# HP OSS Fault Analytics & Statistics

# Version 1.1

## User Guide

**Edition: 1.0**

**For Linux (RHEL 6.5)**

**October 2015**

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# Preface

This guide describes the default reports that are packaged with the HP OSS Fault Analytics & Statistics software component.

Software component name: HP OSS Fault Analytics & Statistics

Software component version: 1.1

Software kit version: V1.1

## Intended audience

- This guide is for anyone who wants to understand the HP OSS Fault Analytics & Statistics default reports (a.k.a dashboards).
- The readers are assumed to understand the HP TeMIP concepts.

## Software versions

The terms Unix and Linux are used as a generic reference to the operating system, unless otherwise specified.

The software versions referred to in this document are as follows:

| Product Version | Supported Operating systems |
|---|---|
| *HP OSS Fault Analytics & Statistics 1.1.0* | • Red Hat Enterprise Linux Server release RHEL 6.5 |
| *HP OSS Analytics Foundation 1.1.1* | • Red Hat Enterprise Linux Server release RHEL 6.5 |
| *HP Vertica Version 7.1* | • Red Hat Enterprise Linux Server release RHEL 6.5 |
| *HP UMB Server Version 1.0* | • Red Hat Enterprise Linux Server release RHEL 6.5 |
| *HP Unified OSS Console 2.1* | • Red Hat Enterprise Linux Server release RHEL 6.5 |
| *HP TeMIP 6.2* | • Red Hat Enterprise Linux Server release RHEL 6.5 |

**Table 1 - Software versions**

## Typographical conventions

`Courier` font:

- Source code and examples of file contents
- Commands that you enter on the screen
- Path names
- Keyboard key names

*Italic* text:

- File names, programs, and parameters
- The names of other documents referenced in this manual

**Bold** text:

- To introduce new terms and to emphasize important words

## Associated documents

- HP OSS Fault Analytics & Statistics Install & Admin Guide
- HP OSS Fault Analytics & Statistics Release Notes
- HP OSS Fault Analytics & Statistics Customization Guide

## Support

Visit the HP Software Support Online website at https://softwaresupport.hp.com/ for contact information, and for details about HP software products, services, and support.

The software support area of the website includes the following:

- Downloadable documentation
- Troubleshooting information
- Patches and updates
- Problem reporting
- Training information
- Support program information

Chapter 1

# Product overview

## 1.1 HP OSS Fault Analytics & Statistics overview

HP OSS Fault Analytics and Statistics (FAS) is a software product that enables telecommunications service providers with the capabilities to collect and persist fault information from fault and surveillance systems, transform the data as needed and deliver actionable insight to operations staff to operate and manage their network. The actionable insight is inferred using a host of statistical and analytical techniques.

OSS FAS is positioned as an independent product, working with fault information consolidated in HP TeMIP, as well as any other surveillance system from an independent software vendor.

OSS FAS is based on HP Vertica, complemented by a mediation layer allowing for collection of fault information in real time.

A brief summary of the key features:

- Transformation of vast amounts of alarm data received from HP TeMIP into meaningful information
- Use of the HP Vertica database, optimized for data warehousing, data analytics and data reporting
- Optional activation of default summarizations batch jobs in order to populate new tables containing information data about alarms (aggregation based on different time granularities and different dimensions)
- Optional default FAS reports (built with Unified OSS Console) based on those summarized tables

## 1.2 Architecture

HP OSS Fault Analytics and Statistics (FAS) solution is composed of three software components:

- TeMIP Analytics
- OSS Analytics foundation
- OSS FAS Core

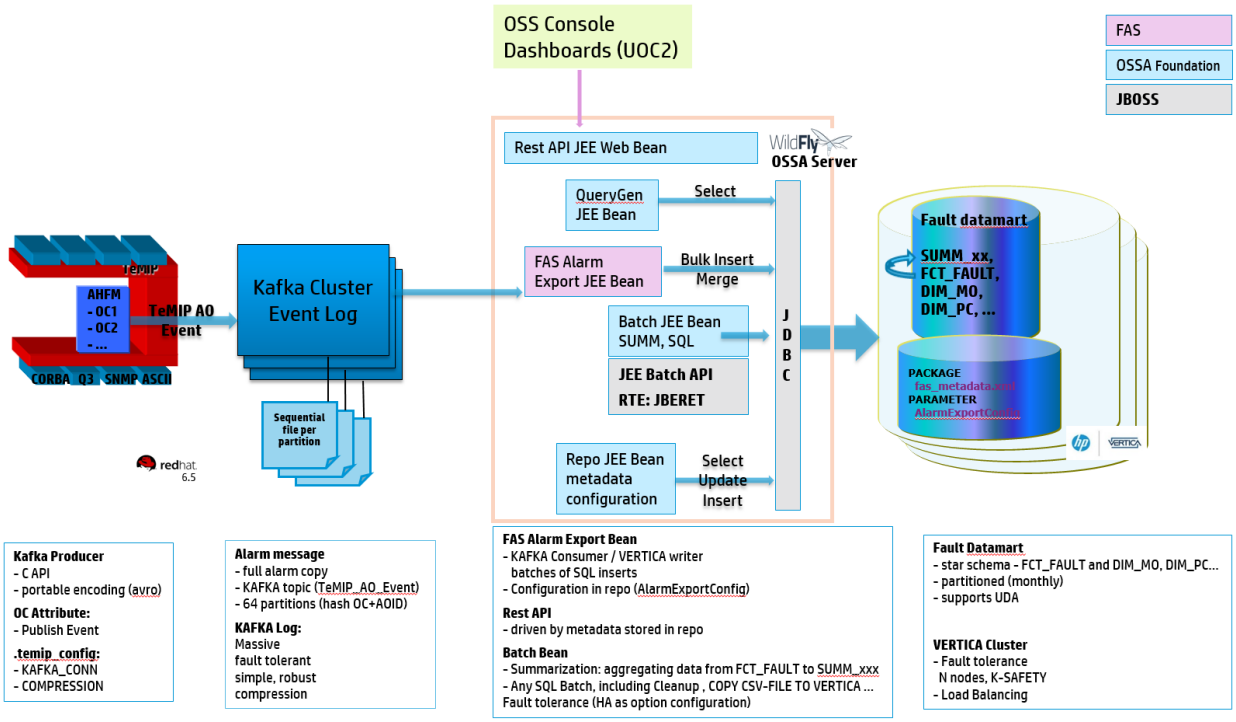


**Figure 1 – OSS Fault Analytics & Statistics architecture**

Chapter 2

# Fault Analytics & Statistics reports

The Fault Analytics & Statistics reports rely on the FAS metadata which is the abstraction layer, representing the structure of the data stored in the FAS datamart.
For more information on the FAS metadata and datamart, please refer to the HP Fault Analytics & Statistics Customization guide.

The Fault Analytics & Statistics reports are implemented as JSON files that use a specific grammar defined by the UOCv2 product.
Once defined, they have to be pushed into the UOCv2 configuration and added in the FAS workspace in order to display them as views.

To better understand the UOCv2 concepts, please refer to the UOCv2 documentation quoted in the references section.

The FAS kit is delivered with a set of default reports that are explained hereunder.

The FAS reports mainly focus on two main aspects:

- The health of the Network from a fault perspective
- And how do the Operations manage the Network faults

## 2.1 Network Health Reports

The Network Health reports give you visibility into how your network behaves overtime through a number of indicators and formulas.

### 2.1.1 Network Health Indicators

#### 2.1.1.1 Description

This report lists some metrics (a.k.a indicators) that help to analyse the health of the network layer from a fault perspective.
Each indicator is calculated and displayed in a dedicated table for both a considered and a reference time periods.
The time periods are easily configurable from time selectors to compare any period of time together.
The variation (in %) between the periods is automatically calculated and displayed as well in a dedicated table.
Comparing time periods helps to better understand the trend and therefore to better plan any network activity.

#### 2.1.1.2 Metrics

| Indicators | Description | Metadata Identifiers used in the Considered & Reference Tables | Formulas defined in the Deviation Table |
|---|---|---|---|
| Alarm Objects (AO) | Number of AOs collected during the time period | ALARM_OBJECTS_COUNTER_SUM | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| Alarm Occurrences (AO + SA) | Number of AOs and similar alarms collected during the time period | ALARM_COUNTER_SUM | ["percent", ["variation", ["/" , "ALARM_COUNTER_SUM", "consPeriodSize" ], ["/" , |

| | | | |
|---|---|---|---|
| | | | "ALARM_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Alarm Reduction Ratio** (SA / AO) | Ratio of SAs vs AOs during the time period | ["percent" , [ "/" , "SIMILAR_ALARM_COUNTER_SUM" , "ALARM_OBJECTS_COUNTER_SUM" ] ] | ["variation", [ "/" , "SIMILAR_ALARM_COUNTER_SUM" , "ALARM_OBJECTS_COUNTER_SUM" ], [ "/" , "SIMILAR_ALARM_COUNTER_SUM_1" , "ALARM_OBJECTS_COUNTER_SUM_1" ]] |
| **Managed Objects** (MO) | Number of equipments that have emitted alarms during the time period | MO_COUNT | ["percent", ["/", ["-", "MO_COUNT", "MO_COUNT_1"], "MO_COUNT_1" ] ] |
| **Cumulated In Fault Duration** (CIFD) | The absolute time in hours between the clearance (or the termination if no clear) and the original event time for all the AOs collected during the time period. | IN_FAULT_DURATION_HR_SUM | ["percent", ["variation", ["/" , "IN_FAULT_DURATION_HR_SUM", "consPeriodSize" ], ["/" , "IN_FAULT_DURATION_HR_SUM_1", "refPeriodSize" ]]] |
| **Average In Fault Duration** (AIFD) | The average time in minutes between the clearance (or the termination if no clear) and the original event time for all the AOs collected during the time period. | IN_FAULT_DURATION_MIN_AVG | ["percent", ["variation", ["/" , "IN_FAULT_DURATION_MIN_AVG", "consPeriodSize" ], ["/" , "IN_FAULT_DURATION_MIN_AVG_1", "refPeriodSize" ]]] |

**Table 2 – Network Health Indicators Table**

### 2.1.1.3 Screenshot

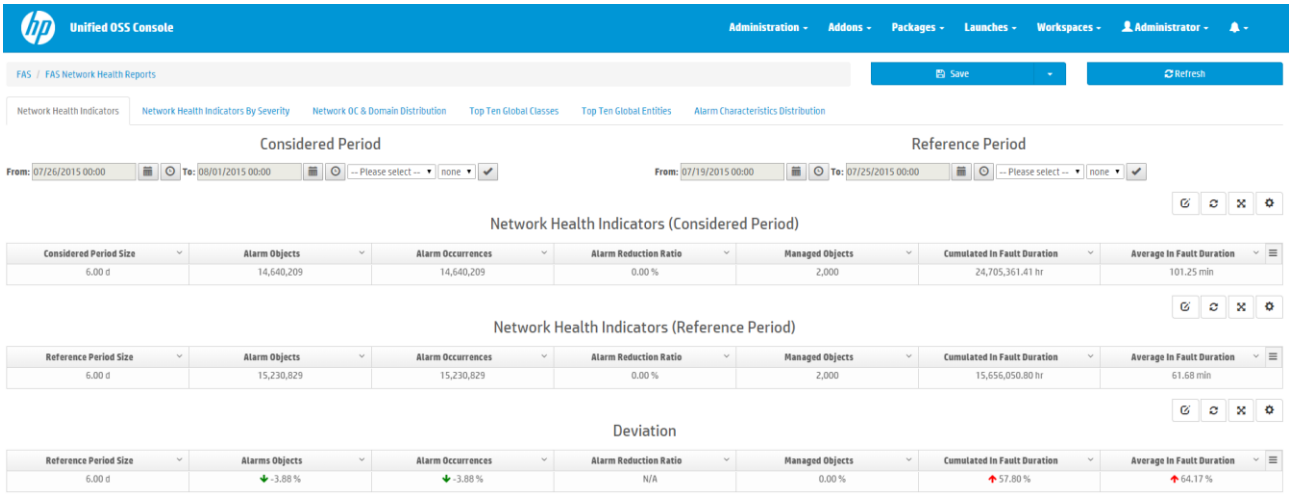


**Figure 2 - Network Health Indicators Report**

In the above screenshot, we have chosen to compare a week from Sunday 26th July 2015 to Friday 1st August 2015 (the considered time period) with its previous week from Sunday 19th July 2015 to Friday 25th July 2015 (the reference time period).

The considered time period is composed of 6 days, and the reference time period is a 6 days period also.

As stressed by the tables, the number of faulty equipments (a.k.a MOs) is the same for both weeks (2000) and the number of alarms (a.k.a AOs) collected in the considered time period is 3.88% less than the previous week (the reference period). This fact is highlighted with green arrow icons associated to the calculated variation percentages in the Deviation table.

There are no similar alarms in this configuration as the Alarm Reduction Ratio is equal to zero percent.

The average time for the collected alarms to be cleared or terminated (*Cumulated In Fault Duration*) is higher of 57.80 % meaning that their related failures has been solved with a longer time. This fact is highlighted with the red arrow icon.

## 2.1.2 Network Health Indicators By Severity

### 2.1.2.1 Description

This report lists the same metrics (a.k.a indicators) as the Network Health Indicator report described above but segregated by Perceived Severity to provide a more complete analysis of the health of the Network.

Please refer to the previous chapter (Network Health Indicators) for a complete description of the report.

### 2.1.2.2 Metrics

| Indicators | Description | Metadata Identifiers used in the Considered & Reference Tables | Formulas defined in the Deviation Table |
|---|---|---|---|
| **Severity** | AO Severity when AO is originally received (Critica, Major, Minor, Warning & Indeterminate) | SEVERITYNAME (Dimension) | SEVERITYNAME (Dimension) |
| **Alarm Objects** (AO) | Number of AOs collected during the time period segregated by perceived severity | ALARM_OBJECTS_COUNTER_SUM | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Alarm Occurrences** (AO + SA) | Number of AOs and similar alarms collected during the time period segregated by perceived severity | ALARM_COUNTER_SUM | ["percent", ["variation", ["/" , "ALARM_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Alarm Reduction Ratio** (SA / AO) | Ratio of SAs vs AOs during the time period segregated by perceived severity | ["percent" , [ "/" , "SIMILAR_ALARM_COUNTER_SUM" , "ALARM_OBJECTS_COUNTER_SUM" ] ] | ["variation", [ "/" , "SIMILAR_ALARM_COUNTER_SUM" , "ALARM_OBJECTS_COUNTER_SUM" ], [ "/" , "SIMILAR_ALARM_COUNTER_SUM_1" , "ALARM_OBJECTS_COUNTER_SUM_1" ]] |
| **Managed Objects** (MO) | Number of equipments that have emitted alarms during the time period segregated by perceived severity | MO_COUNT | ["percent", ["/", ["-", "MO_COUNT", "MO_COUNT_1"], "MO_COUNT_1" ] ] |
| **Cumulated In Fault Duration** (CIFD) | The absolute time in hours between the clearance (or the termination if no clear) and the original event time for all the AOs collected during the time period segregated by perceived severity | IN_FAULT_DURATION_HR_SUM | ["percent", ["variation", ["/" , "IN_FAULT_DURATION_HR_SUM", "consPeriodSize" ], ["/" , "IN_FAULT_DURATION_HR_SUM_1", "refPeriodSize" ]]] |
| **Average In Fault Duration** (AIFD) | The average time in minutes between the clearance (or the termination if no clear) and the original event time for all the AOs collected during the time period segregated by perceived severity | IN_FAULT_DURATION_MIN_AVG | ["percent", ["variation", ["/" , "IN_FAULT_DURATION_MIN_AVG", "consPeriodSize" ], ["/" , "IN_FAULT_DURATION_MIN_AVG_1", "refPeriodSize" ]]] |

**Table 3 – Network Health Indicators By Severity Table**

### 2.1.2.3 Screenshot

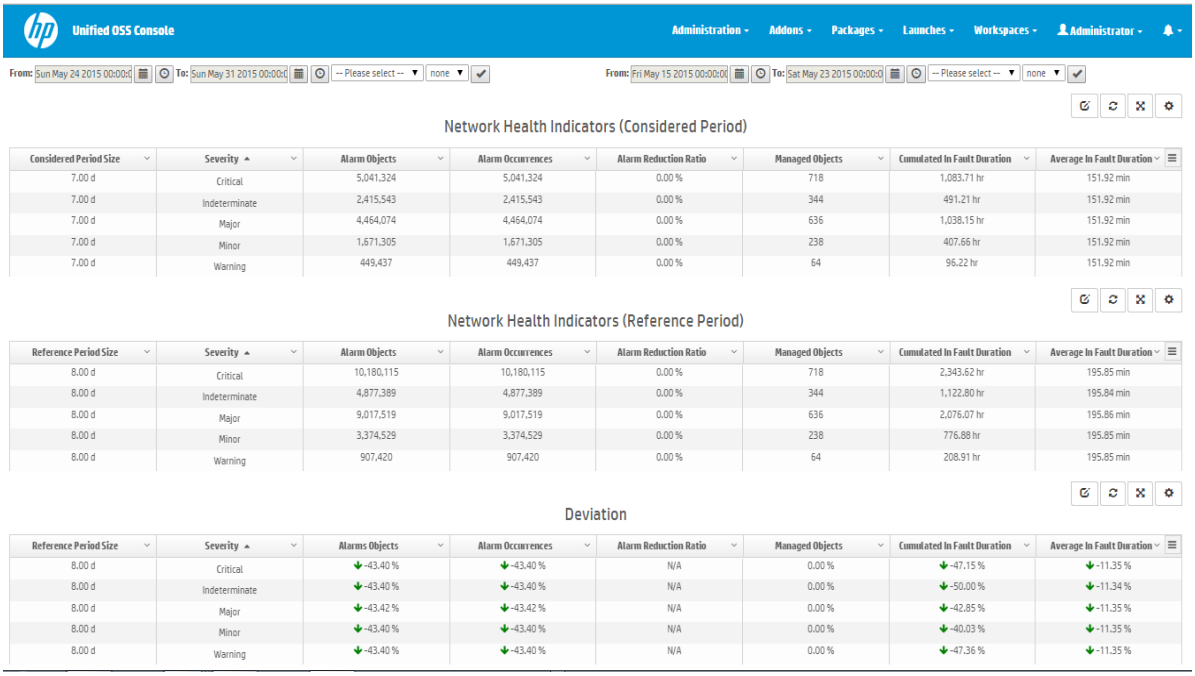


**Figure 3 - Network Health Indicators By Severity Report**

In the above screenshot, we compare a week (the considered time period) with its previous week (the reference time period).

The considered time period is composed of 7 days where the reference time period is here a 8 days period.

The computed metrics are the same than the Network Health Indicator report but there are now segregated by perceived severity.

As stressed by the tables, the number of faulty equipments (a.k.a MOs) is the same for both weeks whatever the severity but the number of alarms (a.k.a AOs) collected in the considered time period is more than 40% less than the previous week (the reference period). This fact is highlighted with green arrow icons associated to the calculated variation percentages in the Deviation table.

There are no similar alarms in this configuration as the Alarm Reduction Ratio is equal to zero percent.

The average time for the collected alarms to be cleared or terminated is lower of 11% whatever the alarms severity meaning that their related failures has been solved faster.

## 2.1.3 Network Operation Context and Domain Distribution

### 2.1.3.1 Description

This report highlights for each OC and for each Domain:

- The number of Alarm Objects (AOs) collected during a time period.
- The cumulated number of hours (CIFD) where the AOs were/are considered as not fixed (meaning neither terminated nor cleared)
- And the variation (a.k.a Deviation) in percentage of the two above quoted metrics compare to the selected reference time period

This content helps to better understand the trends by profiles of collection (e.g. by type of equipment, by technology, etc. depending on the meaning given to the OCs and the Domains) and therefore to better plan future network activities.

### 2.1.3.2 Operation Context Distribution Metrics

| Indicators | Description | Metadata Identifiers and formulas used in the Table |
|---|---|---|
| **Operation Context** (OC) | Name of the OC | OPERATIONCONTEXTNAME (Dimension) |
| **Alarm Objects** (AO) | Number of AOs collected during the considered time period segregated by OC | ALARM_OBJECTS_COUNTER_SUM |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Cumulated In Fault Duration** (CIFD) | The absolute time in hours between the clearance (or the termination if no clear) and the original event time for all the AOs collected during the considered time period segregated by OC | IN_FAULT_DURATION_HR_SUM |
| **CIFD Deviation** (%) | Variation in % of CIFD between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , " IN_FAULT_DURATION_HR_SUM ", "consPeriodSize" ], ["/" , " IN_FAULT_DURATION_HR_SUM _1", "refPeriodSize" ]]] |

**Table 4 – Network OC Distribution Indicators Table**

### 2.1.3.3 Domain Distribution Metrics

| Indicators | Description | Metadata Identifiers and formulas used in the Table |
|---|---|---|
| **Domain** | Name of the Domain | DOMAINNAME (Dimension) |
| **Alarm Objects** (AO) | Number of AOs collected during the considered time period segregated by Domain | ALARM_OBJECTS_COUNTER_SUM |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods segregated by Domain | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Cumulated In Fault Duration** (CIFD) | The absolute time in hours between the clearance (or the termination if no clear) and the original event time for all the AOs collected during the considered time period segregated by Domain | IN_FAULT_DURATION_HR_SUM |
| **CIFD Deviation** (%) | Variation in % of CIFD between the reference and the considered time periods segregated by Domain | ["percent", ["variation", ["/" , " IN_FAULT_DURATION_HR_SUM ", "consPeriodSize" ], ["/" , " IN_FAULT_DURATION_HR_SUM _1", "refPeriodSize" ]]] |

**Table 5 – Network Domain Distribution Indicators Table**

### 2.1.3.4 Screenshot

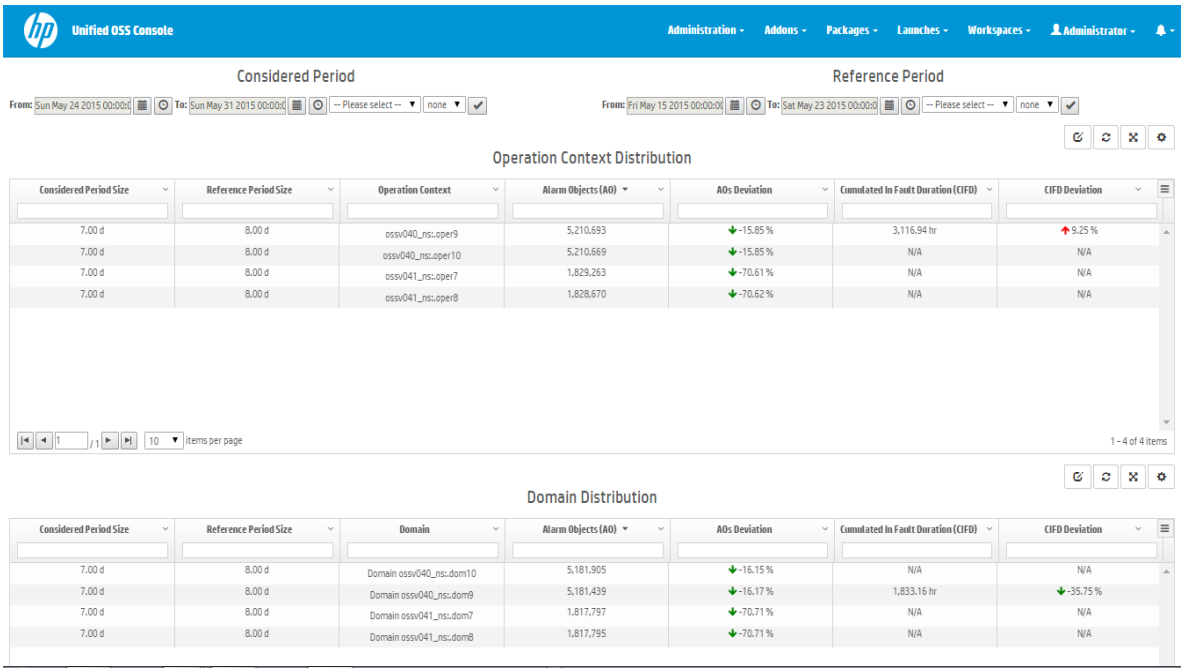


**Figure 4 - Network OC & Domain Distribution Report**

In the above screenshot, we compare a week (the considered time period) with its previous week (the reference time period).

The considered time period is composed of 7 days where the reference time period is here a 8 days period.

The tables highligh that the number of alarms (a.k.a AOs) collected in the considered time period is lower than the previous week (the reference period) from 15% to 70% less whatever the OCs or Domains we considered. This is highlighted with green arrow icons associated to the calculated variation percentages of the deviation indicators.

The Cumulated In Fault Duration is not available for all OCs and Domains. This means that none of the alarms related to these OCs and Domains are neither cleared or terminated yet. When available, we can notice that their related variations are either worse (red arrow for OC oper9) or better (green arrow for Domain dom9).

## 2.1.4 Top N Global Classes

### 2.1.4.1 Description

This report highlights:

- The Top N Managed Object Global Classes for all the alarms collected during the considered time period. Default value for N is equal to 10
- The Top N Managed Object Global Classes in term of cumulated in fault duration period (cumulated absolute time differences between the clearance or the termination alarms timestamps and their original event timestamps) for the alarms collected during the considered time period. Default value for N is equal to 10

Note that all the alarm objects related to a type of network equipment (a.k.a Managed Object (MO) Global Class) are taken into consideration.

### 2.1.4.2 Top N Metrics

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| **Global Classes** (OC) | Name of the Managed Object Global Class | GLOBALCLASSNAME (Dimension) |
| **Number of Alarms** (AO) | Number of AOs collected during the considered time period segregated by Managed Object (MO) Global Class | ALARM_OBJECTS_COUNTER_SUM |
| **Cumulated In Fault Duration** (CIFD) | The absolute time in **days** between the clearance (or the termination if no clearance timestamp) and the original event time for all the AOs collected during the considered time period segregated by Managed Object (MO) Global Class | IN_FAULT_DURATION_DAY_SUM |

**Table 6 – Top N Global Classes Indicators Table**

### 2.1.4.3 Screenshot

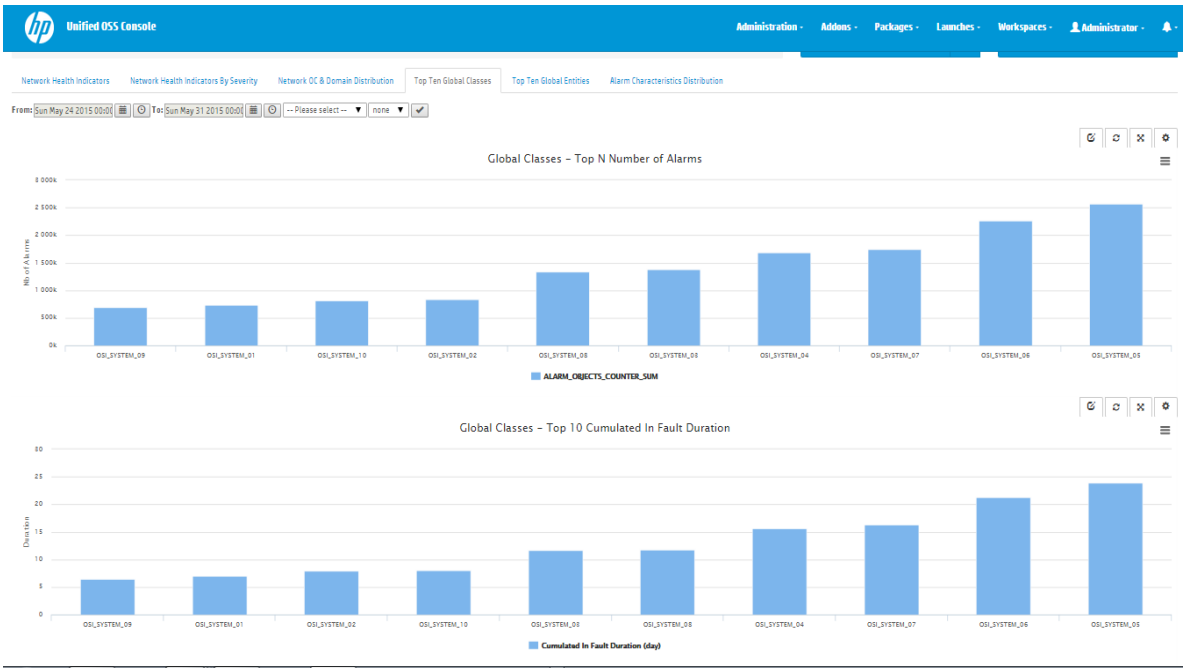


**Figure 5 – Top N Global Classes Report**

By highlighting the Network Equipment types (a.k.a Managed Object Global Classes) that are the most in fault, both in terms of number of alarms and fault

duration, this report allows you to determine the type of equipments that are the likeliest candidates to attention and maintenance.

Note that you can easily choose the Top 'N' value from the *Analysis tool*.
For details on the usage of the Top Filter please refer to the *Unified OSS Console User Guide* at section: *Widgets Management* / *Analysis tools* / *Top Filter section*.

## 2.1.5 Top N Global Entities

### 2.1.5.1 Description

This report highlights:

- The Top N Managed Object Global Entities (a.k.a instances) for all alarms collected during the considered time period. Default value for N is equal to 10
- The Top N Managed Object Global Entities (a.k.a instances) in term of cumulated in fault duration (cumulated absolute time differences between the clearance or the termination alarms timestamps and their original event timestamps) for all the alarms (a.k.a AOs) collected during the considered time period. Default value for N is equal to 10

Note that all the alarm objects related to a network equipment (a.k.a Managed Object (MO) Global Entity) are taken into consideration.

### 2.1.5.2 Top N Metrics

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| **Global Entities** (OC) | Name of the Managed Object Global Entity | GLOBALMONAME (Dimension) |
| **Number of Alarms** (AO) | Number of AOs collected during the considered time period segregated by Managed Object (MO) Global entity | ALARM_OBJECTS_COUNTER_SUM |
| **Cumulated In Fault Duration** (CIFD) | The absolute time in **hours** between the clearance (or the termination if no clearance timestamp) and the original event time for all the AOs collected during the considered time period segregated by Managed Object (MO) Global Entity | IN_FAULT_DURATION_HR_SUM |

**Table 7 – Top N Global Entities Indicators Table**

### 2.1.5.3 Screenshot

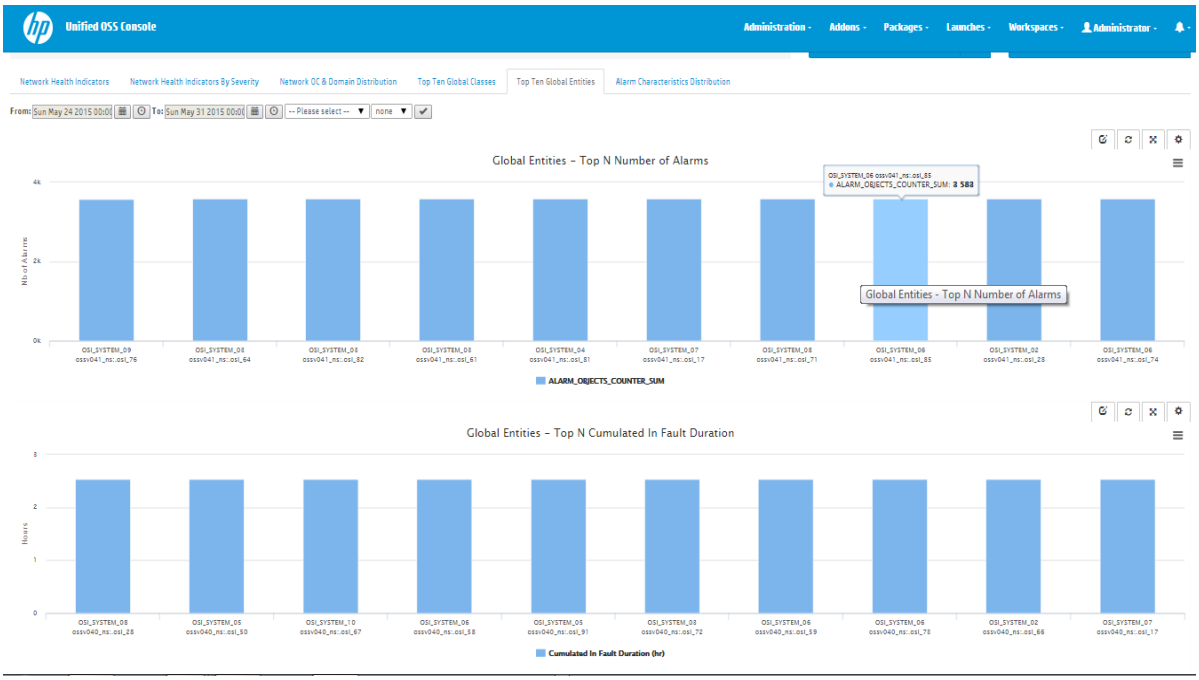


**Figure 6 – Top N Global Entities Report**

By highlighting the Network Elements (a.k.a Managed Object Global Entities) that are the most in fault, both in terms of number of alarms and fault duration, this report allows you to determine the set of resources that are the likeliest candidates to maintenance and preventive root cause analysis.

## 2.1.6 Alarm Characteristics Distribution Report

### 2.1.6.1 Description

This report highlights:

- The alarm severity distribution in percentage for all the alarms collected during the considered time period
- The alarm type distribution in percentage for all the alarms collected during the considered time period
- The Top N Probable Causes for all the alarms collected during the considered time period. Default value for N is equal to 10

Note that all the alarms (a.k.a AOs) are taken into consideration.

### 2.1.6.2 Alarm Severity Distribution Metrics

| Indicators | Description | Metadata Identifiers used in the Chart |
|---|---|---|
| Alarm Severity | Name of the Alarm Severity and its related distribution percentage (ratio between the number of alarms with such a severity and the total number of alarms) | SEVERITYNAME (Dimension) |
| Number of Alarms | Number of AOs collected during the considered time period segregated by Alarm Severity | ALARM_OBJECTS_COUNTER_SUM |

**Table 8 – Alarm Severity Distribution Indicators Table**

### 2.1.6.3 Alarm Type Distribution Metrics

| Indicators | Description | Metadata Identifiers used in the Chart |
|---|---|---|
| Alarm Type | Name of the Alarm Type and its related distribution percentage percentage (ratio between the number of alarms with such a severity and the total number alarms) | ALARMTYPENAME (Dimension) |
| Number of Alarms | Number of AOs collected during the considered time period segregated by Alarm Type | ALARM_OBJECTS_COUNTER_SUM |

**Table 9 – Alarm Type Distribution Indicators Table**

### 2.1.6.4 Top N Probable Causes Metrics

| Indicators | Description | Metadata Identifiers used in the Chart |
|---|---|---|
| Probable Cause | Name of the Probable Cause | PROBABLECAUSENAME (Dimension) |
| Number of Alarms | Number of AOs collected during the considered time period segregated by Probable Cause | ALARM_OBJECTS_COUNTER_SUM |

**Table 10 – Top N Probable Causes Indicators Table**

### 2.1.6.5 Screenshot

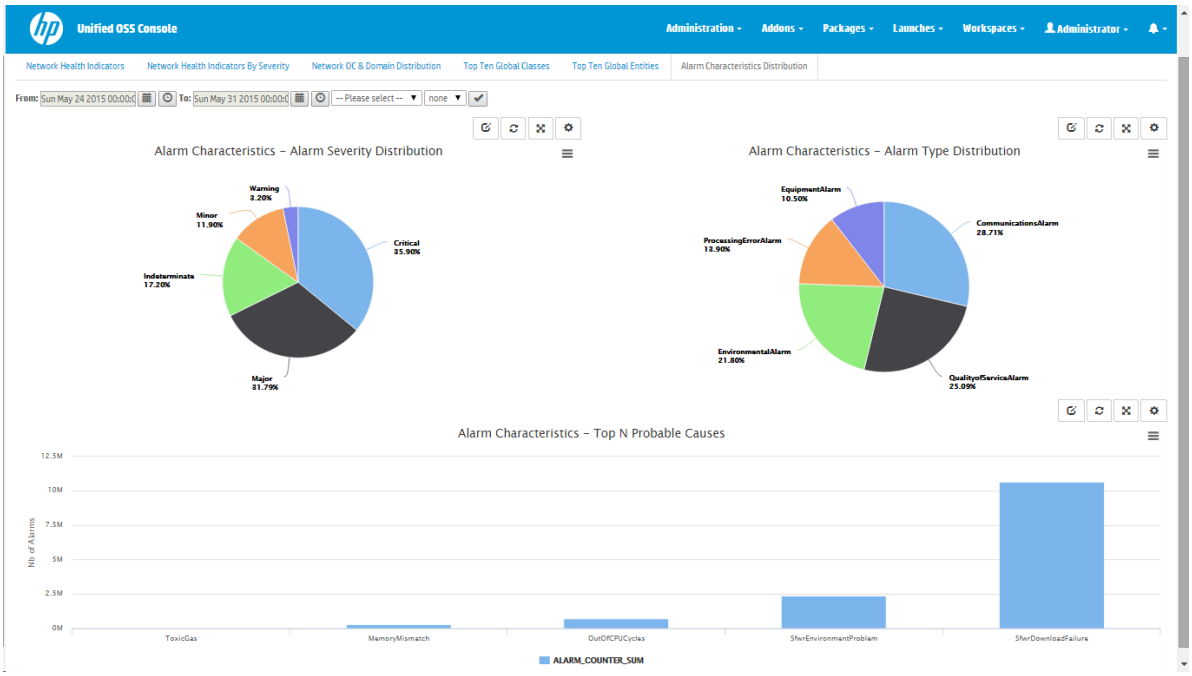


**Figure 7 – Top N Global Entities Report**

This report highlights at-a-glance the overall network state. In the above example, you can quickly notice you received a majority of Critical and Major alarms mainly split into 3 types: CommunicationsAlarm (29%), QoSAlarm (25%) and EnvironmentalAlarm (22%). Looking at the top N probable causes help then to relate the type of problems to the type of alarms and therefore support the Network planning team.

## 2.2 Network Management Health Reports

The Network Management Health reports give you visibility into how do the Operations manage the Network faults overtime.

### 2.2.1 Network Management Health Indicators

#### 2.2.1.1 Description

This report lists some metrics (a.k.a indicators) that help to analyse the overall network management activity.
Each indicator is calculated and displayed in a dedicated table for both a considered and a reference time periods.
The time periods are easily configurable from time selectors to compare any period of time together.
The variation (in %) between the periods is automatically calculated and displayed as well in a dedicated table.
Comparing time periods helps to better understand the trend and therefore to better plan any network activity.

#### 2.2.1.2 Metrics

| Indicators | Description | Metadata Identifiers and Formuals used in the Considered & Reference Tables | Formulas defined in the Deviation Table |
|---|---|---|---|
| **Alarm Objects** (AO) | Number of alarms (a.k.a AOs) collected during the time period | ALARM_OBJECTS_COUNTER_SUM | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Average Acknowledge Duration** (minutes) | How long in average did it take to acknowledge alarms during the time period | [ "/" , "ACK_DURATION_AVG" , 60000 ] | ["percent",["/" , ["-" , "ACK_DURATION_AVG", "ACK_DURATION_AVG_1" ], "ACK_DURATION_AVG_1" ]] |
| **Average Handle Duration** (minutes) | How long in average did it take to handle created alarms during the time period | [ "/" , "HANDLE_DURATION_AVG" , 60000 ] | ["percent",["/" , ["-" , "HANDLE_DURATION_AVG", "HANDLE_DURATION_AVG_1" ], "HANDLE_DURATION_AVG_1" ]] |
| **Average Close Duration** (minutes) | How long in average did it take to close handled alarms during the time period | [ "/" , "CLOSE_DURATION_AVG" , 60000 ] | ["percent",["/" , ["-" , "CLOSE_DURATION_AVG", "CLOSE_DURATION_AVG_1" ], "CLOSE_DURATION_AVG_1" ]] |
| **Average Termination Duration** (minutes) | How long in average did it take to terminate created alarms during the time period | [ "/" , "TERM_DURATION_AVG" , 60000 ] | ["percent",["/" , ["-" , "TERM_DURATION_AVG", "TERM_DURATION_AVG_1" ], "TERM_DURATION_AVG_1" ]] |
| **Average In Management Duration** (minutes) | How long in average did it take to clear (or close) created alarms | IN_MANAGEMENT_DURATION_MIN_AVG | ["percent",["/" , ["-" , "IN_MANAGEMENT_DURATION_MIN_AVG", "IN_MANAGEMENT_DURATION_MIN_AVG_1" ], "IN_MANAGEMENT_DURATION_MIN_AVG_1" ]] |
| **Number Of Escalated Alarms** | How many alarms have been escalated during the time period | ESCALATED_COUNTER_SUM | ["percent", ["variation", ["/", "ESCALATED_COUNTER_SUM" , "consPeriodSize" ], ["/", "ESCALATED_COUNTER_SUM_1" , "refPeriodSize" ]]] |

**Table 11 – Network Management Health Indicators Table**

### 2.2.1.3 Screenshot

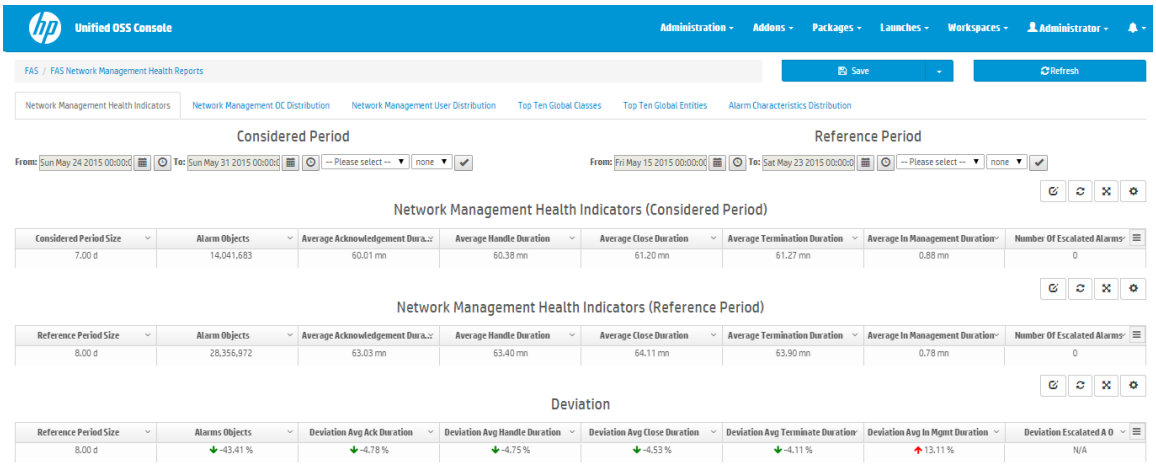


**Figure 8 - Network Management Health Indicators Report**

The report highlights a decrease of the overall alarms handling from a management perspective between month N and month N-1.

Indeed, the number of collected alarms decreased by 43% but the mean time to take a management action decreased only by 4% in average and even worse, the variation of the overall “in management duration” indicator has increased by 13% stressing that in average it took longer to solve the network failures (i.e. terminate the alarms) once acknowledged.

## 2.2.2 Network Management Operation Context Distribution

### 2.2.2.1 Description

This report highlights for all Operation Contexts

- The proportion of managed AOs compare to the total AOs segregated by management action for a considered time period
- And a set of counters that reflects the average duration of each alarm management action and their variation in percentage from the reference period

### 2.2.2.2 Operation Context Counters Distribution Metrics

| Indicators | Description | Metadata Identifiers and formulas used in the Table |
|---|---|---|
| **Operation Context** (OC) | Name of the OC | OPERATIONCONTEXTNAME (Dimension) |
| **Alarm Objects** (AO) | Number of AOs collected during the considered time period segregated by OC | ALARM_OBJECTS_COUNTER_SUM |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Acknowledged** | Proportion of acknowledged AOs compare to the total number of AOs for the considered time period | ["percent", ["/", "ACK_COUNTER_SUM", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Handled** | Proportion of handled AOs compare to the total number of AOs for the considered time period | ["percent", ["/", "HANDLED_COUNTER_SUM", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Closed** | Proportion of closed AOs compare to the total number of AOs for the considered time period | ["percent", ["/", "CLOSED_COUNTER_SUM", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Terminated** | Proportion of terminated AOs compare to the total number of AOs for the considered time period | ["percent", ["/", "TERMINATED_FLAG_SUM", "ALARM_OBJECTS_COUNTER_SUM"]] |

**Table 12 – Network Management OC Counters Distribution Table**

### 2.2.2.3 Operation Context Average Duration Distribution Metrics

| Indicators | Description | Metadata Identifiers and formulas used in the Table |
|---|---|---|
| **Operation Context** (OC) | Name of the OC | OPERATIONCONTEXTNAME (Dimension) |
| **Alarm Objects** (AO) | Number of AOs collected during the considered time period segregated by OC | ALARM_OBJECTS_COUNTER_SUM |
| **Average Acknowledge Duration** (minutes) | How long in average did it take to acknowledge created alarms during the time period segregated by OC | [ "/" , "ACK_DURATION_AVG" , 60000 ] |
| **Acknowledged Average Duration Deviation** (%) | Variation in % of of Average Acknowledge Duration between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , "[ "/" , "ACK_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "ACK_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |
| **Average Handle Duration** (minutes) | How long in average did it take to handle created alarms during the time period segregated by OC | [ "/" , "HANDLE_DURATION_AVG" , 60000 ] |
| **Handled Average Duration Deviation** (%) | Variation in % of of Average Handle Duration between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , "[ "/" , "HANDLE_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "HANDLE_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |
| **Average Close Duration** (minutes) | How long in average did it take to close handled alarms during the time period segregated by OC | [ "/" , "CLOSE_DURATION_AVG" , 60000 ] |

| | | |
|---|---|---|
| **Closed Average Duration Deviation** (%) | Variation in % of of Average Close Duration between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , "[ "/" , "CLOSE_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "CLOSE_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |
| **Average Termination Duration** (minutes) | How long in average did it take to terminate created alarms during the time period segregated by OC | [ "/" , "TERM_DURATION_AVG" , 60000 ] |
| **Terminated Average Duration Deviation** (%) | Variation in % of of Average Terminate Duration between the reference and the considered time periods segregated by OC | ["percent", ["variation", ["/" , "[ "/" , "TERM_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "TERM_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |

**Table 13 – Network Management OC Average Duration Distribution Table**

### 2.2.2.4 Screenshot

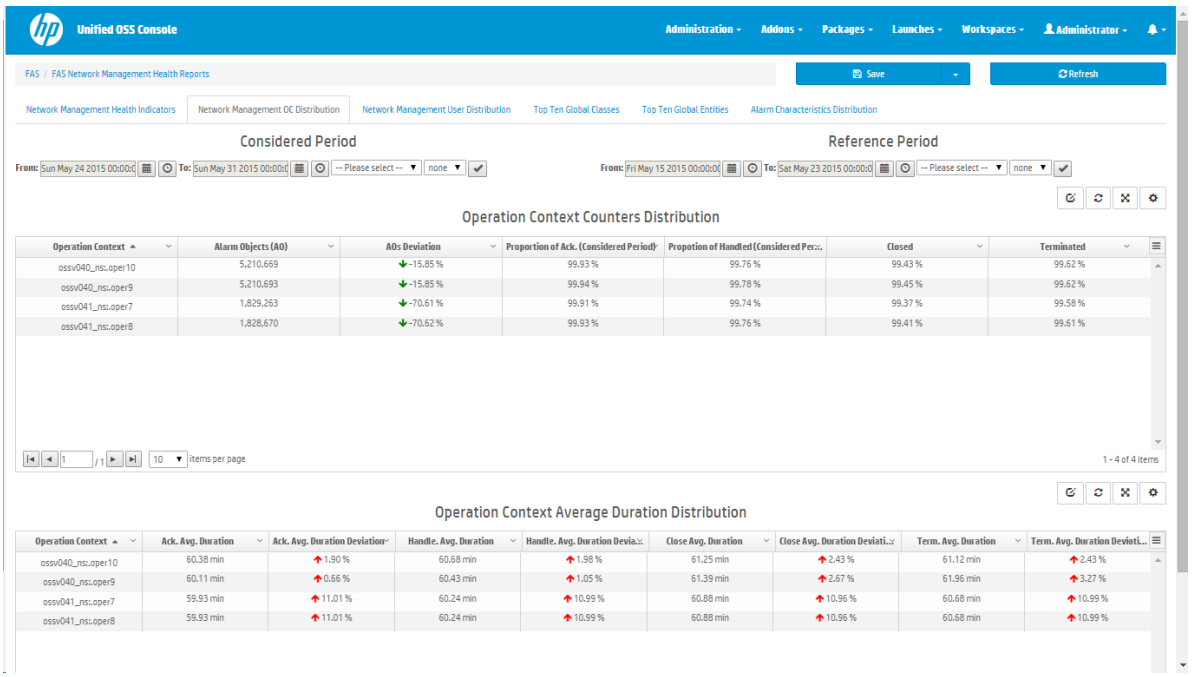


**Figure 9 - Network Management OC Distribution Report**

## 2.2.3 Network Management User Distribution

### 2.2.3.1 Description

This report highlights important statistics on the alarm management actions that have been taken by the Operations' users to enhance the management processes overtime.

There are four tables displayed, each of them is related to specific type of alarm management action: Acknowledge an alarm, Terminate an alarm, Handle an alarm, Close an alarm.

For each type of management action, some indicators per user are displayed for the considered time period and the variation in percentage from the reference time period.
This allows to easily understand the trend of management actions on alarms.

### 2.2.3.2 Ack Users Counters Distribution

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| **User Name** | Name of the user who acknowledged alarms | ackusername (Dimension) |
| **Alarm Objects Acknowledged** (AOs) | Number of AOs acknowledged by the user during the considered time period | ALARM_OBJECTS_COUNTER_SUM |
| **Proportion of Acknowledged alarms** (% Ack.) | Among those alarms, the percentage of acknowledged alarms | ["percent", ["/", "ACK_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Proportion of Handled alarms** (% Handled) | Among those alarms, the percentage of handled alarms | ["percent", ["/", "HANDLED_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods for the user acknowledging alarms | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Average Acknowledge Duration** (in mn) (Avg. Ack) | How long in average did it take to acknowledge created alarms during the time period for those alarms | ["/", "ACK_DURATION_AVG", 60000] |
| **Acknowledged Average Duration Deviation** (Variation Avg. Ack. %) | Variation in % of of Average Acknowledge Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "AckAvgDurationMin", "consPeriodSize" ], ["/" , "AckAvgDurationMinRefPeriod", "refPeriodSize" ]]] |
| **Average Termination Duration** (Avg. Term. in mn) | How long in average did it take to terminate created alarms during the time period for those alarms | [ "/" , "TERM_DURATION_AVG" , 60000 ] |
| **Terminated Average Duration Deviation** (Variation Avg. Term. %) | Variation in % of of Average Terminate Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "[ "/" , "TERM_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "TERM_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |

**Table 14 – Network Management Ack User Distribution Indicators Table**

### 2.2.3.3 Terminate Users Counters Distribution

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| **User Name** | Name of the user who terminated alarms | termusername (Dimension) |

| | | |
|---|---|---|
| **Alarm Objects Teminated** (AOs) | Number of AOs terminated by the user during the considered time period | ALARM_OBJECTS_COUNTER_SUM |
| **Proportion of Acknowledged alarms** (% Ack.) | Among those alarms, the percentage of acknowledged alarms | ["percent", ["/", "ACK_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Proportion of Handled alarms** (% Handled) | Among those alarms, the percentage of handled alarms | ["percent", ["/", "HANDLED_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods for the user terminating alarms | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Average Acknowledge Duration** (in mn) (Avg. Ack) | How long in average did it take to acknowledge created alarms during the time period for those alarms | ["/", "ACK_DURATION_AVG", 60000] |
| **Acknowledged Average Duration Deviation** (Variation Avg. Ack. %) | Variation in % of of Average Acknowledge Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "AckAvgDurationMin", "consPeriodSize" ], ["/" , "AckAvgDurationMinRefPeriod", "refPeriodSize" ]]] |
| **Average Termination Duration** (Avg. Term. in mn) | How long in average did it take to terminate created alarms during the time period for those alarms | [ "/" , "TERM_DURATION_AVG" , 60000 ] |
| **Terminated Average Duration Deviation** (Variation Avg. Term. %) | Variation in % of of Average Terminate Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "[ "/" , "TERM_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "TERM_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |

**Table 15 – Network Management Terminate User Distribution Indicators Table**

### 2.2.3.4 Handle Users Counters Distribution

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| **User Name** | Name of the user who handled alarms | handleusername (Dimension) |
| **Alarm Objects Handled** (AOs) | Number of AOs handled by the user during the considered time period | ALARM_OBJECTS_COUNTER_SUM |
| **Proportion of Acknowledged alarms** (% Ack.) | Among those alarms, the percentage of acknowledged alarms | ["percent", ["/", "ACK_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Proportion of Handled alarms** (% Handled) | Among those alarms, the percentage of handled alarms | ["percent", ["/", "HANDLED_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods for the user handling alarms | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Average Acknowledge Duration** (in mn) (Avg. Ack) | How long in average did it take to acknowledge created alarms during the time period for those alarms | ["/", "ACK_DURATION_AVG", 60000] |
| **Acknowledged Average Duration Deviation** | Variation in % of of Average Acknowledge Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "AckAvgDurationMin", "consPeriodSize" ], ["/" , |

| | | |
|---|---|---|
| (Variation Avg. Ack. %) | | "AckAvgDurationMinRefPeriod", "refPeriodSize" ]]] |
| **Average Termination Duration** (Avg. Term. in mn) | How long in average did it take to terminate created alarms during the time period for those alarms | [ "/" , "TERM_DURATION_AVG" , 60000 ] |
| **Terminated Average Duration Deviation** (Variation Avg. Term. %) | Variation in % of of Average Terminate Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "[ "/" , "TERM_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "TERM_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |

**Table 16 – Network Management Handle User Distribution Indicators Table**

### 2.2.3.5 Close Users Counters Distribution

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| **User Name** | Name of the user who closed alarms | closeusername (Dimension) |
| **Alarm Objects Closed** (AOs) | Number of AOs closed by the user during the considered time period | ALARM_OBJECTS_COUNTER_SUM |
| **Proportion of Acknowledged alarms** (% Ack.) | Among those alarms, the percentage of acknowledged alarms | ["percent", ["/", "ACK_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **Proportion of Handled alarms** (% Handled) | Among those alarms, the percentage of handled alarms | ["percent", ["/", "HANDLED_BY_COUNT", "ALARM_OBJECTS_COUNTER_SUM"]] |
| **AOs Deviation** (%) | Variation in % of AOs between the reference and the considered time periods for the user closing alarms | ["percent", ["variation", ["/" , "ALARM_OBJECTS_COUNTER_SUM", "consPeriodSize" ], ["/" , "ALARM_OBJECTS_COUNTER_SUM_1", "refPeriodSize" ]]] |
| **Average Acknowledge Duration** (in mn) (Avg. Ack) | How long in average did it take to acknowledge created alarms during the time period for those alarms | ["/", "ACK_DURATION_AVG", 60000] |
| **Acknowledged Average Duration Deviation** (Variation Avg. Ack. %) | Variation in % of of Average Acknowledge Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "AckAvgDurationMin", "consPeriodSize" ], ["/" , "AckAvgDurationMinRefPeriod", "refPeriodSize" ]]] |
| **Average Termination Duration** (Avg. Term. in mn) | How long in average did it take to terminate created alarms during the time period for those alarms | [ "/" , "TERM_DURATION_AVG" , 60000 ] |
| **Terminated Average Duration Deviation** (Variation Avg. Term. %) | Variation in % of of Average Terminate Duration between the reference and the considered time periods for those alarms | ["percent", ["variation", ["/" , "[ "/" , "TERM_DURATION_AVG" , 60000 ]", "consPeriodSize" ], ["/" , "[ "/" , "TERM_DURATION_AVG_1" , 60000 ]", "refPeriodSize" ]]] |

**Table 17 – Network Management Close User Distribution Indicators Table**

### 2.2.3.6 Screenshot

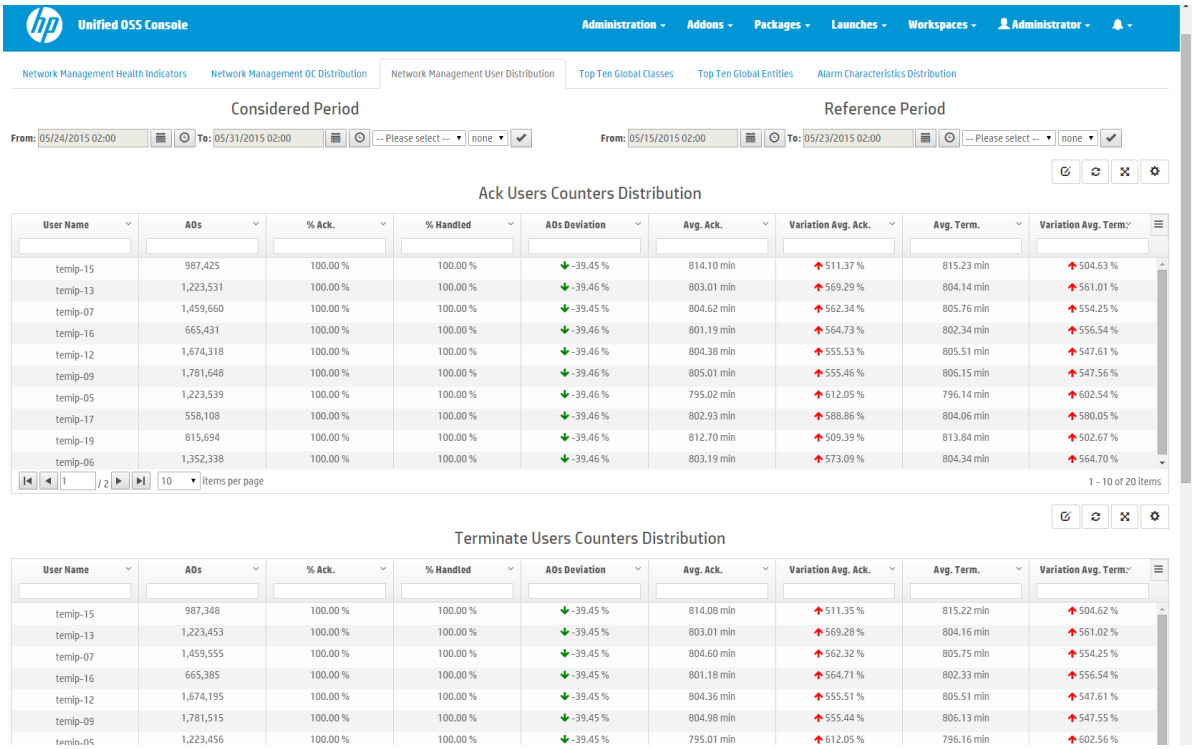


**Figure 10 – Network Management User Distribution Report**

## 2.2.4 Network Management Top N Global Classes

### 2.2.4.1 Description

This report highlights:

- The Top N Managed Object Global Classes in term of cumulated in management duration period (cumulated absolute time difference between the close (or clear) timestamp and the creation timestamp of an alarm) for the alarms collected during the considered time period. Default value for N is equal to 10
- The Top N Managed Object Global Classes in term of average in management duration period (average time difference between the close (or clear) timestamp and the creation timestamp of an alarm) for the alarms collected during the considered time period. Default value for N is equal to 10

Note that all the alarm objects related to a type of network equipment (a.k.a Managed Object (MO) Global Class) are taken into consideration.

### 2.2.4.2 Top N Metrics

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| Global Classes (OC) | Name of the Managed Object Global Class | GLOBALCLASSNAME (Dimension) |
| Cumulated In Management Duration | The cumulated absolute time in **days** between the creation and the clear (or close) timestamps for all the AOs collected during the considered time period segregated by Managed Object Global Class | IN_MANAGEMENT_DURATION_DAY_SUM |
| Average In Management Duration | The mean time in **minutes** between the creation and the clear (or close) timestamps for all the AOs collected during the considered time period segregated by Managed Object (MO) Global Class | IN_MANAGEMENT_DURATION_MIN_AVG |

**Table 18 – Network Management Top N Global Classes Indicators Table**

### 2.2.4.3 Screenshot

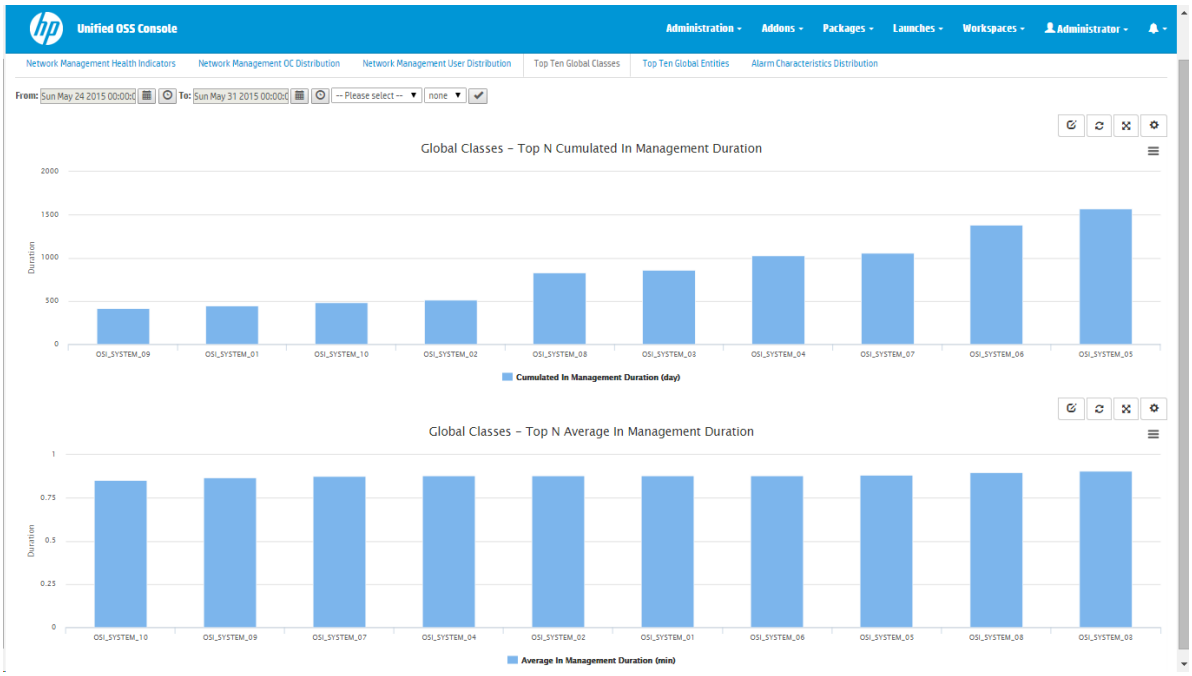


**Figure 11 – Network Management Top N Global Classes Report**

This report highlights which Network Equipment types (a.k.a Managed Object Global Classes) are the most demanding in term of alarms management.

## 2.2.5 Network Management Top N Global Entities

### 2.2.5.1 Description

This report highlights:

- The Top N Managed Object Global Entities (a.k.a instances) in term of cumulated in management duration period (cumulated absolute time difference between the close (or clear) timestamp and the creation timestamp of an alarm) for the alarms collected during the considered time period. Default value for N is equal to 10
- The Top N Managed Object Global Entities (a.k.a instances) in term of average in management duration (average time difference between the close (or clear) timestamp and the creation timestamp of an alarm) for all the alarms collected during the considered time period. Default value for N is equal to 10

Note that all the alarm objects related to a network equipment (a.k.a Managed Object (MO) Global Entity) are taken into consideration.

### 2.2.5.2 Top N Metrics

| Indicators | Description | Metadata Identifiers used in the Charts |
|---|---|---|
| Global Entities (OC) | Name of the Managed Object Global Entity | GLOBALMONAME (Dimension) |
| Cumulated In Management Duration | The cumulated absolute time in **hours** between the creation and the clear (or close) timestamps for all the AOs collected during the considered time period segregated by Managed Object Global Entity | IN_MANAGEMENT_DURATION_HR_SUM |
| Average In Management Duration | The mean time in **minutes** between the creation and the clear (or close) timestamps for all the AOs collected during the considered time period segregated by Managed Object (MO) Global Entity | IN_MANAGEMENT_DURATION_MIN_AVG |

**Table 19 – Network Management Top N Global Entities Indicators Table**

### 2.2.5.3 Screenshot

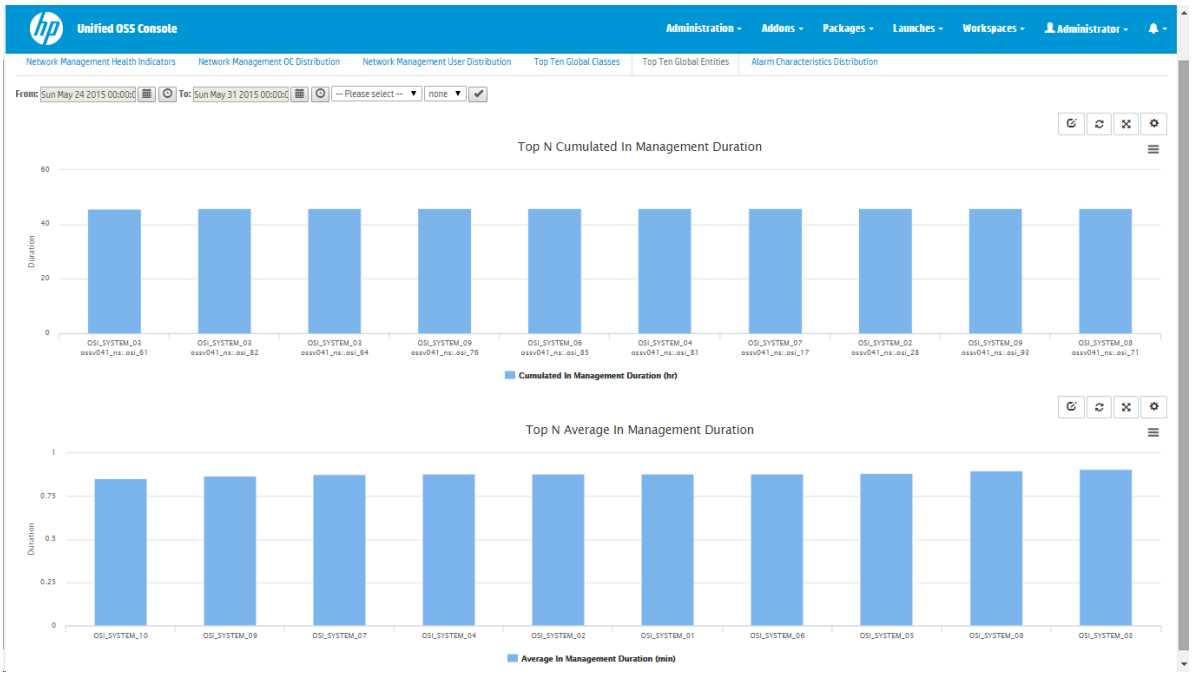


**Figure 12 – Network Management Top N Global Entities Report**

This report highlights which Network Elements (a.k.a Managed Object Global Entities) are the most demanding in term of alarms management.

## 2.2.6 Network Management Alarm Characteristics Distribution Report

### 2.2.6.1 Description

This report highlights:

- The alarm state distribution in percentage for all the alarms collected during the considered time period
- The problem status distribution in percentage for all the alarms collected during the considered time period
- The alarms distribution overtime based on the selected granularity (for instance, by day) for the considered time period

Note that all managed alarms (a.k.a AOs) are taken into consideration.

### 2.2.6.2 Alarm State Distribution Metrics

| Indicators | Description | Metadata Identifiers used in the Chart |
|---|---|---|
| Alarm State | Name of the Alarm State and its related distribution percentage (ratio between the number of managed alarms with such a state and the total number of managed alarms) | STATENAME (Dimension) |
| Number of Alarms | Number of managed alarms collected during the considered time period segregated by Alarm State | ALARM_COUNTER_SUM |

**Table 20 – Alarm State Distribution Indicators Table**

### 2.2.6.3 Problem Status Distribution Metrics

| Indicators | Description | Metadata Identifiers used in the Chart |
|---|---|---|
| Problem Status | Name of the Problem Status and its related distribution percentage percentage (ratio between the number of managed alarms with such a problem status and the total number of managed alarms) | PROBLEMSTATUSNAME (Dimension) |
| Number of Alarms | Number of managed alarms collected during the considered time period segregated by Problem Status | ALARM_COUNTER_SUM |

**Table 21 – Problem Status Distribution Indicators Table**

### 2.2.6.4 Alarms Distribution Overtime Metrics

| Indicators | Description | Metadata Identifiers used in the Chart |
|---|---|---|
| Number of Alarms | Number alarms collected during the considered time period | ALARM_COUNTER_SUM |

**Table 22 – Alarms Distribution Overtime Indicators Table**

### 2.2.6.5 Screenshot

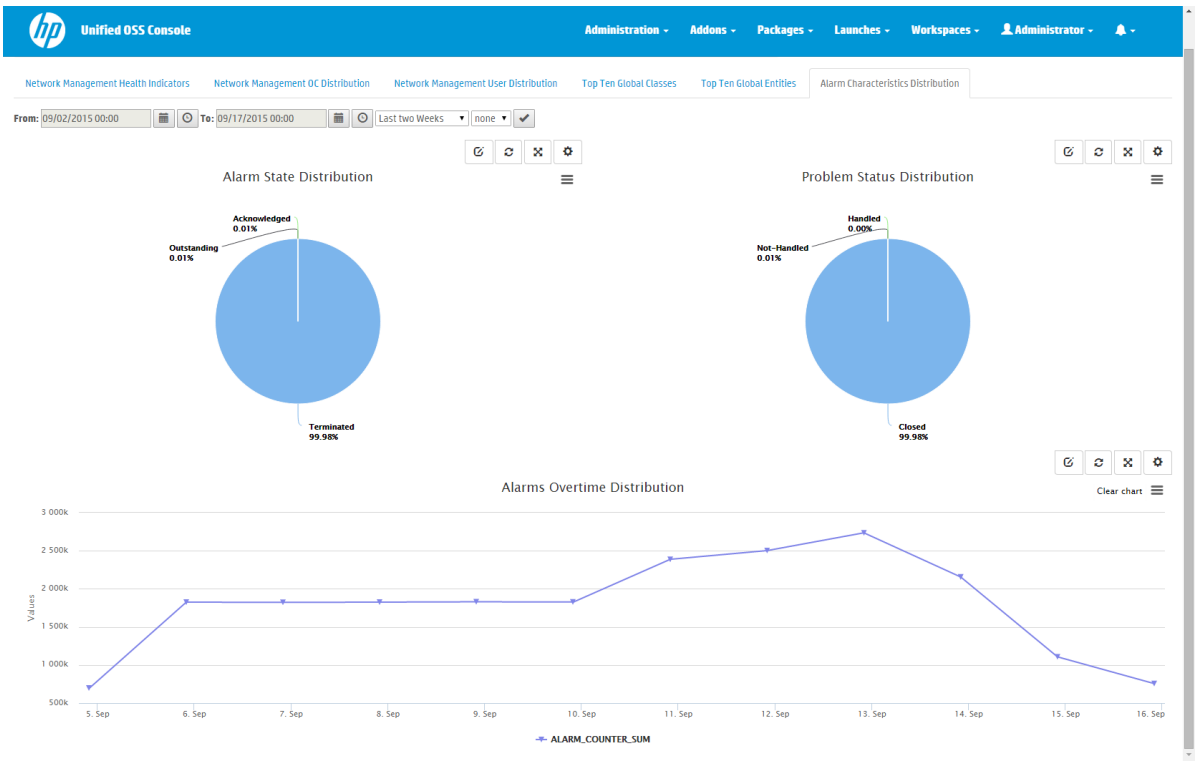


**Figure 13 – Network Management Alarms Characteristics Distribution Report**

This report highlights at-a-glance the overall network state from a management perspective.

# 2.3 Alarm Health Reports

The standard FAS **Alarm Health Reports** gives you visibility about the evolution of the number of alarms overtime.

Two types of graphs are displayed in order to show the information differently: a table and a chart line.

## 2.3.1 Standard report

### 2.3.1.1 Description

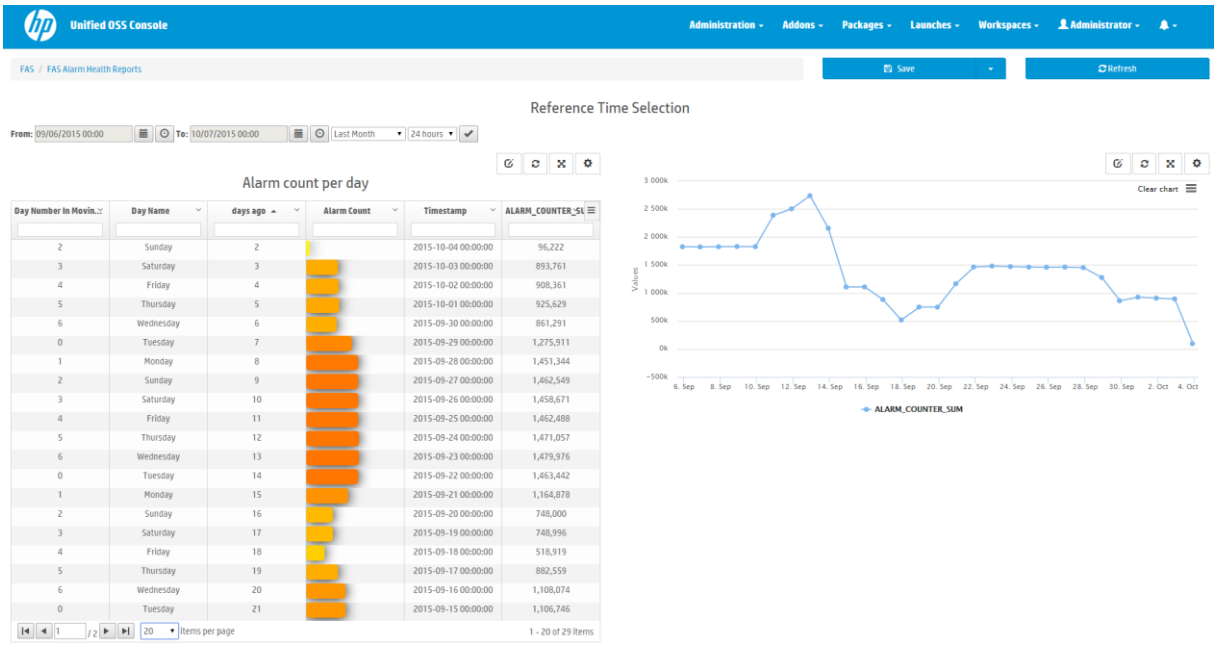


**Figure 14 – Alarm Health Report**

The time period is easily configurable from the **time selector** combobox and affects both the table and the chart line.
You can choose to analyze the evolution of alarms from '*Last Month*', '*Today*', '*Last week*', '*Last two weeks*' or '*Yesterday*' (default is '*Last Month*').

From the combobox which is at the right of the time selector, you can also choose the **granularity** of the information that is displayed within the chart line: 24 hours or 1 hour (default is 24 hours).

In the chart line (at the right), you can clearly see the evolution of the number of alarms during the time period you have chosen (see figure above )

In the table (at the left), each row represents a day with its corresponding total number of alarms as a number (`ALARM_COUNTER_SUM` column) and as a bar (`Alarm Count column`). This allows to clearly see the evolution of the number of alarms during a week for example.

Moreover, the rows can be filtered thanks to the filter fields below the header of the columns.
For example, by filtering `Day Number In Moving Week`, you can compare the number of alarms for each Friday of the month, as shown below:

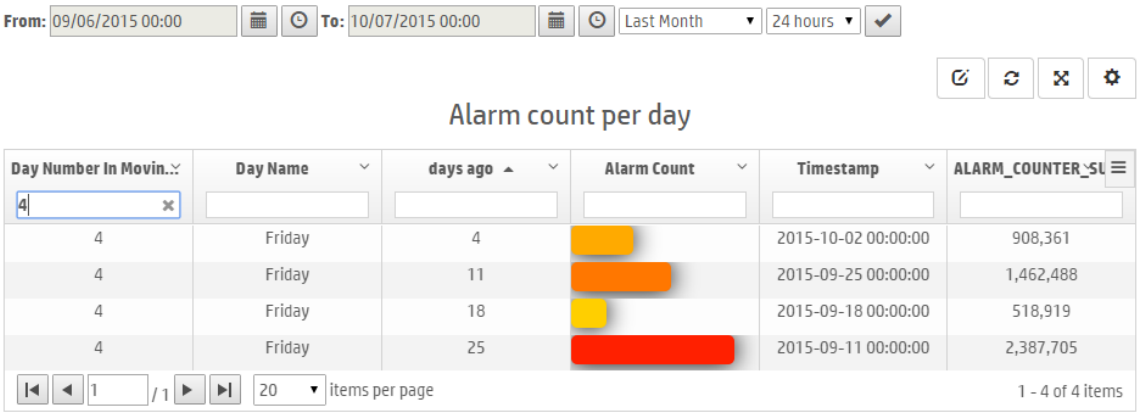


**Figure 15 – Number of alarms for a given day within each week over a month**

### 2.3.1.2 Metrics

For both widgets the only Fact Id used is: `ALARM_COUNTER_SUM`.
All other indicators displayed in the widgets are declared within the json views thanks to formulas relying on this fact and on the time.

## 2.3.2 Enhanced usage of standard FAS Alarm Health Reports

Here are some examples of possible dynamic configurations of those graphs.

### 2.3.2.1 Evolution of critical alarm number overtime

In this example, you can first configure the table by adding the *Severity* dimension to the '*Data Selection*', as shown below:

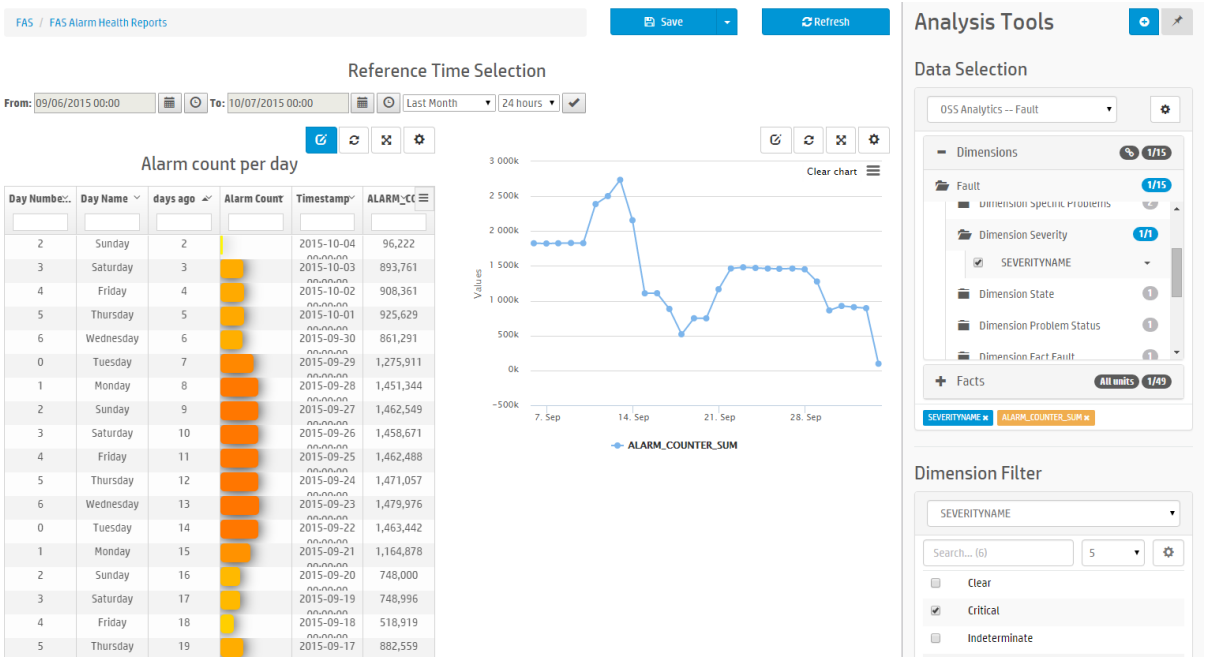

**Figure 16 – Data Selection: add a dimension**

Then, refresh the table, and thus, you can use the dynamic filtering within the SEVERITYNAME table header, as shown below.

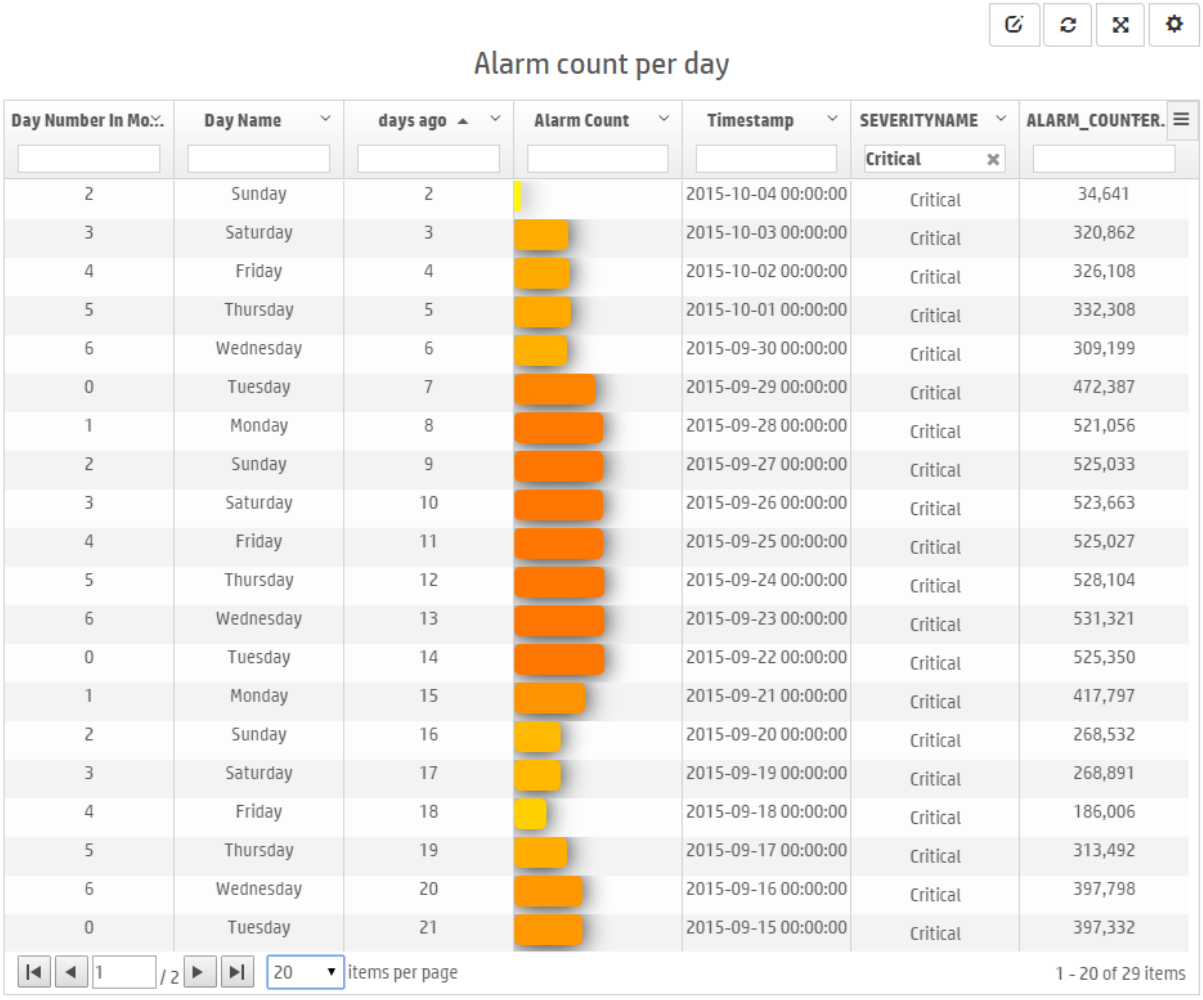


**Figure 17 – Evolution of critical alarm number overtime**

This gives the evolution of the number of Critical alarms during the past days.

### 2.3.2.2 Evolution of critical and major alarms compared to the total number of alarms

In this example, as shown below, you can first configure the chart line by adding to the '*Data Selection*' new facts: *major_occurrences_sum* , *critical_occurrences_sum*, *alarm_counter_sum*.

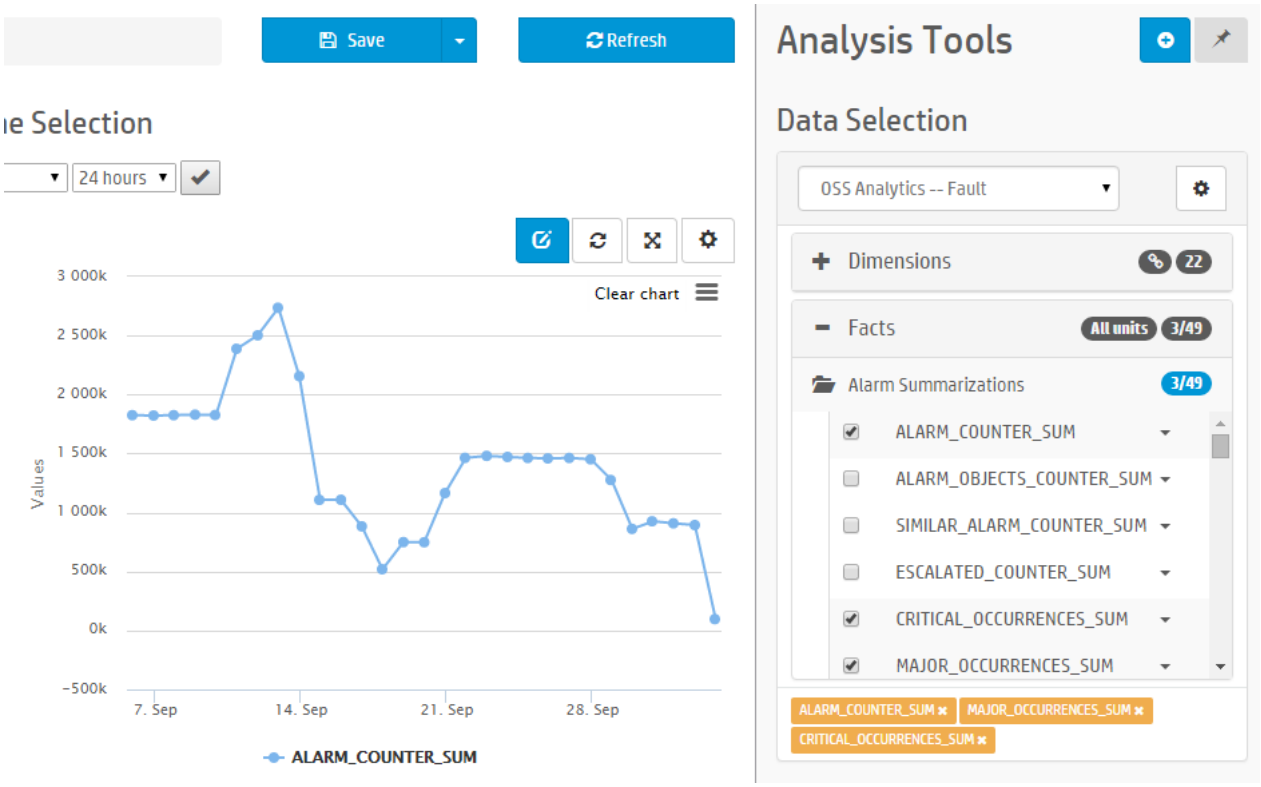


**Figure 18 – Data Selection: add facts**

After refreshing the chart, you will get the evolution of the three facts: number of alarms, number of critical alarms and number of major alarms into one single graph, as shown below.

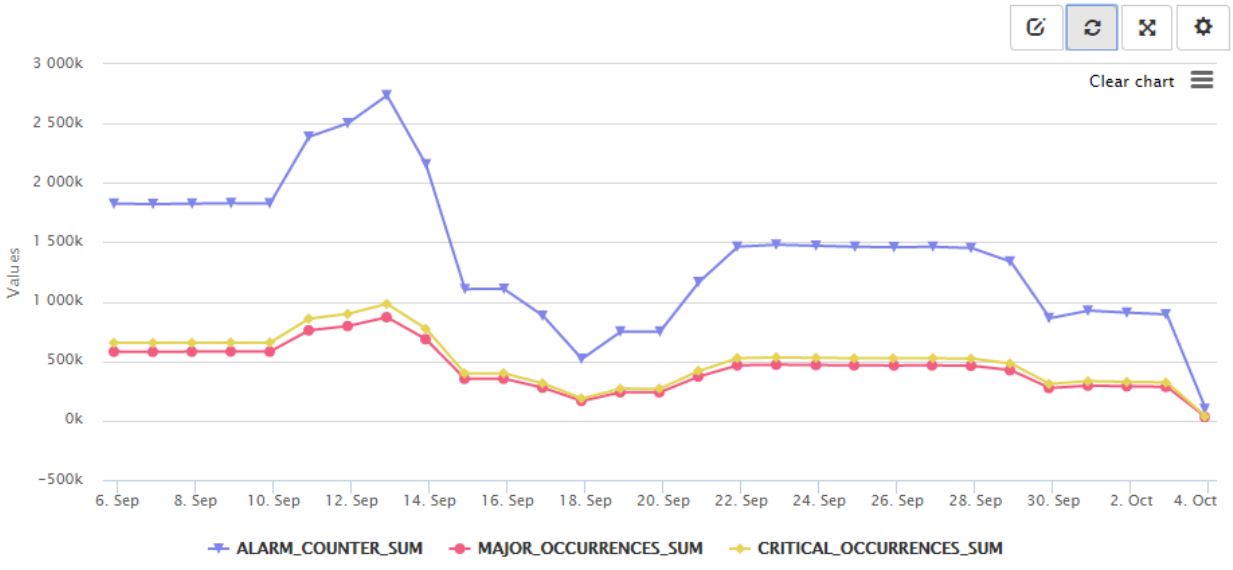


**Figure 19 – Evolution of critical and major alarms compared to the total number of alarms**

This gives the evolution of the number of Major and Critical alarms compared to the total number of alarms during the past days.
In this example, we clearly see that the evolution is nearly the same and that the major and critical alarms are the main ones compared to the total number of alarms.

## 2.4 Schedule reports

The FAS solution can be customized in order to schedule standard or user specific reports.

For details, please refer to the *HP Fault Analytics and Statistics - Customization Guide* at section *FAS Customization / Reports scheduling*.