

1 Introduction

This document describes the optional service Performance monitoring for the GTS Ethernet VPN service.

2 Description of Performance monitoring application

The Performance monitoring is the optional service to the GTS Ethernet VPN service. The monitoring application is operated on a BaseN solution which is primarily intended for the sphere of the telco services performance management. The BaseN application collects data from network equipments which are being monitored and assures a presentation of the collected data in real time through On-line WEB based portal.

The information provided by this optional service cannot serve as the basis for the calculation of credits for non-compliance with SLA due to the fact that all types of outages are recorded in the application. This includes, for instance, planned service outages, excluded events, outages caused by the customer, etc., which are not included in the total unavailability of the service.

2.1 Data collection

The application collects data from GTS managed equipments in the GTS network, especially from PE switches and Customer Edge (CE) equipments located at the End User Sites. The data collection is carried out every 15 minutes periodically. The collected data are stored in Database (DB) for 24 months. Various types of reports can be generated via online web interface.

The measurements of quality parameters are performed according to ITU-T Y.1731 recommendation, which specifies mechanisms required to operate and maintain the network and service aspects of the ETH layer.

The measured data are collected using SNMP protocol.

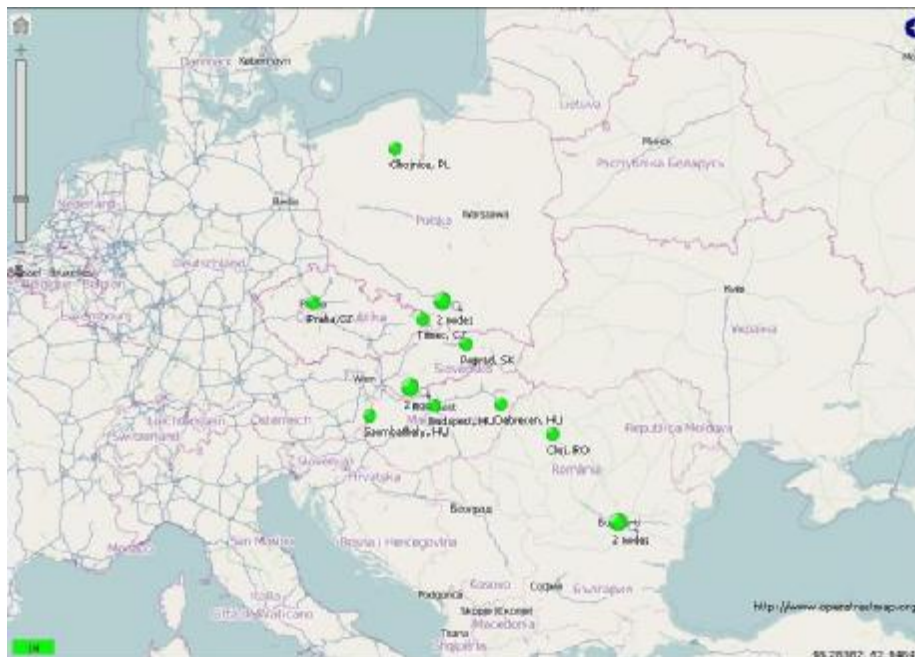
2.2 Configured reports

Status Summary

Summarizing overview of all of the monitored services the participant, their current availability and graphical illustration of the location on the map.

Network Map

A graphic illustration of the location of monitored services on a map. The colour illustration of the locality indicates current service availability. The colour of the dot is a function of the summary status (colour) of the recent actual metering in the colour stripe of the Status Table. Clicking on the service displays the statistics of the locality selected.



Status Table

An overview of monitored services and their current accessibility on the basis of an ICMP protocol. The coloured status indicator is divided into 5-minute intervals. The last minute monitored is the coloured strip on the very right, the status 2-3 minutes previously is in the centre, and the oldest measurement is on the very left. The status is automatically updated every minute.

Overview (last 5 min)			
Availability based on ICMP Echo status (for managed CPE services)			
Status	Location	ServiceLine	Page
■	PL, Bytom, Chorzowska 33	823090	GTS Test 823090 ServiceEntityId
■	PL, Chojnice, Sukienników 65	823091	GTS Test 823091 ServiceEntityId
■	PL, Chrzanów, Trzebińska 73	823092	GTS Test 823092 ServiceEntityId
■	CZ, Třinec, Dostojevského 45	GN61176	GTS Test GN61176 ServiceEntityId
■	HU, Szombathely, Hefele Menyhart utca 43.	GSTGPLM9401	GTS Test GSTGPLM9401 ServiceEntityId
■	HU, Budapest, Lechner Odon Fasor	GTSGPLM1103	GTS Test GTSGPLM1103 ServiceEntityId
■	HU, Debrecen, Vagohid u. 58	GTSGPLM5201	GTS Test GTSGPLM5201 ServiceEntityId
■	RO, Bucuresti, St Vidin, Nr. 54A	GTSRO-S-135458	GTS Test GTSRO-S-135458 ServiceEntityId
■	RO, Bucuresti, St Turnu Magurele, Nr. 501E	GTSRO-S-135461	GTS Test GTSRO-S-135461 ServiceEntityId
■	RO, Cluj, St Coastei, Nr. 94	GTSRO-S-135470	GTS Test GTSRO-S-135470 ServiceEntityId
■	SK, Nitra, Farská 27	SL20950SK	GTS Test SL20950SK ServiceEntityId
■	SK, Nové Zámky, Podzámska 104	SL20951SK	GTS Test SL20951SK ServiceEntityId
■	SK, Poprad, Hviezdoslavova 91a	SL20952SK	GTS Test SL20952SK ServiceEntityId

13 items shown.

- - Managed service, CPE is available.
- - Managed service, CPE is unavailable.
- - Unmanaged service.

The status view is split into 5 one minute areas. The last minute is on the rightmost side of the area. The status of 2-3 minutes ago is in the middle and the oldest measurement is in the leftmost.

This page refreshes itself once a minute.

2.2.1 Basic measurement

Basic measurement of GTS Ethernet VPN includes:

§ Measurement of interface of PE Switch

- Traffic of whole circuit in the direction to the customer (egress) [kbit/s, Mbit/s];
- Traffic of whole circuit in the direction from the customer (ingress) [kbit/s, Mbit/s].

2.2.2 Advance measurement

Advance measurement of GTS Ethernet VPN includes:

The Advanced performance parameters of the GTS Ethernet VPN service are measured between selected service locality and Central Measurement Point. Central Measurement Point is one locality of customer's VPN, selected by customer.

- Reports of traffic of whole circuit

§ Measurement of WAN interface of CPE Switch:

- Traffic in the direction to the customer (egress) [kbit/s, Mbit/s];
- Traffic in the direction from the customer (ingress) [kbit/s, Mbit/s].

- Reports of performance parameters of Standard Class of Service, from the locality to the Central Measurement Point

§ One-Way Frame Delay (egress) [ms];

§ Frame Delay Variation (egress) [ms];

§ Reports of Frame Loss (egress) [%].

2.3 Measured magnitudes

Traffic

The traffic on the interface of the measured equipment, it displays the transferred data in and out of the equipment, displayed in Kbps or Mbps.

Frame Delay

The Frame delay parameter shows the time in a Standard class in which the provider's network delivers the frame to target equipment (Central Measurement Point). The Frame delay in a network is calculated as the time difference between moment of sending a frame from an ethernet port of the originating equipment and the moment of acceptance of the entire frame on an ethernet port of the terminating equipment (on Central Measurement Point). The statistic shown on the graph charting is the time delay from the source to the target equipment (Central Measurement Point).

Frame Delay Variation

Frame Delay Variation statistic shows a variation of frame delay in the time segment and in the Standard class.

Frame Loss

The Frame loss is a parameter which shows the percentage of frames in Standard class which are not delivered to the target equipment (Central Measurement Point). This loss might be caused, for instance, by the non-availability of

service, by a high failure ratio of the End User Access Line, by an overloading of the End User Access Line (e.g. caused by viruses, SPAM, DoS attacks, etc.), etc.

3 Benefits for customer

The customer gains the same service statistics as employees of the GTS Network Operation Centre - there is no difference in a data source.

Basic measurement

This type of reports is beneficial for monitoring of the most utilized branches. It helps identify which End User Sites need to be paid more attention and which can cause problems with high utilization.

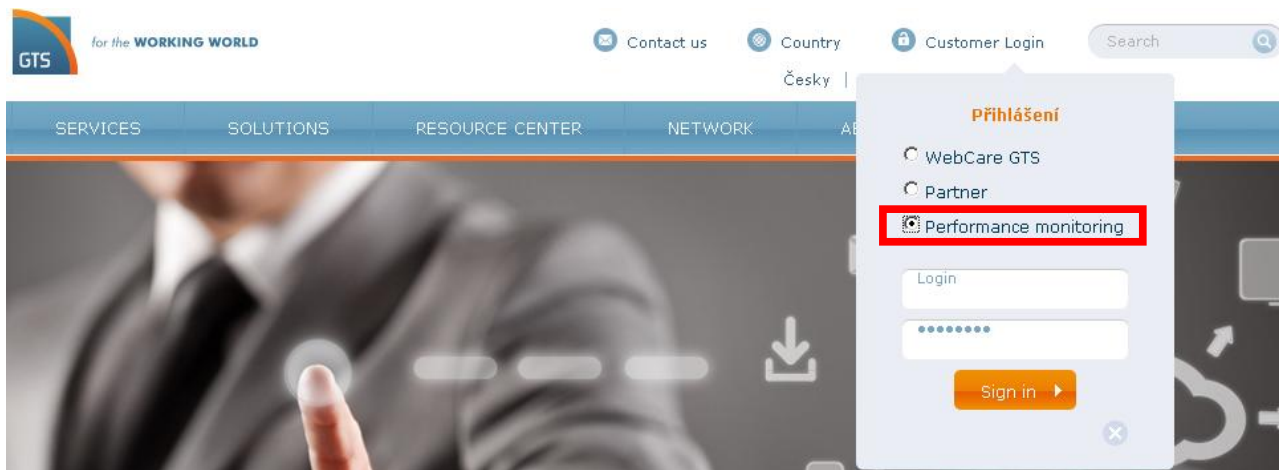
Advanced measurement

Advanced measurement provides more detailed overview of quality parameters: Frame Delay, Frame Delay Variation and Frame Loss.

These reports are very beneficial for customers who want to monitor detailed performance parameters, especially for monitoring of real-time applications.

4 Description of the customer interface

The customer has access to the interface of the application Performance monitoring by means of an internet browser from the website www.gts.cz, the section "Customer Login"



For authorisation and identification of a user a name and password are used which the customer receives when establishing the additional service Performance monitoring. After entering the name and password the Performance monitoring is displayed.

Service

- Status Summary
- GTS IP VPN
 - Network Map
 - Status Table
 - C2
- Třinec
 - Dostojenského 45 (G661176)
 - HJ
 - PL
 - RO
 - SK
- GTS Internet
 - Network Map
 - Status Table
 - C2
 - Praha
 - G66135145 - Připotoční 2210/BSc (9N00074)

Overview (last 5 min.)

Availability based on ICMP Echo status (for managed CPE services)

Status	Location	Service line	Page
■	PL, Bytów, Chorowicka 33	023090	GTS Test-023090-ServiceEntryId
■	PL, Chejnice, Suberskiów 65	023091	GTS Test-023091-ServiceEntryId
■	PL, Chrocin, Trzebniako 73	023092	GTS Test-023092-ServiceEntryId
■	CZ, Třinec, Dostojenského 45	0661176	GTS Test-0661176-ServiceEntryId
■	HU, Szombathely, I. Wéala Manyhart utca 43	G07QPLM9401	GTS Test-G07QPLM9401-ServiceEntryId
■	HU, Budapest, Lechner Odan *aicc	G15QPLM1103	GTS Test-G15QPLM1103-ServiceEntryId
■	HU, Debrecen, Vajkai u. 98	075QPLM8201	GTS Test-075QPLM8201-ServiceEntryId
■	RO, Bucuresti, St. Vidii, Nr. 54A	G15RO-S-135458	GTS Test-G15RO-S-135458-ServiceEntryId
■	RO, Bucuresti, St. Tamas Magaricki, Nr. 50LE	G15RO-S-135461	GTS Test-G15RO-S-135461-ServiceEntryId
■	RO, Cluj, St. Coasta, Nr. 94	G15RO-S-135470	GTS Test-G15RO-S-135470-ServiceEntryId
■	SK, Nová, Horská 27	SL209508	GTS Test-SL209508-ServiceEntryId
■	SK, Nová Zámky, Podbáňská :04	SL209513	GTS Test-SL209513-ServiceEntryId
■	SK, Poprad, Hviezdoslavova 91a	SL209525	GTS Test-SL209525-ServiceEntryId

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The customer interface is displayed above.

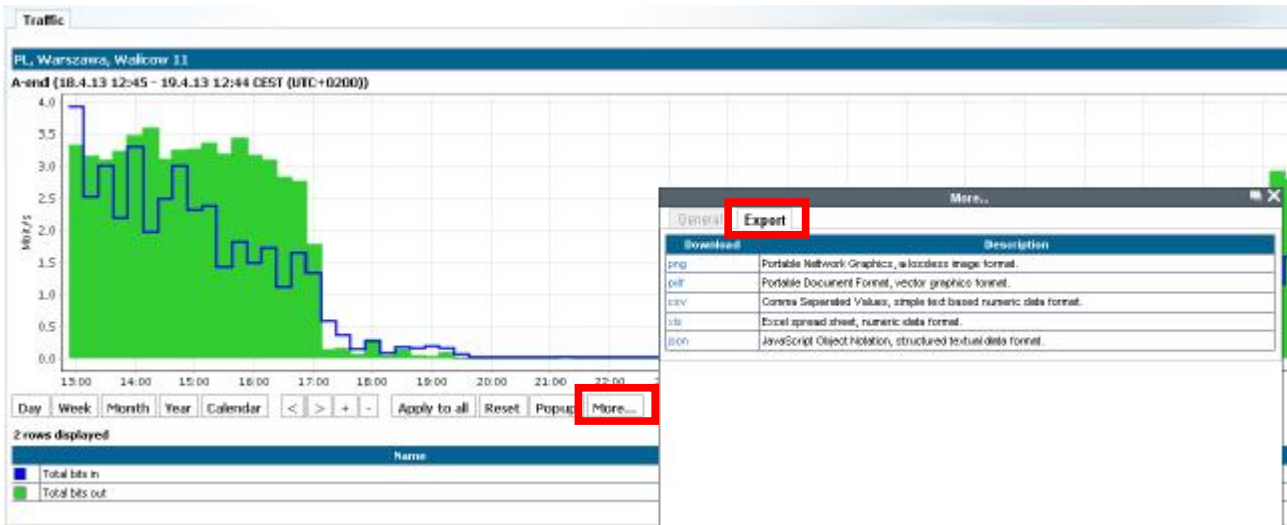
1. Overview of all services included in the Performance monitoring
2. Specific product included in the Performance monitoring
3. Displaying a list of all connections of a particular product in a geographic map
4. Displaying a list of all connections of a particular product in the table
5. Select individual services in a chosen location (region)
6. Sign out

Upon clicking on a specific service in the location (see item 5 in the above picture), further selection is offered in the form of tables. It is possible to select visualisation of specific metering (see item 7 in the above picture).

5 Control of the WEB interface for the creation of graphs

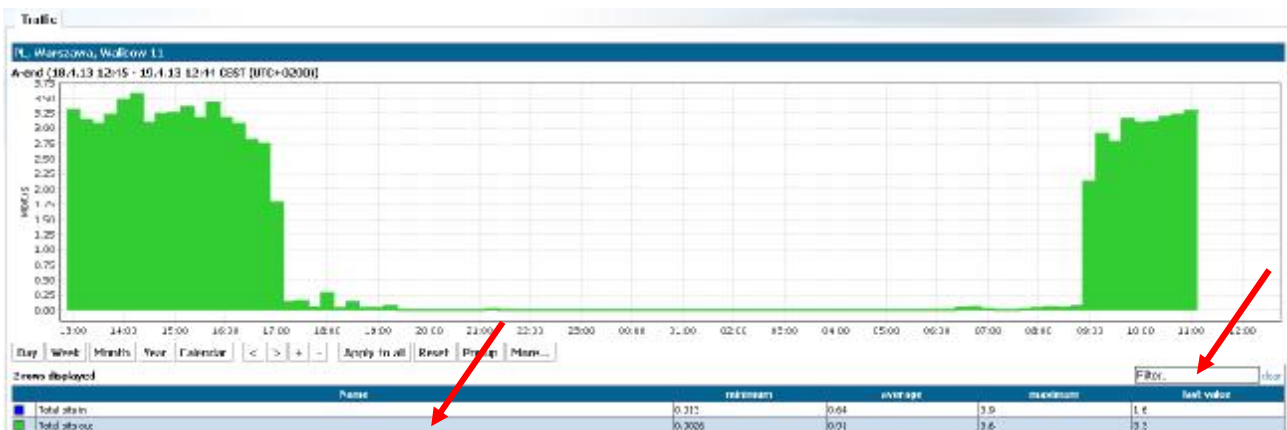
5.1 Export of the measured values and graphs

In the customer interface it is possible to export any graph (or data used) into Excel (e.g. as data for further processing) or a PDF document. Click on "More...", select "Export" bookmark and chose the required data format.



5.2 Display filter

In order to filter the interface displayed (or QoS classes) simply write the requisite interface (or QoS class) in the appropriate field "Filter...". If the filtration of more than one interface is required, simply divide the individual interfaces with a comma in the appropriate field "Filter...". Alternatively you can simply click on the row representing the measured interface.



5.3 Zoom

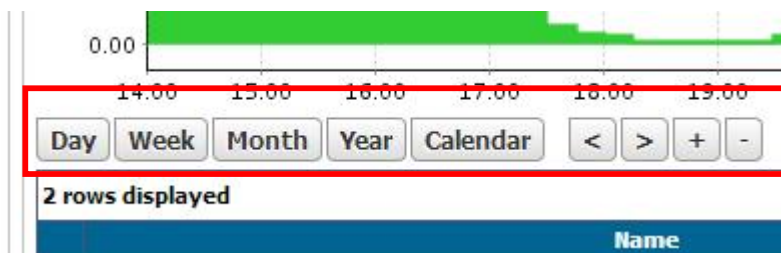


5.4 Change of criteria

Following criteria can be changed for chart display:

- DAY is a view of 1 day with 15-minute measurements interval (1d/15m)
- WEEK is a view of 7 days with 2-hours measurements interval (7d/2h)
- MONTH is a view of 30 days with 12-hours measurements interval (30d/12h)
- YEAR is a view of 12months with 7-days measurements interval (12m/7d)

Moving between the displayed periods can be done by using the buttons << a >>.



6 Examples of graphs

6.1 Interface Traffic



The graph shows Traffic on individual interfaces.

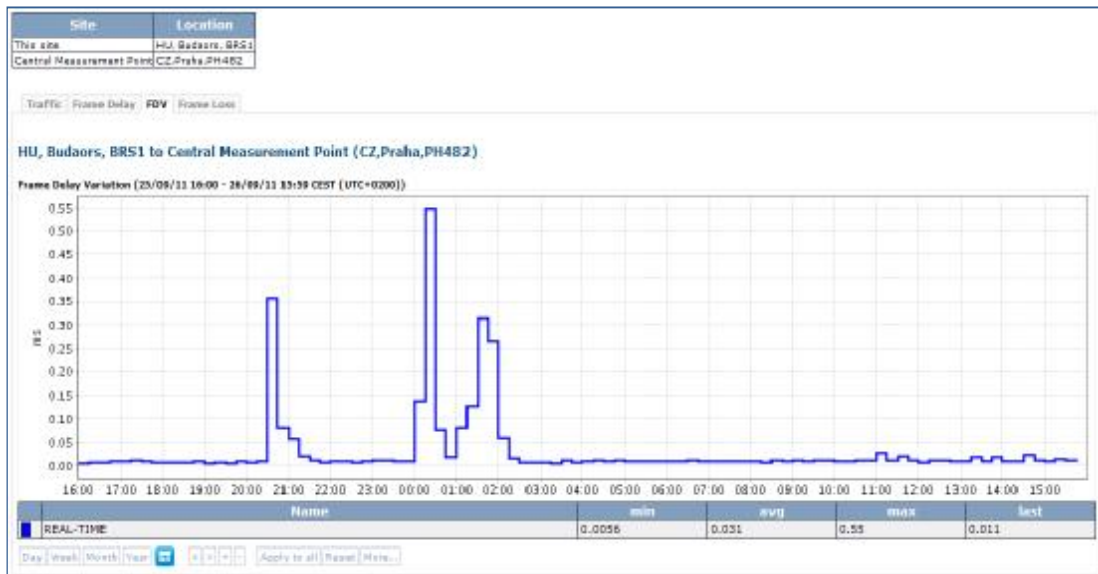
6.2 Performance parameters of Standard CoS

6.2.1 Frame Delay



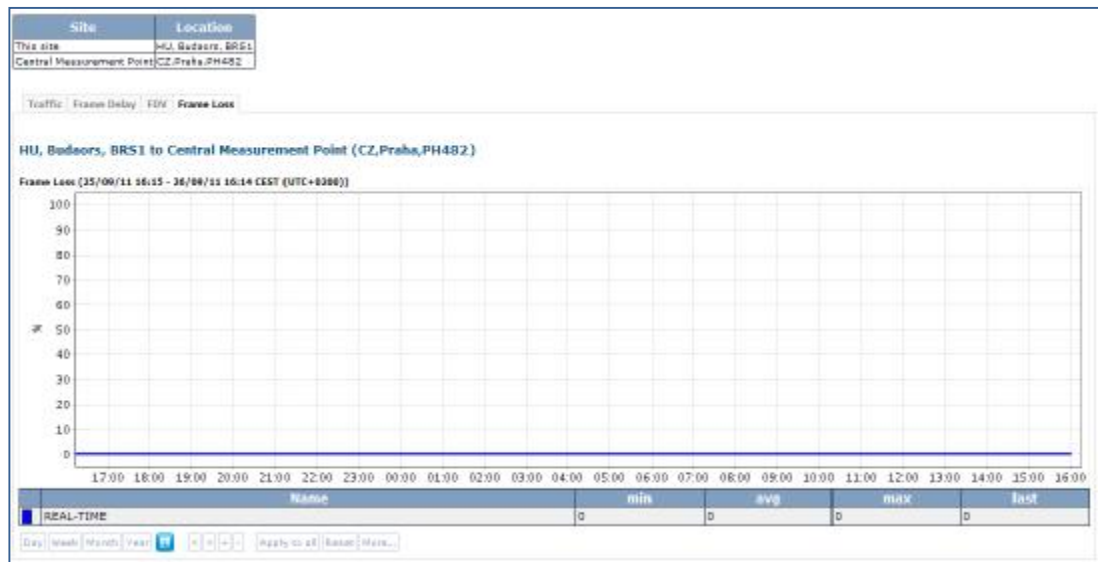
The graph shows the one way Frame Delay for Standard class.

6.2.2 Frame Delay Variation (FDV)



The graph shows the average Frame Delay Variation (Jitter) for Standard class.

6.2.3 Frame Loss



The graph shows the values of Frame Loss for Standard class.