from which you can administer the appliance. The same commands that are available through the serial console connection session are available in the remote console.



The **help commands** command will provide you a list of available commands. Not all of them are necessarily intended for customer use.

The **show version** command displays the firmware level and installation date for the appliance, along with the machine type an serial number.

Helpful commands in the command line shell

- **start-progress**
  - Shows the progress of the appliance startup in percentages
  - Useful after a firmware upgrade since appliance is “silent” for about 10 minutes after an upgrade
  - Message **”STARTED”** means the appliance is ready for use
- **clear-all** – use with caution
  - Clear all data cache information from the appliance and restarts all caching services
  - Is not a reboot; the appliance operating system remains running
  - IP configuration information for the appliance stays intact
  - Does not reset xcadmin user password
- **device RESET** – use with caution
  - Upper case RESET is required
  - Performs same function as clear-all,
  - Puts the appliance in “factory ship” state”
  - After completion, requires serial console action to place the appliance on the network

The **start-progress** command shows the progress of the appliances startup in percentages. This command shows “STARTED” when the caching services are fully initialized and the web console is ready for login.

The **clear-all** command should be used with caution, since it removes all data cache information from the appliance and restarts all caching services. The command does not reset the IP information.

The **device RESET** command should be used with caution, since it performs the same functions as **clear-all** plus it also resets IP information, license acceptances, and administrator password. The appliance is placed in “factory ship” state and thus requires serial console customization before it can be active on a network again.

Diagnostic commands: collect-pd, must-gather

platform collect-pd *<PDfilename>*

- used to capture data for problem determination
- By default it places the output into file **collect-pd.txt**

platform must-gather <tarfilename> [<PDfilename>]

collect-logs <tarfilename> [<PDfilename>]

- Invokes *platform collect-pd* before creating the output tar file
- creates a compressed tarfile (".tgz") containing system logs and trace files
  - Example:
    - *platform must-gather* ***logs.tgz***
    - *collect-logs logs.tgz*
- ***clear-logs***
  - Deletes all appliance logs

The ***platform collect-pd*** command creates a text file containing appliance configuration and status information. By default it places the output into a file called **collect-pd.txt**, but you can specify a different file name on the command invocation. This file contains output from appliance status commands and network configuration details. Some information in the generated file represents internal operational details and is intentionally obfuscated.

The ***platform must-gather*** command creates a compressed tar file which includes appliance trace and log files. The name of the output tar file must be specified on the command invocation. This command issues the ***platform collect-pd*** command before creating the tar file, and the generated problem determination information is included in the tar file. The V1 firmware command **collect-logs** is deprecated and replaced by ***platform must-gather***.

If an appliance has been running for a long period of time the logs files can be extremely large. Even compressed the must gathers can exceed one gigabyte in size. The DataPower XC10 V2 firmware includes the command ***clear-logs*** which resets all of the log files to zero length.

Network diagnostic commands

- net-test
  - provides some diagnostics to test the network
- net-test ping <*host*>
  - Ping the specified machine specified with its name or IP address

```
Console> net-test ping aimcp158.austin.ibm.com
  Ok
```

- net-test dns <*host*>
  - Does a DNS lookup of the specified host and returns it IP address

```
Console> net-test dns aimcp140.austin.ibm.com
  9.3.75.140
```

- net-test tcp <*host*> <*port*>
  - Tries to open a TCP connection on the specified port number to the host

```
Console> net-test tcp aimcp140.test.ibm.com 9060
  Ok
  Console> net-test tcp aimcp140.test.ibm.com 9061
  connection failed:  Connection refused
```

- net-test available
  - Tests if any NIC sees carrier

```
Console> net-test available
  Network available
```


The DataPower XC10 V2 command line interface provides ***net-test*** commands which provide diagnostics to test the network and connectivity of the appliance.

The ***ping host*** subcommand ping the specified host name or IP address.

The DataPower Xc10 must be able to resolve client host names through DNS lookups. The ***net-test dns*** subcommand performs a DNS lookup of the specified host and returns its IP address.

The subcommand ***net-test tcp*** will attempt to open a socket to the specified host and port. This command can be useful to find out if a firewall is blocking communication between appliances in a collective.

The subcommand **net-test available** tests if *any* of the enabled network interface cards see a carrier.

Other commands are available for reviewing and modifying you appliance's network configuration. These commands are covered in more detail in the command line Interface presentation.

Section

Summary

This section will summarize the problem determination for the DataPower XC10 appliance.

Summary

- Problem Determination
- Troubleshooting
- Gathering log files
- Component logs in trace.zip
- Trace and audit
- Hardware and network
- Command line shell
- Summary

Problem determination requires you to investigate to see if a suspected problem is within the appliance, in the network environment, or with other software. Other software can include the WebSphere eXtreme Scale client software, WebSphere Application Server, or the stand-alone Java environment.

If the issue is suspected to be on the appliance, you can use the troubleshooting menu to gather information about the appliance's current state. The most important tool is typically the log files from the appliance. You saw several ways to gather the log files, including how to gather Java cores and heap dumps. The more important component log files within trace.zip are the administrative actions controller, web interface, catalog server and caching service process log files. You saw how to set a trace string if requested by IBM support.

And finally, you saw some helpful diagnostic commands available from a remote command line shell.

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