

NTS Network Time Software Audit & Monitoring for MiFID II

- Alarms all events in view
- Scalable intuitive GUI
- WEB-based technology
- Multi-tier architecture
- Geographical topology
- Maps OpenStreetMap, Google*
- PDF raport auto generation
- Operates standalone SERVER
- Works in Virtual Machine env.
- Multiple views
- HA High Availability option
- User panel customization
- Data Base storing AUDITdata
- Hardware Requirement:

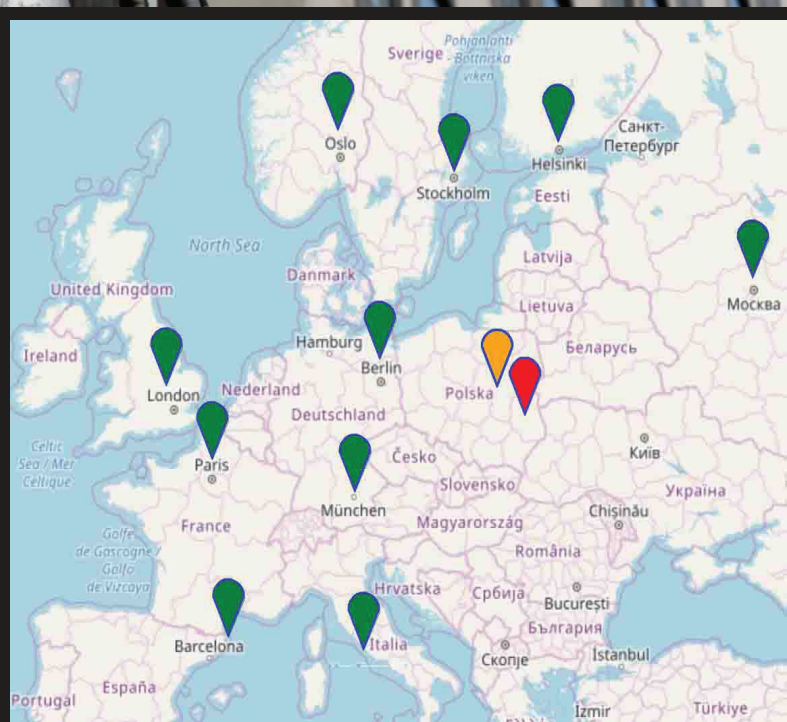
CPU 8x core

RAM 64 GB

HD 4TB (SSD RAID5)

OS Ubuntu x64 Srv

- Supporting NTS-5000
- Applications Smart Grids
(Networks) Telecom 5G
Financial Market
Government
Enterprise
Radio/TV



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The fundamental principle of using ELPROMA time audit and monitoring software is limited to focusing on colors. There are three signal class colors: **RED** indicating **ERROR**, **YELLOW** - highlighting warnings, and most peaceful **GREEN** meaning everything is fine (ok) with synchronization. Main screen includes three areas: left, mid and right. The left part of the screen displays user-defined groups of servers. You can create your own customized definition of groups for quick accessing the specific server population. Below example present set of servers: EUROPE (all servers), servers located in LONDON(UK) and POLAND. Red color indicates there are problems with servers located in Poland. You can trace alarms & events general LOGs on the right side of the screen.

The ALARMS menu item is alternative step to STATUS view. It provides detailed event information from specific group of time servers. You can sort the information in specific order by clicking title row item. All DATA LOG information is stored inside database (DB) for current and future retrospective analyses.

| ID | Time | UID | Name | Location | Dev | Level | Alarm | Status |
|---------|---------------------|-----------------|----------|----------|--------|-------|-------------------------------------|--------|
| 3070372 | 2020-02-26 12:48:44 | 385442/T0004 | NTS-5000 | POLAND | ANT2 | 1 | WORKS CORRECTLY | 0 |
| 3045945 | 2020-02-26 05:56:49 | 16384/T0001 | NTS-5000 | POLAND | REFCLK | 7 | NTP_REFCLK_REACHABLE RB | 0 |
| 3019074 | 2020-02-25 22:26:37 | 16384/T0001 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 3005478 | 2020-02-25 18:40:17 | 385442/T0004 | NTS-5000 | POLAND | ANT2 | 1 | WORKS CORRECTLY | 0 |
| 3005326 | 2020-02-25 18:37:45 | 385442/T0004 | NTS-5000 | POLAND | ANT2 | 1 | WORKS CORRECTLY | 0 |
| 2984843 | 2020-02-25 12:54:07 | 385442/T0004 | NTS-5000 | POLAND | ANT2 | 1 | WORKS CORRECTLY | 0 |
| 2980181 | 2020-02-25 11:35:46 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 2977768 | 2020-02-25 10:55:18 | 15397150/A00081 | NTS-5000 | POLAND | ANT1 | 1 | WORKS CORRECTLY | 0 |
| 2974372 | 2020-02-25 09:56:44 | 16384/T0001 | NTS-5000 | POLAND | REFCLK | 7 | NTP_REFCLK_EXCEEDED ANT1, 282.637ms | 0 |
| 2974281 | 2020-02-25 09:56:58 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 2968724 | 2020-02-25 08:23:46 | 520104/T0003 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 2968675 | 2020-02-25 08:22:58 | 520104/T0003 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |

Another way of handling large population of NTS time server devices is text-mode view panel. The special syntactic sugar of this text-mode screen is the right side LED indication row. It provides a real-time device front panel LED status information. Together with other network data it provides general status quo of server group or specific queried it's subgroup.



| UID | SN | Type | Location | Name | Firmware | LANs | Uptime | Offset | Heartbeat | Leds |
|----------|--------|----------|----------|----------|----------|-----------------------------|---------|--------|---------------------|----------------------------------------------------|
| 520104 | T0003 | NTS-5000 | POLAND | NTS-5000 | 20190928 | 10.0.0.26 192.168.0.26 | 6459282 | 0.000 | 2020-02-25 07:05:52 | ANT2 ANT1 LAN2 LAN1 GPS GNSS OSC |
| 385442 | T0004 | NTS-5000 | POLAND | NTS-5000 | 20190915 | 10.0.0.27 192.168.0.27 | 207101 | -0.039 | 2020-02-27 16:43:09 | ANT2 ANT1 LAN2 LAN1 GPS GNSS OSC |
| 379821 | T0002 | NTS-5000 | POLAND | NTS-5000 | 20190928 | 192.168.1.2 10.0.0.210 | 3190522 | 0.003 | 2020-02-27 16:43:09 | ANT2 ANT1 LAN2 LAN1 GPS GNSS OSC |
| 16384 | T0001 | NTS-5000 | POLAND | NTS-5000 | 20190928 | 10.0.0.2 192.168.0.2 | 207102 | 0.017 | 2020-02-27 16:43:09 | ANT2 ANT1 LAN2 LAN1 GPS GNSS OSC |
| 15397150 | A00081 | NTS-5000 | POLAND | NTS-5000 | 20190928 | 10.0.0.210 192.168.0.241 | 5681279 | -0.001 | 2020-02-25 07:05:52 | ANT2 ANT1 LAN2 LAN1 GPS GNSS OSC |
| 15391118 | B00142 | NTS-TC | POLAND | NTS-TC | 20190928 | 10.0.0.210 192.168.0.240 | 6460209 | -0.003 | 2020-02-25 07:05:52 | ANT2 ANT1 LAN2 LAN1 GPS GNSS OSC |



CLEPSIDRA
Time SYSTEMS

15397150, NTS-5000, 192.168.0.241

LAN1

LAN2

COMMUNICATION ERROR

ANT1

ANT2

CLEPSIDRA
Time SYSTEMS

16384, NTS-5000, 192.168.0.2

LAN1
10.0.0.2

LAN2
192.168.0.2

27-02-2020 OK

16:03:42 GPS A= 7/ 7

Uptime: 2d, 8:52:15

ANT1

CLEPSIDRA
Time SYSTEMS

379821, NTS-5000, 192.168.1.2

LAN1
192.168.1.2

LAN2
10.0.0.210

27-02-2020 OK

17:03:42 GPS A= 5/ 7

Uptime: 36d, 21:35:55

ANT1

2020-02-27 16:03:41

Time: VALID
Offset: 24.625 us
OCXO: OK (Synced)
RB: Power supplies and Discharge Lamp (80)
IRIG-B IN: Free run - cold start
IRIG-B OUT: OK (Synced)
NTP IP backup: 0

2020-02-27 16:03:41

Time: VALID
Offset: 5.634 us
OCXO: RESET
RB: Frequency Lock to 1PPS (68)
IRIG-B IN: RESET
IRIG-B OUT: RESET
NTP IP backup: 0

The PANELS is a next MENU item. It groups inside single view window all NTS server virtual front panels. It is simplified version of real NTS front panel. Panels operate real-time (RT) providing all LED/LCD information. Additional information, the one as TIME, OFFSET, OCXO/Rb STATUS etc. are provided too.

STATUS ALARMS DEVICES PANELS GNSS MAP CHARTS ADMIN

POLAND

GNSS Data

NTS: 15397150, NTS-5000, ANT1

Status
Latitude: 52.3462°
Longitude: 20.8923°
Altitude: 83.529 m
Time: 2020-02-29 19:31:13

Position
Fix: 3D/2D
GPS: 12
GLN: 9
SNR max: 46dB
SNR avg: 31.9 dB
GNSS Time valid

NTS: 16384, NTS-5000, ANT1

Status
Latitude: 52.3463°
Longitude: 20.8925°
Altitude: 100.93 m
Time: 2020-02-29 19:29:49

Position
Fix: 3D/2D
GPS: 7
SNR max: 44dB
SNR avg: 37.57 dB
GNSS Time valid

NTS: 379821, NTS-5000, ANT1

Status
Latitude: 52.3463°
Longitude: 20.8923°
Altitude: 73 m
Time: 2020-02-29 19:30:44

Position
Fix: 3D/2D
GPS: 7
SNR max: 40dB
SNR avg: 26.57 dB
GNSS Time valid

Each server's antenna is traceable individually. But you can also group receivers on one screen. The screen can display multiple GNSS radars (graphic status information), so all regions or groups can be traced from single console. Each GNSS receiver data includes: Latitude, Longitude, Altitude, UTC, Fix-position 2D/3D, number of visible satellites, their signal strength and final time validity information.

STATUS ALARMS DEVICES PANELS GNSS MAP CHARTS ADMIN

LUZON

GNSS Data

NTS: 3456781, TEST1000, ANT1

Status
Latitude: 14.642169°
Longitude: 120.958183°
Altitude: 99.69 m
Time: 2020-03-02 17:30:31

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456782, TEST1000, ANT1

Status
Latitude: 14.64549°
Longitude: 120.940351°
Altitude: 188.0 m
Time: 2020-03-06 08:00:25

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456783, TEST1000, ANT1

Status
Latitude: 14.477229°
Longitude: 120.973355°
Altitude: 20 m
Time: 2020-03-15 20:51:05

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456784, TEST1000, ANT1

Status
Latitude: 14.670013°
Longitude: 121.049363°
Altitude: 20 m
Time: 2020-03-06 16:26:45

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456785, TEST1000, ANT1

Status
Latitude: 14.620121°
Longitude: 121.014424°
Altitude: 20 m
Time: 2020-03-13 08:53:55

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456786, TEST1000, ANT1

Status
Latitude: 15.468301°
Longitude: 121.947189°
Altitude: 99 m
Time: 2020-03-02 17:30:31

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456787, TEST1000, ANT1

Status
Latitude: 14.261678°
Longitude: 122.788608°
Altitude: 50 m
Time: 2020-03-27 00:43:25

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456788, TEST1000, ANT1

Status
Latitude: 13.833942°
Longitude: 122.828608°
Altitude: 100 m
Time: 2020-03-02 20:15:05

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456789, TEST1000, ANT1

Status
Latitude: 12.269597°
Longitude: 122.828608°
Altitude: 100 m
Time: 2020-03-08 16:05:30

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

NTS: 3456790, TEST1000, ANT1

Status
Latitude: 15.742486°
Longitude: 120.921894°
Altitude: 20 m
Time: 2020-03-27 09:00:45

Position
Fix: 3D/2D
GPS: 16
GLN: 8
SNR max: 51dB
SNR avg: 25.46 dB
GNSS Time valid

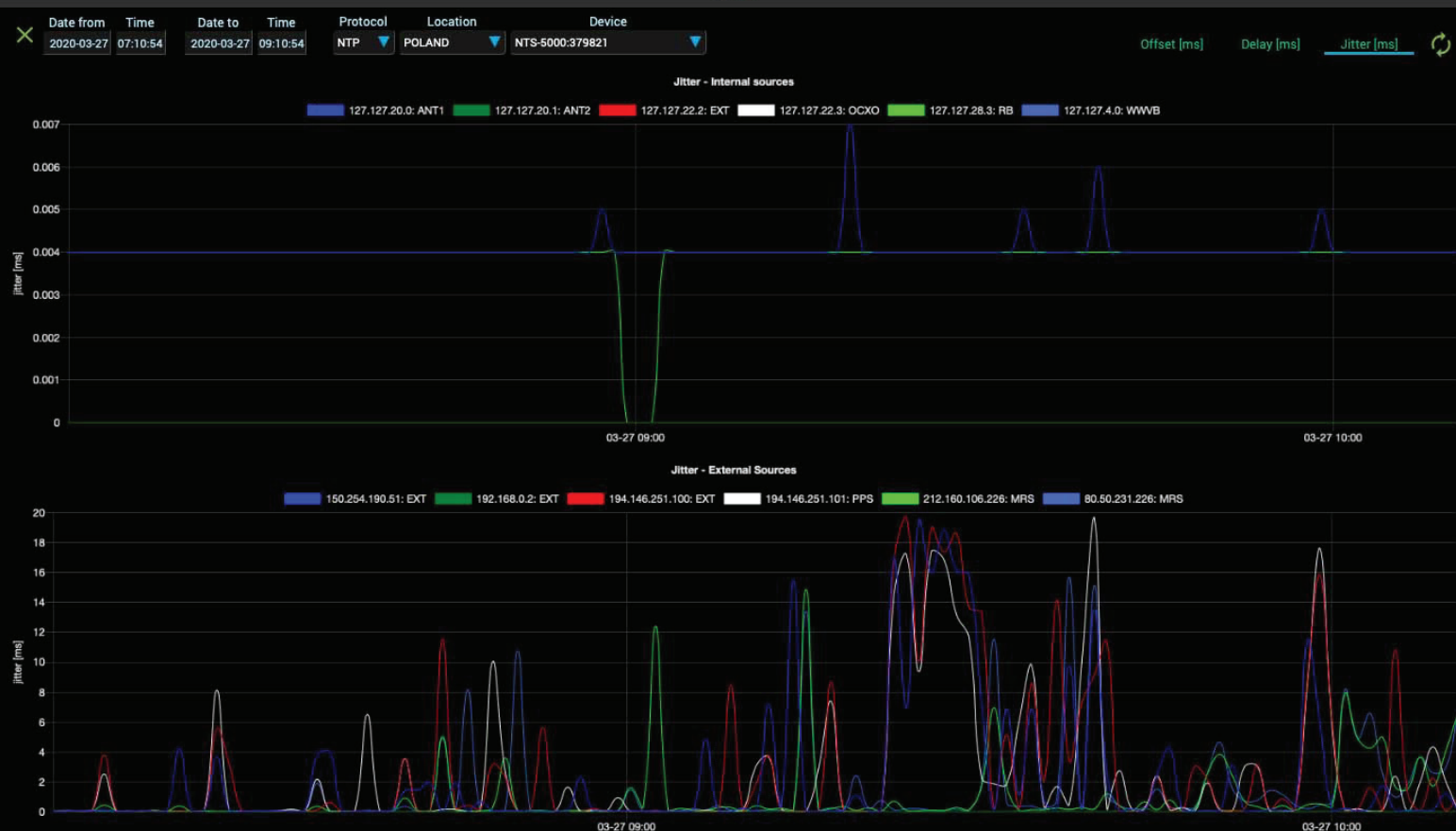
Charts



Plotting charts is one of major functionalities. Multiple servers can be observed simultaneously for all 3 parameters: OFFSET to UTC, network DELAY, synchronization JITTER. It lets administrator compare beehive of time servers located in different places but measured from one common point of reference – the central management system.

This data is stored in local DataBase (DB) subsystem and can be used for later report generation. Depends on legislation requirements data can be archived from days up to many years. It lets recover the conditions synchronization was operating at specific moment of history. Such functionality is specially useful for future problems, including blackout analyses.

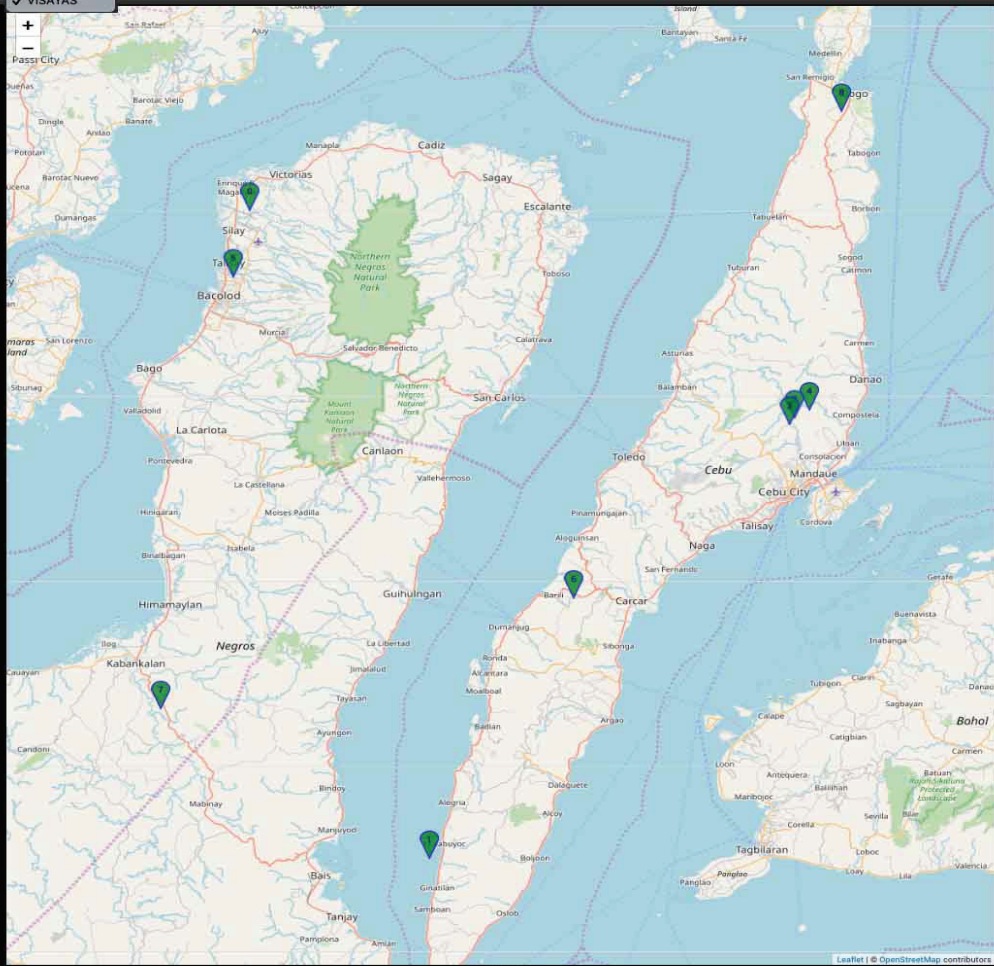
Charts



Map



Map



The GNSS receivers can be linked to Maps. The NTS Monitoring Software use Open Street Maps and alternatively (optionally) the Google Maps. The maps show with accuracy of meters localization of GNSS antennas (not NTS-5000 servers). This is helpful in case of deploying service procedures and system maintenance.

You can choose between different maps and screens. The map can show all country, it's region or a local street and buildings where GNSS receiver is located. Switching between groups of antennas is organized during system deployment. You can choose specific group of GNSS receivers from the upper left menu.

- WORLD
- ASIA
- PHILIPPINES
- LUZON
- MINDANAO
- VISAYAS

Menu to switch between the maps
You can group GNSS receivers displaying different receivers depends on map.

Alarms are always ADMIN basic views to follow. The ELPROMA network synchronization software provides necessary tools to view and monitor status quo of all time servers simultaneously. The build-in alarm database enables functionality to archive all data for later retrospective analyses (e.g. after blackouts).

Traffic lights-oriented structures of colours (GREEN, YELLOW, RED) immediately helps recognise errors and warnings. You can sort and search alarm events by selecting specific pattern for each data column individually.

| safetime | | | | | | | | |
|-----------------------------------------------------------|---------------------|-----------------|----------|----------|----------|-------|-------------------------------|---------|
| STATUS <u>ALARMS</u> DEVICES PANELS GNSS MAP CHARTS ADMIN | | | | | | | | |
| Alarms and events | | | | | | | | |
| Item count: 115719 Page: 1 of 1158 | | | | | | | | |
| ID | Time | UID | Name | Location | Dev | Level | Alarm | Status |
| 5635719 | 2020-03-27 07:04:28 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5635456 | 2020-03-27 07:00:03 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5635440 | 2020-03-27 06:59:47 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5635351 | 2020-03-27 06:58:19 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5635280 | 2020-03-27 06:57:07 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5635264 | 2020-03-27 06:56:52 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5635254 | 2020-03-27 06:56:44 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5634903 | 2020-03-27 06:50:51 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5634768 | 2020-03-27 06:48:35 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5634744 | 2020-03-27 06:48:11 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5634694 | 2020-03-27 06:47:23 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5634623 | 2020-03-27 06:46:11 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5634571 | 2020-03-27 06:45:23 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5631832 | 2020-03-27 05:59:24 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5594665 | 2020-03-26 19:35:07 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5548490 | 2020-03-26 06:39:35 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5544312 | 2020-03-26 05:29:31 | 379821/T0002 | NTS-5000 | POLAND | ANT1 | 7 | ANT_GPS_LOW_SIGNAL (2/6) | 0 |
| 5502558 | 2020-03-25 17:48:48 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5477885 | 2020-03-25 10:55:03 | 385442/T0004 | NTS-5000 | POLAND | ANT2 | 1 | WORKS CORRECTLY | 0 |
| 5474363 | 2020-03-25 09:55:49 | 379821/T0002 | NTS-5000 | POLAND | NTP PEER | 1 | NTP_PEER_OK | 0 |
| 5465437 | 2020-03-25 07:25:57 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5465078 | 2020-03-25 07:19:56 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5465021 | 2020-03-25 07:19:00 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5464972 | 2020-03-25 07:18:12 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5464795 | 2020-03-25 07:15:16 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5464762 | 2020-03-25 07:14:44 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5464745 | 2020-03-25 07:14:28 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5464720 | 2020-03-25 07:14:04 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5464656 | 2020-03-25 07:13:00 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5462213 | 2020-03-25 06:31:57 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5450084 | 2020-03-25 03:07:36 | 16384/T0001 | NTS-5000 | POLAND | ANT1 | 3 | ANT_LEAP_NOT_AVAILABLE | 5450088 |
| 5433736 | 2020-03-24 22:32:10 | 16384/T0001 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5415271 | 2020-03-24 17:24:06 | 385442/T0004 | NTS-5000 | POLAND | REFCLK | 1 | NTP_REFCLK_OK | 0 |
| 5407340 | 2020-03-24 15:10:58 | 15397150/A00081 | NTS-5000 | POLAND | REFCLK | 7 | NTP_REFCLK_REACHABLE RB | 0 |
| 5407038 | 2020-03-24 15:05:58 | 15397150/A00081 | NTS-5000 | POLAND | REFCLK | 7 | NTP_REFCLK_REACHABLE OCXO | 0 |
| 5406102 | 2020-03-24 14:50:14 | 15397150/A00081 | NTS-5000 | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5406039 | 2020-03-24 14:49:15 | 385442/T0004 | NTS-5000 | POLAND | ANT1 | 9 | ANT_FAILURE_NOT_CONNECTED | 0 |
| 5405842 | 2020-03-24 14:45:58 | 15397150/A00081 | NTS-5000 | POLAND | ANT1 | 9 | ANT_FAILURE_NOT_CONNECTED | 0 |
| 5405757 | 2020-03-24 14:44:35 | 385442/T0004 | NTS-5000 | POLAND | ANT1 | 9 | ANT_FAILURE_NOT_CONNECTED | 0 |
| 5401749 | 2020-03-24 13:36:36 | 16384/T0001 | NTS-5000 | POLAND | ANT1 | 3 | ANT_LEAP_NOT_AVAILABLE | 5401754 |
| 5399844 | 2020-03-24 13:05:25 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 9 | ANT_FAILURE_NOT_CONNECTED | 0 |
| 5387478 | 2020-03-24 09:37:51 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 1 | WORKS CORRECTLY | 0 |
| 5387325 | 2020-03-24 09:35:17 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 7 | GLONASS LOW SAT SIGNALS (0/9) | 5387478 |
| 5387324 | 2020-03-24 09:35:17 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 7 | ANT_GPS_LOW_SIGNAL (0/19) | 5387478 |
| 5387274 | 2020-03-24 09:34:28 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 8 | ANT_TIME_NOT_VALID | 5387478 |
| 5386142 | 2020-03-24 09:15:29 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 1 | WORKS CORRECTLY | 0 |
| 5386100 | 2020-03-24 09:14:47 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 8 | ANT_TIME_NOT_VALID | 5387478 |
| 5386036 | 2020-03-24 09:13:42 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 7 | TIME FRAME FAILURE | 5387478 |
| 5382831 | 2020-03-24 08:19:51 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 1 | WORKS CORRECTLY | 0 |
| 5382778 | 2020-03-24 08:18:59 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 8 | ANT_TIME_NOT_VALID | 5387478 |
| 5382720 | 2020-03-24 08:18:03 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 7 | TIME FRAME FAILURE | 5387478 |
| 5382591 | 2020-03-24 08:15:54 | 15391118/B00142 | NTS-TC | POLAND | REFCLK | 9 | NTP_TIME_NOT_VALID | 0 |
| 5382335 | 2020-03-24 08:11:36 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 1 | WORKS CORRECTLY | 0 |
| 5382226 | 2020-03-24 08:09:48 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 8 | ANT_TIME_NOT_VALID | 5387478 |
| 5382192 | 2020-03-24 08:09:16 | 15391118/B00142 | NTS-TC | POLAND | ANT1 | 9 | ANT_FAILURE_NOT_CONNECTED | 5387478 |



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System requirements & recommended IT environment:

VM Virtual Machine:

CPU 8x core, RAM 64GB ,HD 4TB (SSD RAID5 or SAS 10K)

Elproma software basis on Linux Ubuntu Server (x64) v18.04