

# Preconfigured Key Performance Indicators

Cloud Execution Environment

INTERWORK DESCRIPTION

**Copyright**

© Ericsson AB 2016, 2017. All rights reserved. No part of this document may be reproduced in any form without the written permission of the copyright owner.

**Disclaimer**

The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing. Ericsson shall have no liability for any error or damage of any kind resulting from the use of this document.

**Trademark List**

All trademarks mentioned herein are the property of their respective owners. These are shown in the document Trademark Information.



# Contents

<b>1</b>	<b>Scope</b>	<b>1</b>
<b>2</b>	<b>Introduction</b>	<b>2</b>
<b>3</b>	<b>General</b>	<b>4</b>
3.1	Interfaces	4
3.2	Collection Type	4
3.3	Retention Policy	5
3.4	Source	5
<b>4</b>	<b>Description</b>	<b>8</b>
4.1	Alarms	8
4.2	Characteristics	12
4.3	ISP Logs	14
4.4	PM Reports	20
4.5	Rest (KPIs for Additional Monitoring)	54
	<b>Reference List</b>	<b>64</b>





# 1 Scope

Factory default Key Performance Indicators (KPIs) are available at the northbound interfaces of the Cloud Execution Environment (CEE) used for performance management (PM). KPIs inform the operator about the actual status of the various physical and virtual resources. For further information on the performance indicators, refer to the relevant Zabbix and OpenStack documentation.

This document provides information about Zabbix KPIs.

For Ceilometer KPIs, refer to section [Basic OpenStack Operations in the OpenStack Telemetry API in CEE](#). For the list of services monitored by the [Service Supervision plugin](#), refer to section [Additional Information in Service Permanently Stopped](#).



## 2 Introduction

The PM function in the CEE is realized by the following components:

- The **Ceilometer** component of OpenStack is used to track virtual resources, mainly for billing purposes. This component performs the telemetry functionality in OpenStack.

Telemetry is a highly automated communications process by which measurements are made and data collected at remote points are transmitted to the receiving equipment that performs accounting and billing.

Ceilometer provides a Single Point of Contact for billing systems, providing all the counters they need to establish customer billing, across all current and future OpenStack components. The delivery of counters is traceable and auditable. The counters are easily extensible to support new projects since the various agents doing data collections are independent of the overall system.

For a list of Ceilometer KPIs, refer to section [Basic OpenStack Operations](#) in the [OpenStack Telemetry API](#) in CEE.

Ceilometer is disabled on single server deployment, refer to the [CEE Technical Description](#).

- CEE includes **Zabbix** as a tool for monitoring the performance of the host environment. This monitoring tool extends the operations of Ceilometer by providing data for detailed performance analysis and optimization. In general, the granularity of monitoring data is about one magnitude higher than the granularity of data used for telemetry.

Zabbix has built-in interfaces for quick analysis and real-time visualization. These interfaces are wrapped and extended by standardized telecom-type and REST-based access to monitoring data. The delivery of counters is traceable and auditable. The counter settings can easily be extended, modified or reduced, based on customer needs.

Ceilometer and Zabbix also support the setting of various triggers to indicate that certain counter values are reached. A predefined set of these triggers are routed to the alarm system of CEE. The used interface is not extendable, so further triggers are only visible in their telemetry or monitoring environment.

CEE is delivered with certain KPIs of the Ceilometer and Zabbix systems preconfigured with default values for granularity, retention time, trend generation, and time-to-live. These settings ensure a stable system behavior that also generates enough information to judge system behavior, perform optimization, and fine tuning analysis. Changes to the settings can influence the capacity and long-term stability of the system. System integrators are expected to adjust what measurements are enabled in order to optimize system performance, refer to [Configuration > Items](#) in the Zabbix documentation, Reference [1]. Changes to these settings on live nodes are out of the scope of Ericsson support.



Provided IP address and TCP port for Zabbix GUI are configured in the section `bind` of the below configuration files on the Cloud Infrastructure Controllers (CICs):

- `/etc/haproxy/conf.d/211-zabbix-ui.cfg`
- `/etc/haproxy/conf.d/212-zabbix-ui-ssl.cfg`

Example for getting the addresses and ports of Zabbix GUI:

```
grep bind /etc/haproxy/conf.d/*zabbix-ui*.cfg
```

For the full path to Zabbix GUI example, refer to `/etc/zabbix/zabbix-conf.conf`, controlled in `/etc/zabbix/apache.conf`.

**Note:** Due to security reasons, not all configured IP addresses and TCP ports are accessible from external systems.

This document only describes the factory default KPIs and settings contained by the CEE as delivered by Ericsson. The data is accessible on various northbound interfaces, as described in Section 3.1 on page 4.



## 3 General

This section provides information on the terms used in the KPI descriptions in Section 4 on page 8.

### 3.1 Interfaces

Measurement data can be used for both real-time processing and offline analysis. These two main usages are supported by the following northbound interface types:

- Generated report files, mainly used for offline processing after download
- REST-based interfaces for real-time utilization

The following interfaces of these types are used:

- Generated report files
  - **PM Report File**  
Refer to the [Performance Management Northbound API](#) for the description of the xml report file.  
  
Measurement group `pmreports` must be enabled for the `ericsson_zabbix` Fuel plugin, see Section 4 on page 8.
  - **ISP Report Log File**  
Refer to the [In Service Performance Northbound API](#) for the description of the xml report file.  
  
Measurement group `isplogs` must be enabled for `ericsson_zabbix` Fuel plugin, see Section 4 on page 8.
- REST-based interfaces
  - **Telemetry API**  
The output of this interface includes all the Telemetry data. Refer to the [OpenStack Telemetry API in CEE](#) for the description of the interface.
  - **Monitoring API**  
The output of this interface, beside other measurements, includes the content of the PM Report file and the ISP Report Log File. Refer to the [Performance Management Northbound API](#) for the description of the interface.

### 3.2 Collection Type

Collection type means the format of the source data.





The following collection types are used:

<b>Boolean</b>	A data type with only two possible values that can be text or numbers, for example, yes or no, true or false, 1 or 0
<b>Text</b>	A string of characters
<b>Delta</b>	A value integrated from a certain time
<b>Gauge</b>	The actual value of measured data

### 3.3 Retention Policy

The retention policy specifies the used retention times for a KPI.

The retention policy consists of the following retention times:

<b>History</b>	Number of days the measured data for a specific item is kept.
<b>Trend</b>	<p>Number of days the trend data for a specific item is kept. Numeric data older than specified by the <b>History</b> are consolidated to save disk space. The following trend data are stored:</p> <ul style="list-style-type: none"> <li>• Hourly average</li> <li>• Hourly minimum</li> <li>• Hourly maximum</li> </ul>

**Note:** Trend data is not stored for KPIs with **Collection Type Text**.

Table 1 describes the used Retention Policies.

Table 1 Retention Policies

Retention Policy	History (days)	Trend (days)
ISP	45	0
KPI	7	45
Metering	2	0

### 3.4 Source

The measured data are collected by Zabbix and Ceilometer from the sources listed in this section.



### 3.4.1 Zabbix

The following sources are used:

- Compute  
The name of the compute host. Example: `compute-0-5`
- Controller  
The name of the controller host. Example: `cic-0-3`
- Cluster  
The provided number is the calculated average of the data collected from the three controllers.
- Switch  
The name of the switch. Example: `extreme-1`

### 3.4.2 Ceilometer

The identifier (ID) in the source names stands for the universally unique identifiers (UUIDs) of the sources used in the indicated OpenStack components.

A UUID looks similar to the following example:  
`940f3b2f-bd74-45ad-bee7-eb0a7318aa84`

The following sources are used:

- Instance ID  
UUID of the virtual machine (VM) in Nova
- Image ID  
UUID of the image in Glance
- IP ID  
UUID of the Internet Protocol (IP) address in Neutron
- Subnet ID  
UUID of the subnet in Neutron
- Port ID  
UUID of the port in Neutron
- Router ID  
UUID of the virtual router in Neutron
- Volume ID  
UUID of the volume in Cinder
- Store ID  
UUID of the store in Swift
- Network ID  
UUID of the network in Neutron



- Interface ID  
UUID of the interface in Nova



## 4 Description

The following subsections describe the KPIs provided by the PM service.

The subsection titles in this section are identical to the KPI names appearing at the interface. KPI names are self-explanatory in most of the cases. A short explanation is provided for some KPIs.

Each subsection contains a table with the parameters of the KPI. Rows for irrelevant parameters are not shown. The following parameters are used in the subsections:

<b>Periodic Check Interval in Seconds</b>	The refreshment period of the KPI value
<b>Retention Policy</b>	See Section 3.3 on page 5.
<b>Shown at Interface</b>	The interface or interfaces where the user can see the KPI value. See Section 3.1 on page 4. Ceilometer metrics are marked as “Telemetry API”.
<b>Collection Type</b>	The type of source data. See Section 3.2 on page 4.
<b>Output Measure</b>	Measure of the shown KPI value, if applicable
<b>Source</b>	The UUID in the OpenStack component or the name of the Cloud component providing the source data. See Section 3.4 on page 5.

The below listed KPIs are active only if their measurement is enabled in Ceilometer or Zabbix. For Ceilometer meter configuration, refer to section [Basic OpenStack Operations in the OpenStack Telemetry API in CEE](#). Zabbix measurement groups can be enabled or disabled at initial configuration, refer to section [Zabbix Monitoring in the Fuel Plugin Configuration Guide](#).

**Note:** For reporting all of the following Zabbix measurements, measurement groups must be enabled for the `ericsson_zabbix` Fuel plugin (`pmreports`, `isplogs`, `characteristics`, and `rest`). This configuration cannot be changed after installation.

### 4.1 Alarms

This section describes the KPIs for alarms.



**Note:** The services listed in *Service Permanently Stopped* are monitored as part of this level.

#### 4.1.1 Bandwidth Management

##### 4.1.1.1 Bandwidth Management Overallocation

This KPI indicates bandwidth overallocated due to race condition.

Periodic Check Interval in Seconds	600
Retention Policy	ISP
Shown at Interface	Monitoring API
Collection Type	Boolean
Source	Compute

#### 4.1.2 Certificates

##### 4.1.2.1 Certificate validity in days for certificate nr <index> in file <certificate\_file\_name>

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.1.3 Core Dumps

##### 4.1.3.1 Core dump <core\_file\_path> exists

Periodic Check Interval in Seconds	30
Retention Policy	ISP
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller, Compute



#### 4.1.4 Host

##### 4.1.4.1 CPU idle time (5 min)

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	% of time
Source	Controller, compute

##### 4.1.4.2 Free memory distance from limit

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	PM Report File, Monitoring API
Collection Type	Gauge
Source	Controller, compute

##### 4.1.4.3 Percentage of space used on disk <filesystem\_mount\_point>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	% of disk space
Source	Controller, compute

##### 4.1.4.4 Processor load (5 min average per core)

The processor load is calculated as system CPU load divided by number of CPU cores.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge



<b>Output Measure</b>	Number of units
<b>Source</b>	Controller, compute

## 4.1.5 NTP

### 4.1.5.1 NTP authentication status

<b>Periodic Check Interval in Seconds</b>	360
<b>Retention Policy</b>	ISP
<b>Shown at Interfaces</b>	Monitoring API
<b>Collection Type</b>	Gauge
<b>Source</b>	Compute

### 4.1.5.2 NTP stratum level

<b>Periodic Check Interval in Seconds</b>	30
<b>Retention Policy</b>	ISP
<b>Shown at Interfaces</b>	Monitoring API
<b>Collection Type</b>	Gauge
<b>Source</b>	Compute

### 4.1.5.3 NTP upstream server status

<b>Periodic Check Interval in Seconds</b>	30
<b>Retention Policy</b>	ISP
<b>Shown at Interfaces</b>	Monitoring API
<b>Collection Type</b>	Gauge
<b>Source</b>	Compute

## 4.1.6 Extreme Network

### 4.1.6.1 ifOperStatus for interface <interface\_id>

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	ISP
<b>Shown at Interfaces</b>	ISP Report Log File, Monitoring API



Collection Type	Text
Source	Switch

#### 4.1.6.2 Operational status of fan #<fan\_id>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Switch

#### 4.1.6.3 Status of PS #<power\_supply\_id>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	Monitoring API
Collection Type	Gauge
Source	Switch

## 4.2 Characteristics

This section describes the KPIs for characteristic measurements.

### 4.2.1 MongoDB

#### 4.2.1.1 Ceilometer data size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Byte
Source	Controller

#### 4.2.1.2 MongoDB Ceilometer index size

Periodic Check Interval in Seconds	60
Retention Policy	KPI





Shown at Interface	Monitoring API
Collection Type	Byte
Source	Controller

#### 4.2.1.3 MongoDB Ceilometer meter collection index size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Byte
Source	Controller

#### 4.2.1.4 MongoDB Ceilometer meter collection size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Byte
Source	Controller

#### 4.2.1.5 MongoDB local index size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Byte
Source	Controller

#### 4.2.1.6 MongoDB local size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Byte
Source	Controller



## 4.3 ISP Logs

This section describes the KPIs for isplogs.

### 4.3.1 Host

#### 4.3.1.1 /dev/<md\_device\_name> device status

Periodic Check Interval in Seconds	600
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Text
Source	Controller, compute

### 4.3.2 DNS

#### 4.3.2.1 DNS lookup

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller, compute

### 4.3.3 NTP

#### 4.3.3.1 NTP Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller, compute



#### 4.3.4 PMAPI

##### 4.3.4.1 PMAPI Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interface	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

##### 4.3.4.2 PMAPI test succeeded

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interface	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

##### 4.3.4.3 PMAPI VIP API test succeeded

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interface	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

#### 4.3.5 OpenStack Services

##### 4.3.5.1 Ceilometer API Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.2 Cinder API Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.3 Cinder API test succeeded**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.4 Glance API Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.5 Glance API test succeeded**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.6 Glance Registry Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API



Collection Type	Boolean
Source	Controller

#### 4.3.5.7 Glance VIP API test succeeded

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Cluster

#### 4.3.5.8 Keystone Admin API Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

#### 4.3.5.9 Keystone API Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

#### 4.3.5.10 Keystone API test succeeded

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.11 Keystone VIP API test succeeded**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Cluster

**4.3.5.12 Neutron VIP API test succeeded**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Cluster

**4.3.5.13 Nova API OSAPI Compute Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.14 Nova API test succeeded**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.15 Nova VIP API test succeeded**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API



Collection Type	Boolean
Source	Cluster

#### 4.3.5.16 RabbitMQ AMQP is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

#### 4.3.5.17 RabbitMQ EPMD is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

#### 4.3.5.18 RabbitMQ Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

#### 4.3.5.19 Swift Account Server is listening on port

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.20 Swift Container Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.21 Swift Object Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.3.5.22 Swift Proxy Server is listening on port**

Periodic Check Interval in Seconds	60
Retention Policy	ISP
Shown at Interfaces	ISP Report Log File, Monitoring API
Collection Type	Boolean
Source	Controller

**4.4 PM Reports**

This section describes the KPIs for `pmreport`.

**4.4.1 Host****4.4.1.1 Available memory**

Available memory is defined as the sum of free, cached, and buffers memory.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge





<b>Output Measure</b>	Bytes
<b>Source</b>	Controller, compute

#### 4.4.1.2 Context switches per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta
<b>Output Measure</b>	Switches per second
<b>Source</b>	Controller, compute

#### 4.4.1.3 CPU idle time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.4 CPU interrupt time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.5 CPU iowait time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge



<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.6 CPU nice time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.7 CPU softirq time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.8 CPU steal time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.9 CPU system time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge



<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.10 CPU user time

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of time
<b>Source</b>	Controller, compute

#### 4.4.1.11 Disk <linux\_device\_name> reads avg1

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Operations per second
<b>Source</b>	Controller, compute

#### 4.4.1.12 Disk <linux\_device\_name> writes avg1

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Operations per second
<b>Source</b>	Controller, compute

#### 4.4.1.13 Free disk space on <filesystem\_mount\_point> (percentage)

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge



Output Measure	% of partition
Source	Controller, compute

**4.4.1.14 Free disk space on <filesystem\_mount\_point>**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Controller, compute

**4.4.1.15 Free inodes on <filesystem\_mount\_point> (percentage)**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	% of inodes
Source	Controller, compute

**4.4.1.16 Free swap space in %**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	% of partition
Source	Controller, compute

**4.4.1.17 Free swap space**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge



Output Measure	Bytes
Source	Controller, compute

#### 4.4.1.18 Incoming network dropped packets on <interface\_name>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Packets per second
Source	Controller, compute

#### 4.4.1.19 Incoming network errors on <interface\_name>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Errors per second
Source	Controller, compute

#### 4.4.1.20 Incoming network traffic on <interface\_name>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Bytes per second
Source	Controller, compute

#### 4.4.1.21 Interrupts per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge



Output Measure	Interrupts per second
Source	Controller, compute

## 4.4.1.22

## memu

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	% of memory
Source	Controller, compute

## 4.4.1.23

## Outgoing network dropped packets on &lt;interface\_name&gt;

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Packets per second
Source	Controller, compute

## 4.4.1.24

## Outgoing network errors on &lt;interface\_name&gt;

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Errors per second
Source	Controller, compute

## 4.4.1.25

## Outgoing network traffic on &lt;interface\_name&gt;

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta



<b>Output Measure</b>	Bytes per second
<b>Source</b>	Controller, compute

#### 4.4.1.26 Processor load (1 min average per core)

The processor load is calculated as system CPU load divided by number of CPU cores.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of units
<b>Source</b>	Controller, compute

#### 4.4.1.27 Processor load (15 min average per core)

The processor load is calculated as system CPU load divided by number of CPU cores.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of units
<b>Source</b>	Controller, compute

#### 4.4.1.28 Total disk space on <filesystem\_mount\_point>

<b>Periodic Check Interval in Seconds</b>	3600
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Bytes
<b>Source</b>	Controller, compute



## 4.4.1.29

## Total memory

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Controller, compute

## 4.4.1.30

## Total swap space

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Controller, compute

## 4.4.2

## Memcache

## 4.4.2.1

## Bytes read by this server per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Bytes per second
Source	Controller

## 4.4.2.2

## Bytes sent by this server per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta





Output Measure	Bytes per second
Source	Controller

#### 4.4.2.3 Bytes this server is allowed to use for storage

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Controller

#### 4.4.2.4 Current number of bytes used to store items

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Controller

#### 4.4.2.5 Current number of items stored

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of items
Source	Controller

#### 4.4.2.6 Items removed to free memory per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta



<b>Output Measure</b>	Items per second
<b>Source</b>	Controller

#### 4.4.2.7 Items requested and not found per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta
<b>Output Measure</b>	Items per second
<b>Source</b>	Controller

#### 4.4.2.8 Keys requested and found present per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta
<b>Output Measure</b>	Items per second
<b>Source</b>	Controller

#### 4.4.2.9 Number of connection structures allocated by the server

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta
<b>Output Measure</b>	Connections per second
<b>Source</b>	Controller

#### 4.4.2.10 Number of connections opened per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta



<b>Output Measure</b>	Connections per second
<b>Source</b>	Controller

#### 4.4.2.11 Number of new items stored per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta
<b>Output Measure</b>	Connections per second
<b>Source</b>	Controller

#### 4.4.2.12 Number of open connections

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of connections
<b>Source</b>	Controller

#### 4.4.2.13 Number of processes

This KPI indicates the total number of processes in any state.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of processes
<b>Source</b>	Controller, compute

#### 4.4.2.14 Number of retrieval requests per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API



Collection Type	Delta
Output Measure	Requests per second
Source	Controller

#### 4.4.2.15 Number of running processes

This KPI indicates the number of processes in running state.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of processes
Source	Controller, compute

#### 4.4.2.16 Number of seconds since the server started

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Seconds
Source	Controller

#### 4.4.2.17 Number of storage requests per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Requests per second
Source	Controller

#### 4.4.2.18 Number of worker threads requested

Periodic Check Interval in Seconds	60
Retention Policy	KPI



Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of threads
Source	Controller

#### 4.4.2.19 System time for this process

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	s
Source	Controller

#### 4.4.2.20 Total number of retrieval and storage requests per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Requests per second
Source	Controller

#### 4.4.2.21 User time for this process

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	s
Source	Controller



### 4.4.3 HAProxy

#### 4.4.3.1 HAProxy - <ha\_proxy\_service> Connection Errors

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Connections per second
Source	Controller

#### 4.4.3.2 HAProxy - <ha\_proxy\_service> Denied Requests

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Requests per second
Source	Controller

#### 4.4.3.3 HAProxy - <ha\_proxy\_service> Queued Requests

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of requests
Source	Controller

#### 4.4.3.4 HAProxy - <ha\_proxy\_service> Request Errors

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Requests per second
Source	Controller



#### 4.4.3.5 HAProxy - <ha\_proxy\_service> Request Rate Max

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.4.3.6 HAProxy - <ha\_proxy\_service> Request Rate

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Requests per second
Source	Controller

#### 4.4.3.7 HAProxy - <ha\_proxy\_service> Response Errors

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Responses per second
Source	Controller

#### 4.4.3.8 HAProxy - <ha\_proxy\_service> Session Rate Limit

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Sessions per second
Source	Controller

**4.4.3.9 HAProxy - <ha\_proxy\_service> Session Rate Max**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Sessions per second
Source	Controller

**4.4.3.10 HAProxy - <ha\_proxy\_service> Session Rate**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Sessions per second
Source	Controller

**4.4.3.11 HAProxy - <ha\_proxy\_service> Total Downtime**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	s
Source	Controller

**4.4.4 Extreme Networks****4.4.4.1 ifInDiscards for interface <interface\_id>**

This KPI indicates the number of inbound packets discarded.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge





<b>Output Measure</b>	Number of packets
<b>Source</b>	Switch

#### 4.4.4.2 ifInErrors for interface <interface\_id>

This KPI indicates the number of inbound packets that were not delivered due to errors.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of packets
<b>Source</b>	Switch

#### 4.4.4.3 ifInNUcastPkts for interface <interface\_id>

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of packets
<b>Source</b>	Switch

#### 4.4.4.4 ifInOctets for interface <interface\_id>

This KPI indicates the total number of bytes received on the interface.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Bytes
<b>Source</b>	Switch

#### 4.4.4.5 ifInUcastPkts for interface <interface\_id>

This KPI indicates the number of unicast packets delivered by the interface.



Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Switch

#### 4.4.4.6 ifInUnknownProtos for interface <interface\_id>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Switch

#### 4.4.4.7 ifLastChange for interface <interface\_id>

This KPI indicates the timestamp of the last state change on the interface.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	s
Source	Switch

#### 4.4.4.8 ifOutDiscards for interface <interface\_id>

This KPI indicates the number of outbound packets discarded.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Switch



#### 4.4.4.9 ifOutErrors for interface <interface\_id>

This KPI indicates the number of inbound packets not transmitted due to errors.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Switch

#### 4.4.4.10 ifOutNUcastPkts for interface <interface\_id>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Switch

#### 4.4.4.11 ifOutOctets for interface <interface\_id>

This KPI indicates the number of outbound packets.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Switch

#### 4.4.4.12 ifOutQLen for interface <interface\_id>

This KPI indicates the output queue length.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API



Collection Type	Gauge
Output Measure	Number of packets
Source	Switch

#### 4.4.4.13 ifOutUcastPkts for interface <interface\_id>

This KPI indicates the number of unicast packets transmitted by the interface.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Switch

#### 4.4.4.14 ifPhysAddress for interface <interface\_id>

This KPI indicates the media access control (MAC) address of the interface.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Switch

#### 4.4.4.15 ifSpeed for interface <interface\_id>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bits per second
Source	Switch



## 4.4.5 Cluster

### 4.4.5.1 Aggregated Controllers 1 minutes load

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of units
Source	Cluster

### 4.4.5.2 Aggregated Controllers 5 minutes load

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of units
Source	Cluster

### 4.4.5.3 Aggregated Controllers 15 minutes load

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of units
Source	Cluster

### 4.4.5.4 Keystone token count

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of tokens
Source	Cluster

**4.4.5.5 Number of Cinder services in offline state**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of services
<b>Source</b>	Cluster

**4.4.5.6 Number of instances in error state**

This KPI indicates the number of all VMs that are in error state, configured for any compute instance in the OpenStack cluster.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of instances
<b>Source</b>	Cluster

**4.4.5.7 Number of instances**

This KPI indicates the number of all VMs configured for any compute instance in the OpenStack cluster.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of instances
<b>Source</b>	Cluster

**4.4.5.8 Number of Nova services in offline state**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API



<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of services
<b>Source</b>	Cluster

#### 4.4.5.9 Number of used CPUs in cluster

This KPI indicates the number of all virtual Central Processing Units (vCPUs) belonging to any VMs in the OpenStack cluster. The number is queried from the Nova database.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of VCPUs
<b>Source</b>	Cluster

#### 4.4.5.10 Total amount of RAM in cluster

This KPI indicates the total amount of RAM belonging to any compute instances in the OpenStack cluster.

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Megabytes
<b>Source</b>	Cluster

#### 4.4.5.11 Total number of CPUs in cluster

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of CPUs
<b>Source</b>	Cluster

**4.4.5.12 Used RAM in cluster**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Megabytes
<b>Source</b>	Cluster

**4.4.6 MongoDB****4.4.6.1 MongoDB bytes received**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Byte
<b>Source</b>	Controller

**4.4.6.2 MongoDB bytes sent**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Byte
<b>Source</b>	Controller

**4.4.6.3 MongoDB Ceilometer data size**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	Monitoring API
<b>Collection Type</b>	Gauge
<b>Source</b>	Controller





#### 4.4.6.4 MongoDB Ceilometer index size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.4.6.5 MongoDB Ceilometer meter collection index size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.4.6.6 MongoDB Ceilometer meter collection size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.4.6.7 MongoDB database size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Byte
Source	Controller

#### 4.4.6.8 MongoDB local index size

Periodic Check Interval in Seconds	60
Retention Policy	KPI



Shown at Interfaces	Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.4.6.9 MongoDB local size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	Monitoring API
Collection Type	Gauge
Source	Controller

#### 4.4.6.10 MongoDB number of current connections

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Connection
Source	Controller

#### 4.4.6.11 MongoDB number of open cursors

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Operation
Source	Controller

#### 4.4.6.12 MongoDB resident memory usage

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta



Output Measure	Byte
Source	Controller

#### 4.4.6.13 MongoDB virtual memory usage

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Byte
Source	Controller

### 4.4.7 MySQL

#### 4.4.7.1 MySQL aborted clients

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of clients
Source	Controller

#### 4.4.7.2 MySQL aborted connects

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of connections
Source	Controller

#### 4.4.7.3 MySQL bytes received per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI



Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Bytes per second
Source	Controller

#### 4.4.7.4 MySQL bytes sent per second

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Delta
Output Measure	Bytes per second
Source	Controller

#### 4.4.7.5 MySQL connection latency

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	s
Source	Controller

#### 4.4.7.6 MySQL database size

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Bytes
Source	Controller

#### 4.4.7.7 MySQL number of current connections

Periodic Check Interval in Seconds	60
Retention Policy	KPI



<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of connections
<b>Source</b>	Controller

#### 4.4.7.8 MySQL open files

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of files
<b>Source</b>	Controller

#### 4.4.7.9 MySQL rollback operations per second

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta
<b>Output Measure</b>	Queries per second
<b>Source</b>	Controller

### 4.4.8 RabbitMQ

#### 4.4.8.1 RabbitMQ missing nodes

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of nodes
<b>Source</b>	Controller

**4.4.8.2 RabbitMQ missing queues**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of queues
<b>Source</b>	Controller

**4.4.8.3 RabbitMQ queue items**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of items
<b>Source</b>	Controller

**4.4.8.4 RabbitMQ queues without consumers**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of queues
<b>Source</b>	Controller

**4.4.8.5 RabbitMQ unmirrored queues**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of queues
<b>Source</b>	Controller



## 4.4.9 Iptables

### 4.4.9.1 tcp established

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Number of packets
Source	Controller, compute

### 4.4.9.2 tcp syn

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Packet
Source	Controller, compute

### 4.4.9.3 tcp timewait

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Packet
Source	Controller, compute

### 4.4.9.4 total icmp

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interfaces	PM Report File, Monitoring API
Collection Type	Gauge
Output Measure	Packet
Source	Controller, compute

**4.4.9.5 total other**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Packet
<b>Source</b>	Controller, compute

**4.4.9.6 total tcp**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Packet
<b>Source</b>	Controller, compute

**4.4.9.7 total udp**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Packet
<b>Source</b>	Controller, compute

**4.4.10 Zabbix****4.4.10.1 Values processed by Zabbix server per second**

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Delta





<b>Output Measure</b>	Number of values per second
<b>Source</b>	Controller

#### 4.4.10.2 Zabbix configuration cache, % free

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of cache
<b>Source</b>	Controller

#### 4.4.10.3 Zabbix history write cache, % free

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of cache
<b>Source</b>	Controller

#### 4.4.10.4 Zabbix queue over 10m

<b>Periodic Check Interval in Seconds</b>	600
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	Number of items
<b>Source</b>	Controller

#### 4.4.10.5 Zabbix queue

<b>Periodic Check Interval in Seconds</b>	600
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge



<b>Output Measure</b>	Number of items
<b>Source</b>	Controller

#### 4.4.10.6 Zabbix text write cache, % free

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of cache
<b>Source</b>	Controller

#### 4.4.10.7 Zabbix trend write cache, % free

<b>Periodic Check Interval in Seconds</b>	60
<b>Retention Policy</b>	KPI
<b>Shown at Interfaces</b>	PM Report File, Monitoring API
<b>Collection Type</b>	Gauge
<b>Output Measure</b>	% of cache
<b>Source</b>	Controller

## 4.5 Rest (KPIs for Additional Monitoring)

This section describes the KPIs used for additional monitoring.

### 4.5.1 Host

#### 4.5.1.1 Buffered memory

<b>Periodic Check Interval in Seconds</b>	30
<b>Retention Policy</b>	KPI
<b>Shown at Interface</b>	Monitoring API
<b>Collection Type</b>	Gauge
<b>Source</b>	Controller, compute



#### 4.5.1.2 Cached memory

Periodic Check Interval in Seconds	30
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller, compute

#### 4.5.1.3 Free memory

Periodic Check Interval in Seconds	30
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller, compute

#### 4.5.1.4 Host name of zabbix\_agentd running

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Controller, compute

#### 4.5.1.5 Host name

Name of the system host.

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Controller, compute



## 4.5.2 Memcahce

### 4.5.2.1 Process id of this server process

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Controller

## 4.5.3 MySQL

### 4.5.3.1 MySQL uptime

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller

### 4.5.3.2 MySQL version

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller

## 4.5.4 Extreme Networks

### 4.5.4.1 Extreme System ID of <switch\_host\_name>

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Switch



#### 4.5.4.2 Power Alarm of <switch\_host\_name>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Switch

#### 4.5.4.3 Power Status of <switch\_host\_name>

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Switch

#### 4.5.4.4 ifAdminStatus for interface <interface\_id>

This KPI indicates the current state of the interface set by the administrator.

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Switch

### 4.5.5 HAProxy

#### 4.5.5.1 HAProxy - <ha\_proxy\_service> Active (Y/N)

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Controller

**4.5.5.2 HAProxy - <ha\_proxy\_service> Backup (Y/N)**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Text
Source	Controller

**4.5.5.3 HAProxy - <ha\_proxy\_service> Bytes in**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.4 HAProxy - <ha\_proxy\_service> Bytes out**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.5 HAProxy - <ha\_proxy\_service> Check code**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.6 HAProxy - <ha\_proxy\_service> Check Status**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API



Collection Type	Gauge
Source	Controller,

#### 4.5.5.7 HAProxy - <ha\_proxy\_service> Client Aborts

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.8 HAProxy - <ha\_proxy\_service> Current Sessions

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.9 HAProxy - <ha\_proxy\_service> Denied Responses

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.10 HAProxy - <ha\_proxy\_service> Failed Check count

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.11 HAProxy - <ha\_proxy\_service> HTTP 4XX responses**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.12 HAProxy - <ha\_proxy\_service> HTTP 5XX responses**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.13 HAProxy - <ha\_proxy\_service> HTTP other responses**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.14 HAProxy - <ha\_proxy\_service> Last Change**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.15 HAProxy - <ha\_proxy\_service> Max Queued requests**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API





Collection Type	Gauge
Source	Controller,

#### 4.5.5.16 HAProxy - <ha\_proxy\_service> Max Sessions

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.17 HAProxy - <ha\_proxy\_service> Queue Limit

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.18 HAProxy - <ha\_proxy\_service> Redispatches

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.19 HAProxy - <ha\_proxy\_service> Retries

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.20 HAProxy - <ha\_proxy\_service> Server Aborts**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.21 HAProxy - <ha\_proxy\_service> Session Rate Max**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.22 HAProxy - <ha\_proxy\_service> Sessions Limit**

Periodic Check Interval in Seconds	3600
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.23 HAProxy - <ha\_proxy\_service> Status**

Periodic Check Interval in Seconds	60
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

**4.5.5.24 HAProxy - <ha\_proxy\_service> Total Requests**

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API



Collection Type	Gauge
Source	Controller,

#### 4.5.5.25 HAProxy - <ha\_proxy\_service> Total Sessions

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,

#### 4.5.5.26 HAProxy - <ha\_proxy\_service> Transitions

Periodic Check Interval in Seconds	900
Retention Policy	KPI
Shown at Interface	Monitoring API
Collection Type	Gauge
Source	Controller,



## Reference List

- [1] Zabbix Documentation 2.4, Items, <https://www.zabbix.com/documentation/2.4/manual/config/items>