HP Customer Experience Assurance V4.5

Administration and Troubleshooting Guide

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HP Customer Experience Assurance V4.5 is an OEM of the FlowSight application Release 4.5 from Zhilabs S.L. This document may contain references to FlowSight (e.g. in figures) which is the same application as HP Customer Experience Assurance.

Contents

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1 Introduction

The HP CEA Administration Manual provides information about setting up and managing HP CEA platform and applications.

1.1 Who Should Use This Manual

This guide is intended for anyone who is interested in setting up and managing HP CEA platform and applications. Experience using SUSE Linux Enterprise Server or another Linux version is recommended.

1.2 How this Manual is Organized

The following table contains the chapters in this document:

Table 1: Organization of the manual

Chapter	Description
Chapter 1. Introduction	Current chapter.
Chapter 2. HP CEA Overview	Provides an overview of HP CEA and its features and benefits. It also covers some basic concepts and terminology.
Chapter 3. Getting Started	This chapter provides step-by-step instructions on setting up simple HP CEA configurations.
Chapter 4. HP CEA Basic Operation	Basic operations performed from SLES command-line interface.
Chapter 5. Users and Permissions	Handle privacy and user preferences.
Chapter 6. JDBC Console	Basic functionality of the main administration tool: jdbcnsl.
Chapter 7. Advanced Tools	Additional tools for HP CEA administration.
Chapter 8. Log Files	This chapter provides information about how to follow log info.
Chapter 9. Administration	Operations to administrate HP CEA.
Chapter 10. Troubleshooting	Basic troubleshooting.

1.3 Related Documents

Related information about general HP CEA topics can be found in the following documents:

- HP CEA 4.5 Installation Guide

- HP CEA 4.5 Deployment Guide
- HP CEA 4.5 MBBQoE User Guide

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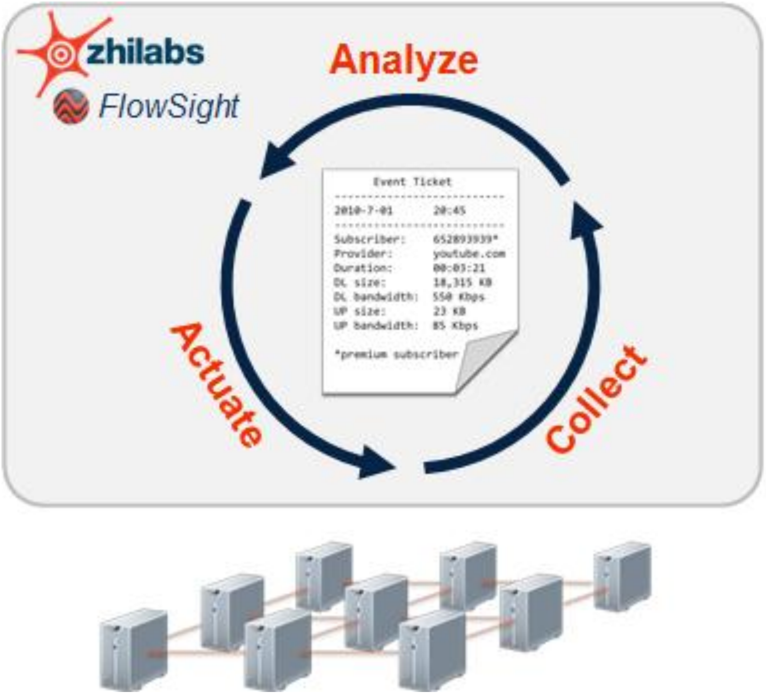
2 HP CEA Overview

HP CEA is an analytic platform extremely scalable and distributed for real-time based applications which need to collect, analyze and actuate on events.

HP CEA platform allows solutions for different domains, such as:

- HP CEA for Network Intelligence
- HP CEA for Customer Intelligence
- HP CEA for Customer Experience



```
      Event Ticket
-----------------------------
2010-7-01       20:45
-----------------------------
Subscriber:     652893939*
Provider:       youtube.com
Duration:       00:03:21
DL size:        18,315 KB
DL bandwidth:   550 Kbps
UP size:        23 KB
UP bandwidth:   85 Kbps

*premium subscriber
```

Figure 1. HP CEA high-level view.

3 GETTING STARTED

This chapter provides step-by-step instructions on setting up simple HP CEA configurations. By the end of this chapter, you should have a basic idea of how the HP CEA commands work. This chapter is not designed to be a comprehensive overview and refers to later chapters for more detailed information.

The following sections are provided in this chapter:

- Directory Layout
- Program files
- Base configuration files
- Create a basic configuration with one peer
- Create a basic configuration with multiple peers in one machine
- Create a basic configuration with multiple peers in multiple machines

For HP CEA Hardware and Software Requirements and Recommendations please check document HP CEA Installation Manual Release 4.5

For specific command syntax check HP CEA User Guide Release 4.5.

3.1 DIRECTORY LAYOUT

HP CEA application software package is installed in */opt/zl* directory tree and it contains the following directories:

Table 2: HP CEA directory layout

Directory Name	Description
/opt/zl/nwi	Root directory for nwi application
/opt/zl/wizard	Root directory for wizard application
/opt/zl/etc	Template files generated for the wizard
/opt/zl/gui	GUI application
/opt/zl/nwi/bin	HP CEA executables and scripts
/opt/zl/nwi/lib	HP CEA libraries
/opt/zl/nwi/var	Variable data files
/opt/zl/nwi/etc	Configuration files
/opt/zl/nwi/doc	Documentation

Commands and library directories won't have to be modified except during software installation or upgrades.

Variable data files directory usually contains the storage data, except when storage location is changed from out-of-the box HP CEA installation configuration.

Configuration files and definitions should only be manipulated by HP CEA administrators or integrators, not the final users of the system.

3.2 PROGRAM FILES

This following table describes the basic program files needed to operate the system.

Table 3: HP CEA basic program files

Script or executable	Name	Description
/etc/init.d/zen-nwi	Init zen script for nwi	Basic operation script to start/check/stop HP CEA nwi.
/etc/init.d/zen-wizard	Init zen script for wizard	Basic operation script to start/check/stop HP CEA wizard.
/opt/zl/nwi/bin/zen	Zen executable (nwi)	Main HP CEA NWI executable file.
/opt/zl/wizard/bin/zen	Zen executable (wizard)	Main HP CEA Wizard executable file.

3.3 BASE CONFIGURATION FILES

Some configuration files contain base commands needed for HP CEA. The following table describes the more relevant:

Table 4: HP CEA base configuration files

Script or executable	Name	Description
/etc/sysconfig/zen-nwi	Startup configuration for nwi	HP CEA startup configuration when using init script
/etc/sysconfig/zen-wizard	Startup configuration for wizard	HP CEA startup configuration for wizard when using init script
/opt/zl/nwi/etc/flowsight-standalone.cfg	NWI main configuration file	Configuration file that defines all peers.
/opt/zl/wizard/etc/flowsight-standalone.cfg	Wizard main configuration file	Configuration file that defines all zen peers for the wizard.

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4 HP CEA BASIC OPERATION

This chapter will describe the HP CEA operation commands.

The following table describes the commands in this chapter:

Table 5: Basic HP CEA commands

Command	Brief Description
/etc/init.d/zen-nwi start	Start HP CEA in a local machine, connecting to the zen cluster according to the configuration.
/etc/init.d/zen-wizard start	Start Wizard in a local machine, connecting to its zen cluster according to the configuration
/etc/init.d/zen-nwi stop	Stop HP CEA in local machine, including all local peers.
/etc/init.d/zen-wizard stop	Stop Wizard in local machine, including all local peers.
/etc/init.d/zen-nwi status	Retrieves HP CEA status from local machine.
/etc/init.d/zen-wizard status	Retrieves Wizard status from local machine.

4.1 ADMINISTRATION USER

Operation commands can only be executed with *zhilabs* administration user or super-user. Other users are not allowed to perform such commands.

It is strongly recommended to login as *zhilabs* and avoid using super-user unless strictly necessary.

Additional administration users can be added to a HP CEA installation by adding them to group *zhilabs*.

Zhilabs administration user and group are created during installation process. Check HP CEA Installation Manual Release 4.5 for further detail on such procedure.

4.2 STARTING HP CEA

To manually start HP CEA in a local installation user *zhilabs*, or any other user from *zhilabs* group, has to issue the following command:

```
$ /etc/init.d/zen-nwi start
Starting zen                                                              done
```

Command return value will indicate whether the command successes (0) or failed (different than 0).

HP CEA is started automatically in server startup procedure, since it is configured from installation.

```
$ /sbin/chkconfig zen-nwi
```

```
zen      on
```

It is hardly recommended to change this setting since it would force to issue a manual HP CEA startup command in case of an eventual system reboot do to a failure or maintenance procedures.

The procedure for the wizard is exactly the same.

4.3 STOPPING HP CEA

To manually stop HP CEA in a local installation user *zhilabs*, or any other user from *zhilabs* group, has to issue the following command:

```
$ /etc/init.d/zen-nwi stop
Stopping zen                                                          done
```

Command return value will indicate whether the command successes (0) or failed (different than 0).

The same procedure can be followed to stop zen-wizard.

To stop HP CEA and avoid losing data, please refer to section Stopping HP CEA.

4.4 CHECKING HP CEA STATUS

To manually check HP CEA status in a local installation any user can issue the following command:

```
$ /etc/init.d/zen-flowsight status
Checking for service zen                                              done
```

Check status with checkproc(8), if process is running command will return with exit status 0.

Return value is slightly different from previous commands:

- # 0 - service up and running
- # 1 - service dead, but /var/run/ pid file exists
- # 2 - service dead, but /var/lock/ lock file exists
- # 3 - service not running (unused)
- # 4 - service status unknown

If 1 or 2 is returned it means HP CEA is dead. Check the log files for a possible cause, and remove the stale lock or pid file before restarting HP CEA again.

If 4 is returned from the checkproc command, check if all HP CEA’s processes are still running and restart the application if they are not.

The return code 3 is not used at the moment.

5 Users And Permissions

HP CEA handles authentication by means of the association of groups of permissions to groups of users.

The list of permissions currently configurable by HP CEA is:

Table 6: HP CEA permissions.

Permission type	Permission value	Description
Subscriber	gui-subscriber-all	Subscriber information level available from user interface
Search	gui-search-all	Level of information available in search results
Reports	gui-reports-all gui-all-reports-viewer-all	Selection of report classes available to the user
Event viewer	gui-event-viewer	Whether event viewer is available in the user interface
Report definition	gui-report-definition-all	Whether this user can define new reports
Management	gui-mgmt-all	Enables management screen
Dashboard	gui-composer-all	Enables dashboard composer screen
Denominators	gui-denominator-shared-viewer-all	Enables denominators and shared buttons in SDDT.
PDF/CDF	gui-pdf-cdf-viewer-all	Enables PDF/CFD buttons in SDDT
Formulas	gui-formula-viewer-all	Enables report select fields visibility

The configuration of such permission and its association to HP CEA user roles can be performed in different ways depending on the system configuration.

If the system is configured to perform user authentication via console, all user access to the system, even via GUI, is controlled by plain configuration files, combining users and user-groups definitions with the permissions from the previous table. See section 5.1 for more details on this option.

On the other hand, if the system is configured to perform user authentication via table, the user access to the GUI is configured and controlled in the Admin Console from the GUI, accessible to

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HP CEA administrator users, identified by the /authentication/admin authentication group. See section 5.2 for this configuration option.
The identification of the administrator users is always controlled in configuration files.

5.1 Configuration File Example

The following configuration example shows an hypothetic scenario with different user groups which have very clear differences between users of those groups, namely:

- Executive users: With access to reports with all sensible data obfuscated.
- Marketing Department users: Can define reports with all sensible data obfuscated as well.
- CRM users: Can access to all subscriber related information with sensible information related to content such as URLs obfuscated for privacy reasons.
- Network operation users: Can define reports with subscriber related data obfuscated for privacy reasons.

```
# executive users and permissions
authentication-group /authentication/executive
        permissions /permissions/executive
        user executive pwd 33c6b7
!
permissions /permissions/executive
        permission gui-reports-all
        permission gui-obfuscate-all
!
# marketing department users and permissions
authentication-group /authentication/marketing
        permissions /permissions/marketing
        user marketing pwd 20c513
!
permissions /permissions/marketing
        permission gui-reports-all
        permission gui-report-definition-all
        permission gui-denominator-shared-viewer-all
        permission gui-pdf-cdf-viewer-all
!

#crm users group
authentication-group /authentication/crm
        permissions /permissions/crm
        user crm pwd 821a40
!
```

```
permissions /permissions/crm
        permission gui-subscriber-all
        permission gui-search-all
        permission gui-reports-all
        permission gui-event-viewer
!

# network operation users and permissions
authentication-group /authentication/network
        permissions /permissions/network
        user network pwd ac5089
!
permissions /permissions/network
        permission gui-search-all
        permission gui-reports-all
        permission gui-event-viewer
        permission gui-report-definition-all
!
```

5.2 ADMIN CONSOLE

The Admin Console is located in the top bar menu of the GUI, and it is visible only to the administrator users (although this is configurable as shown in section 5.1).

This menu launches a screen that allows the administrators to manage the users that have access to the system and to edit some properties of the defined reports.

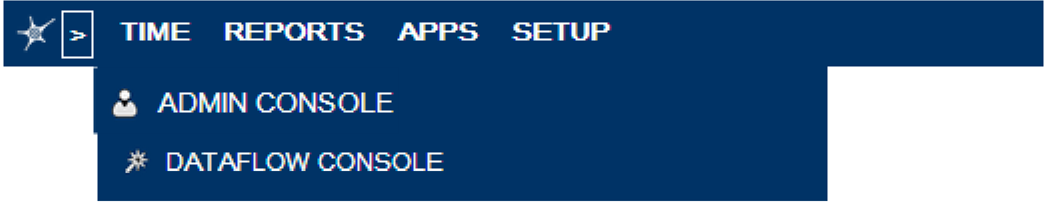
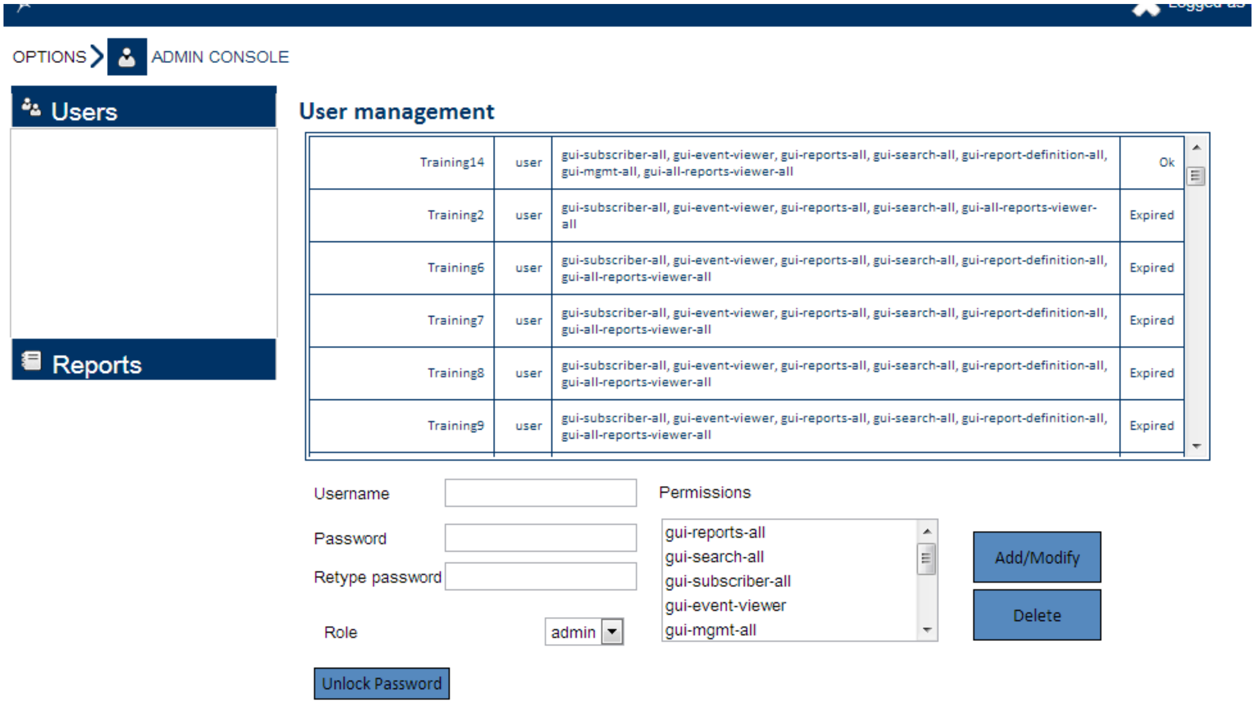


Figure 2: Admin console

5.2.1 USER MANAGEMENT

This functionality gives to the administrator the opportunity to control which users can access the system, control their permissions and change their passwords. It also allows creating new users and deleting existing ones too.



User management

Training14	user	gui-subscriber-all, gui-event-viewer, gui-reports-all, gui-search-all, gui-report-definition-all, gui-mgmt-all, gui-all-reports-viewer-all	Ok
Training2	user	gui-subscriber-all, gui-event-viewer, gui-reports-all, gui-search-all, gui-all-reports-viewer-all	Expired
Training6	user	gui-subscriber-all, gui-event-viewer, gui-reports-all, gui-search-all, gui-report-definition-all, gui-all-reports-viewer-all	Expired
Training7	user	gui-subscriber-all, gui-event-viewer, gui-reports-all, gui-search-all, gui-report-definition-all, gui-all-reports-viewer-all	Expired
Training8	user	gui-subscriber-all, gui-event-viewer, gui-reports-all, gui-search-all, gui-report-definition-all, gui-all-reports-viewer-all	Expired
Training9	user	gui-subscriber-all, gui-event-viewer, gui-reports-all, gui-search-all, gui-report-definition-all, gui-all-reports-viewer-all	Expired

Username

Password

Retype password

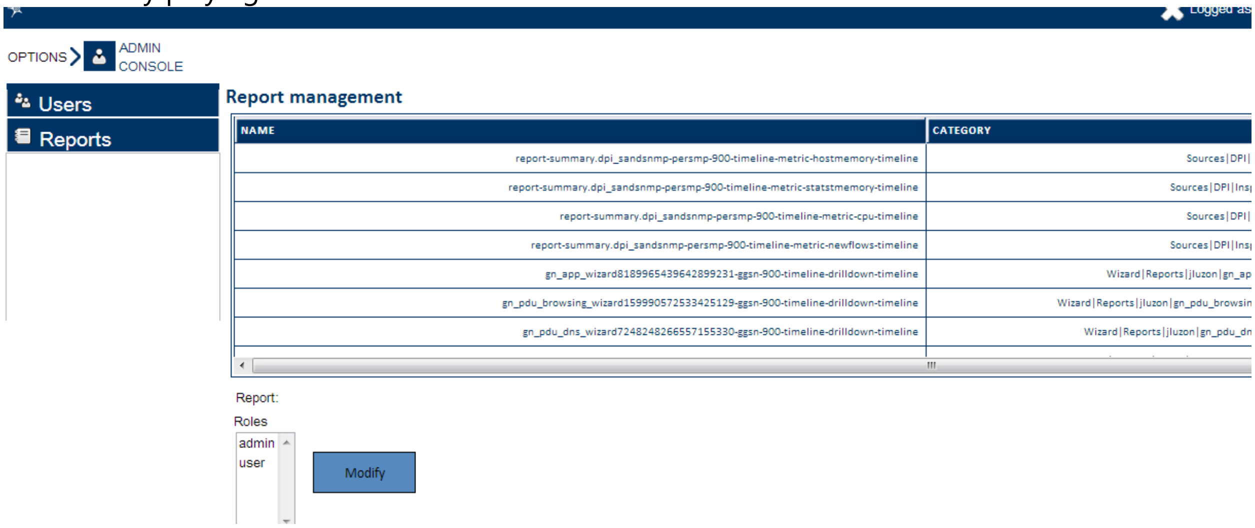
Role admin

Permissions
gui-reports-all
gui-search-all
gui-subscriber-all
gui-event-viewer
gui-mgmt-all

Figure 3: Admin console, user management

5.2.2 Report Management

In the same way as the *user management*, through this panel the administrator is able to control the existing reports by restricting their visualization to the desired subset of users. This can be achieved by playing with the available roles.



Report management

NAME	CATEGORY
report-summary.dpi_sandsnmp-persmp-900-timeline-metric-hostmemory-timeline	Sources|DPI|
report-summary.dpi_sandsnmp-persmp-900-timeline-metric-statstmemory-timeline	Sources|DPI|Ins
report-summary.dpi_sandsnmp-persmp-900-timeline-metric-cpu-timeline	Sources|DPI|
report-summary.dpi_sandsnmp-persmp-900-timeline-metric-newflows-timeline	Sources|DPI|Ins
gn_app_wizard8189965439642899231-ggsn-900-timeline-drilldown-timeline	Wizard|Reports|jluzon|gn_ap
gn_pdu_browsing_wizard1599905725334 25129-ggsn-900-timeline-drilldown-timeline	Wizard|Reports|jluzon|gn_pdu_browsin
gn_pdu_dns_wizard7248248266557155330-ggsn-900-timeline-drilldown-timeline	Wizard|Reports|jluzon|gn_pdu_dn

Report:

Roles
admin
user

Figure 4: Admin console, report management

6 JDBC CONSOLE

Jdbcnsl is a datastore command-line console using JDBC interface and SQL-like commands. For further details in HP CEA datastore infrastructure and interfaces please review HP CEA Programming Guide Release 4.5 manual.

6.1 COMMAND-LINE INTERFACE

The command to access to HP CEA with jdbcnsl console is:

```
jdbcnsl URL [-batch CMD-FILE] [USERNAME[:PASSWORD]] [PROPERTY=VALUE ...]
```

Where:

Table 7: Jdbcnsl connection parameters

Parameter	Mandatory	Description	Default Value
URL	yes	URL is of the form jdbc:zstore://host[:port]/database	Default port is 1974
CMD-FILE	no	The name of the file containing the commands to be executed in batch mode.	
USERNAME	yes	The username to connect to the datastore with. If username is not provided via command parameter, it is interactively requested to the user.	
PASSWORD	yes	The username's password. If password is not provided via command parameter, it is interactively requested to the user.	
PROPERTY=VALUE	no	Allows the user to provide additional arguments to the driver (e.g. "pool-size=10" will open 10 connections against the DB). There can be as many attribute-value pairs as desired.	

Possible properties include:

Table 8: Jdbcnsl connection properties

Property	Brief Description

pool-size	Number of connections in pool when in pooled mode. The connection is considered as pooled if the number of connections is greater than 1.
chunk-size	The maximum number of records fetched in every chunk while iterating with the rset.next() method.
max-prepared-statements	Maximum number of prepared statements to be kept in memory.
login-timeout	The maximum timeout for connection and login (in msecs).
read-timeout	The maximum timeout for read operations from the datastore (in msecs). If the timeout occurs, the connection is considered as invalid and marked as closed/recoverable.

Login sequence looks like:

```
zhilabs@GUI:~> /opt/zl/nwi/bin/jdbcnsl  jdbc:zstore://localhost:1999//m0/zen5/zstore-frontend
=============================================================
Zhilabs JDBC Console

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=============================================================




username: admin
password:
jdbcnsl>
```

The JDBCNSL tool needs an environment variable to function properly. This variable is called ZE_ROOT and should point to the installation path. It can be set via an export command.

```
zhilabs@GUI:~> export ZE_ROOT=/opt/zl/nwi
```

Or as an invocation only assignation:

```
zhilabs@GUI:~> ZE_ROOT=/opt/zl/nwi  /opt/zl/nwi/bin/jdbcnsl  jdbc:zst....
```

6.2 JDBCNSL COMMANDS

The following chapters explain all the commands for jdbcnsl.

6.2.1 CLEAR

This command *clears* the screen for jdbcnsl.

6.2.2 DELETE […]

This command executes the *Delete* statement. The parameters are SQL-like. Some examples include:

```
DELETE FROM table WHERE key = value
DELETE (col1, col2) FROM table WHERE key = value
```

6.2.3 DESCRIBE TABLE

This command *describes* the table, meaning that all columns defined for the table will be shown. An example can look like this:

```
jdbcnsl> describe index.gui-user-credentials
TABLE-NAME                    TABLE-TYPE
index.gui-user-credentials       TABLE

COLUMN-NAME                                  TYPE-NAME  PK
field:report.last-valid-login               STRING     FALSE
field:report.passwords                      STRING     FALSE
field:report.permissions                    STRING     FALSE
field:report.retries                     INT        FALSE
field:report.roles                       STRING     FALSE
report.username                            STRING     TRUE
timestamp                                TIMESTAMP  FALSE
```

6.2.4 DISCONNECT

This command is used to *disconnect* from the JDBC server and exit the *jdbcnsl* application.

6.2.5 EXECUTE FILE *FILENAME*

This command executes the orders in the *filename* file and produces the output on jdbcnsl. The orders must be defined on its line, and they will be executed one after the other. An example of a file follows:

```
$ cat orders.batch
describe index.gui-user-credentials
select * from index.gui-user-credentials
$ /opt/zl/nwi/bin/jdbcnsl  jdbc:zstore://localhost:1999//m0/zen5/zstore-frontend -batch
orders.batch
username: admin
password:
```

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6.2.6 EXIT

This command is used to exit the application

6.2.7 FLUSH DATASTORE <DATASTORE>

This command is used to flush the datastore into disk.

```
jdbcnsl> flush datastore report-summary
```

6.2.8 FLUSH TABLE <TABLE>

This command is used to flush the given table into disk.

```
jdbcnsl> flush table report-summary.gn_app-site-900-timeline
```

6.2.9 HELP […]

This command provides general or specific help for a given topic/command.

6.2.10 INSERT […]

This command executes the *insert* statement, in an SQL-like format. The template for the *insert* command is the following:

```
INSERT INTO table (col1, col2) VALUES (value1, value2)
```

6.2.11 QUIT

This command is used to exit the application. It is equivalent to the *exit* command.

6.2.12 SCAN […]

This command executes the given SCAN statement but only for the given row-key. Several examples of the *scan* functionality are:

```
SCAN * FROM table WHERE rowKey = rowValue
SCAN * FROM table WHERE rowKey = rowValue AND timestamp > 'DATESTR'
SCAN * FROM table WHERE rowKey = rowValue AND max-versions = MAX
```

Where DATESTR can be expressed in the YYYYMMDD[HH[MM[SS]]] format or one of the usual formats to express date and time strings (e.g. 'Nov 4, 2003 8:14 PM', '3:30 PM', '12/13/09', '12/13/09 4:45', etc).

Max-versions sets the maximum number of row versions to be returned (defaults to one).

6.2.13 SELECT […]

This command executes the *select* statement in an SQL-like format. The following list shows some examples of its format:

```
SELECT * FROM table
SELECT field1, field2 FROM table
SELECT * FROM table WHERE rowKey = rowValue
SELECT * FROM table WHERE rowKey LIKE rowValue% // Starts with
SELECT * FROM table WHERE rowKey LIKE %rowValue% // Contains
SELECT * FROM table WHERE rowKey LIKE %rowValue // Ends with
SELECT * FROM table WHERE timestamp > 'DATESTR'
SELECT * FROM table WHERE rowKey = rowValue AND timestamp > 'DATESTR'
SELECT * FROM table WHERE rowKey = rowValue AND max-versions = MAX
```

Where DATESTR can be expressed in the YYYYMMDD[HH[MM[SS]]] format or one of the usual formats to express date and time strings (e.g. 'Nov 4, 2003 8:14 PM', '3:30 PM', '12/13/09', '12/13/09 4:45', etc).

Max-versions sets the maximum number of row versions to be returned (defaults to one).

There are several special clauses to the select command. The most common are explained below:

6.2.13.1 RANGE-KEY-JOIN

The *range-key-join* clause is used to select a set of keys considering a range of dates. The format of this clause is:

```
SELECT * FROM <table> RANGE-KEY-JOIN(<date-start>,<date-end>,<list-of-keys>)
```

Where <date-start> and <date-end> are both negated timestamps (check section Tstamp), and <list-of-keys> are a list of all the keys needed, separated by commas, and surrounded by quotations.

6.2.13.2 RANGE-JOIN

The *range-join* clause is equivalent to the *range-key-join* clause, except is does not need a list of keys, and instead all the keys are shown.

```
SELECT * FROM <table> RANGE-JOIN(<table>,<date-start>,<date-end>)
```

6.2.13.3 SUMMARIZE-BY

The *summarize-by* clause is used to define the summarize function that is going to be used in the query. The format of this clause is:

```
SELECT * FROM <table> SUMMARIZE-BY(<period>,<function>)
```

Where <period> defines the period that needs to be summarized (hour, month, etc… or global for all), and <function> defines the summarization function (sum, avg…)

6.2.13.4 ZAP-DIMENSION

The *zap-dimension* clause is used to configure the zap functionality onto the query. To zap a dimension is not use it in the query. The format of this clause is the following:

```
SELECT * FROM <table> ZAP-DIMENSION(<func>, <columns-to-zap>)
```

Where <func> is the aggregation function, and <columns-to-zap> are the column number of each column to zap, separated by commas. For example ZAP-DIMENSION(sum, 1, 2) would use the sum function to zap columns 1 and 2 in the SDDT (Selectable Drill Down Table).

6.2.14 SELECT NOT-NULL

This command executes the given SELECT statement but only for the given row-key. The format of this command is shown below:

```
SELECT-NOT-NULL * FROM table WHERE rowKey = rowValue
SELECT-NOT-NULL * FROM table WHERE rowKey = rowValue AND timestamp > 'DATESTR'
SELECT-NOT-NULL * FROM table WHERE rowKey = rowValue AND max-versions = MAX
```

Where DATESTR can be expressed in the YYYYMMDD[HH[MM[SS]]] format or one of the usual formats to express date and time strings (e.g. 'Nov 4, 2003 8:14 PM', '3:30 PM', '12/13/09', '12/13/09 4:45', etc).
Max-versions sets the maximum number of row versions to be returned (defaults to one).

6.2.15 SET CHUNK SIZE <CHUNK-SIZE>

This command sets or fetches the chunk size. Must be greater than 0.

6.2.16 SET COLUMN SEPARATOR <SEPARATOR>

This command sets the column separator string. Type “null” to disable the separator.

6.2.17 SET COMMAND ECHO {ON|OFF}

This command enables or disables the display of the executed command. It is useful when in batch mode.

6.2.18 SET DEBUG {ON|OFF}

This command enables or disables driver debugging.

6.2.19 SET DISPLAY MODE {COLUMN|AVP}

This command sets the result display mode.

6.2.20 SET DISPLAY NEGATED TIMESTAMPS {ON|OFF}

This commands enables/disables the displaying of negated timestamps.

6.2.21 SET DISPLAY RESULTS {ON|OFF}

Enables/disables result display.

6.2.22 SET LIMITS RESULTS <RESULTS>

This command sets the maximum number of results. Set 0 for all results.

6.2.23 SET PAGING {ON|OFF}

This command enables or disables paging.

6.2.24 SHOW COMMANDS [...]

This command displays all commands or commands starting with the given prefix**.**

6.2.25 SHOW SESSION

This command is used to show the current session parameters. An example:

```
jdbcnsl> show session
Username:        admin
URL:             jdbc:zstore://localhost:1999//m0/zen5/zstore-frontend
Connection time:    Mon Aug 26 04:34:44 CDT 2013
Column separator:   |
Paging:          on
Command echo:       on
Debugging:          off
Result limit:       unlimited
Result display:      on
Result display mode: column
Result display negated timestamp: on
Chunk size:         100
#last rows:         0

Driver properties:
NAME                          VALUE DESCRIPTION
pool-size                         0 Number of connections in pool when in pooled mode.
    The connection is considered as pooled if the number of connections is
    greater than 1.
chunk-size                      100 The maximum number of records fetched in every chunk
    while iterating with the rset.next() method.
max-prepared-statements         1000 Maximum number of prepared statements to be
    kept in memory.
login-timeout                 120000 The maximum timeout for connection and login (in msecs).
read-timeout                  300000 The maximum timeout for read operations from the DB
    (in msecs). If the timeout occurs, the connection is considered as invalid and marked as
    closed/recoverable.
```

6.2.26 SHOW TABLE <TABLE>

Show all available tables or the definition of the given table.

7 Advanced Tools

This chapter introduces a set of command-line tools which allow an advanced operation of HP CEA platform. In some situations, such as task automation, it is useful to have advanced command-line tools to perform such specific actions described here. These commands are only accessible by the zhilabs administration user.

7.1 Zcontrol

7.1.1 Overview

Zcontrol is a command-line tool which allows controlling and monitoring multiple HP CEA platform elements from a single interface.

7.1.2 Command-Line interface

Zcontrol command-line includes the following arguments:

```
zcontrol [-c COMMAND -e ENTRY] [-l LOG_PARAM] [-r CONFIG_FILE]
         [--remote-address=ip] [--remote-port=port]
         [--local-address=ip] [--local-port=port]
         [--remote-peer-name=name] [--config-entry=name] [-v] [-h]
```

Where:

Table 9: zcontrol command-line arguments

Parameter	Mandatory	Description	Default Value
-c COMMAND	no	Command to be executed. See command list in next section.	
-e ENTRY	no	Entity name. It can be a dataflow, a component or a peer. Examples: • /workflow/definition/foo • /m0/zen2/net2 • /m0/zen2	
-l LOG_PARAM	no	Log level, class or feature name. Required for trace log related commands. Examples: • debug • zl::zstoretasks::ScannerTask • net	

-r CONFIG_FILE	no	Configuration file to reload.	
--config-entry	yes	Configuration entry in HP CEA distributed directory.	/startup
--remote-address	yes	Remote IP address to connect to the zen cluster and issue the configured command.	127.0.0.1
--remote-port	yes	Remote TCP port to connect to.	8000
--local-address	no	Local IP address to use	
--local-port	no	Local TCP Port to use	
--remote-peer-name	yes	Remote peer name to connect to the zen cluster.	/m0/zen0
-v	no	Log verbosity. Add multiple times to increase.	
-k	no	Issue log messages to console.	
-h	no	Display help message with zcontrol usage.	

7.1.3 ZCONTROL COMMANDS

Zcontrol provides the commands described below.

Some control commands, such as start, stop and check, allow the interaction with different HP CEA control entities.

HP CEA control entities:

- Peers
- Components
- Dataflows

Table 10: zcontrol command list

Command	Required Arguments	Brief Description
start	-e ENTITY	Start the execution of a HP CEA entity.
stop	-e ENTITY	Stop the execution of a HP CEA entity.
check	-e ENTITY	Check the execution status of a HP CEA entity.
increase-log	-e PEER	Increase the trace log level of a HP CEA peer.
decrease-log	-e PEER	Decrease the trace log level of a HP CEA peer.
set-log-level	-e PEER –l LOG_LEVEL	Set explicit log level to a HP CEA peer. Valid log levels, from highest to lowest

		severity: · Alert · Critical · Error · Warning · Info · Notice · Debug · Debug2 · Debug3
enable-log-class	-e PEER –l LOG_CLASS	Enable a specific log class in a HP CEA peer.
disable-log-class	-e PEER –l LOG_CLASS	Disable a specific log class in a HP CEA peer.
enable-log-feature	-e PEER –l LOG_FEATURE	Enable a log feature in a HP CEA peer. See available log features in command description.
disable-log-feature	-e PEER –l LOG_FEATURE	Disable a log feature in a HP CEA peer. See available log features in command description.
start-scheduling		Allows the scheduling of new workflows
stop-scheduling		Prevents the scheduling of new workflows
check-scheduling		Checks the state of the scheduling.
list		Lists all the dataflows configured.

7.1.3.1 Start

This command allows the starting of a HP CEA entity. Return code will be 0 on success. Standard output will show the last well-known entity status after performing the start command.
Examples:

- Start a peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c start -e /m0/zen5
__status: running
```

- Start a component

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c start -e /m0/zen0/esink
__status: running
```

- Start a dataflow

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c start -e
```

```
/workflow/definition/collector/gn_signaling
__status: running
```

- Start an unknown entity

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c start -e /foo
__status: unknown
```

7.1.3.2 Stop

This command allows the stopping of a running HP CEA entity. Return code will be 0 on success. Standard output will show the last well-known entity status after performing the stop command.
Examples:

- Stop a peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c stop -e /m0/zen5
__status: stopped
```

- Stop a component

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c stop -e /m0/zen0/esink
__status: stopped
```

- Stop a dataflow

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c stop -e
/workflow/definition/collector/gn_signaling
__status: stopped
```

- Stop an entity already stopped

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c stop -e
/workflow/definition/collector/gn_signaling
__status: stopped
```

7.1.3.3 Check

This command allows the checking of the status of a running HP CEA entity. Return code will be 0 on success. Standard output will show the entity current status.
Examples:

- Check status from a running peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c check -e /m0/zen0
__status: running
```

- Check status from a running component

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c check -e /m0/zen0/minidir
```

```
__status: running
```

- Check status from a running dataflow

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c check -e
/workflow/definition/collector/gn_signaling
__status: running
```

- Check status from an already stopped entity

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c check -e /m0/zen0/esink
__status: stopped
```

- Check status from an unknown entity

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c check -e /foo
__status: unknown
```

7.1.3.4 Increase-log

This command allows the increasing of the log level of a running HP CEA peer. Return code will be set to 0 on success.
Example:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c increase-log -e /m0/zen5
```

7.1.3.5 Decrease-log

This command allows the decreasing of the log level of a running HP CEA peer. Return code will be set to 0 on success.
Example:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol -c decrease-log -e /m0/zen5
```

7.1.3.6 Set-log-level

This command allows the setting of an explicit log level to a running HP CEA peer. Return code will be set to 0 on success.
Example:

- Set peer log level to debug

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c set-log-level -e /m0/zen5 –l debug
```

7.1.3.7 Enable-log-class

This command allows the enabling of log filtering for a specific class component for a running HP CEA peer. Return code will be set to 0 on success.
Example:

- Enable server class log filtering in a peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c enable-log-class -e /m0/zen5 –l Server
```

7.1.3.8 Disable-log-class

This command allows the disabling of log filtering for a specific class component for a running HP CEA peer. Return code will be set to 0 on success.

Example:

- Disable server class log filtering in a peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c disable-log-class - e /m0/zen5 –l Server
```

7.1.3.9 Enable-log-feature

This command allows the enabling of the log filtering functionality for a specific feature component for a running HP CEA peer. Return code will be set to 0 on success.

Example:

- Enable zstore feature log filtering in a peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c enable-log-feature -e /m0/zen5 –l zstore
```

7.1.3.10 Disable-log-feature

This command allows the disabling of the log filtering for a specific feature for a running HP CEA peer. Return code will be set to 0 on success.

Example:

- Disable zstore feature log filtering in a peer

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c disable-log-feature -e /m0/zen5 –l zstore
```

7.1.3.11 Start-scheduling

This command resumes the scheduling of workflows, meaning that new workflows can be started automatically by the scheduler.

Example:

- Start the scheduling of workflows

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c start-scheduling
```

7.1.3.12 Stop-scheduling

This command prevents the scheduling of new workflows, meaning that new workflows won’t start unless started manually via the zcontrol’s start command.

Example:

- Stop the scheduling of workflows

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c stop-scheduling
```

7.1.3.13 Check-scheduling

This command checks whether the scheduling of new workflows is enabled or disabled.

Example:

- Check the scheduling of new workflows

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c check-scheduling
New workflow scheduling is enabled
zhilabs@mediation:~>
```

7.1.3.14 List

This command lists all the workflows that are configured in the server. It lists the name, the peer running them, the state of the workflow and the scheduled time when they will start.

Example:

- List the workflows available

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zcontrol –c list
DATAFLOW                                                PEER            STATUS
SCHEDULING
/workflow/definition/collector/gn                       /m0/zenwf_2_0      stopped(BASE)
20130828084033.227004
/workflow/definition/collector/gn_app                   /m0/zenwf_3_0      stopped(BASE)
20130828083556.890039
/workflow/definition/collector/gn_pdu_browsing          /m0/zenwf_4_0      running(RUNNING)
20130828083622.062490
/workflow/definition/collector/gn_pdu_dns               /m0/zenwf_5_0      running(RUNNING)
20130828084035.581186
[ … ]
```

7.1.4 Log Features

A log feature includes a set of components and libraries which are related to a low level feature. All log messages corresponding to such grouped components and libraries will be handled via single zcontrol log commands.

The following list includes the most useful log features:

Table 11: HP CEA log features

Log feature	Brief Description
applogic	Applogic task and related libraries log messages.
ber	BER encoding/decoding.
boot	Boot component and related libraries log messages.
config	Configuration engine and related libraries log messages.
correlator	Correlator tasks and related libraries log messages.

diameter	Diameter encoding/decoding library log messages.
diametertasks	Diameter collection tasks library log messages.
esink	Esink component and related libraries log messages.
iotasks	Input/output tasks libraries log messages.
jdbc	JDBC sessions and related libraries log messages.
messaging	Zen cluster messaging and related libraries log messages.
minidir	Directory service component and related libraries log messages.
minidir-stats	Directory service using statistics log messages.
ml	Machine-learning library log messages.
net	Net probes tasks library log messages.
net-stats	Net probes statistics tasks measurement log messages.
python	Python components, tasks and related libraries log messages.
radius	Radius encoding/decoding library log messages.
radiustasks	Radius encoding/decoding library log messages.
resmgr	Resource management component and related libraries log messages.
rules	Rule engine task and related libraries log messages.
utiltasks	Util tasks library log messages.
workflow	Dataflow engine and related libraries log messages.
xml	XML encoding/decoding and related libraries log messages.
zconsole	Zconsole component and related libraries log messages.

zcontrol	Zcontrol component and related libraries log messages.
Zstore	Zstore components and related libraries log messages.
Zstoretasks	zstore tasks library log messages.

7.2 ZIZE

7.2.1 OVERVIEW

Zize is a command-line tool which allows system administrator to verify actual disk occupation from the distributed datastore.

7.2.2 COMMAND-LINE INTERFACE

Zize command-line includes the following arguments:

```
zize [--partitions] [--backends]
        [--zstore=name]
        [--remote-address=ip] [--remote-port=port]
        [--local-address=ip] [--local-port=port]
        [--remote-peer-name=name]
        [-v] [-k] [-h]
```

Where:

Table 12: Zize command-line arguments.

Parameter	Mandatory	Description	Default Value
--partitions	No	Show size of each partition.	
--backends	No	Show size of each backend within each partition. Backends are the threads that send and receive data from and to zstore	
--zstore	Yes	Target zstore.	/m0/zen0/zstore-fronend
--remote-address	Yes	Remote IP address to connect to the zen cluster and issue the configured command.	127.0.0.1
--remote-port	Yes	Remote TCP port to connect to.	8000

--local-address	No	Local IP address to use.	
--local-port	No	Local TCP port to use.	
-v	No	Verbosity. Add multiple to increment.	
-k	No	Log to console.	

Output format is:

- K = Keys in memory
- B = Blocks in memory
- M = Memory used
- TK = Total keys
- TB = Total Blocks
- TM = Total memory
- C = Cache Hits/Cache Misses
- minT = min-timestamp of stored keys
- maxT = max-timestamp of stored keys
- RK = last row-key

7.2.3 EXAMPLES

This chapter provides some examples on how to use zize:

- Total datastore size:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zize
total-/m0/zen0/zstore-frontend K=1.6M B=0 M=0.0MB TK=37.6M TB=2562 TM=6.1GB
C=77702/271688
```

- Total datastore size with partition level detail:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zize --partitions
total-/m0/zen2/zstore-partition2 K=431.6K B=0 M=0.0MB TK=9.9M TB=577 TM=1.6GB
C=13729/87791
total-/m0/zen3/zstore-partition3 K=396.4K B=0 M=0.0MB TK=9.5M TB=571 TM=1.5GB
C=20623/49174
total-/m0/zen1/zstore-partition1 K=420.3K B=0 M=0.0MB TK=9.5M TB=842 TM=1.5GB
C=16674/76430
total-/m0/zen4/zstore-partition4 K=376.4K B=0 M=0.0MB TK=8.8M TB=572 TM=1.4GB
C=26676/58293
total-/m0/zen0/zstore-frontend K=1.6M B=0 M=0.0MB TK=37.6M TB=2562 TM=6.1GB
C=77702/271688
```

- Total datastore size including partitions and backends on each partition detail:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zize --backends
total-/m0/zen4/zstore-partition4-backend03 K=81.7K B=0 M=0.0MB TK=1.5M TB=127
TM=196.1MB C=14340/48009
total-/m0/zen4/zstore-partition4-backend00 K=65.6K B=0 M=0.0MB TK=589.3K TB=111
TM=100.3MB C=3119/634
total-/m0/zen4/zstore-partition4-backend02 K=119.6K B=0 M=0.0MB TK=841.4K TB=151
TM=109.4MB C=7175/9224
total-/m0/zen4/zstore-partition4-backend01 K=109.5K B=0 M=0.0MB TK=5.9M TB=183
TM=1.0GB C=2042/426
total-/m0/zen4/zstore-partition4 K=376.4K B=0 M=0.0MB TK=8.8M TB=572 TM=1.4GB
C=26676/58293
total-/m0/zen1/zstore-partition1-backend00 K=69.9K B=0 M=0.0MB TK=767.2K TB=179
TM=145.3MB C=3616/962
total-/m0/zen1/zstore-partition1-backend02 K=144.0K B=0 M=0.0MB TK=779.3K TB=196
TM=100.5MB C=4400/437
total-/m0/zen1/zstore-partition1-backend03 K=102.2K B=0 M=0.0MB TK=1.6M TB=209
TM=207.0MB C=2238/74376
total-/m0/zen1/zstore-partition1-backend01 K=104.2K B=0 M=0.0MB TK=6.4M TB=258
TM=1.1GB C=6420/655
total-/m0/zen1/zstore-partition1 K=420.3K B=0 M=0.0MB TK=9.5M TB=842 TM=1.5GB
C=16674/76430
total-/m0/zen2/zstore-partition2-backend00 K=41.5K B=0 M=0.0MB TK=1.0M TB=88
TM=174.7MB C=2891/491
total-/m0/zen2/zstore-partition2-backend03 K=97.5K B=0 M=0.0MB TK=1.9M TB=149
TM=269.2MB C=2304/86161
total-/m0/zen2/zstore-partition2-backend01 K=99.0K B=0 M=0.0MB TK=6.0M TB=190
TM=1.0GB C=4367/690
total-/m0/zen2/zstore-partition2-backend02 K=193.6K B=0 M=0.0MB TK=920.7K TB=150
TM=127.7MB C=4167/449
total-/m0/zen2/zstore-partition2 K=431.6K B=0 M=0.0MB TK=9.9M TB=577 TM=1.6GB
C=13729/87791
total-/m0/zen3/zstore-partition3-backend00 K=66.8K B=0 M=0.0MB TK=572.2K TB=100
TM=99.5MB C=2969/488
total-/m0/zen3/zstore-partition3-backend01 K=110.5K B=0 M=0.0MB TK=6.0M TB=192
TM=1.1GB C=3141/384
total-/m0/zen3/zstore-partition3-backend02 K=156.5K B=0 M=0.0MB TK=1.1M TB=142
TM=150.7MB C=4491/10878
total-/m0/zen3/zstore-partition3-backend03 K=62.6K B=0 M=0.0MB TK=1.7M TB=137
```

```
TM=231.9MB C=10022/37424
total-/m0/zen3/zstore-partition3 K=396.4K B=0 M=0.0MB TK=9.5M TB=571 TM=1.5GB
C=20623/49174
total-/m0/zen0/zstore-frontend K=1.6M B=0 M=0.0MB TK=37.6M TB=2562 TM=6.1GB
C=77702/271688
```

7.3 CFGCHECK

7.3.1 OVERVIEW

Cfgcheck is a command-line tool to perform configuration validations before the actual application of configuration changes.

7.3.2 COMMAND-LINE INTERFACE

Cfgcheck command-line includes the following arguments:

```
cfgcheck [-root-dir ROOT-DIR] [-v] [-d] CONFIG-FILE ROLE
```

Where:

Table 13: Cfgcheck command-line arguments.

Parameter	Mandatory	Description	Default Value
-root-dir path	no	Path to HP CEA installation	/opt/zl
-d	no	Dump configuration in standard output	Disabled
-v	no	Verbosity. Add it multiple times to increment the level.	Disabled
CONFIG-FILE	yes	HP CEA base configuration file.	
ROLE	yes	Peer name, so called role. For example: /m0/zen0	

7.3.3 EXAMPLES

Example with correct configuration:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/cfgcheck -root-dir /opt/zl/nwi
/opt/zl/nwi/etc/flowsight-standalone.cfg /m0/zen0
Checking configuration file (/opt/zl/nwi/etc/flowsight-standalone.cfg)
Config is OK (5032 items)
```

Example with invalid configuration:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/cfgcheck -root-dir /opt/zl/nwi
```

```
/opt/zl/nwi/etc/flowsight-standalone.cfg /m0/zen0
Checking configuration file (/opt/zl/nwi/etc/flowsight-standalone.cfg)
Mon May 7 15:11:06 2012: [ERROR]: [CommandDescriptor::checkConstraints]:
collector-config/distributor: Cardinality constraint FAILED for
placeholder($type): card(1:1) ocurrences(0)
Mon May 7 15:11:06 2012: [ERROR]: [CommandContext::checkConstraints]: Error
checking constraints for command(collector-config)
Mon May 7 15:11:06 2012: [ERROR]: [ParsingContext::evaluateTemplate]: Error
checking integrity constraint at line #467 in file
/opt/zl/nwi/etc/flowsight-standalone.cfg for config command collector-config
Mon May 7 15:11:06 2012: [ERROR]: [ParsingContext::parse]: Error when
parsing template-generated line (!) from file(/opt/zl/nwi/etc/flowsight-
standalone.cfg) and input line #467
Mon May 7 15:11:06 2012: [ERROR]: [cfg::ObjectFactory* parseConfig]: Could
not load config file /opt/zl/nwi/etc/flowsight-standalone.cfg
Config is INVALID. Use -d to get more information or check logs.
```

7.4 DUMP

7.4.1 OVERVIEW

Dump is a command-line tool which allows system administrator to perform different read-only checks on datastore.

7.4.2 DUMP COMMAND-LINE INTERFACE

Dump command-line includes the following arguments:

```
dump [-v] [-k] [-b size] [-d] [-m]
        [-s key [-q][-r]] [-c] [-l] [-S] -p path
```

Where:

Table 14: Dump command-line arguments.

Parameter	Mandatory	Description	Default Value
-p path	yes	Path to datastore column.	
-b size	no	Block size	
-d	no	Dump block.	
-m	no	Show a map of block	
-s key	no	Scan using key with format rowkey, columnf,columnq, tstamp.	
-q	no	Enforce filter by column	
-r	no	Enforce filter by row	

-c	no	Dump commit redo.	
-l	no	Dump checkpoint.	
-g	no	Dump group.	
-S	no	Dump the schema.	
-v	no	Verbosity. Add multiple to increment.	
-k	no	Log to console.	

7.4.3 Dump Commands

Although most of dump options are for internal use only, a very useful command for troubleshooting purposes is the ability to dump the datastore schema.

Example:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/dump -S -p /opt/zl/nwi/var/zstore/fact/inbox-
fact/inbox-fact__event.severity/
datastore=fact
table=inbox-fact
column-group=inbox-fact__event.severity
rootPath=/opt/zl/nwi/var/zstore//
columnStorePath=fact/inbox-fact/
schema for datastore(fact)
table(test-fact)
group(test-fact__bearer.sessionId)
group(test-fact__bearer.sgsn)
group(test-fact__event.severity)
group(test-fact__net.uplink)
group(test-fact__bearer.ggsn)
group(test-fact__test.location)
group(test-fact__event.key)
group(test-fact__fact)
group(test-fact__bearer.rnc)
group(test-fact__location.lac)
group(test-fact__test.type)
group(test-fact__net.cell-ip)
group(test-fact__location.ci)
group(test-fact__bearer.location)
group(test-fact__net.flowID)
group(test-fact__net.throughput)
group(test-fact__test.description)
group(test-fact__event.timestamp)
group(test-fact__event.link)
table(cluster-graph-fact)
group(cluster-graph-fact__field)
table(cluster-instances-fact)
group(cluster-instances-fact__field)
table(session-fact)
group(session-fact__bearer.stop-time)
group(session-fact__event.link)
group(session-fact__test.link)
group(session-fact__fact)
group(session-fact__bearer.sessionId)
group(session-fact__bearer.start-time)
group(session-fact__bearer.location)
group(session-fact__event.severity)
table(test-report-fact)
group(test-report-fact__event.key)
group(test-report-fact__net.uplink)
group(test-report-fact__fact)
group(test-report-fact__net.cell-ip)
group(test-report-fact__net.throughput)
group(test-report-fact__report.png)
group(test-report-fact__event.severity)
group(test-report-fact__bearer.sessionId)
group(test-report-fact__test.type)
group(test-report-fact__test.description)
table(event-fact)
group(event-fact__event.severity-reason)
group(event-fact__location.mcc)
group(event-fact__net.uplink)
group(event-fact__traffica-sgsn)
group(event-fact__tcptrace)
group(event-fact__net.srv-ip)
group(event-fact__bearer.ggsn)
group(event-fact__http.url)
group(event-fact__http.host)
group(event-fact__net.throughputUp)
group(event-fact__net.cell-port)
group(event-fact__bearer.imeisv)
group(event-fact__net.cell-ip)
group(event-fact__tshark)
group(event-fact__osix)
group(event-fact__location.mnc)
group(event-fact__net.srv-port)
group(event-fact__location.sac)
group(event-fact__net.throughputDown)
group(event-fact__bearer.msisdn)
group(event-fact__event.text)
group(event-fact__event.timestamp)
group(event-fact__bearer.sgsn)
group(event-fact__report.png)
group(event-fact__netqual)
group(event-fact__bearer.imsi)
group(event-fact__bearer.rnc)
group(event-fact__tsg)
group(event-fact__event.severity)
group(event-fact__bearer.sessionId)
group(event-fact__polystar-ggsn)
group(event-fact__event.source)
group(event-fact__location.lac)
group(event-fact__location.ci)
group(event-fact__net.flowID)
table(inbox-fact)
group(inbox-fact__event.severity)
group(inbox-fact__event.description)
group(inbox-fact__event.class)
group(inbox-fact__fact)
group(inbox-fact__event.source)
group(inbox-fact__event.text)
group(inbox-fact__bearer.sessionId)
group(inbox-fact__event.timestamp)
group(inbox-fact__event.link)
```

7.5 EXTERNAL-DUMP

7.5.1 OVERVIEW

The external-dump is a tool to inspect .BIN files from the zstore.

7.5.2 Command-Line Interface

The command-line interface for the external-dump tool is the following:

```
zhilabs@GUI:~> /opt/zl/nwi/bin/external-dump -h
Usage: external-dump BIN..
       [--print-file-name=yes;no]
       [--print-block-info=yes;no]
       [--print-block-index=no;yes]
       [--print-keys=no;yes]
       [--print-key-values=no;yes]
       [--print-bloom=no;yes]
       [--print-all]
       [-v] [-k] [-h]

        Where:
         --print-file-name: (default: yes)
         --print-block-info: (default: no)
         --print-block-index: (default: no)
         --print-keys: (default: no)
         --print-key-valuess: (default: no)
         --print-bloom: (default: no)
         --print-all: print all info in verbosest mode
         -v: verbosity (add multiple to incr)
         -k: log to konsole
         -h: print this help

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```

Where:

Table 15: External-dump parameters.

Parameter	Mandatory	Description	Default Value
BIN	yes	Path to the binary file to check	
print-file-name	no	Whether the filename should be printed	yes

7.6 External-Merger

7.6.1 Overview

The external-merger is a utility to perform compactations to the zstore. The zstore compactation is a process used to pack the zstore binaries into larger files, so the access to the zstore is faster.

The external-merger utility, however, is used via a set of wrappers that encapsulate everything, and configure the external-merger properly. These wrappers and their description are:

Table 16: External-merger scripts.

External merger wrapper	Brief Description
hourly-partition.sh	Starts the compactiation for the previous hour.
daily-partition.sh	Starts the compactation for the previous day.
weekly-partition.sh	Starts the compactation for the previous week.
apply-imf-on-write-no-partition.sh	Starts the compactation only for the apply imf on write=no partitions (direct-write).

7.6.2 COMMAND-LINE INTERFACE

The command-line interface for the external-merger and its wrappers is the following:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/daily-partition.sh  <partition>
```

7.6.3 LOG FILES

The external-merger tool stores all its logs in the */opt/zl/nwi/var/logs/external-merger* directory.

7.7 SETUP-GUI

7.7.1 OVERVIEW

Setup-gui is a tool intended for the configuration of the GUI parameters. It's highly recommended to don't change the values in it without knowledge of the effects of those changes.

When the setup-gui changes are applied the GUI server is restarted.

```
zhilabs@gui:~> /opt/zl/gui/bin/setup-gui
```

7.7.2 PARAMETERS

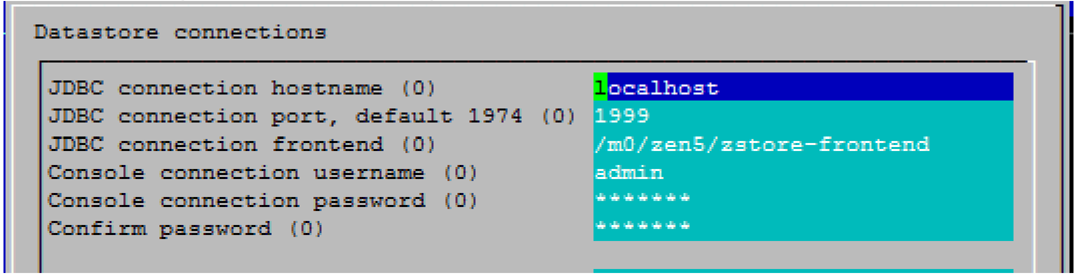
There are several parameters that can be changed using setup-gui to affect the behavior of the GUI. The setup-gui tool has two screens. The first one defines all the connections to the existing zstores, and the second one configures several important parameters.

```
$ /opt/zl/gui/bin/setup-gui [ -i infile ] [ -o outfile ] [ -t templatefile ] [ -d ] [ -c ] [ -a ] [ -n ]

-h          show this help
-i infile    read initial values from infile (default: /etc/zhilabs/gui/WEB-INF/web.xml if found,
otherwise internal defaults)
```

```
-d          don't read any input file; use internal default for initialization
-o outfile   write resulting XML to outfile, use - for stdout (default: /etc/zhilabs/gui/WEB-INF/web.xml)
-t template  use template as basic template file (default: /etc/zhilabs/gui/WEB-INF/web.xml.basic)
-c          empty existing cache
-a          automatic deployment (no questions are asked)
-n          do not deploy; only write resulting XML
-x          expert mode, more configurable options
```

7.7.2.1 Zstore Connections

The first screen consists of several (up to 19) sets of connections. Each one defines a connection to a zstore. An example is shown in the picture below.



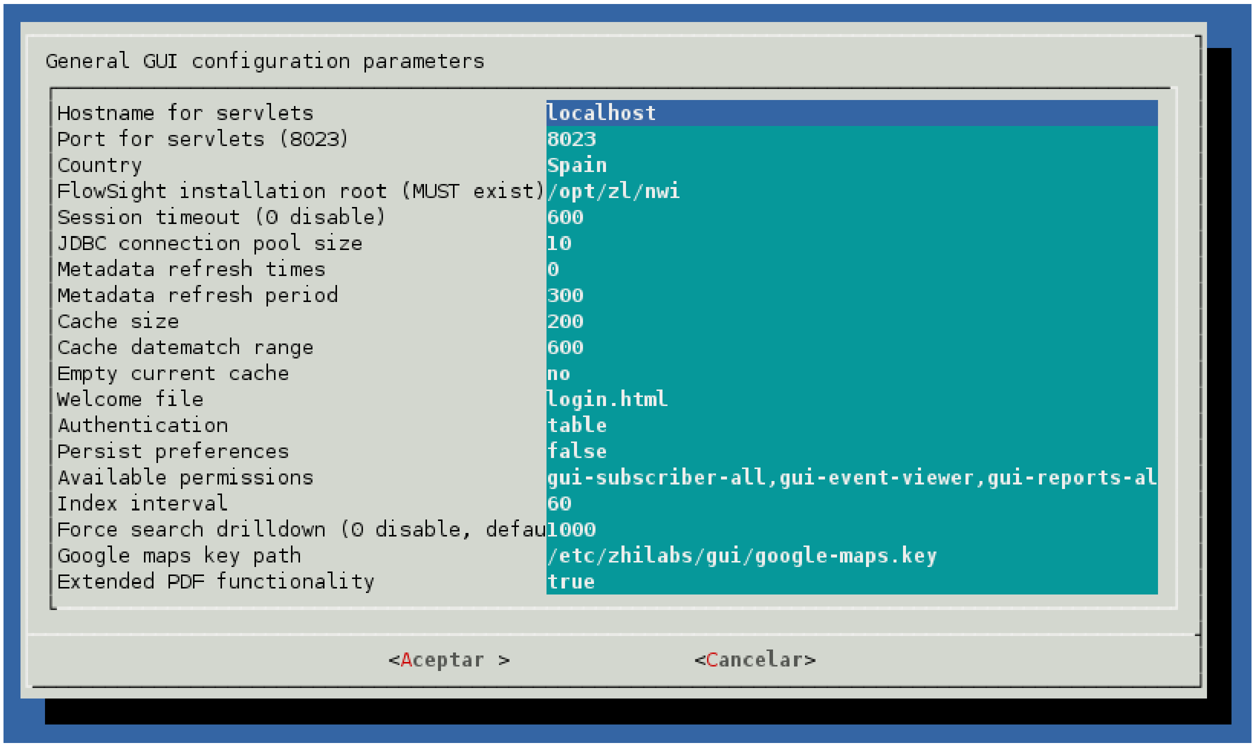
```
Datastore connections

JDBC connection hostname (0)              localhost
JDBC connection port, default 1974 (0)    1999
JDBC connection frontend (0)              /m0/zen5/zstore-frontend
Console connection username (0)           admin
Console connection password (0)           *******
Confirm password (0)                      *******
```

Figure 5: Setup-gui zstore connections

The parameters are explained in the following table:

Table 17: setup-gui zstore connection parameters

Parameter	Brief Description
JDBC hostname	Hostname where the zstore is. Use localhost for local zstores.
JDBC Port	Port where the zstore listens to.
JDBC Frontend	Frontend to access the zstore.
Connection username	Username to connect to the JDBC server
Connection password	Password to connect to the JDBC Server



```
General GUI configuration parameters

Hostname for servlets                   localhost
Port for servlets (8023)                8023
Country                                 Spain
FlowSight installation root (MUST exist)/opt/zl/nwi
Session timeout (0 disable)             600
JDBC connection pool size               10
Metadata refresh times                  0
Metadata refresh period                 300
Cache size                              200
Cache datematch range                   600
Empty current cache                     no
Welcome file                            login.html
Authentication                          table
Persist preferences                     false
Available permissions                   gui-subscriber-all,gui-event-viewer,gui-reports-al
Index interval                          60
Force search drilldown (0 disable, defau1000
Google maps key path                    /etc/zhilabs/gui/google-maps.key
Extended PDF functionality              true
```

7.7.2.2 Hostname for Servlets

This parameter defines the hostname where the servlets will run.

7.7.2.3 Port for servlets

This parameter defines the port that the servlets will use. The default value is 8023.

7.7.2.4 Country

This parameter is set to the name of the country where the installation is running.

7.7.2.5 HP CEA installation root

It specifies the root directory of the HP CEA installation. It must exist. Will usually be /opt/zl/nwi.

7.7.2.6 Session timeout

This parameter specifies when will a user session time out and need a re-login. A value of 0 will disable it.

7.7.2.7 JDBC Connection Pool Size

It defines the amount of connection pools to access the zstore. Usually 10 is a suitable value.

7.7.2.8 Metadata refresh times

It defines the maximum number of times that the metadata will be refreshed. A value of 0 will update the metadata forever, and it is the preferred value.

7.7.2.9 Metadata refresh period

This parameter defines the wait time between metadata refreshes. Very tight values will overhead the system, while a very large value might force the user to wait until a refresh is performed. A value of 300 is usually used.

7.7.2.10 Cache size

This parameter defines the number of cache entries. The default value is 200.

7.7.2.11 Cache date match range

It defines the time interval for which queries, with different from-to, are considered the same. The default value is 600.

7.7.2.12 Empty current cache

This parameter will force the cache to be emptied if set to *yes*. The default value is *no*.

7.7.2.13 Welcome file

It defines the file containing the html that will be presented when login in. The default value is login.html.

7.7.2.14 Authentication

This parameter defines the type of authentication when accessing the GUI. It can be either *console*, when the authentication is done via file (authentication.cfg) or *table*, when the authentication is done using the zstore.

7.7.2.15 Persist preferences

This parameter allows the GUI to store the preferences of the user, so in future invocations everything is set as the user left it. The possible values are *true* or *false*.

7.7.2.16 Available permissions

This parameter is a list of available permissions that a user can have. When a new permission is added here, it will be added also to the dropdown of available permissions in the Admin Console.

7.7.2.17 Index interval

This parameter defines the frequency when the indexation process takes place. The default value is 86400.

7.7.2.18 Force search drilldown

This parameter defines the number of dimension components from which an SDDT will automatically turn into an SSBT. 0 means no limit.

7.7.2.19 Google maps key path

This parameter defines the path where the Google maps key is installed.

7.7.2.20 Extended PDF functionality

This parameter defines whether the extended PDF functionality is available or not. The possible values are *true* or *false*.

7.8 MONIT

7.8.1 OVERVIEW

Monit is a third-party application. It is used to monitor the system and the processes and restart them should they finish by an unknown cause.

The monit process runs all the time, and performs checks to the running processes according to a configuration file. The default directory for the configuration files is */etc/monit.d*. All files should have *.monit* extensions. The global configuration file is stored in */etc/monitrc*. An example of a configuration file that monitors the zen process (zen-monit) is shown below:

```
##########################################################################
## Monit control file
## $Id: zen 39082 2013-05-10 15:52:32Z $
##########################################################################
##
## zen-nwi
check process zen-nwi with pidfile /opt/zl/nwi/var/zen-nwi.pid
   alert support-alarms@zhilabs.com only on { timeout }
   mode manual
   start program = "/etc/init.d/zen-nwi start" with timeout 300 seconds
   stop program = "/etc/init.d/zen-nwi stop"
   if 5 restarts within 5 cycles then timeout
   group zhilabs
```

7.8.2 COMMAND-LINE INTERFACE

The monit process has several commands that can be invoked to perform several tasks. Here are the most common ones.

7.8.2.1 Status

This command is used to check the status of all the resources that monit is monitoring. The invocation of the status command is as follows:

```
zhilabs@GUI:/etc/monit.d> monit status
```

And the output of the command should look similar to this:

```
zhilabs@GUI:/etc/monit.d> monit status
The Monit daemon 5.2.5 uptime: 15d 0h 56m

Filesystem 'rootfs-wizard'
 status                    accessible
 monitoring status              monitored
 permission                  755
 uid                     1000
 gid                     1000
 filesystem flags              0x1000
 block size                  4096 B
 blocks total                 24512013 [95750.0 MB]
 blocks free for non superuser     18066589 [70572.6 MB] [73.7%]
 blocks free total              19311726 [75436.4 MB] [78.8%]
 inodes total                 6225920
 inodes free                 6083990 [97.7%]
 data collected               Tue Aug 27 04:49:33 2013

Filesystem 'rootfs-nwi'
 status                    accessible
 monitoring status              monitored
 permission                  755
 uid                     1000
 gid                     1000
 filesystem flags              0x1000
 block size                  4096 B
 blocks total                 24512013 [95750.0 MB]
 blocks free for non superuser     18066589 [70572.6 MB] [73.7%]
 blocks free total              19311726 [75436.4 MB] [78.8%]
 inodes total                 6225920
 inodes free                 6083990 [97.7%]
 data collected               Tue Aug 27 04:49:33 2013
```

```
Process 'zen-wizard'
  status                          running
  monitoring status                       monitored
  pid                           7395
  parent pid                        1
  uptime                          6d 21h 12m
  children                       6
  memory kilobytes                       237108
  memory kilobytes total                4001200
  memory percent                      0.1%
  memory percent total                 2.0%
  cpu percent                    0.0%
  cpu percent total                 0.0%
  data collected                 Tue Aug 27 04:49:33 2013

Process 'zen-nwi'
  status                          running
  monitoring status                       monitored
  pid                           6834
  parent pid                        1
  uptime                          6d 21h 12m
  children                       22
  memory kilobytes                       902152
  memory kilobytes total                106262892
  memory percent                      0.4%
  memory percent total                 53.5%
  cpu percent                    0.0%
  cpu percent total                 9.3%
  data collected                 Tue Aug 27 04:49:33 2013

Process 'mstrsrv-wizard'
  status                          running
  monitoring status                       monitored
  pid                           7690
  parent pid                        1
  uptime                          6d 21h 12m
  children                       1
  memory kilobytes                       1448
  memory kilobytes total                1277496
```

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```
  memory percent                  0.0%
  memory percent total              0.6%
  cpu percent                   0.0%
  cpu percent total               0.0%
  data collected                Tue Aug 27 04:49:33 2013

Process 'mstrsrv-nwi'
  status                       running
  monitoring status                monitored
  pid                         7415
  parent pid                     1
  uptime                       6d 21h 12m
  children                     1
  memory kilobytes                1448
  memory kilobytes total            5326192
  memory percent                  0.0%
  memory percent total              2.6%
  cpu percent                   0.0%
  cpu percent total               0.0%
  data collected                Tue Aug 27 04:49:33 2013

System 'system_localhost'
  status                       running
  monitoring status                monitored
  load average                  [25.08] [21.66] [16.55]
  cpu                         13.8%us 1.2%sy 7.8%wa
  memory usage                   126007436 kB [63.5%]
  swap usage                    32152 kB [0.1%]
  data collected                Tue Aug 27 04:49:33 2013
```

7.8.2.2 Monitor

This command is used if a resource needs to be monitored. The invocation of the command is as follows:

```
zhilabs@GUI:/etc/monit.d> monit monitor zen-nwi
```

And the process zen-nwi will be monitored.

7.8.2.3 Unmonitor

This command is used to unmonitor a specific resource. The invocation of the command is:

```
zhilabs@GUI:/etc/monit.d> monit unmonitor zen-nwi
```

7.9 Ganglia

7.9.1 Overview

Ganglia is a third-party software that monitors a set of servers, presenting several graphs with the state of them. The key indicators that can be monitored are CPU usage, memory, load average, network use, etc…The data can be presented in intervals of the last hour, the last day, or the last month.

Ganglia uses an apache server and is usually accessed via the 80 port, under /ganglia.

7.9.2 Gmetad

Ganglia uses a centralized server gathering the information from all the other servers. This centralized node is defined by the *gmetad* process. The configuration is stored in */etc/ganglia/gmetad.conf*. In this file the clusters of the others servers are defined:

```
data_source "Mediations" gui1.telefonica.com.pe
data_source "La Victoria" lav1.telefonica.com.pe
data_source "San Isidro" sis1.telefonica.com.pe
```

7.9.3 Gmond

Each server communicates its data every interval to the *gmetad* server. The process doing this communitcation is *gmond*. The configuration of this process is located in */etc/ganglia/gmond.conf*:

```
…
cluster {
  name = "Mediations"
  owner = "unspecified"
  latlong = "unspecified"
  url = "http://gui1.pe/ganglia"
}
…
udp_send_channel {
  host = gui1.pe
  port = 8649
}
```

7.9.4 Examples

Here are a couple of examples of the graphics showed by ganglia.

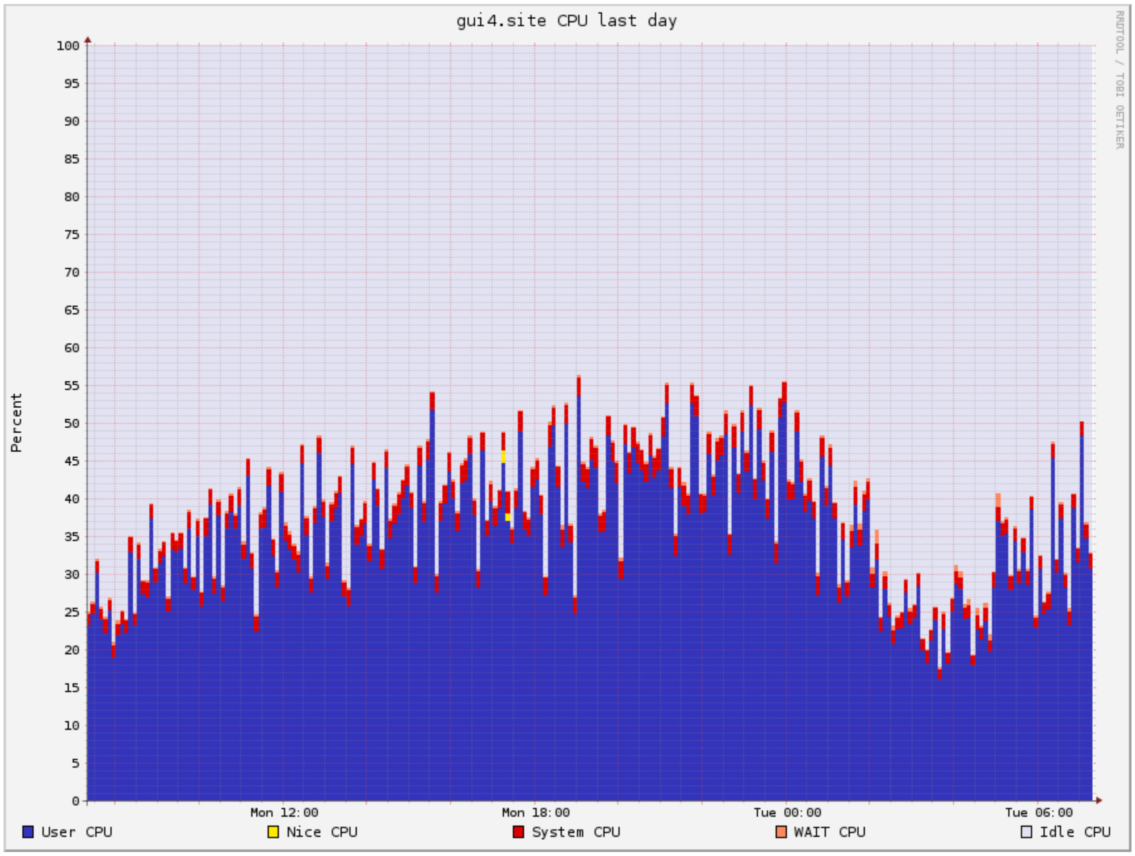

Figure 6: Ganglia CPU graphic

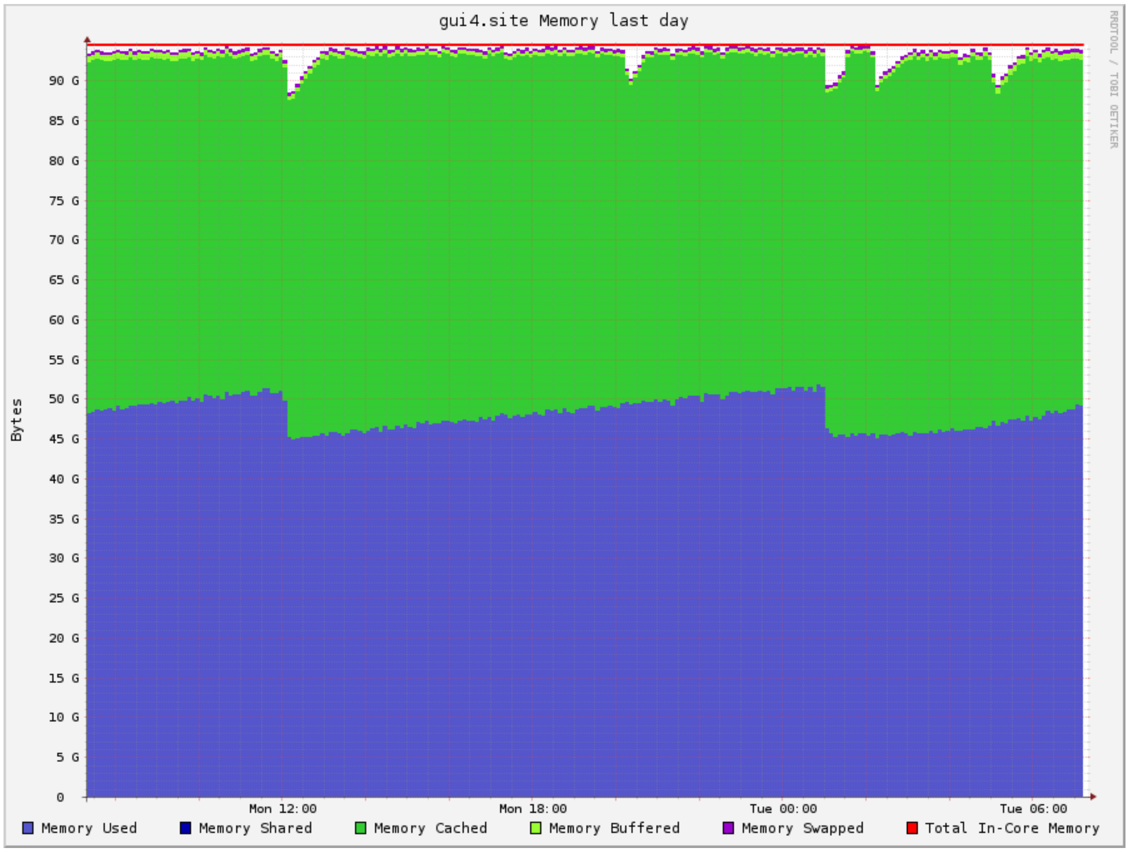

Figure 7: Ganglia memory graphic

7.10 Alarms

7.10.1 Overview

The alarm subsystem is handled by several standalone tools. It collects information from all the installation servers, processes it, and sends the traps and handles the SNMP server queries.
There are two different types of alarms:

1. Self-management alarms: that are pre-defined alarms providing information about the status of *HP CEA* elements, and
2. Threshold alarms: They provide information of deviation of KPI values based on thresholds defined by the end-user. Threshold alarm are described is section *7.10.6 Threshold Alarms* and section *7.10.7 Threshold Alarm Configuration*

Please refer to *Alarm Catalog* section to get the list of alarms available in *HP CEA*.

7.10.2 ZENHEALTH

Zenhealth is a tool that tries to measure and identify issues in a zen deployment. The following issues are checked in a zen deployment.

- XDR remote collector source queues
- XDR collected queues
- SFTP concectivity
- SNMP connectivity
- CNB. Can Not Build files.
- Zize
- Memory blocks
- Disk blocks
- Last inserted record timestamp

Zenhealth checks from the early source to the last inserted row. Zenhealt use the installed configuration to measure the connectivity. The parameters of the instalation to be checked are extracted from the data.

Zenhealth is able to auto-replicate to other servers or nodes. The invocation of zenhealth is the following:

```
zenhealth [<node1>…<noden>]
```

Zenhealth is run continuously and stores all the traps it generates in */opt/zl/nwi/var/traps* directory, in a file named *zen-snmp.dat*.

7.10.3 ZENALARMS

Zenalarms is a python script that will set, show and clear alarms manually. It's handy to test the connectivity setting, clearing and showing alarms. It will also be used by net-snmp (standard package) to provide the answer to the queries from an external SNMP server.

There is another package, java-snmp, which will monitor the trap directory, check for SNMP trap files and send a SNMP trap PDU.

7.10.4 MIB DESCRIPTION

HP CEA mib is named ZEN-FLOWSIGHT.mib and can be located in */usr/share/snmp/mibs*. All zen traps had the same structure.

The intermediate files contain the information needed to fill the trap but the NotificationID is filled by the java-snmp package.

Each variable in the trap is mapped to a value following a naming convention in the files.

An example of a trap is shown below:

```
zenZStoreCompact TRAP-TYPE
   ENTERPRISE zhilabs
   VARIABLES {
      zenAlarmEventType,
      zenAlarmProbableCause,
      zenAlarmPerceivedSeverity,
      zenAlarmNotificationID,
      zenAlarmAdditionalText
   }
```

7.10.5 TRAPS FILE NAMING

The trap control is done by creating two files that has one of the following prefix

- trap: set a trap
- clear: clear a trap.

```
{trap|clear}-TRAP-EVENTTYPE-PROBABLECAUSE-SEVERITY-ADDITIONALTEXT
```

Where:

TRAP: is the trap number as defined by the mib
EVENTTYPE: is one of the event type numbers as defined by the mib
PROBABLECAUSE: is the probable cause number as defined by the mib
SEVERITY: is the severity of the trap as defined by the mib
ADDITIONALTEXT: is a text that will be included in the trap. The Additional text shall be unique if more than one trap with the same trap number is going to be issued. There must be no spaces in the content of this parameter.

7.10.6 THRESHOLD ALARMS

The threshold alarms are workflow processes that run periodically checking that the configured timelines are under a user-defined threshold values. A description of how the user can define the threshold values is included in the document: *HP CEA 4.5 User Guide*.

When a workflow detects that a timeline value has reached a threshold value it creates an alarm message. As described in *Alarm Catalog* section, KPI threshold alarms are type 200.

There are two modes of operation:

1. The first one is the centralized mode, which uses the threshold alarms on (and limited to) a single mediation
2. The second one is the distributed mode. On this mode, the thresholds are synchronized along different mediators. Each mediator server checks the threshold for the data it is processing and will raise an alarm in case the threshold is reached. In this way, the alarm will indicate not only a deviation of a specific indicator in the whole network but also if the deviation is happening just for the piece of network the mediator is in charge of. According to this behavior, when configuring thresholds for accumulative KPIs, such as Total Volume or http transactions, the user should do an estimation of the reasonable threshold value to be used, that should not be the total one, but inversely-proportional to the number of mediators.

7.10.7 Threshold Alarm Configuration

The threshold alarms are configured using a static part and a dynamic part. The static configuration is set using a regular configuration file (e.g. thresholds.cfg) and can be found in /opt/zl/nwi/etc/base/thresholds.cfg. The dynamic configuration is set using the index.thresholds table from the local datastore, which stores the configuration values introduced using the threshold section from the GUI.

The configuration file is as follows:

```
threshold threshold
  directory     /opt/zl/nwi/var/traps
  table         inbox-fact
  interval      900
  jitter        900
  schedule      /workflow/schedule/never
  description   "Operator inbox"
!
```

To configure the distributed mode for the threshold alarms the user must perform a few additional steps:

Step 1: on a slave, and as user zhilabs, generate the RSA keys for the slave mediation (nwi)

```
:~> ssh-keygen -t rsa
```

Step 2: copy the public keys to the master mediation (nwi+gui):

```
:~> scp .ssh/id_rsa.pub zhilabs@master:/home/zhilabs/.ssh/
```

Step 3: login to the master mediation and authorize the public keys. These first steps allow the rsync command to access the master mediation without using a password.

```
:~> ssh zhilabs@master
:~> cat .ssh/id_rsa.pub >> .ssh/authorized_keys
```

Step 4: add the following entries to cron on a slave mediation and for the user zhilabs:

```
:~> crontab -e

*/5 * * * * rsync -a zhilabs@master:/opt/zl/nwi/var/zstore/zstore-
```

```
partition1/index/thresholds/thresholds__fields/
/opt/zl/nwi/var/zstore/zstore-
partition1/index/thresholds/thresholds__fields/ && export
ZE_ROOT=/opt/zl/nwi && /opt/zl/nwi/bin/zql --zstore=/m0/zen5/zstore-
frontend --cmd='reload-column index.thresholds field'
*/5 * * * * rsync -a zhilabs@master:/opt/zl/nwi/var/zstore/zstore-
partition2/index/thresholds/thresholds__fields/
/opt/zl/nwi/var/zstore/zstore-
partition2/index/thresholds/thresholds__fields/ && export
ZE_ROOT=/opt/zl/nwi && /opt/zl/nwi/bin/zql --zstore=/m0/zen5/zstore-
frontend --cmd='reload-column index.thresholds field'
*/5 * * * * rsync -a zhilabs@master:/opt/zl/nwi/var/zstore/zstore-
partition3/index/thresholds/thresholds__fields/
/opt/zl/nwi/var/zstore/zstore-
partition3/index/thresholds/thresholds__fields/ && export
ZE_ROOT=/opt/zl/nwi && /opt/zl/nwi/bin/zql --zstore=/m0/zen5/zstore-
frontend --cmd='reload-column index.thresholds field'
*/5 * * * * rsync -a zhilabs@master:/opt/zl/nwi/var/zstore/zstore-
partition4/index/thresholds/thresholds__fields/
/opt/zl/nwi/var/zstore/zstore-
partition4/index/thresholds/thresholds__fields/ && export
ZE_ROOT=/opt/zl/nwi && /opt/zl/nwi/bin/zql --zstore=/m0/zen5/zstore-
frontend --cmd='reload-column index.thresholds field'
```

The previous crontab entries will synchronize the thresholds table every five minutes. For a custom installation change the zstore paths accordingly (both on master and slave mediations). Also set the cron schedule that best fits your needs.

7.11 TSTAMP

7.11.1 OVERVIEW

Tstamp is a tool to convert dates to the format used by the zstore.

7.11.2 USAGE

The command-line parameters of tstamp are the following:

```
zhilabs@GUI:/opt/zl/nwi/bin> /opt/zl/nwi/bin/tstamp
timestamp is mandatory
Usage: tstamp [-t tstamp] [-d date] [-n]
        -t tstamp: timestamp to show in nsecs from the epoch
        -d date  : date to show in %Y%m%d%H%M%S
        -n       : input timestamp needs to be negated

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```

7.12 ZEN-BTK

7.12.1 Overview

Zen-btk is a tool to monitor the correct behavior of HP CEA. It watches all dataflows and restarts the ones that get stuck. It is managed in crontab.

An example of execution:

```
/opt/zl/nwi/bin/zen-btk.sh
```

7.12.2 Log Files

The log files for Zen-btk are stored in */opt/zl/nwi/var/logs*, with file names *zen-btk-messages.log*.

7.13 UPDATE-TABLES

7.13.1 Overview

In order to quickly have the total keys from a table, they are stored in another table called <table>-values. This table is updated automatically by the script /opt/zl/bin/update-tables.

7.13.2 Usage

```
$ /opt/zl/nwi/bin/update-tables -h
Usage: update-tables
    --datastore=name
    [--select:1;0]
    [--exclude-table=name]
    [--add-table=name]
    [--from=nanosec]
    [--to=nanosec]
    [--threads=number]
    [--zstore=name]
    [--remote-address=ip] [--remote-port=port]
    [--local-address=ip] [--local-port=port]
    [--remote-peer-name=name]
    [-v] [-k] [-x] [-h]

        Where:
        --datastore: add datastore to update
        --select: wich tables are update (1 all, 0 for none)
        --add-table: add table
```

```
            --exclude-table: exclude a table
            --from: from (default: yesterday)
            --to: to (default: now)
            --threads: number of created threads (default: 1)
            --zstore: zstore to connect to (default: /m0/zen0/zstore-frontend)
            --remote-address: remote-address to use (default: 127.0.0.1)
            --remote-port: remote-port to use (default: 8000)
            --local-address: local-address to use (default: not used)
            --local-port: local-port to use (default: not used)
            --remote-peer-name: remote peer-name (default: /m0/zen0)
            -v: verbosity (add multiple to incr)
            -k: log to konsole
            -x: exit abruptely
            -h: print this help

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```

Example of execution to update the keys of gn_app-site:

```
$ /opt/zl/nwi/bin/update-tables --datastore report --zstore=/m0/zen7/zstore-frontend --
select=0 --add-table=gn_app_site-900-timeline
```

7.14 REPORT-UPDATE

7.14.1 OVERVIEW

Every day are calculated the top and the worst keys for some reports. This is done by /opt/zl/nwi/bin/report-update. The task is programmed in crontab so it could be problematic to launch it manually.

7.14.2 USAGE

```
$ /opt/zl/nwi/bin/report-update -h
Usage: report-update
      --report=name
      [--from=nanosec or date in zstore format '0000-00-00T00:00:00']
      [--to=nanosec or date in zstore format '0000-00-00T00:00:00']
      [--scanning-from-last=force;no;yes]
      [--use-rowkey-timestamp=no;yes]
      [--delete-chunks=yes;no]
      [--base-interval=number]
      [--zstore=name]
```

```
    [--datastore=name]
    [--config-path=path]
    [--config-file=file]
    [--remote-address=ip] [--remote-port=port]
    [--local-address=ip] [--local-port=port]
    [--remote-peer-name=name]
    [-v] [-k] [-x] [-h]

        Where:
        --report: update a report (or use * for all reports)
        --from: from (default: yesterday)
        --to: to (default: now)
        --scanning-from-last: scanning-from-last (default: no)
        --use-rowkey-timestamp: use rowkey timestamp instead zstore version (default: no)
        --delete-chunks: DELETE PREVIOUS DATA in chunks to be scanned (default: no)
        --base-interval: base-interval (default: 86400)
        --zstore: zstore to connect to (default: /m0/zen0/zstore-frontend)
        --datastore: consults datastore.report-metadata (default: report-summary)
        --config-path: config path (default: ..)
        --config-file: HP CEA config file (default: ../etc/flowsight-standalone.cfg)
        --remote-address: remote-address to use (default: 127.0.0.1)
        --remote-port: remote-port to use (default: 8000)
        --local-address: local-address to use (default: not used)
        --local-port: local-port to use (default: not used)
        --remote-peer-name: remote peer-name (default: /m0/zen0)
        -v: verbosity (add multiple to incr)
        -k: log to konsole
        -x: exit abruptely
        -h: print this help

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```

Example of execution:

```
$ /opt/zl/nwi/bin/report-update --report=* --zstore /m0/zen5/zstore-frontend --config-path
/opt/zl/nwi/ --config-file /opt/zl/nwi/etc/flowsight-standalone.cfg
```

8 Log Files

HP CEA produces several logs in different log files. There are three major locations for storing the logs under HP CEA, each covered in the following chapters.

8.1 /opt/zl/nwi/var/logs

This location stores several log files from several tools.

8.1.1 External-Merger

The external merger log files are stored in /opt/zl/nwi/var/logs/external-merger. There are several log files for the external-mergers. There are always two types of files: the .log files and the .messages files. The log files contain information about the external-merger, while the messages files contain information about the execution of the external-merger.
For each type of merger (daily, weekly, hourly, apply imf on write) there is one type of log file: emd for the dailies, emw for the weeklies, emh for the hourlies, and emaiowo for the apply imf on write.
For each of these types, there is one for each of the four partitions.
Logs are rotated using linux's facility logrotate.d, The configuration file for the rotation of the logs is /etc/logrotate.d/external-merger-nwi.

8.1.2 Zen-btk

The log files for zen-btk tool are named zen-btk-messages.log, and they are rotated by the zen-btk itself.

8.1.3 Master Server

The log files for the master server are named mstrsrv_x_y.log.gz and are rotated by the tool itself.

8.1.4 SNMPQuerier

The log files for the SNMPQuerier are named SNMPQuerier_0.x.log and are rotated by the tool itseld.

8.2 /var/log

This location contains the system log files. HP CEA writes into the *messages* file all its log messages.

8.2.1 Log level filters

- INFO
- ERROR
- NOTICE

- DEBUG
- DEBUG2
- DEBUG3

8.2.2 MODIFYING LOG LEVEL

The log level can be modified dynamically as it is explained in Zcontrol. It can also be modified via configuration in the file /opt/zl/nwi/etc/flowsight-standalone.cfg. After the change a zen restart is needed.

```
system log
  level info
  class-method on
  server-name on
  component-name on
  console off
  unique-id on
  thread-id on
  feature miniconf
  feature workflow
  feature net
  feature jdbc
  feature zstore
  feature iotasks
  feature utiltasks
  feature zstoretasks
  feature rules
  feature zconsole
  feature esink
  feature correlator
  feature applogic
  feature recovery
  feature messaging
  feature top
!
```

8.3 /VAR/LOG/TOMCAT6

This location contains the tomcat log files. There are two types of logs.

8.3.1 CATALINA.OUT

Catalina.out files are generated by tomcat, and contain error messages and connection pool messages. These log files are rotated using *logrotate*, and are configured by the file */etc/logrotate.d/tomcat6*

8.3.2 APP.LOG

App.log file contains all the logs generated by the GUI. It contains the statements and results of all the GUI queries, all metadata connections, and log in procedures.

9 Administration

9.1 Basic Operation

9.1.1 Stopping HP CEA

This procedure will show how to stop HP CEA properly, so no data is lost. The first operation to perform is to prevent HP CEA from starting new dataflows. Only when no dataflow is running, HP CEA can be stopped.

To stop the scheduling of dataflows, use zcontrol.

```
zhilabs@gui:~> /opt/zl/nwi/bin/zcontrol –c stop-scheduling
```

Once the scheduling is disabled, no new dataflows will start. If there is any dataflow running, wait until it finishes.

If there is an online dataflow, check the *collected* and *processing* directories to check they’re empty. If they’re not, wait until it is.

It the processing directory contains many files and you don’t want to wait the time it would be needed to process all these files, you can move the files from the processing directory back to the collected directory. But take into account that, if not done properly, data could be duplicated. Ensure that the files being moved are not being used by the dataflow.

Once all the dataflows are idle or stopped, run zcontrol to stop them all. That will flush its data.

```
zhilabs@gui:~> /opt/zl/nwi/bin/zcontrol -c stop-all
```

The next step is to flush the zstore to disk. JDBCNSL can be used to flush all datastores, or ZQL also. Here is an example of how to use ZQL to flush all the datastore of zen5.

```
zhilabs@gui:~> /opt/zl/nwi/bin/zql --zstore /m0/zen5/zstore-frontend --cmd "flush-datastore
report;flush-datastore report-summary; flush-datastore index; flush-datastore report-index"
```

If partitioning-write is being used, flush also zen8.

The flushes will provoke CPU consumption from the zen partitions (1 through 4 and 11 to 14). Wait until they have no CPU usage. Be sure they’re not doing anything (looking at logs, or waiting a few seconds with no CPU usage).

The only step remaining is to restart HP CEA.

```
zhilabs@gui:~> /etc/init.d/zen-nwi stop
```

9.1.2 Update Decoration Files

This process is very simple. Once we have the new database files we have to stop the scheduling.

```
$ /opt/zl/nwi/bin/zcontrol -c stop-scheduling
```

Now replace the obsolete files by the new and start the scheduling again to continue with the normal working of the processes.

```
$ /opt/zl/nwi/bin/zcontrol -c start-scheduling
```

9.1.3 FOLLOW DATA

To check if the XDR files have been processing correctly be sure they are following the next path:

In the collector directories there are (at least) three subdirectories:

- Collected: where the files are waiting to be processed
- Processing: here are the files that are currently being processed
- Processed: where the files are stored once they have been processed

9.1.4 REPROCESS DATA

Sometimes can be a problem processing the XDR and could be necessary to reprocess it. Before do anything be sure that you have the XDR files for the period you want to reprocess and erase the data that are currently stored in the zstore.

Once everything is done move the files to the subdirectory collected of the collector directory.

For example for gn_session:

```
$ mv <files_to_reprocess> /opt/zl/nwi/var/data/gn_session/collected/
```

Now the collector will process them before the newer files.

9.1.5 SET RETENTION TIME OUT IN ZSTORE

All the tables of the zstore have a parameter that indicates how much time data will remain stored in the zstore.

Usually this time is 2 years but there are some tables that need another config. For example subscriber tables contain a lot of data and the time out is set to 45 days.

This parameter can be modified in the config files of the tables (/opt/zl/nwi/etc/base/).

An example for subscriber (45 days):

```
table correlator-grid
  in-memory-function set
  key olap.dimension
  column-family field
  max-versions 1
  hashed true
  index-interval 15
  # expiration time is in seconds
  expiration 64800
  has-bloom yes
  mode read-only
!
```

9.1.6 DELETE DATA FROM A SPECIFIC PERIOD OF TIME

To do this we can use the jdbc command “export”. This command selects all the content of a table and writes it in a file.

```
jdbcnsl> EXPORT TIMELINE timeline start-date end-date file
```

Where:

timeline	The name of the table
start-date	Format: YYYYMMDDHHmmDD
end-date	Format: YYYYMMDDHHmmDD
file	Output file name

For every row read it is written its INSERT and DELETE sentence.

Then we only have to delete the INSERT lines from the file and execute it via jdbc using the batch parameter.

Example to delete an hour:

```
$ /opt/zl/nwi/bin/jdbcnsl jdbc:zstore://localhost:1974//m0/zen5/zstore-frontend <user>:<pass>
=================================================================
Zhilabs JDBC Console

Copyright (c) 2008-2013 Zhilabs

All rights reserved
=================================================================

jdbcnsl> EXPORT TIMELINE report.gn_session-ggsn-900-timeline 20130812090000
20130812095959 session-ggsn.out
jdbcnsl> quit

$ cat session-ggsn.out | sed ‘s/^INSERT.*//g’ > session-ggsn.delete
$ /opt/zl/nwi/bin/jdbcnsl jdbc:zstore://localhost:1974//m0/zen5/zstore-frontend <user>:<pass>
-batch session-ggsn.delete
```

Finally make a flush of the affected table.

This process will only affect to the machine we are working on. If we want to delete all the data of that period the process must be done in all the machines.

9.1.7 ADDITIONAL WORKFLOWS

There are some workflows that aren’t processing data from the probes. These workflows have other functions and have a different scheduler from the common collectors.

9.1.7.1 Location-db-load

Is executed once per day and uses the file /opt/zl/nwi/var/decoration/cells.csv to store into the table index.mcc-mnc-lac-sac-cid-location-index info about cells (cell name, ci, latitude…). The table is used by the gui in cell name resolution, network inspector and cell location.

9.1.7.2 Device-db-load

This collector is executed once per day. Uses the file /opt/zl/nwi/var/device-db.zcsv to store into the table index.imei-index info about devices. This table is used by the gui to show subscribers device info.

9.2 SCHEDULED EXECUTIONS (CRON)

9.2.1 OVERVIEW

There are several tasks that run from external tools that need to be programmed at a certain time. The mechanism used is *cron*. All tasks are defined in several files under */etc/cron.d* directory. The most important ones are listed below.

9.2.2 EXTERNAL-MERGERS

The external-mergers are programmed to start every while. The hourly mergers have to start once each hour for all the partitions. More information on external-mergers can be found at External-Merger and External-Merger.

9.2.3 XDR PURGE

The XDR files are stored so the wizard can use them to calculate any report. The amount of XDRs stored depends on the installation disk and requirements. There is a purge mechanism that will delete all XDRs old enough. This purge mechanism is programmed in the cron files.

- purge_probe_processed.sh: deletes probe processed files older than 1 day
- purge_probe_errors.sh: deletes probe processing errors older than 3 days
- purge_aggregation_processed.sh: deletes the processed files once the wizard doesn’t needs them (45 days)

9.2.4 TOPS CALCULATION

The topper functionality needs to have the XDR files of the whole day to calculate the data correctly so the calculation is programmed in the early morning using the data of the day before.

9.2.5 TOP SITES

Every day is updated the sites top100 and they will be included in the site reports calculation. The result is stored in /opt/zl/nwi/var/topsites.txt which is used by the collectors.

9.3 BACKUP AND RESTORE

9.3.1 OVERVIEW

Before a HP CEA/wizard update is important to make a backup of some files and directories in order to can restore the last correct config if a not expected error happens with the update.

9.3.2 BACKUP

Are usually stored in /opt/zl/nwi/var/backup.
There are needed all the bin and config rpms.
The directories are:

9.3.2.1 NWI

- /opt/zl/nwi/etc
- /opt/zl/nwi/bin

9.3.2.2 WIZARD

- /opt/zl/wizard/etc
- /opt/zl/wizard/bin

It is also useful making a backup of cron config files:

- /etc/cron.d

9.3.3 RESTORE

First uninstall the new rpms and reinstall the previous version. After those restore the backups and check that everything has been done correctly. Before to start again HP CEA/wizard processes make a restart of the cron service.

9.3.4 ZSTORE

Usually zstore contains some TB of data so be careful with this.

9.3.4.1 Backup

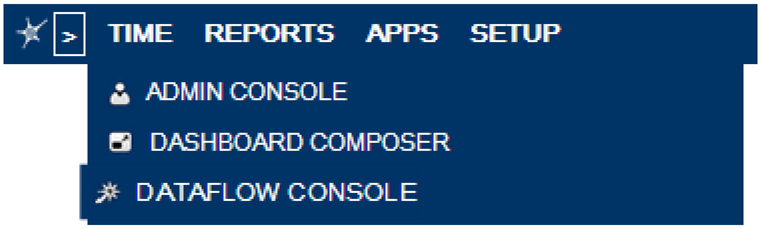
First stop the zen service in a correct way and copy de zstore directory.
For example /opt/zl/nwi/var/zstore

9.3.4.2 Restore

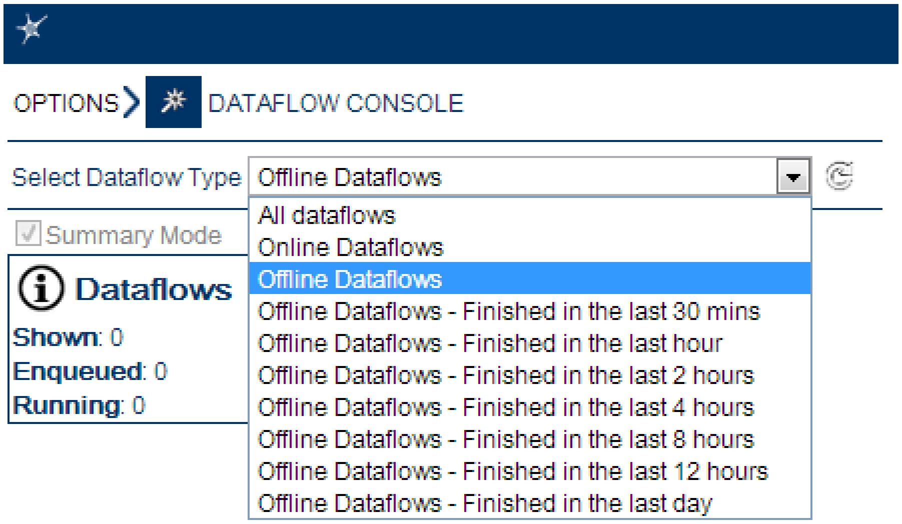
With the zen service stopped remove the current zstore directory and copy the backup (new data since the backup to now will be lost).

9.4 WIZARD ADMINISTRATION

The wizard administration console is accessible via GUI through the menu:



We can see the current, pending and finished online/offline wizards launched with some time requisites:


OPTIONS
DATAFLOW CONSOLE
All dataflows
Online Dataflows
Offline Dataflows
Offline Dataflows - Finished in the last 30 mins
Offline Dataflows - Finished in the last hour
Offline Dataflows - Finished in the last 2 hours
Offline Dataflows - Finished in the last 4 hours
Offline Dataflows - Finished in the last 8 hours
Offline Dataflows - Finished in the last 12 hours
Offline Dataflows - Finished in the last day

Select Dataflow Type: Offline Dataflows

☑ Summary Mode

Dataflows

Shown: 0
Enqueued: 0
Running: 0

We also can see some information of the wizards like:

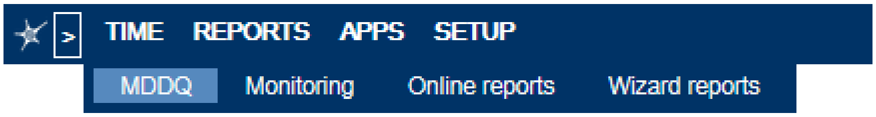
Time enqueued
Time started
Dimensions
Kpi family
Data range time
Estimated time of arrival (if running)

Completion in %
Input files
Processed files
User

And some more information.

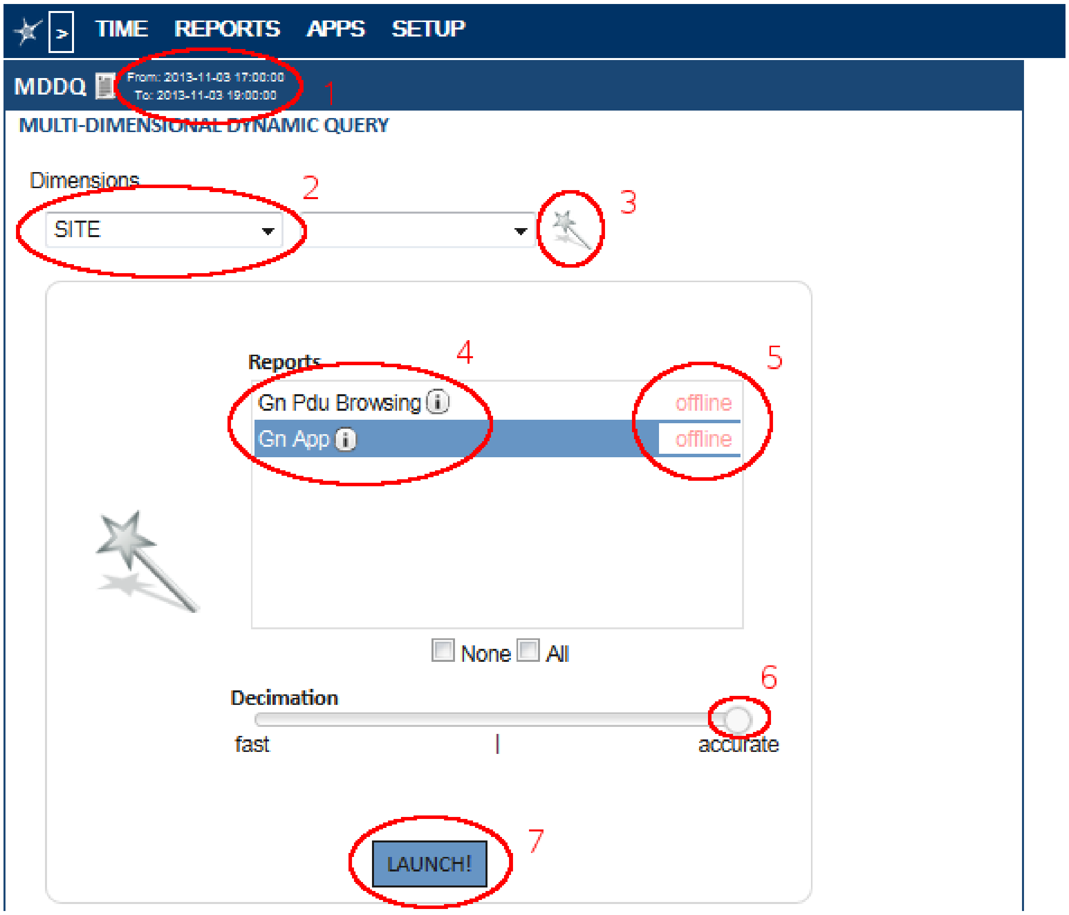
9.4.1 START A WIZARD

Wizards are launched via GUI through the menu "REPORTS->MDDQ".



Then:

1. Select the time interval
2. Select the dimensions
3. Click on the wand
4. Select the families
5. Set offline/online
6. Set decimation
7. Launch it



9.4.2 Stop a wizard

It is possible to stop a current or a pending wizard through the “STOP” button from the wizard administration console.

Once a wizard has been stopped is not possible to continue it, if a similar wizard is needed it must be launched again.

9.5 MasterServer

The MasterServer (mstrsrv) manage the querys and access to the different servers to obtain the correct data from them.

9.5.1 Configuration

The mstrsrv configuration is in the base config directory.

```
$ cat /opt/zl/nwi/etc/base/mstrsrv.cfg
```

```
jdbc-mstrsrv server
  jdbc-url      jdbc:zstore://localhost:1974//m0/zen5/zstore-frontend
  jdbc-url      jdbc:zstore://host1:1974//m0/zen5/zstore-frontend
  jdbc-url      jdbc:zstore://host2:1974//m0/zen5/zstore-frontend
  jdbc-url      jdbc:zstore://host3:1974//m0/zen5/zstore-frontend
  jdbc-url      jdbc:zstore://host4:1974//m0/zen5/zstore-frontend

  connection-timeout 20000
  transaction-timeout 3600000
  connection-inactivity 3600000
  timeout 3600000
  max-range-key-join-keys 2000

  port 1999
  log-level     info
!
```

9.5.2 START/STOP

The mstrsrv service is /etc/init.d/mstrsrv-nwi. It can be started and stopped as normal services:

- /etc/init.d/mstrsrv-nwi start
- /etc/init.d/mstrsrv-nwi stop

10 TROUBLESHOOTING

10.1 FAILURE SCENARIOS

10.1.1 PROBLEMS LOGIN IN OR ACCESSING THE GUI

10.1.1.1 Symptom

There are times when logging into the GUI fails. Not complaining about a wrong username or password, but simply not doing anything. The log file *app.log* shows authentication succeeded but no menu is shown.

10.1.1.2 Cause

The pool of connections is used, and no new connection is possible.

10.1.1.3 Solution

The solution to this problem is to restart tomcat. But first dump the tomcat logs so Zhilabs Support Team can study it.

To dump the log:

```
zhilabs@gui:~> sudo kill –QUIT <tomcat-pid>
```

To restart tomcat:

```
zhilabs@gui:~> sudo /etc/init.d/tomcat6 restart
```

10.1.2 GUI DOESN'T SHOW ALL THE REPORTS

10.1.2.1 Symptom

Some menus and submenus have disappeared and aren't accessible.

10.1.2.2 Cause

Tomcat has a problem reading any store and reports stored in that store are lost.

10.1.2.3 Solution

Update the version from the affected store via jdbcnsl modifying the column "version" from the row "VERSION" from the table report-summary.report-metadata.

10.1.3 NOISE VALUES IN GUI

10.1.3.1 Symptom

When a report is selected, dimension names are incorrect.

10.1.3.2 Cause

The disk of a machine is full and data is generated with strange values.

10.1.3.3 Solution

Clean the disk to make free space, recalculate the values of the wrong tables and clean the tomcat cache.

10.1.4 INDEXATION PROBLEMS

10.1.4.1 Symptom

GUI doesn't translate new msisdn.

10.1.4.2 Cause

1. The partition /var (where the msisdn-imsi cache is stored) is full.
2. Is a new msisdn that appeared from first time.

10.1.4.3 Solution

1. Clean /var partition or delete the folder /var/cache/tomcat6/temp/search-index and make a tomcat restart.
2. Wait a day to everyday msisdn-imsi recalculation.

10.1.5 GUI TOO SLOW

10.1.5.1 Symptom

GUI takes a lot of time loading reports and works slower in general.

10.1.5.2 Cause

There is too fragmentation in the store and the access to the frontend takes much time.

10.1.5.3 Solution

Launch the weekly merger to the affected partitions.

Example:

```
$ /opt/zl/nwi/bin/weekly-partition.sh /opt/zl/nwi/var/zstore/zstore-partition2
```

10.1.6 CANNOT ADD/REMOVE USER ON THE ADMIN CONSOLE

10.1.6.1 Symptom

Problems creating or deleting a user because the doesn't allow to do it.

10.1.6.2 Cause

- You don't have permissions.
- Setup-gui configured as "console".

10.1.6.3 Solution

- Add or request for the necessary permissions.
- Change the setup-gui to table, or modify the users using the file /opt/zl/nwi/etc/base/authentication.cfg.

10.1.7 I CANNOT SEE ALL THE PERMISSIONS IN THE LIST OF AVAILABLE ONES IN THE ADMIN CONSOLE

10.1.7.1 Symptom

Some of the common permissions are not in the list of available permissions.

10.1.7.2 Cause

The permissions have been deleted from the config file (web.xml).

10.1.7.3 Solution

The available permissions are set executing the setup-gui.

10.1.8 THE SETUP-GUI SHOWS ALL FIELDS EMPTY

10.1.8.1 Symptom

Trying to do a setup-gui al fields are empty and the config is not saved.

10.1.8.2 Cause

The config file web.xml is corrupted and it cannot be read.

10.1.8.3 Solution

Remove the web.xml file and do the setup-gui again.

10.1.9 WIZARD PROBLEMS

10.1.9.1 Identify the problem

First of all check that the service /etc/init.d/zen-wizard is running. It is also necessary the tool /opt/zl/wizard/bin/wizard-loop-handlequeue (it should be in the crontab file "crontab.wizard" to be executed regularly).

A wizard problem can have several causes so it is necessary to check logs.

10.1.9.2 How to Find a Wizard

First of all we need the flow id of the wizard to find it in the logs.
In the dataflow console (via GUI) there is the field "ID", we can use this info to correlate with the content of the wizard zstore table "index.wizardflows" and to get the flow id.
We can use the new info to check the logs from /opt/zl/wizard/var/executions and /var/log/messages.

10.1.10 WIZARD FINISHED NO DATA

10.1.10.1 Symptom

After launch a wizard it finishes with the error "FINISHED NODATA".

10.1.10.2 Cause

The wizard can't found files with the time period you have configured it

10.1.10.3 Solution

Check if the files have already been purged or if the wizard is not searching in the directory where they are (logs in /opt/zl/wizard/var/executions/). In the last case it is necessary to do a symbolic link.

10.1.11DECORATION PROBLEMS

10.1.11.1 Symptom

Loss of data due to empty file fields.

10.1.11.2 Cause

The fields are generated using a decoration file, but the content is incorrect or it doesn't exist.

10.1.11.3 Solution

- If the file doesn't exist check if it exists with a different extension and modify the config files where it is used.
- If the content of the decoration file doesn't seem correct check how it is generated in order to find the problem.

10.1.12GAPS AND BACKLOG

10.1.12.1 Symptom

Reports don't show recent data or there are time periods empty.

10.1.12.2 Cause

The disk has been or is full. Or there are dataflows blocked.

10.1.12.3 Solution

If the disk is full make free space and check there aren't files in the subdirectories notprocessed under /opt/zl/nwi/var/data/…/
Check if there are dataflows blocked and kill them.

10.1.13Swap

10.1.13.1 Symptom

The performance is worse and I/O is occupying a high % of CPU.

10.1.13.2 Cause

There are too many processes doing I/O operations.

10.1.13.3 Solution

Decrease mappers and reducers in dataflow config files, reduce the number of local and remote collectors, schedule some processes in early morning…

10.1.14 Service Not Configured

10.1.14.1 Symptom

Zen service neither starts nor stops:

```
zhilabs@mediation:/opt/zl/nwi/etc> /etc/init.d/zen-nwi start
Starting zen                                                        failed
zhilabs@mediation:/opt/zl/nwi/etc> /etc/init.d/zen-nwi stop
Shutting down zen                                                   failed
```

10.1.14.2 Cause

Empty zen service configuration file, commonly after initial HP CEA installation and when setup script hasn't been executed.
In other situations, zen service configuration file might have been accidentally removed.

10.1.14.3 Solution

Recreate zen service configuration file by running installation setup script:

```
zhilabs@mediation:/opt/zl/nwi/etc> /opt/zl/nwi/bin/setup
Is this root zen? (default: yes):
Is this root zen?: "yes"
Local peer name (default: /m0/zen0):
```

```
Local peer name: "/m0/zen0"
Local IP address (default: 127.0.0.1):
Local IP address: "127.0.0.1"
Local port (default: 8000):
Local port: "8000"
Config file (default: /opt/zl/nwi/etc/flowsight-standalone.cfg):
Config file: "/opt/zl/nwi/etc/flowsight-standalone.cfg"
System ready. Configuration written into /etc/sysconfig/zen file.
zhilabs@mediation:/opt/zl/nwi/etc> /etc/init.d/zen-nwi start
Starting zen                                                  done
```

10.1.15 Cannot Bind IP Address in Zen Cluster Setup

10.1.15.1 Symptom

Zen service starts but status is unavailable and related processes are not running:

```
zhilabs@mediation:~> /etc/init.d/zen-nwi start
Starting zen                                                  done
zhilabs@mediation:~> /etc/init.d/zen-nwi status
Checking for service zen                                      unused
zhilabs@mediation:~> pgrep -f zen
zhilabs@mediation:~>
```

Log traces point out to an IP address, TCP port bind problem due to a busy port.

```
May 23 11:01:12 mediation /opt/zl/nwi/bin/zen[20712]:
[Zen::runFromConfigFile]: Starting execution with pid(20712) and
uid(1000/1000)
May 23 11:01:12 mediation /opt/zl/nwi/bin/zen[20712]:
[TCPServerSocket::initialize][/m0/zen0]: (6): cannot bind to
10.93.0.225:8000 (13)
May 23 11:01:12 mediation /opt/zl/nwi/bin/zen[20712]:
[Server::run][/m0/zen0]: (/m0/zen0): error(-1) when initializing-all. Server
exiting, pid(20712)
```

10.1.15.2 Cause

HP CEA’s zen0 peer is using either an undefined IP address or a busy or unauthorized TCP port. Note that HP CEA does not assign IP addresses to the SLES operating system and cannot use system ports since it does not run with superuser privileges.

10.1.15.3 Solution

Recreate zen service configuration file by setting a valid IP address and local TCP port:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/setup
```

```
Is this root zen? (default: yes):
Is this root zen?: "yes"
Local peer name (default: /m0/zen0):
Local peer name: "/m0/zen0"
Local IP address (default: 127.0.0.1):
Local IP address: "127.0.0.1"
Local port (default: 8000):
Local port: "8000"
Config file (default: /opt/zl/nwi/etc/flowsight-standalone.cfg):
Config file: "/opt/zl/nwi/etc/flowsight-standalone.cfg"
System ready. Configuration written into /etc/sysconfig/zen file.
zhilabs@mediation:~> /etc/init.d/zen-nwi start
Starting zen                                                    running
zhilabs@mediation:~> /etc/init.d/zen-nwi status
Checking for service zen                                        running
zhilabs@mediation:~> pgrep -f zen
23752
```

Additionally, verify that current machine (in the example above m0) has a valid IP Address and zen peers have valid ports as well, since this configuration will apply to the rest of local peers.

10.1.16 Cannot Start a Component

10.1.16.1 Symptom

Component start process fails with the following log message:

```
Apr 2 12:53:23 mediation /opt/zl/nwi/bin/zen[2063]:
[ResourceController::loadComponent][/m0/zen0:/m0/zen0/resmgr]: Cannot start type
(zstorefrontend), library (zstorefrontend), error ((null)). Problem loading library
```

10.1.16.2 Cause

Resource manager component from the peer with the related issue (/m0/zen0 above) lacks of scan configuration for the library containing the component described in the error log message. Note that resource manager does not load all installed libraries by default. Explicit libraries have to be configured for such purpose.

10.1.16.3 Solution

Update resource manager configuration to include missing library

```
resource-manager /m0/zen0/resmgr
  watchdog on
  lib-path /opt/zl/flowsight/lib
  lib-scan esink
  lib-scan resmgr
  lib-scan workflow
  # missing library scan
  lib-scan zstore
!
```

10.1.17 Errors In Configuration Files

10.1.17.1 Symptom

Starting zen fails.

```
zhilabs@mediation:/opt/zl/nwi/etc> /etc/init.d/zen-nwi start
Starting zen-nwi                                          failed
```

Status doesn't show anything:

```
zhilabs@mediation:/opt/zl/nwi/bin> /etc/init.d/zen-nwi status
Checking for service zen-nwi
```

10.1.17.2 Cause

Error in one config file. For example, using command “peerd” instead of “peer”.

10.1.17.3 Solution

The way to solve the error is running cfgcheck, which will show where the error is. Or check messages log.

```
zhilabs@mediation:/opt/zl/nwi/bin> ./cfgcheck ../etc/flowsight-standalone.cfg /m0/zen0
Thu Apr 26 16:40:50 2012: [ERROR]: [CommandContext::match]: Command line(peerd
/m0/zen1) does not match against any available command definition
Thu Apr 26 16:40:50 2012: [ERROR]: [ParsingContext::parse]: Error parsing line #34 (peerd
/m0/zen1) in file(../etc/flowsight-standalone.cfg)
Thu Apr 26 16:40:50 2012: [ERROR]: [cfg::ObjectFactory* parseConfig]: Could not load config
file ../etc/flowsight-standalone.cfg
```

10.1.18 Jdbcnsl Doesn’t start

10.1.18.1 Symptom

When starting jdbcnsl a java error is shown:

```
Exception in thread "main" java.lang.NoClassDefFoundError:
com/zhilabs/jdbc/console/Console
Caused by: java.lang.ClassNotFoundException:
com.zhilabs.jdbc.console.Console
```

```
  at java.net.URLClassLoader$1.run(URLClassLoader.java:217)
  at java.security.AccessController.doPrivileged(Native Method)
  at java.net.URLClassLoader.findClass(URLClassLoader.java:205)
  at java.lang.ClassLoader.loadClass(ClassLoader.java:319)
  at sun.misc.Launcher$AppClassLoader.loadClass(Launcher.java:294)
  at java.lang.ClassLoader.loadClass(ClassLoader.java:264)
  at java.lang.ClassLoader.loadClassInternal(ClassLoader.java:332)
Could not find the main class: com.zhilabs.jdbc.console.Console. Program will exit.
```

10.1.18.2 Cause

Jdbcnsl needs the environment variable ZE_ROOT to be set to point to the current installation of HP CEA.

10.1.18.3 Solution

Define the ZE_ROOT variable. Something like this:

```
$ export ZE_ROOT=/opt/zl/nwi
```

Or add it to the invocation of the jdbcnsl command, like this:

```
$ ZE_ROOT=/opt/zl/nwi /opt/zl/nwi/bin/jdbcnsl …
```

10.1.19 ZIZE SHOWS NOTHING

10.1.19.1 Symptom

When starting zize, no prompt is given and nothing happens. A situation like this:

```
zhilabs@mediation:~> /opt/zl/nwi/bin/zize

```

And no prompt.

10.1.19.2 Cause

The default parameters of zize point to a zstore that it's not in use. To check the parameters, run zize with the -help option.

10.1.19.3 Solution

Add the --zstore parameter to the zize invocation. To check which zstore frontend to use, check the basic configuration.

10.2 IDENTIFYING PROBLEMS IN HP CEA

10.2.1 REMOTE-COLLECTOR PROBLEMS

The main problems of a remote-collector are:

- Wrong config: Check all the parameters are correct (host, use, remote-path…)

- Ssh key: Try to connect through ssh to the remote host to see if is a problem related with rsa key.
- Remote-Collector blocked: Logs show a similar message every time. It is needed to kill the process and make a restart of the remote-collector.

10.2.2 Collector Problems

There are some causes that produce a malfunction of a collector:

- Wrong config: Check all the parameters are correct and make sense.
- No input data: Check that probes are running without problems and generating files, and that remote-collectors are working correctly.
- Collector blocked: Logs show a similar message every time. It is needed to kill the process and make a restart of the collector.

Otherwise check logs, where it can be found the key to know what is happening with the collector.

10.3 Repairing a Damaged Zstore

In unlikely scenarios there might be needed to repair a datastore. In such situation the procedure to address the situation would be the following:

1. Remove schema files from the damaged datastore, located in zstore-path /*datastore*/schema.bin files.
2. Restart datastore peers. It might be done in different ways. Most likely partition by partition using high availability feature from zstore.
3. New schema files will be generated automatically by datastore components, addressing the problem with the previous schema files.

11 ALARM CATALOG

11.1 INTRODUCTION

This chapter describes the alarms present in the *CEA* system. At the same time it provides an indication on the action that the receiving party should take for each of them.

In the current version, all the alarms are at the same level, corresponding to the ***warning*** level. This level is configurable and could be adapted to customer needs.

11.1.1 ZHILABS ESN

The enterprise ID for all OID references is 34593.

The ESN is registered in IANA and accessible on the following URL:

http://www.iana.org/assignments/enterprise-numbers

11.2 ALARM DESCRIPTION AND PROCEDURES

This section includes the list of alarm including the description and the recommended action to be taken should they be raised.

11.2.1 RESOURCE ALARMS

11.2.1.1 Memory

zenMemoryThreshold	
TYPE	110
Description	RAM memory occupation value is above 80% or below 10%
Severity	***warning***
Additional Text	
Recommended action	This could be a transient situation due to the different loads throughout the day. If the problem persists for more than 4 hours, notify it to the support team

11.2.1.2 Disk

zenDiskThreshold

TYPE	111
Description	Disk occupation value is above 80%
Severity	***warning***
Additional Text	Mount point of the offending partition
Recommended action	This could be a transient situation due to the different loads throughout the day. Notify the problem to the support team indicating the problematic partition as included in the "additional text" field of the alarm event.

11.2.1.3 CPU

zenCpuLoadHigh	
TYPE	112
Description	Overall CPU load value is above 80% or below 10%
Severity	***warning***
Additional Text	
Recommended action	This could be a transient situation due to the different loads throughout the day. If the problem persists for more than 4 hours, notify it to the support team

11.2.2 Application Alarms

11.2.2.1 Dataflow

zenDataFlowError	
TYPE	100
Description	Error when running one of the application dataflows
Severity	***warning***
Additional Text	Name of the dataflow having the error
Recommended action	This could be a transient error. If the problem persists for more than 1 hour, notify it to the support team

11.2.2.2 Application

zenApplicationError	
TYPE	101
Description	Internal application error due to some of its processes not being present
Severity	***warning***
Additional Text	Name of the application having the error

Recommended action	This is usually a transient error and the process should recover automatically. If the problem persists for more than 1 hour, notify it to the support team.

11.2.3 Data Source Alarms

11.2.3.1 Collector

zenCollectorQueue	
TYPE	102
Description	Number of XDRs pending to be processed older than 240 minutes is greater than 0. The alarm text indicates which the offending datasource is.
Severity	***Critical***
Additional Text	Name of the machine and datasource having the error
Recommended action	1.- Check that the access to the datasource is still active 2.- Check that user and password for this datasource is still valid 3.- Check that disks are not full If everything is correct, notify the problem to the support team

11.2.3.2 Remote Collector

zenRemoteCollectorError	
TYPE	120
Description	One of the remote data sources is not receiving information. - One of the file remote collector has not been received for more than 240 minutes. The alarm text indicates which the datasource is. - One of the configured Ethernet interfaces in the probe is dropping packets in reception. - One of the configured Ethernet interfaces in the probe has an incoming bitrate lower than 80000 bytes/s
Severity	***warning*** for all the datasources except for traffic probes. ***critical*** Traffic probes will raise a ***critical*** alarm
Additional Text	Name of the machine and datasource having the error
Recommended action	1.- Check that the access to the datasource is still active 2.- Check that user and password for this datasource is still valid 3.- Check that disks are not full 4.- Check connectivity to the remote machine If everything is correct, notify the problem to the support team

11.2.4 STORE

11.2.4.1 Store

zenStore	
TYPE	121
Description	Problem in the application store. The alarm is raised in two cases. - Delay: One table has not been update in more than 240 minutes. The alarm text indicates which the table has the delay. - Timeout: The analisis of the tables in the zenStore takes more than 120 secs.
Severity	***Warning*** ***critical***
Additional Text	Name of the machine with the offending behaviour adding following elements used to identify the issue. - Delay: table-name - timeout: "zize timeout raised"

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Recommended action	This could be a transient situation. If the problem persists for more than 4 hours, notify it to the support team

11.2.4.2 Fragmentation

zenStoreCompact	
TYPE	122
Description	The application store is too fragmented, which may impact response times.
Severity	***warning***
Additional Text	Name of the machine with the offending behaviour
Recommended action	This could be a transient situation. If the problem persists for more than 4 hours, notify it to the support team

11.2.5 KPI

11.2.5.1 KPI Threshold above level.

zenKPIThreshold	
TYPE	200
Description	KPI threshold has been reached.
Severity	***warning***
Additional Text	Description of the KPI Threshold as introduced in the GUI.
Recommended action	Check the KPI report in the GUI.
Note	This KPI threshold alarm is not activated by default with the HP CEA platform alarms.

11.2.6 HEARTBEAT

11.2.6.1 Heart beat & keep alive notification.

zenKPIThreshold	
TYPE	300
Description	Platform heartbeat
Severity	***Warning***
Additional Text	Hostname,heartbeat
Recommended action	None, this notification is sent continuously.

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Note	This notification means the platform is alive and reachable. The heartbeat notification is disabled by default.

11.2.7 ADDITIONAL TEXT FORMAT

The SNMP Additional text is build by concatenating information that will be necessary to identify the cause of the alarm. The aditional text is created by concatenation of the columns source, entity, subentity, value, compare and threshold in Table 2.

The tokens prefixed with a "$" are variables that are substituted when the alarm is raised, they contains the value to be sent in the trap. The description of the tokens can be found in Table 1

Table 1: Additional text variables.

Name	Description
$user	user used in the connection
$remotehost	remote host to retrieve files from (by ftp or sftp)
$hostname	hostname sending the alarm
$table	zstore table name
$partition	filesystem partition
$ifname	ethernet interface name
$collector	Collector name as written in the configuration
$used	Total space used
$blocks	Total blocks of the zstore
$remotepath	remote path to retrieve files from (by ftp or sftp)
$localpath	local path of the collector

The columns in Table 2 are used to create the alarm. Following list is a description of each column in the table

.

- Notification id: SNMP Notification id that will be sent. See the Alarm Catalog section for their numeric value.
- Source: the host sending the alarm
- entity: the HP CEA entity subject of the alarm.
- subentity: complements the entity field adding more information in case the "entity" sends more than one alarm.
- value: the counter value that trigger the alarm after reaching a threshold
- compare: the function used to compare the value and the threshold.

- threshold: the numeric value used as a level that raises an alarm when crossed.

Table 2: Additional Text Structure.

Alarm Id	source	entity	subentity	value	compare	threshold
zenRemoteCollectorError	$hostname	$collector	$localpath	$count	older-than	240
zenApplicationError	$hostname	$collector	$remotehost:$remotepath	$count	older-than	240
zenZStoreCompact	$hostname	number-of-files	cnb	$count	greater-than	0
zenZStore	$hostname	$table	total-memory	$memory	greater-than	0
zenZStore	$hostname	$table	total-blocks	$blocks	greater-than	0
zenZStore	$hostname	$table	timestamp	$timestamp	greater-than	0
zenZStore	$hostname	zize	timeout	raised	older-than	120
zenMemoryThreshold	$hostname	memory	total	usage	greater-than	80
zenMemoryThreshold	$hostname	memory	total	usage	lower-than	10
zenCpuLoadHigh	$hostname	cpu	total	usage	greater-than	80
zenCpuLoadHigh	$hostname	cpu	total	usage	lower-than	10
zenDiskThreshold	$hostname	$partition	total	usage	greater-than	80
zenRemoteCollectorError	$hostname	$ifname	rx-packet-rate	$rate	lower-than	80000

11.3 Appendix: SNMP v1 MIB

This appendix includes *HP CEA* MIB.

```
-------------------------------------------------------------------------------
--
--  (c) 2008-2012 Zhilabs
--
-------------------------------------------------------------------------------
--
--  Zhilabs Flowsight MIB file.
--
--  The Zhilabs enterprise number is 34593.
--  The ASN.1 oid is: 1.3.6.1.4.1.34593
--
-------------------------------------------------------------------------------

ZEN-MIB DEFINITIONS ::= BEGIN

    IMPORTS
       enterprises    FROM RFC1155-SMI
       OBJECT-TYPE    FROM RFC1155-SMI
       TRAP-TYPE      FROM RFC-1215
       DisplayString  FROM RFC1213-MIB;

    zhilabs           OBJECT IDENTIFIER ::= { enterprises 34593 }
```

```
------------------------------------------------------------------------------
--
--   ZEN Active Alarm Table:
--
--   zen enterprise                 1.3.6.1.4.1.34593
--    zen Group                                   1.3.6.1.4.1.34593.1
--     zen Events Group                           1.3.6.1.4.1.34593.1.2
--      zen AlarmActiveTable               1.3.6.1.4.1.34593.1.2.1
--
------------------------------------------------------------------------------

    zenAlarmActiveTable OBJECT-TYPE
       SYNTAX SEQUENCE OF ZenAlarmActiveTableEntry
       ACCESS not-accessible
       STATUS mandatory
       DESCRIPTION
           "Alarm status, contains each alarm that has been trigger"
       ::= { zhilabs 1 }

    zenAlarmActiveTableEntry OBJECT-TYPE
       SYNTAX ZenAlarmActiveTableEntry
       ACCESS not-accessible
       STATUS mandatory
       DESCRIPTION
           "Alarm definition."
       INDEX  { zenAlarmIndex }
       ::= { zenAlarmActiveTable 1 }

    ZenAlarmActiveTableEntry ::= SEQUENCE {
           zenAlarmIndex     INTEGER,
           zenAlarmSpecificType INTEGER,
           zenAlarmEventType INTEGER,
           zenAlarmProbableCause INTEGER,
           zenAlarmPerceivedSeverity INTEGER,
           zenAlarmNotificationID INTEGER,
           zenAlarmAdditionalText DisplayString
       }

    zenAlarmIndex OBJECT-TYPE
       SYNTAX INTEGER (0..65535)
       ACCESS read-only
       STATUS mandatory
       DESCRIPTION
           "Alarm index. Unique value. TRAP ID"
       ::= { zenAlarmActiveTableEntry 1 }

    zenAlarmSpecificType OBJECT-TYPE
       SYNTAX INTEGER
       ACCESS read-only
       STATUS mandatory
       DESCRIPTION
           "Alarm type."
```

```
      ::= { zenAlarmActiveTableEntry 2 }

   zenAlarmEventType OBJECT-TYPE
      SYNTAX INTEGER {
          communicationsAlarm (2),
          environmentalAlarm (3),
          equipmentAlarm (4),
          processingErrorAlarm (10),
          qualityOfServiceAlarm (11)
      }
      ACCESS read-only
      STATUS mandatory
      DESCRIPTION
          "Event type. CCITT X.721 | ISO/IEC 10165-2"
      ::= { zenAlarmActiveTableEntry 3 }

   zenAlarmProbableCause OBJECT-TYPE
      SYNTAX INTEGER {
       callEstablishmentError (5),
          softwareProgramAbnormallyTerminated (47),
          thresholdCrossed (51)
      }
      ACCESS read-only
      STATUS mandatory
      DESCRIPTION
          "Probable cause of alarm,
          according to CCITT X.721 | ISO/IEC 10165-2"
      ::= { zenAlarmActiveTableEntry 4 }

   zenAlarmPerceivedSeverity OBJECT-TYPE
      SYNTAX INTEGER {
          --indeterminate (0),
          critical(1),
          major(2),
          minor(3),
          warning(4),
          clear(5)
      }
      ACCESS read-only
      STATUS mandatory
      DESCRIPTION
          "Severity of last alarm, according to CCITT X.721 | ISO/IEC 10165-2"
      ::= { zenAlarmActiveTableEntry 5 }

   zenAlarmNotificationID OBJECT-TYPE
      SYNTAX INTEGER
      ACCESS read-only
      STATUS mandatory
      DESCRIPTION
          "A unique number identifying each trap,
          according to CCITT X.721 | ISO/IEC 10165-2"
      ::= { zenAlarmActiveTableEntry 6 }

   zenAlarmAdditionalText OBJECT-TYPE
```

```
       SYNTAX DisplayString
       ACCESS read-only
       STATUS mandatory
       DESCRIPTION
           "Text with additional information about the trap"
       ::= { zenAlarmActiveTableEntry 7 }


------------------------------------------------------------------------------
--
--   zen MIB Trap Definitions
--
--   rules defined in rfc1215.
--
------------------------------------------------------------------------------



    --- Process traps
    zenDataFlowError TRAP-TYPE
    ENTERPRISE zhilabs
    VARIABLES {
        zenAlarmEventType,
        zenAlarmProbableCause,
        zenAlarmPerceivedSeverity,
        zenAlarmNotificationID,
        zenAlarmAdditionalText
    }
    DESCRIPTION
        "Data Flow Error"
    ::= 100

    zenApplicationError TRAP-TYPE
    ENTERPRISE zhilabs
    VARIABLES {
        zenAlarmEventType,
        zenAlarmProbableCause,
        zenAlarmPerceivedSeverity,
        zenAlarmNotificationID,
        zenAlarmAdditionalText
    }
    DESCRIPTION
        "Zen Application Error"
    ::= 101

    zenCollectorQueue TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
```

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```
           "Collector queue threshold"
       ::= 102

    --- Capacity traps
    zenMemoryThreshold TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
           "Memory usage above threshold"
       ::= 110

    zenDiskThreshold TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
           "Disk usage above threshold"
       ::= 111

    zenCpuLoadHigh TRAP-TYPE
        ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
        DESCRIPTION
            "CPU load above threshold"
        ::= 112

    --- Collector traps
    zenRemoteCollectorError TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
```

```
           "Remote end unreachable"
       ::= 120

    --- Zstore traps

    zenZStore TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
           "zstore warning"
       ::= 121

    zenZStoreCompact TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
           "zstore can't compact"
       ::= 122

    zenKPIThreshold TRAP-TYPE
       ENTERPRISE zhilabs
       VARIABLES {
           zenAlarmEventType,
           zenAlarmProbableCause,
           zenAlarmPerceivedSeverity,
           zenAlarmNotificationID,
           zenAlarmAdditionalText
       }
       DESCRIPTION
           "KPI threshold has been reach."
       ::= 200

     zenHeartBeat TRAP-TYPE
        ENTERPRISE zhilabs
        VARIABLES {
            zenAlarmEventType,
            zenAlarmProbableCause,
            zenAlarmPerceivedSeverity,
            zenAlarmNotificationID,
            zenAlarmAdditionalText
        }
        DESCRIPTION
```

```
            "Zen platform heartbeat."
        ::= 300
```

11.4 APPENDIX: SNMP V2C MIB

```
ZEN-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE,Integer32, NOTIFICATION-TYPE, OBJECT-TYPE, enterprises
        FROM SNMPv2-SMI
    DisplayString
        FROM SNMPv2-TC;




zhilabs MODULE-IDENTITY
    LAST-UPDATED "201208190000Z"
    ORGANIZATION "Zhilabs"
    CONTACT-INFO
        "Email: support@zhilabs.com"
       DESCRIPTION
              "Zen flowsight MIB"
       REVISION
              "201208190000Z"
       DESCRIPTION
              "Zen flowsight MIB"
    ::= { enterprises 34593 }



zenAlarmActiveTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF ZenAlarmActiveTableEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Alarm status, contains each alarm that has been trigger"
    ::= { zhilabs 1 }

zenAlarmActiveTableEntry OBJECT-TYPE
    SYNTAX      ZenAlarmActiveTableEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Alarm definition."
    INDEX       { zenAlarmIndex }
    ::= { zenAlarmActiveTable 1 }

ZenAlarmActiveTableEntry ::= SEQUENCE {
    zenAlarmIndex               Integer32,
    zenAlarmSpecificType        Integer32,
    zenAlarmEventType           INTEGER,
    zenAlarmProbableCause       INTEGER,
    zenAlarmPerceivedSeverity   INTEGER,
    zenAlarmNotificationID      Integer32,
    zenAlarmAdditionalText      DisplayString
}
```

```
zenAlarmIndex OBJECT-TYPE
    SYNTAX      Integer32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Alarm index. Unique value. TRAP ID"
    ::= { zenAlarmActiveTableEntry 1 }

zenAlarmSpecificType OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Alarm type."
    ::= { zenAlarmActiveTableEntry 2 }

zenAlarmEventType OBJECT-TYPE
    SYNTAX      INTEGER { communicationsAlarm(2), environmentalAlarm(3),
                    equipmentAlarm(4), processingErrorAlarm(10),
                    qualityOfServiceAlarm(11) }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Event type. CCITT X.721 | ISO/IEC 10165-2"
    ::= { zenAlarmActiveTableEntry 3 }

zenAlarmProbableCause OBJECT-TYPE
    SYNTAX      INTEGER { callEstablishmentError(5),
                    softwareProgramAbnormallyTerminated(47),
                    thresholdCrossed(51) }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Probable cause of alarm,
         according to CCITT X.721 | ISO/IEC 10165-2"
    ::= { zenAlarmActiveTableEntry 4 }

zenAlarmPerceivedSeverity OBJECT-TYPE
    SYNTAX      INTEGER { critical(1), major(2), minor(3), warning(4),
                    clear(5) }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Severity of last alarm, according to CCITT X.721 | ISO/IEC 10165-2"
    ::= { zenAlarmActiveTableEntry 5 }



zenAlarmNotificationID OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
```

```
        "A unique number identifying each trap,
         according to CCITT X.721 | ISO/IEC 10165-2"
    ::= { zenAlarmActiveTableEntry 6 }

zenAlarmAdditionalText OBJECT-TYPE
    SYNTAX      DisplayString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Text with additional information about the trap"
    ::= { zenAlarmActiveTableEntry 7 }



zenDataFlowError NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Data Flow Error"
    ::= { zhilabs 100 }

zenApplicationError NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Zen Application Error"
    ::= { zhilabs 101 }

zenCollectorQueue NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Collector queue threshold"
    ::= { zhilabs 102 }

zenMemoryThreshold NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Memory usage above threshold"
    ::= { zhilabs 110 }

zenDiskThreshold NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Disk usage above threshold"
    ::= { zhilabs 111 }

zenCpuLoadHigh NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "CPU load above threshold"
    ::= { zhilabs 112 }

zenRemoteCollectorError NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Remote end unreachable"
    ::= { zhilabs 120 }

zenZStore NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "zstore warning"
    ::= { zhilabs 121 }

zenZStoreCompact NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "zstore can't compact"
    ::= { zhilabs 122 }

zenKPIThreshold NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "KPI threshold has been reach."
    ::= { zhilabs 200 }

zenHeartBeat NOTIFICATION-TYPE
    OBJECTS     { zenAlarmEventType, zenAlarmProbableCause,
                  zenAlarmPerceivedSeverity, zenAlarmNotificationID,
                  zenAlarmAdditionalText }
    STATUS      current
    DESCRIPTION
        "Zen platform heartbeat."
    ::= { zhilabs 300 }

END -- end of module ZEN-MIB.
```