Statistics Management

This chapter includes the following sections:

Statistics Management

Cisco UCS Central enables you to generate standard and customized reports from the **Statistics** tab. You can generate reports on the following data in the registered Cisco UCS domains:

- Cooling

- Network

- Power

- Temperature

Important You must be logged in as an admin or as a user with statistics privilege to create, modify or delete a report. Other users can only run reports and view available data.

When you generate a report, you can specify the option to view the report either in the format of a table or a chart. Using the display options, you can select top or bottom domains for a specific report type. You can also use overlay to overlay the data for a report type. The following are the two report options:

- **Standard Reports**: Predefined reports on Peak Fan Speed, Receive Traffic(Rx), Transmit Traffic (Tx), Average Power, and Peak Temperature. You can run any of these predefined reports any time to view reports. You can also modify the predefined configurations, but cannot create any new standard report.

- **Custom Reports**: Option to create customized reports from any of the available report options. Based on your requirements, you can create either create individual reports in the **Ungrouped Reports** or create **Report Group**s and then create reports under the groups or sub-groups. You can create, edit or delete the custom report groups at anytime.

Statistics Data Collection in Cisco UCS Central

Cisco UCS Central collects and aggregates statistics data on **Network**, **Temperature**, **Cooling** and **Power** from the registered Cisco UCS domains. During Cisco UCS Central installation, you must specify a default location to store the statistics data. You can store the statistics data in the internal PostgreSQL database called "ucscentral-stats-db" or in an external database such as Oracle 11g, MSSQL, or Postgre SQL. If you have chosen internal storage as the default location during installation, the statistics data is stored only for a maximum of two weeks. If you want to retain the collected data for more than two weeks, it is recommended that you set up an external database, see External Database for Statistics, on page 4.

The collected data is aggregated based on daily, hourly, weekly and real time records and stored in tables. You can run SQL query in this database to retrieve data specific to each of the report components, see Retrieving Data from the External Database, on page 7. Cisco UCS Central database is the default database to store the data.

You can set up statistics collection interval using Cisco UCS Central CLI, to collect information from the registered Cisco UCS domains at a specified interval. When a new Cisco UCS domain is registered in Cisco UCS Central, Cisco UCS Central subscribes the new domain to the statistics collection interval you have specified. If you reconfigure the collection interval, the data is updated in the registered domains. The registered Cisco UCS domains send statistics to Cisco UCS Central based on the specified collection interval.

Statistics collection interval can be one of the following:

- 15 minutes (default)
- 30 minutes
- never—disables statistics collection

> **Important** You can specify the statistics collection interval only in the Cisco UCS Central CLI. You cannot set it from the Cisco UCS Central GUI. You can view the statistics reports only in the Cisco UCS Central GUI and not in the Cisco UCS Central CLI.

Setting the Statistics Collection Interval

The statistics collection policy governs the collection interval for the data from registered UCS domains. Cisco UCS Central subscribes to domain statistics when a new Cisco UCS domain is registered with Cisco UCS Central. This subscription request is also sent when you reconfigure the collection interval. After subscribing to this data, the registered Cisco UCS domains send statistics to Cisco UCS Central based on the specified collection interval.

Before You Begin

You must be logged in as an admin user to perform this task.

Procedure

Step 1 UCSC# **connect stats-mgr**
Enters the statistics manager mode.

Step 2   UCSC (stats-mgr) # **scope collection-policy**
Enters collection policy configuration mode.

Step 3   UCSC (stats-mgr) /collection-policy # **set collection-interval 30min**
Sets the collection interval to 30 minutes. The other options are 15 minutes and never.

Step 4   UCSC (stats-mgr) /collection-policy # **commit-buffer**
Commits the transaction to the system configuration.

Step 5   UCSC (stats-mgr) /collection-policy # **show collection-policy**
Displays the collection policy interval.

The following example sets the statistics collection interval to 15 minutes and commits the transaction:

```
UCSC # connect stats-mgr
UCSC (stats-mgr) # scope collection-policy
UCSC (stats-mgr) /collection-policy # set collection-interval 15min
UCSC (stats-mgr) /collection-policy* # commit-buffer
UCSC (stats-mgr) /collection-policy # show collection-policy
Stats Collection Policy:
    Collection Interval
    -------------------
    15min
UCSC (stats-mgr) /collection-policy #
```

What to Do Next

Leave the system for a few days so statistics are collected and stored. You can then login to Cisco UCS Central GUI and create custom statistic reports for different endpoints.

Setting up an Internal Database for Statistics

Cisco UCS Central collects network statistics data of registered Cisco UCS domains and aggregates it to hourly, daily and weekly data. This statistical data is stored within the Cisco UCS Central environment in a PostgreSQL database called "ucscentral-stats-db". This is the database that is specific to Cisco UCS Central. The statistical data in this Cisco UCS Central database is stored only for a maximum of 2 weeks. Data older than 2 weeks is automatically purged. In addition, when Cisco UCS Central is configured to use the default PostgreSQL database for the statistics data, you can configure a maximum of only 5 Cisco UCS domains for statistics collection. If you want to retain statistics data for a longer period of time, or if you want to register additional Cisco UCS domains for statistics collection, it is recommended that you configure a database external to Cisco UCS Central.

Follow this procedure only when you want to revert from an external database to the default PostgreSQLdatabase.

Procedure

	Command or Action	Purpose
Step 1	UCSC# **connect stats-mgr**	Enters the statistics manager mode.
Step 2	UCSC (stats-mgr) # **scope db-configuration**	Enters database configuration mode.

	Command or Action	Purpose
Step 3	UCSC (stats-mgr) /db-configuration # **set port** *port-number*	Sets the port. The default port is 5432.
Step 4	UCSC (stats-mgr) /db-configuration # **set database** *db-name*	Sets the database name. For an internal database, the name is ucscentral-stats-db.
Step 5	UCSC (stats-mgr) /db-configuration # **set type** *dbtype*	Sets the database type. In this case, enter postgres.
Step 6	UCSC (stats-mgr) /db-configuration # **set user** *dbusername*	Sets the database user name.
Step 7	UCSC (stats-mgr) /db-configuration # **set pwd** *dbpassword*	Sets the database password. The password for the internal database is always blank, so press Enter.
Step 8	UCSC (stats-mgr) /db-configuration # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets up an internal database for statistics data, commits the transaction and shows details for the database:

```
UCSC# connect stats-mgr
UCSC (stats-mgr)  # scope db-configuration
UCSC (stats-mgr) /db-configuration # set port 5432
UCSC (stats-mgr) /db-configuration # set database ucscentral-stats-db
UCSC (stats-mgr) /db-configuration # set type postgres
UCSC (stats-mgr) /db-configuration # set user postgres
UCSC (stats-mgr) /db-configuration # set pwd
UCSC (stats-mgr) /db-configuration # commit-buffer
UCSC (stats-mgr) /db-configuration # show detail

Database Configuration:
    Type: Postgres
    Hostname: localhost
    Port: 5432
    Database: ucscentral-stats-db
    User: postgres
    Pwd:
```

What to Do Next

Set the statistics collection interval if you want it to be an interval other than the default of 15 minutes.

External Database for Statistics

You can set up an external database to retain the collected data for more than two weeks or to collect statistics data from more than 5 registered Cisco UCS domains. The following are the two supported databases that you can use as external database from Cisco UCS Central:

• Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64-bit Production or higher

• PostgreSQL Server 9.1.8 64-bit or higher

> • Microsoft SQL Server 2012 (SP1) - 11.0.3000.0 (X64) or higher
>
> • Microsoft SQL Server 2008 R2 10.50.1600.1 (X64) SP1 or higher

Make sure you have the following information to access and setup either of these databases as your external database:

> • Database server host name
>
> • Database name
>
> • Username
>
> • Password
>
> • Port number

Note You must open the firewall ports in the database server so that Cisco UCS Central can access the configured external database.

Setting up an External Database

You can set up the external database either during initial Cisco UCS Central set up or at anytime you have a requirement to set up an external database for statistics collection:

> • **Setting up external database with initial setup**: When you are doing the initial set up for Cisco UCS Central, you are prompted to enable statistics collection. If you choose **Yes**, you are prompted to enter information on the external database. If you choose **No**, the collection of statistics data from registered Cisco UCS domains is disabled.
>
> • **Anytime**: You can use the Cisco UCS Central CLI to connect to the external database and set up statistics collection for registered Cisco UCS domains. For information on setting up an Oracle database, see Connecting to an External Oracle Database, on page 9. For information on setting up an PostgreSQL database, see Connecting to an External PostgreSQL Database, on page 10.

The external database stores statistical data on network traffic, temperature, cooling and power from the registered Cisco UCS domains. You can run queries on the external database to retrieve statistics data on network, temperature, cooling and power. For information on running queries on the database, see Retrieving Data from the External Database, on page 7.

Note When you set up an external database to store the statistical data, you must determine the time interval to purge old records from the database. You are responsible for maintaining the external database.

Guidelines for Configuring an External Database

When you configure the database for statistics collection, make sure to restart the Cisco UCS Central services. You must restart the services in the following scenarios:

> • After upgrading to the latest version of Cisco UCS Central using the ISO image

Earlier versions of Cisco UCS Central did not have the capability for statistics collection. After the upgrade process is complete, you can use the Cisco UCS Central CLI to set up an external database for statistics data collection.

• You set up an external database for statistics collection after installing Cisco UCS Central. The external database can be either an Oracle database or a PostgreSQL database.

• After switching from an Oracle database to a PostgreSQL database or switching from a PostgreSQL database to an Oracle database.

Backing up and Restoring Cisco UCS Central Statistics Database

The Cisco UCS Central database is not backed up during a full state backup. If you have set up an external database to store statistical data, then you must follow standard database backup and restore procedures. However, prior to restoring an external database, you must stop the Cisco UCS Central service. To stop this service, you must login to the Cisco UCS Central CLI, and run the **pmon stop** command in the **local-mgmt** command mode. After the database is restored, start the Cisco UCS Central service by running the **pmon start** command in the Cisco UCS Central CLI.

Troubleshooting Faults with the External Database

When Cisco UCS Central fails to connect to an external database, a fault is raised. You can view the fault details in the Cisco UCS Central CLI using the **show fault** command or in the Cisco UCS Central GUI, **Fault** panel.. When the problem is resolved ,Cisco UCS Central automatically retries to connect to the external database. If the connection is established, the fault is cleared from the Cisco UCS Central CLI.

Statistics Data in External Database

External database stores the collected statistics data in tables. You can purge old statistics data from the external database using a script. The following table describes the database table names and corresponding data stored in each table:

Table Name	Data Stored in the Table
adaptorHBAVnicStats	HBA Adaptor traffic data.
adaptorNICVnicStats	NIC Adaptor traffic data.
adaptorVnicStats	NIC/HBA Adaptor traffic data.
computeMbPowerStats	Blade Server power data.
computeMbTempStats	Blade Server temperature data.
computeRackUnitMbTempStats	Rack Server temperature data.
equipmentChassisStats	Chassis power data.
equipmentFanStats	Chassis fan speed data.
equipmentNetworkElementFanStats	FI fan speed data.

Table Name	Data Stored in the Table
equipmentPsuStats	Chassis PSU data.
equipmentRackUnitFanStats	Rack server fan speed data.
equipmentRackUnitPsuStats	Rack server PSU data.
etherRxStats	Ethernet traffic receive data
etherTxStats	Ethernet traffic transmit data.
fcStats	FC traffic data.
processorEnvStats	CPU environment data.

Retrieving Data from the External Database

The database collects statistical data on network, temperature, cooling, and power. The data collected from the registered Cisco UCS domains is stored in the database and then aggregated in the following ways:

- Real time records
- Parent to child aggregation

The following table describes the database table and the nature of information stored in this table.

StatType	Stat	Table	MO/TableName	Property
Temperature	Inlet Air Temp	1	computeMbTempStats	fmTempSenIo
	Processor Temp	2	processorEnvStats	Temperature
Power	Blade DC Power	3	computeMbPowerStats	consumedPower
	Chassis AC Power	4	equipmentChassisStats	inputPower
Cooling	FI Fan Speed	5	equipmentNetworkElementFanStats	Speed
	Chassis Fan Speed	6	equipmentFanStats	speed
FI Ethernet Traffic	Transmit	7	etherTxStats	TotalBytes
	Receive	8	etherRxStats	TotalBytes
FI Fibre Channel Traffic	Transmit/Receive	9	fcStats	BytesTx,BytesRx
Server Ethernet Traffic	Transmit/Receive	10	adaptorNICVnicStats	BytesTx,BytesRx
Server FC traffic	Transmit/Receive	11	adaptorHBAVnicStats	BytesTx,BytesRx

StatType	Stat	Table	MO/TableName	Property
Server Eth & FC Traffic	Transmit/Receive	12	adaptorVnicStats	BytesTx,BytesRx
NA	Internal DN mapping table	13	affectedId2Dn	NA

Tip Statistics Database table names can be more than 30 Characters long. In Oracle database, due to a 30 character limitation, the table name may be truncated. Cisco UCS central handles this automatically.

Aggregation on real time records

The statistics collection policy determines the interval for the data from registered Cisco UCS domains. The data received from the registered Cisco UCS domains is stored in the database and aggregated as hourly, daily and weekly records. This aggregation based on real time records is defined by the statistics collection interval. Each of these record types have a specific ID or a unique identifier in the database. The following table lists the identifiers for each record type.

Record Type	ID
Real Time	0
Hourly	1
Daily	2
Weekly	3

If the statistics collection policy is set to 15 minutes, then for every 4 real time records, 1 hourly record is created and stored in the database. The daily and weekly record aggregation is internally defined, and is not determined by the collection interval. Every 24 hours, one daily record is created and stored in the database. Similarly, for every 7 days, one weekly record is created and stored in the database.

Parent to child aggregation

This type of data aggregation is based on the Distinguished Name (DN). A DN is a unique ID for every object that is defined in the database. The total bytes of data is collected and stored in the database tables from the child element to the parent element. For example, in a sample network, a domain has two fabric interconnects. Each fabric interconnect has slots and each of these slots has different ports. The statistics data for these ports is aggregated all the way to the domain level.

Connecting to an External Oracle Database

Before You Begin

- Set up an external Oracle database. The supported version is Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - 64-bit Production or higher. Note down the database server hostname, the database name, the user name and the password to access the database. You must have privileges to create tables in the database and to add, modify and delete records in those tables.

- You must open the firewall ports in the database server so that Cisco UCS Central can access the external database.

Procedure

	Command or Action	Purpose
Step 1	UCSC# **connect stats-mgr**	Enters the statistics manager mode.
Step 2	UCSC (stats-mgr) # **scope db-configuration**	Enters database configuration mode.
Step 3	UCSC (stats-mgr) /db-configuration # **set type** *dbtype*	Sets the database type, in this case Oracle.
Step 4	UCSC (stats-mgr) db-configuration # **set hostname** *hostname*	Sets the hostname.
Step 5	UCSC (stats-mgr) /db-configuration # **set port** *port-number*	Sets the port. The default Oracle port is 1521.
Step 6	UCSC (stats-mgr) /db-configuration # **set database** *dbname*	Sets the database name.
Step 7	UCSC (stats-mgr) /db-configuration # **set user** *dbusername*	Sets the database user name.
Step 8	UCSC (stats-mgr) /db-configuration # **set pwd** **<enter_key>**	Sets the database password.
Step 9	UCSC (stats-mgr) /db-configuration # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets up Cisco UCS Central to use an external Oracle database on the default port and commits the transaction:

```
UCSC # connect stats-mgr
UCSC (stats-mgr) # scope db-configuration
UCSC (stats-mgr) /db-configuration # set type oracle
UCSC (stats-mgr) /db-configuration # set hostname 10.10.10.10
UCSC (stats-mgr) /db-configuration # set port 1521
UCSC (stats-mgr) /db-configuration # set database DB1
UCSC (stats-mgr) /db-configuration # set user User1
UCSC (stats-mgr) /db-configuration # set pwd <enter_key>
Password:
UCSC (stats-mgr) /db-configuration # commit-buffer
```

What to Do Next

You can change the statistics collection interval from the default 15 minutes to 30 minutes. This is optional.

Connecting to an External PostgreSQL Database

Before You Begin

- Set up an external PostgreSQL database. The supported version is PostgreSQL (9.2.3) or higher. Note down the database server hostname, the database name, the user name and the password to access the database. You must have privileges to create tables in the database and to add, modify and delete records in those tables.

- The name of the database should not include the **postgres** phrase.

- You must open the firewall ports in the database server so that Cisco UCS Central can access the external database.

Procedure

	Command or Action	Purpose
Step 1	UCSC# **connect stats-mgr**	Enters the statistics manager mode.
Step 2	UCSC (stats-mgr) # **scope db-configuration**	Enters database configuration mode.
Step 3	UCSC (stats-mgr) /db-configuration # **set type** *dbtype*	Sets the database type, in this case postgreSQL.
Step 4	UCSC (stats-mgr) /db-configuration # **set hostname** *hostname*	Sets the hostname.
Step 5	UCSC (stats-mgr) /db-configuration # **set port** *port-number*	Sets the port. The default port is 5432.
Step 6	UCSC (stats-mgr) /db-configuration # **set database** *dbname*	Sets the database name.
Step 7	UCSC (stats-mgr) /db-configuration # **set user** *dbusername*	Sets the database user name.
Step 8	UCSC (stats-mgr) /db-configuration # **set pwd** **<enter_key>**	Sets the database password.
Step 9	UCSC (stats-mgr) /db-configuration # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets up Cisco UCS Central to use an external postgreSQL database on the default port and commits the transaction:

```
UCSC # connect stats-mgr
UCSC (stats-mgr) # scope db-configuration
UCSC (stats-mgr) /db-configuration # set type postgres
UCSC (stats-mgr) /db-configuration # set hostname 10.10.10.10
UCSC (stats-mgr) /db-configuration # set port 5432
```

```
UCSC (stats-mgr) /db-configuration # set database DB1
UCSC (stats-mgr) /db-configuration # set user User1
UCSC (stats-mgr) /db-configuration # set pwd <enter_key>
Password
UCSC (stats-mgr) /db-configuration # commit-buffer
```

What to Do Next

You can change the statistics collection interval from the default 15 minutes to 30 minutes. This is optional.