MEINBERG
The Synchronization Experts.

Release Notes

meinbergOS *2024.05.8*

English

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Imprint / Legal Notice

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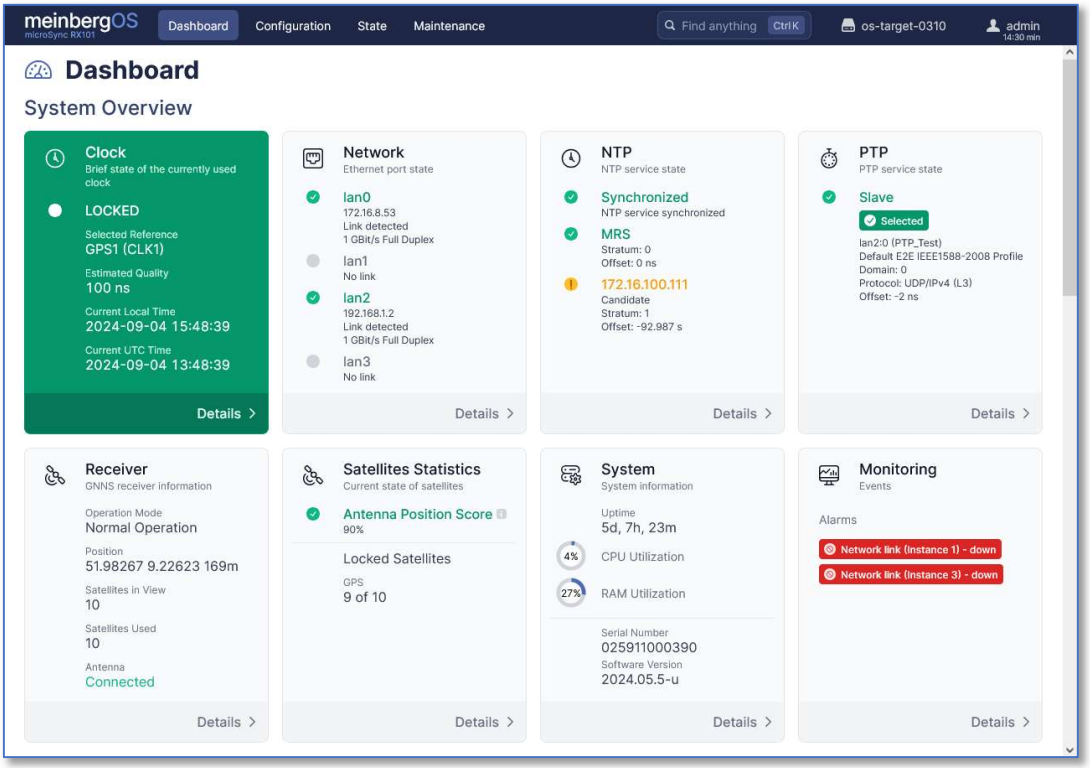


meinbergOS *2024.05* is a Major Release of the microSync operating system that provides many new features and improvements for the microSync range of systems and their management tools, including a variety of stability and security-related improvements.

This document describes the changes & features of each new Patch Release of meinbergOS *2024.05* up to and including meinbergOS *2024.05.8*. Each Patch Release is described in terms of any new features of particular significance followed by a comprehensive changelog. These Release Notes also include a list of the supported cipher suites and cryptographic algorithms that meinbergOS *2024.05* supports for SSL/TLS and SSH encryption.

meinbergOS *2024.05* represents a milestone in that it is the first public release in which all functions of meinbergOS devices are fully represented by the Web Interface introduced in meinbergOS *2022.05*.

As such, the use of Meinberg Device Manager for the management of microSync systems is considered to be **deprecated** with this release. While existing microSync systems will continue to be operable with Meinberg Device Manager for the foreseeable future even with meinbergOS software updates, new functions and features introduced via meinbergOS software updates will generally not be reflected in Meinberg Device Manager. As such, microSync and Nimbra Time Node users are strongly encouraged to use the meinbergOS Web Interface to manage their systems in the future.

Please read these Release Notes carefully before installing meinbergOS *2024.05*, as they contain information that you may need or find helpful to successfully install the software on your Meinberg system.

2 meinbergOS Patch Releases

2.1 meinbergOS *2024.05.8*

2.1.1 Full Changelog for meinbergOS *2024.05.8*

PTP

- Transmit Steps Removed changed from 1 to 0 when running as 802.1AS Grandmaster

Module Firmware

- GPS180 module firmware updated to v2.91
- GNS181 module firmware updated to v2.91
- GNS181UC module firmware updated to v2.91
- GPS183 module firmware updated to v1.18 on microSync^{XS}
- GNS183 module firmware updated to v1.18 on microSync^{XS}
- GNS183-UC module firmware updated to v1.18 on microSync^{XS}

Component Version Updates

- Updated to Linux Kernel 6.1.128.

Web Interface

- Fixed problematic timeout behavior of result messages when saving a configuration page again before the last message has expired

2.2 meinbergOS *2024.05.7*

2.2.1 Full Changelog for meinbergOS *2024.05.7*

PTP

- Fixed recurring service restarts due to congested log directory
- Fixed transfer of Parent Dataset and Steps Removed in Boundary Clock operation
- Fixed 802.1AS neighbor rate ratio boundary for compatibility with ptp4l
- Fixed disregarded delay asymmetry compensation

Web Interface

- Fixed security vulnerability whereby users that had been deactivated due to an expired password were still able to use the Web Interface

System

- Finalized support for new microSync^{XS}
- Added firmware compatibility checks for microSync^{TRX} and microSync^{XS}

2.3 meinbergOS *2024.05.6*

2.3.1 Full Changelog for meinbergOS *2024.05.6*

PTP

- Fixed reoccurring daemon restarts when using a log level other than **Error (0)**.
- Fixed multicast reception on 100 Mbit/s network links.

Web Interface

- Fixed internal server error in Monitoring configuration for users with very limited permissions.
- Ensure that correlating data points are always shown in satellites statistics (per system and combined)
- Fixed typo in dashboard view (**GNNS** → **GNSS**)
- Show correct license information in PTP interface state
- Improved naming of power supplies in system state (**List Item 0** → **Power Supply 1**)

System

- Fixed intermittent loss of network information on display when using DHCP
- Fixed time on display always being behind by one second

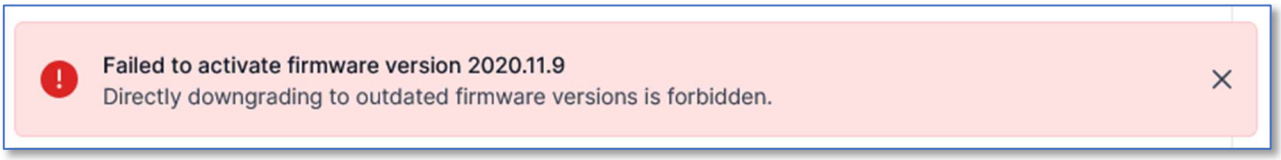
SNMP

- Fixed mbgOsReceiverState syntax in `MEINBERG-OS.mib`.

2.4 meinbergOS *2024.05.5*

2.4.1 Noteworthy New Features in meinbergOS *2024.05.5*

Downgrades to meinbergOS Versions prior to *2022.05.0* Inhibited



As of meinbergOS *2024.05.5*, the system will no longer allow users to downgrade directly from meinbergOS *2024.05.5* to a meinbergOS version earlier than *2022.05.0*. While such older versions can still be installed, attempting to activate such an older version will now be rejected with an error message. This has been done for the following reasons:

- The meinbergOS Web Interface was newly introduced in meinbergOS *2022.05.0*, making significant changes to how the system is managed and monitored. Downgrading to a version of meinbergOS prior to *2022.05.0* from *2024.05.5* will remove access to the Web Interface and can result in issues when connecting via Meinberg Device Manager, especially if no users are configured with access to the Meinberg Device Manager channel.
- meinbergOS versions published since *2022.05.0* have included firmware updates for integrated hardware modules (in particular for reference clocks) that are not compatible with meinbergOS versions prior to *2022.05.0*.

Note that it remains possible to downgrade indirectly to versions prior to *2022.05.0* by first activating a version between *2022.05.0* to *2024.05.4*. However, Meinberg **strongly** advises against doing this, as downgrading in this fashion can result in your system being inoperable.

2.4.2 Full Changelog for meinbergOS *2024.05.5*

NTP

- NTP service is now restarted following DNS configuration changes.

PTP

- The use of an ARB timescale is now allowed and Path Trace TLV is always enabled with 802.1AS Profile.
- Fixed reoccurring daemon restarts if using log level other than Error (0).

Web Interface

- Time-of-day source and phase source options are now hidden for frequency-only reference sources.
- Fixed wrong maximum number of configurable GNSS types with GNS-UC receivers.
- Disable *uvicorn* (Web Interface) access log syslog entries.
- Collapsible menus are now automatically expanded if they have fewer than three rows of content.

REST API

- Fixed overall performance and possible crashes when receiving many requests in parallel.

System

- Forbid direct downgrades to meinbergOS versions < *2022.05.0*.
- Remote authentication is now prohibited for users who exist as a local account.
- Fixed faulty `resolv.conf` if DHCP is disabled and DNS configuration is changed in a single configuration step.
- Empty statistics records are no longer saved for disabled reference sources.

Component Version Updates

- Updated to Linux Kernel 6.1.99.

2.5 meinbergOS *2024.05.4*

2.5.1 Full Changelog for meinbergOS *2024.05.4*

Web Interface/REST API

- The Web Interface should no longer become unresponsive when sending API requests from a non-existent user.
- The mouse-over area of individual datapoints in the Statistics section has been enlarged.
- A memory leak source in the web server has been prevented.

System

- Display timeouts and unresponsiveness are now prevented when using DHCP with very short lease time.

2.6 meinbergOS *2024.05.3*

2.6.1 Full Changelog for meinbergOS *2024.05.3*

System

- Antenna state event no longer triggered each second when unchanged.

2.7 meinbergOS *2024.05.2*

2.7.1 Full Changelog for meinbergOS *2024.05.2*

NTP

- Leap second file for *ntpd* updated.
- Added hostnames of external NTP servers to their associated state objects.

Web Interface

- The “Clock” state button is no longer displayed if the user lacks permissions to view it.
- Users are now automatically granted network state permissions if they PTP read/write permissions are enabled for them.
- The meinbergOS version and serial number are now hidden if the user lacks necessary permissions (instead of showing “None”)

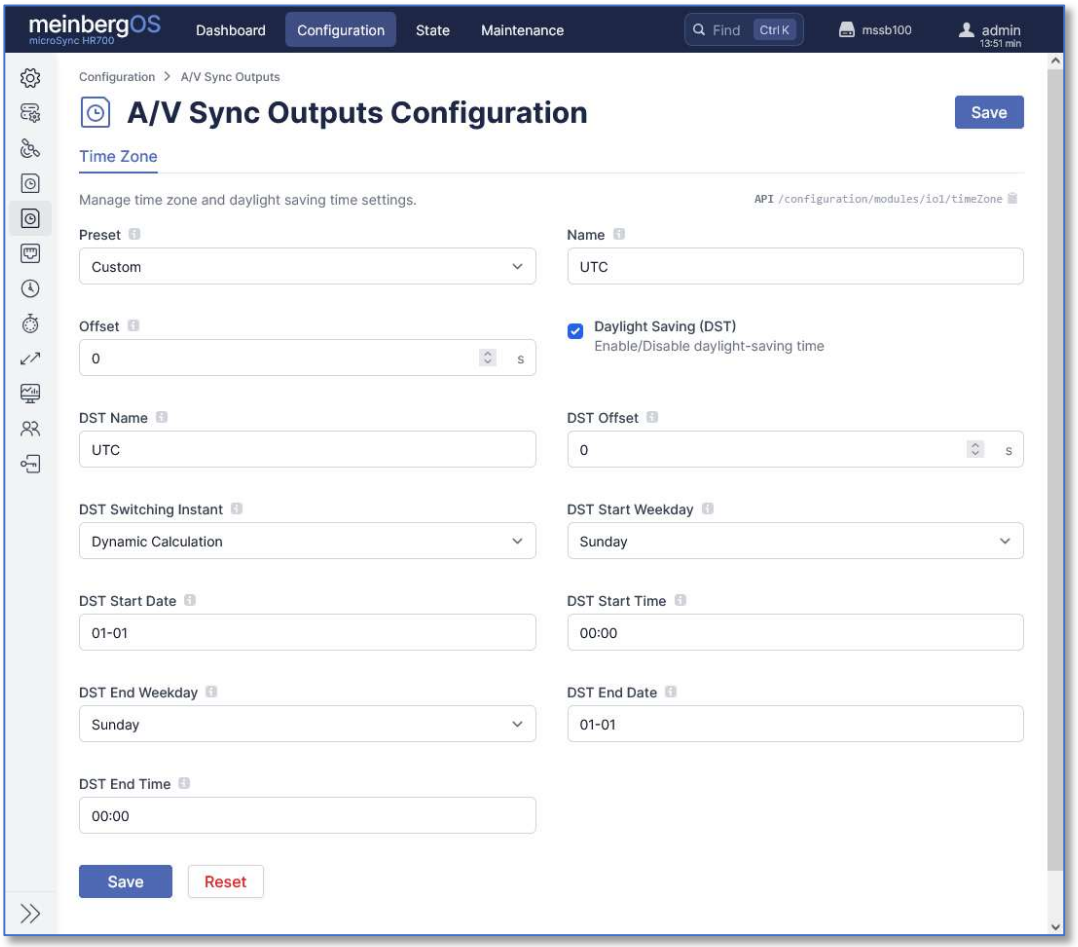
System

- Persistence of network/gateway address configuration via front panel following reboot has been fixed.
- Hostname in DHCP requests when FQDN is configured has been fixed.
- Potential deadlock when using DHCP with a short lease time has been fixed.

2.8 meinbergOS *2024.05.1*

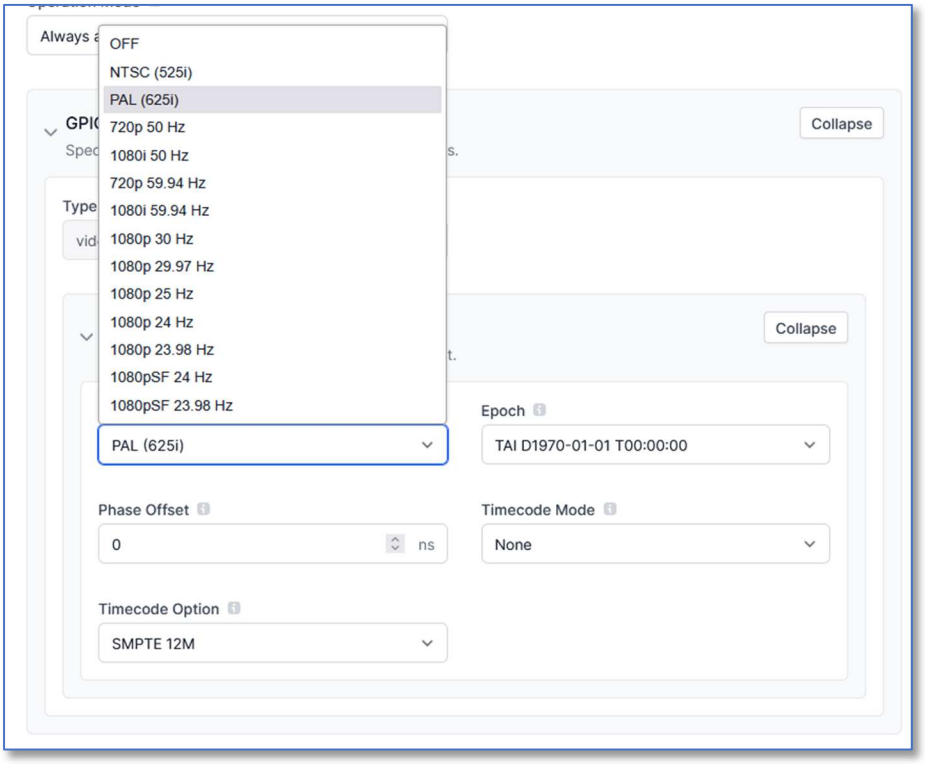
2.8.1 Noteworthy New Features in meinbergOS *2024.05.1*

A/V Sync Output Time Zone Configuration Options (microSync Broadcast)



meinbergOS *2024.05.1* introduced the ability to configure the time zone for the A/V clock outputs of microSync Broadcast models. This allows the local time zone to be accounted for in VITC and LTC output.

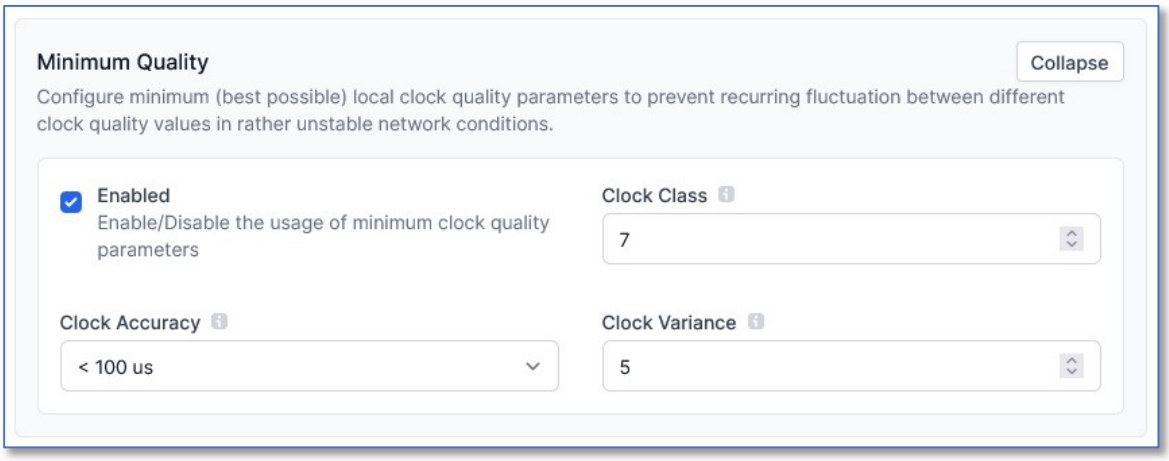
New Signal Formats Supported for Tri-Level Sync (microSync Broadcast)



The following new signal formats are now supported by the microSync Broadcast's Black Burst signal generator (in addition to those already supported):

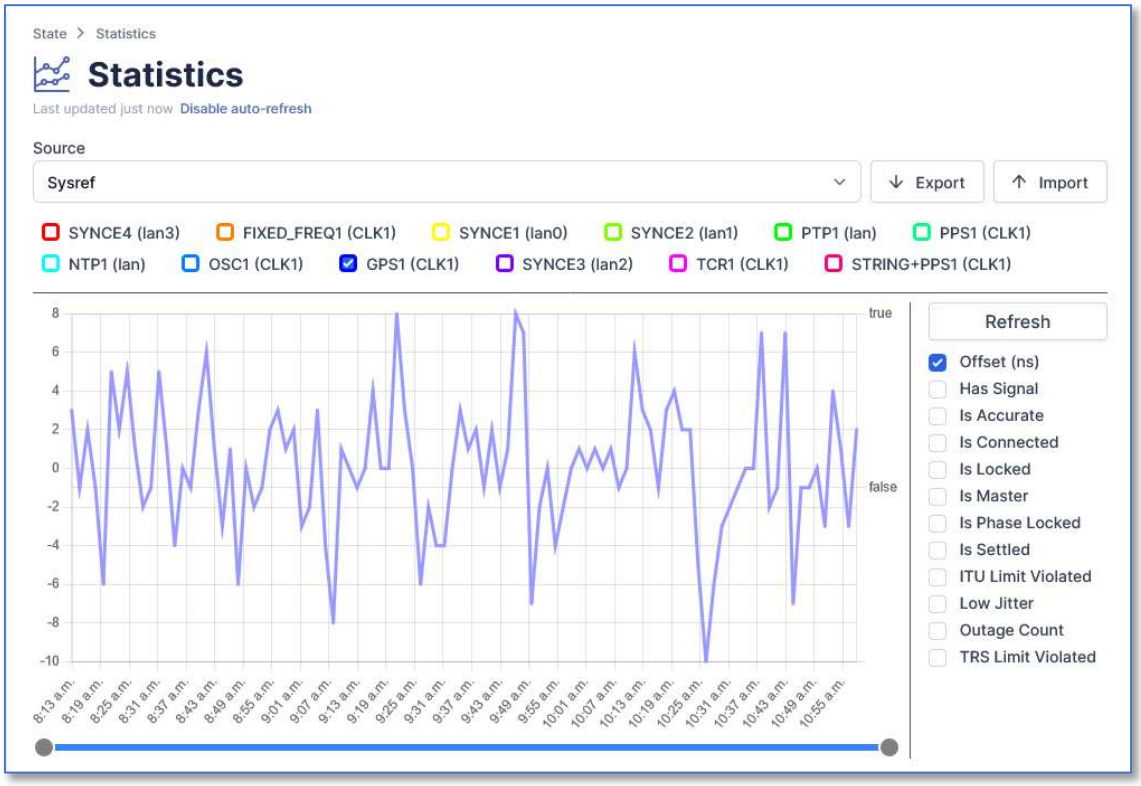
- 1080p @ 23.98 Hz, SMPTE 274M
- 1080p @ 24 Hz, SMPTE 274M
- 1080p @ 25 Hz, SMPTE 274M
- 1080p @ 29.97 Hz, SMPTE 274M
- 1080p @ 30 Hz, SMPTE 274M
- 1080psF @ 23.98 Hz, SMPTE 274M
- 1080psF @ 24 Hz, SMPTE 274M

Define Lower Threshold Clock Class, Accuracy, and Variance Limits in timeTransmitter Mode



This new version also allows lower "minimum quality" thresholds to be set for the Clock Class, Clock Accuracy, and Clock Variance values sent out by the meinbergOS device when operating as a timeTransmitter. This allows the parameters to be stabilized in unstable network conditions and minimize unpredictable timeTransmitter changes.

Satellite Statistics



Building on the reference clock and reference source statistics functionality of meinbergOS *2024.05.0*, meinbergOS *2024.05.1* also provides statistical analysis functions relating to GNSS statistics.

It also adds support for an "Antenna Position Score", in which satellite locks are analyzed against historical data in order to evaluate the quality of the position of the antenna. This score is also displayed in the "Satellite Statistics" panel of the Dashboard.

Receiver LEDs Now Displayed in Visual Representation of Device

meinbergOS 2024.05 adds support for the ability of the newer GPS183, GNS183, and GNS183-UC clock modules to report receiver states to meinbergOS, allowing the system to mirror these LED states on the IO Ports page of the Web Interface, providing an easily read view of the receiver state.

Please note that the firmware of your GPS183, GNS183, or GNS183-UC clock module must be updated to *v1.16* for this to work; this firmware image is included in the meinbergOS *2024.05* software update.

2.8.2 Full Changelog for meinbergOS *2024.05.1*

NTP

- NTP wait time is now correctly read and written to the daemon configuration file.

PTP

- A “Minimum Quality” configuration option can now be set as best possible values for Clock Class/Clock Accuracy/Clock Variance.

Web Interface

- The current IP addresses are now displayed in the Network tile of the Dashboard of the Web Interface.
- An “Antenna Position Score” is now displayed in the Dashboard of the Web Interface.
- The time zone of A/V Sync Outputs on microSync Broadcast models can now be set via the Web Interface.
- The most commonly used time zones have been added as presets when configuring the time zone via the Web Interface.
- GNSS-related statistics are now available via the Web Interface.

Broadcast

- Support has been added for multiple new Tri-Level Sync Black Burst formats (microSync Broadcast).

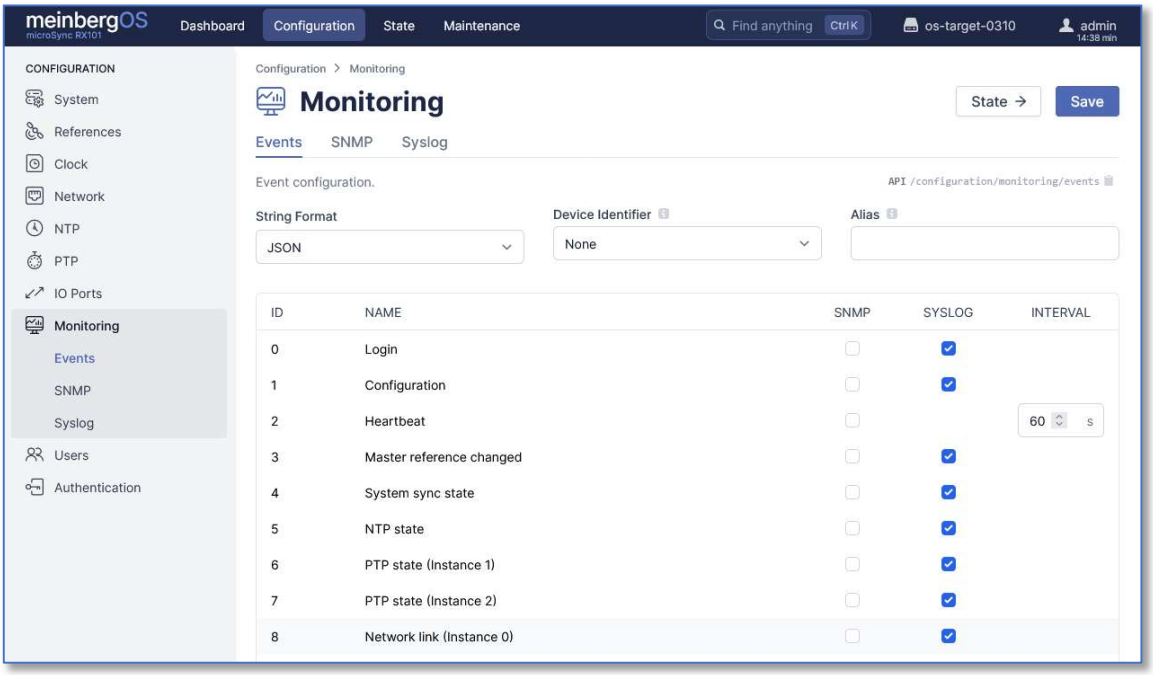
System

- Added traceability for “Logout” and “Authentication Failure” events
- The system now ensures that the full event configuration is saved.
- A discrete event for “Oscillator State” (adjusted/not adjusted) has been added.
- A discrete event for "Antenna State" (connected/not connected) has been added.
- The physical receiver LEDs (Fail/Ant/Nav/Init) are now correctly displayed in the I/O Ports sections of the Web Interface.

2.9 meinbergOS *2024.05.0*

2.9.1 Noteworthy New Features in meinbergOS *2024.05.0*

Event Monitoring Configuration via Web Interface

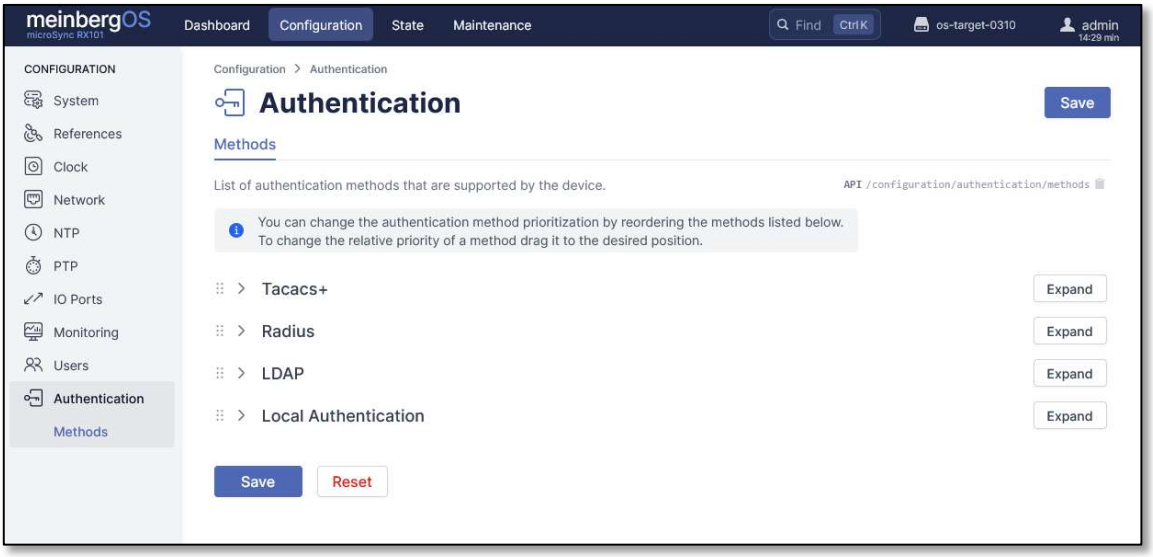


It is now possible to configure event notifications via syslog and SNMP in detail via a dedicated section of the Web Interface. These notifications include login attempts, configuration changes, changes to NTP server and PTP instance states, network link states, and internal sensor readings.

Dual timeReceiver Support

Both PTP-capable ports on a meinbergOS device can now be operated in timeReceiver mode. Where each port is receiving time from different timeTransmitters, the BTCA will be applied internally to select the best of the two timeTransmitters as the reference.

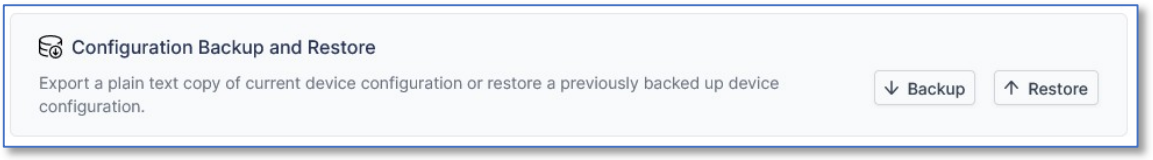
External Authentication Support via LDAP, Radius, and TACACS+



meinbergOS *2024.05* now allows external LDAP, Radius, or TACACS+ authentication servers to be used for access authentication to devices running meinbergOS, with comprehensive configuration options for each one.

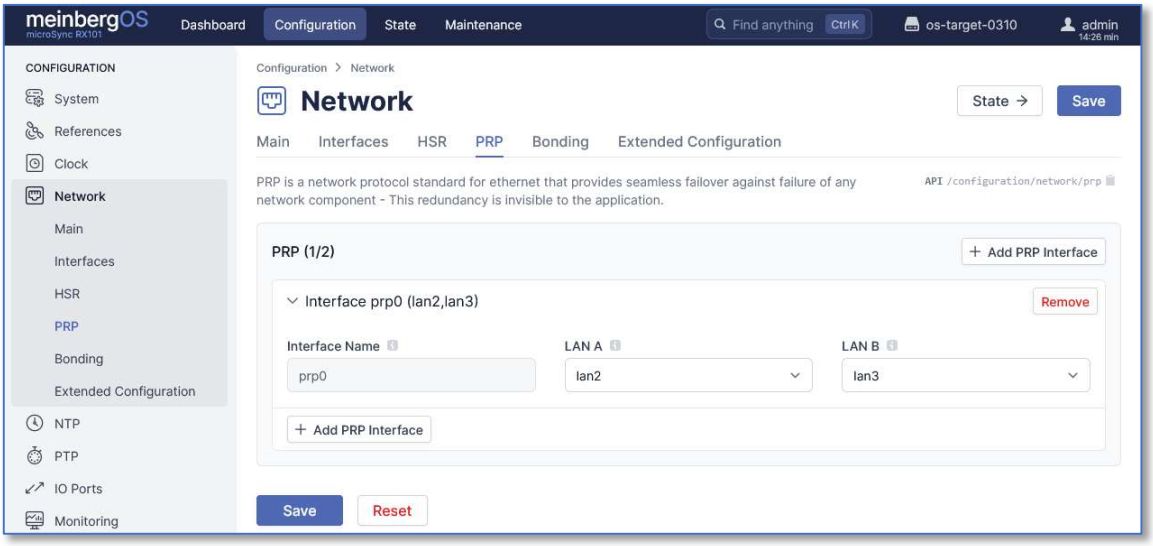
Accordingly, it is also possible to configure local and remote accounts separately, and to disable local authentication.

Configuration Backup & Restore via Web Interface



It is now possible, via the Web Interface, to download a backup your meinbergOS device's current configuration and restore a backup configuration to your meinbergOS device. This functionality previously required the use of Meinberg Device Manager.

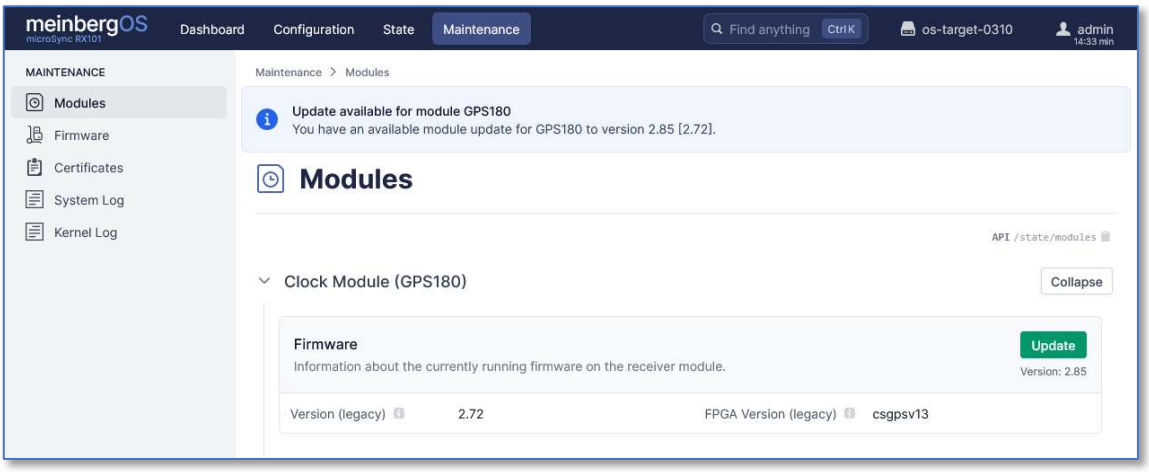
Parallel Redundancy Protocol Support for PTP and NTP



meinbergOS *2024.05* adds NTP and PTP support in Parallel Redundancy Protocol operation. This allows a meinbergOS device operating as a PTP timeTransmitter to send identical PTP packets concurrently to two redundant networks (this requires the PTP timeTransmitter instance to be operating in IEEE 802.3 Layer 2 mode). Conversely, a meinbergOS device operating with two ports in timeReceiver mode (see also information on introduction of dual timeReceiver support, page 8) can also receive time from separate timeTransmitters in redundant networks.

This enhanced PRP support also permits a single meinbergOS device to act as an NTP server to two redundant networks on the same interfaces.

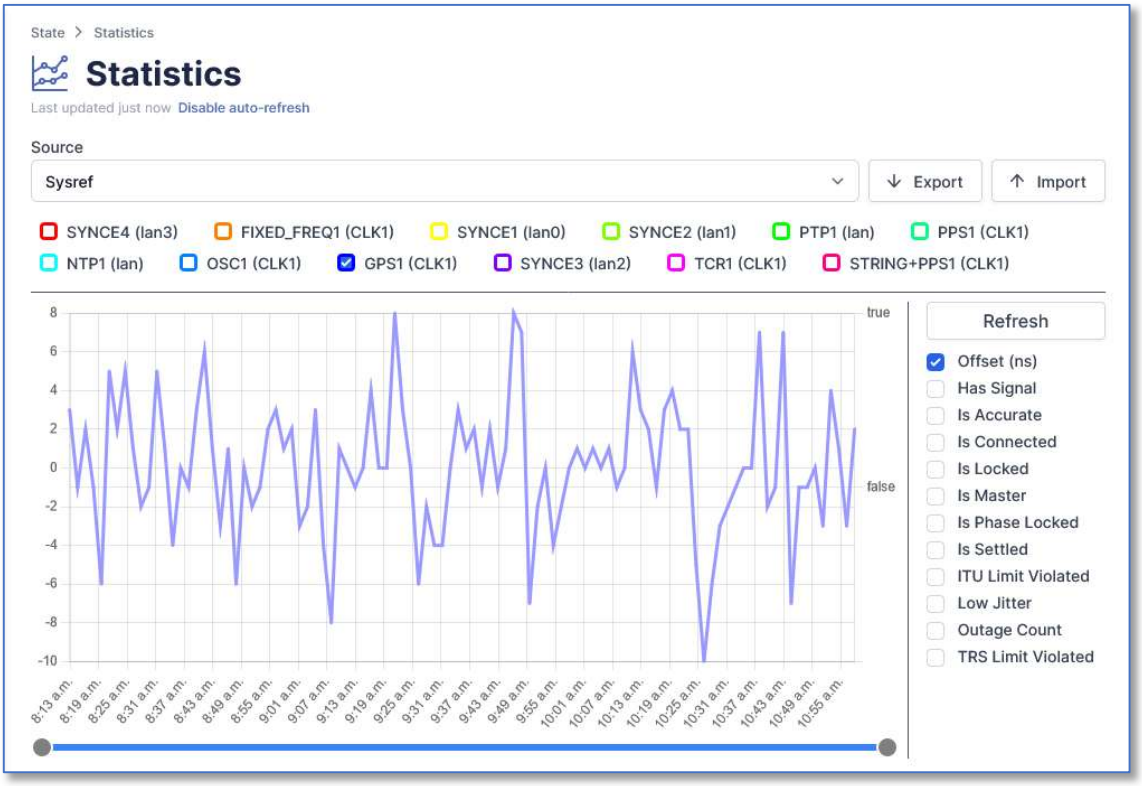
Module Firmware Updates via Web Interface



While it has been possible to install meinbergOS software updates via the Web Interface since the Web Interface was introduced in meinbergOS *2022.05.1*, updates to specific modules (in particular, reference clock modules) made available within meinbergOS software updates had to be installed separately using Meinberg Device Manager.

With the release of meinbergOS *2024.05*, users are advised accordingly of any available firmware updates included in the installed meinbergOS update via a notification under the “Maintenance -> Modules” page and can install module firmware updates directly via the Web Interface.

Reference Clock & Reference Source Statistics



This software release provides numerous statistical analysis functions accessible from the Web Interface relating to reference clock and reference source statistics. These can be used to monitor time offsets between the clock and reference source over time, and monitor oscillator performance.

Software & Firmware Management via CLI

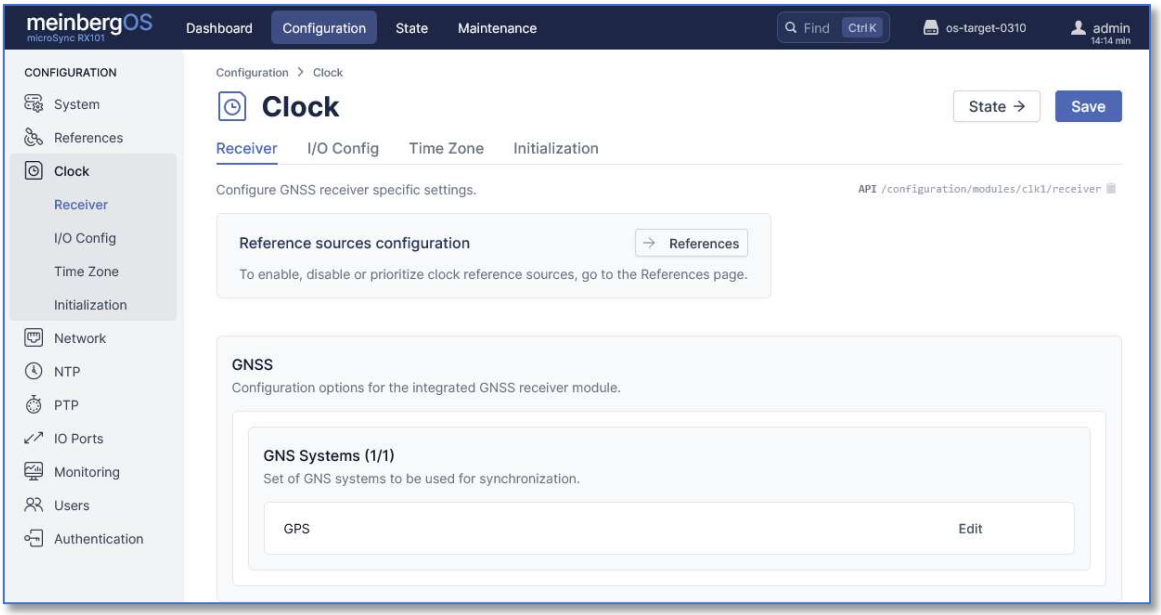
meinbergOS *2024.05* now includes a new CLI tool (*fwmgmt*) that allows software versions to be managed from the CLI (over an SSH connection or serial terminal connection). It is possible to perform any software management action that was otherwise possible from Meinberg Device Manager or the Web Interface; this includes listing already installed versions and installing a new software version from local storage, from a storage medium connected via USB (provided that mounting of USB storage media is enabled).

It also allows module firmware to be updated via the CLI.

Support for microSync^{TRX}

meinbergOS *2024.05.0* adds support for the newly announced microSync^{TRX} time server. More information on this product will be available in due course.

Reference Clock and Receiver Configuration

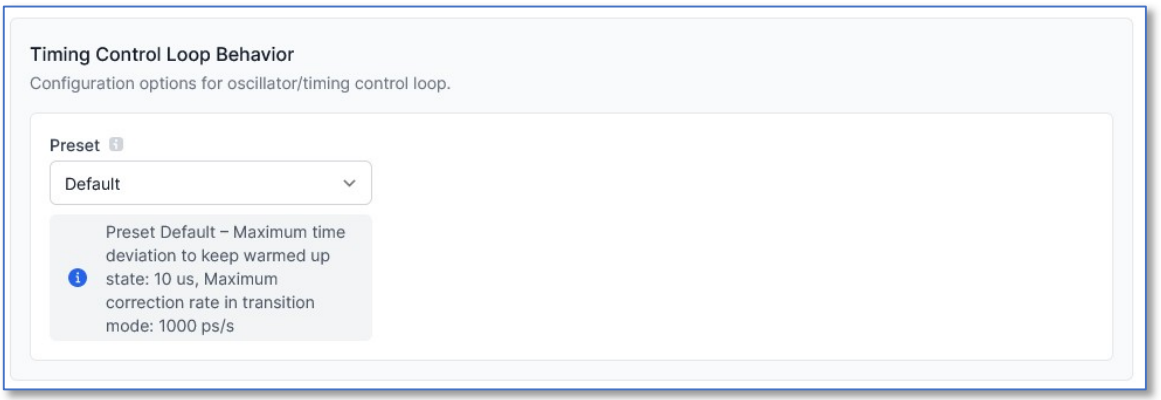


The Web Interface now allows the reference clock and associated receiver to be configured and managed from the Web Interface. The new “Clock” section accommodates not only a number of features that were previously located under the “IO Ports” section (and still are in the interest of continuity), but also a number of features that were previously only adjustable using Meinberg Device Manager. These include the ability to force a cold boot or warm boot of the GNSS receiver, to set the clock’s time zone, to select specific GNSS constellations for multi-GNSS receivers, and to control the conditions under which serial time strings, programmable pulse signals, and frequency signals are output.

Support for mbgNMS Device Discovery

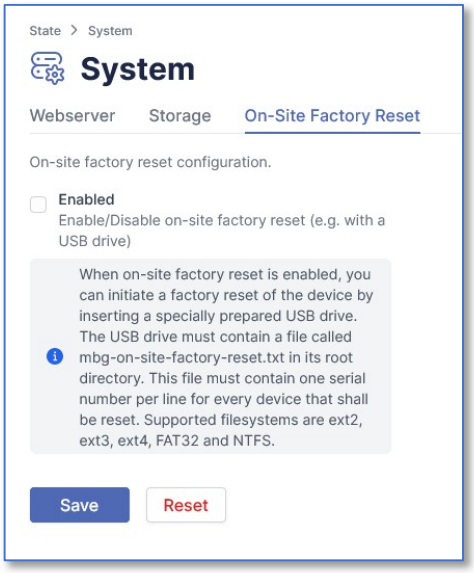
In preparation for the introduction of microSync support to the Meinberg Network Management System mbgNMS, this version of meinbergOS introduces device discovery support that will allow upcoming versions of mbgNMS to detect microSync systems in a network.

Timing Control Loop Options



There are now a number of options (primarily intended for power and broadcasting industry use) that allow some control over how the oscillator is adjusted and that specify the conditions under which the oscillator is considered to be phase-locked.

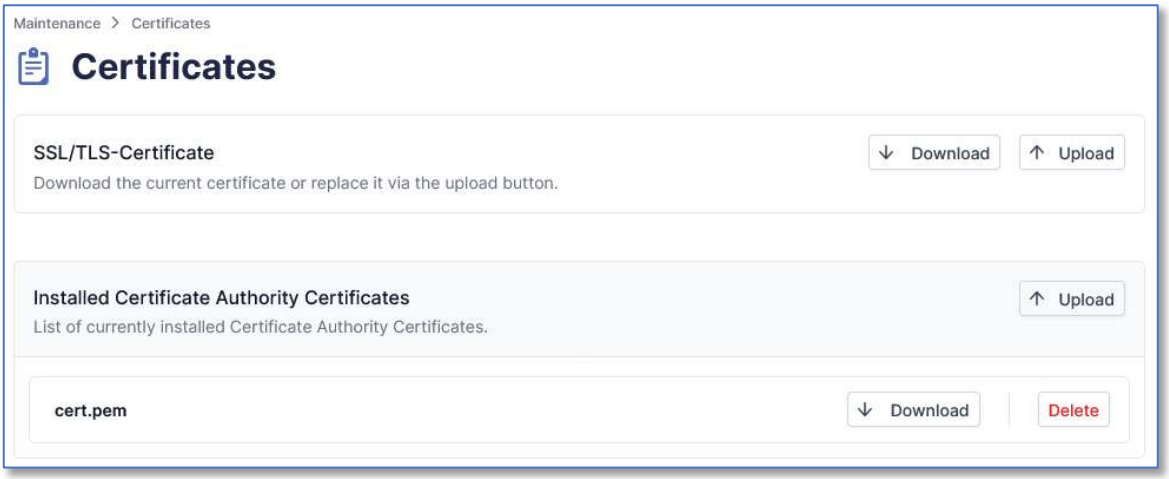
Factory Reset via USB Storage Medium



It is now possible to perform quick factory resets by preparing a USB storage medium containing a specified text file. This requires the meinbergOS system to be explicitly configured to automount external storage media and accept such prepared “factory reset” USB keys.

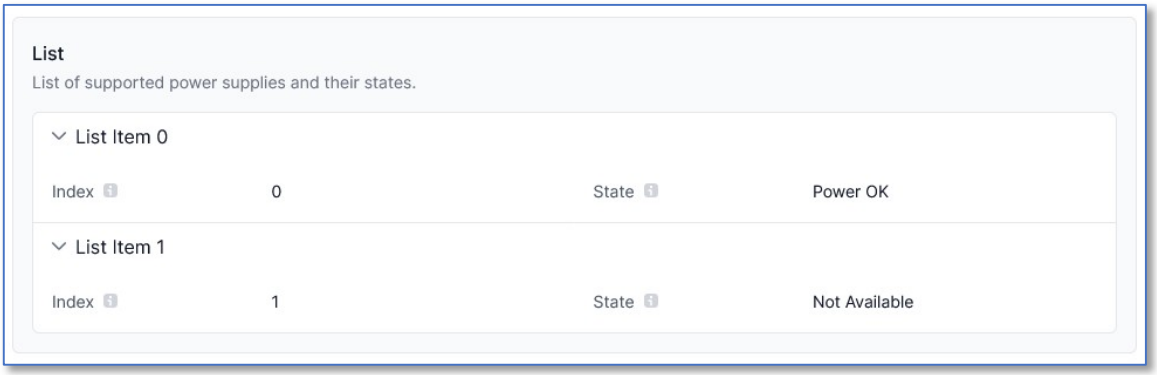
If appropriately configured, a meinbergOS device can therefore be reset to factory settings by simply inserting the prepared USB key.

Certificate Management



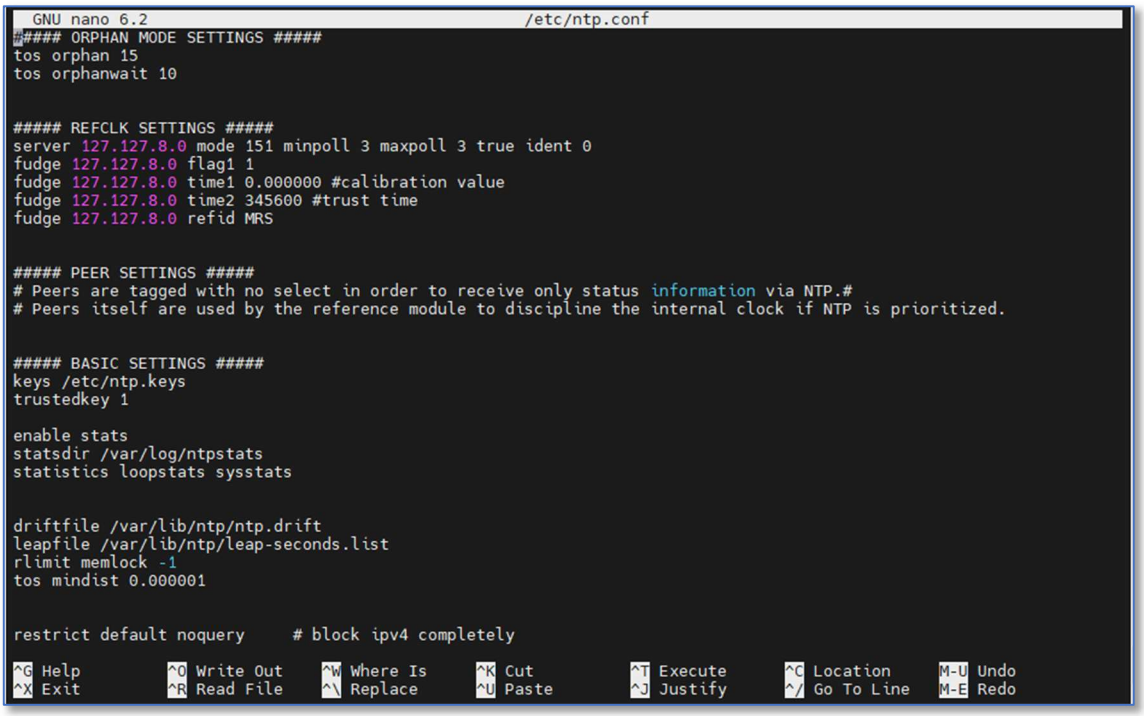
As of meinbergOS *2024.05* it is possible to manage the SSL/TLS certificate for the meinbergOS device’s web server and Certificate Authority certificates via the Web Interface.

Power Supply Monitoring in Web Interface, over SNMP, and via API



meinbergOS *2024.05* introduces the ability to monitor the state of power supplies. These states are indicated in the Web Interface and can also be acquired via the API or reported over SNMP.

nano available as Alternative Text Editor in CLI



Users who use the CLI to manage their meinbergOS device now have access to the GNU *nano* text editor as an alternative to the *vi* editor.

JSON Files No Longer Generated

As announced in the Release Notes for meinbergOS *2022.05.1*, the JSON files generated dynamically by the system to allow third-party applications to acquire data in structured format from the system have now been fully disabled as of meinbergOS *2024.05.0* and are replaced by the new REST API.

The data provided in the JSON files can be fetched with calls to the corresponding new API endpoints as follows:

Legacy JSON File	JSON Dataset	REST API Endpoint
clk1_receiver_info.json	sys-main	/api/state/modules/clk1/system
network.json	net-main	/api/state/network/main
	net-intfs	/api/state/network/interfaces
ntp.json	ntp-main	/api/state/ntp/main
	ntp-ref-clks	/api/state/ntp/server/refClocks
	ntp-ext-server	/api/state/ntp/client/extServers
ptp.json	ptp-instcs	/api/state/ptp/instances
sysinfo.json	sys-main	/api/state/system
sysref.json	ref-main	/api/state/references/global
	ref-srcs	/api/state/references/sources
monitor.json	mon-evts	/api/state/monitoring

Users of the *clk1_all_sv_info.json* data file can continue to acquire satellite information by POSTing the following payload to `/api/commands/statistics/query`:

```
{
        "subject": "Satellites",
        "instance": "CLK1"
}
```

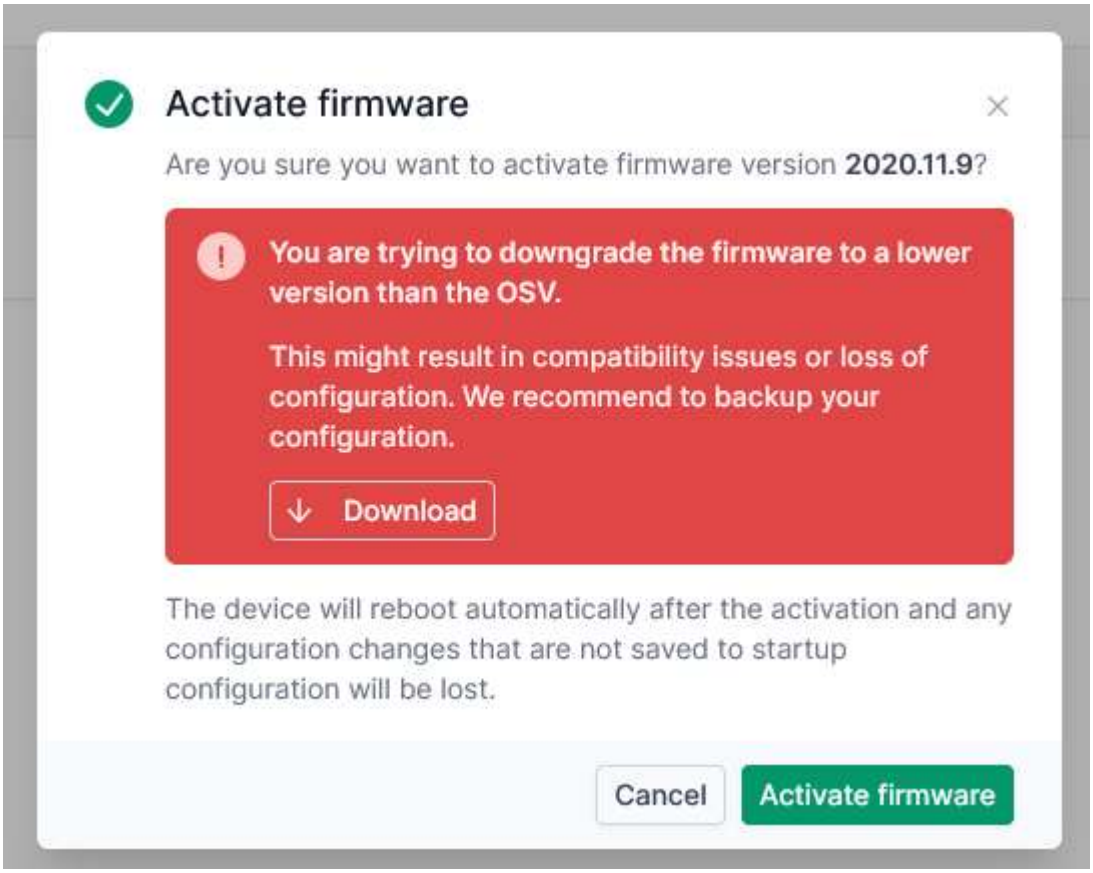
Users of the *sysref_states_[reference].json* data files can continue to acquire statistical information on a reference source by POSTing the following payload to `/api/commands/statistics/query`:

```
{
        "subject": "Sysref",
        "instance": "[REFERENCE]"
}
```

The placeholder ***[REFERENCE]*** in this case is replaced by the `name` identifier of one of the supported time references listed under `/api/state/references/sources` (e.g., `GNSS1 (CLK1)`).

The contents of the files *service.json* and *syschecksums.json* are considered to be no longer necessary due to the greater scope of the new API and therefore have no equivalent in the API.

Warning when Trying to Downgrade to a meinbergOS Version Earlier than the Originally Shipped Version



As of meinbergOS *2024.05.0*, a prominent warning is now displayed when attempting to install a version of meinbergOS that predates the production of your microSync server. This is to protect your system from possibly adverse side effects of installing a version of meinbergOS that predates a microSync device's hardware revision and thus does not support that hardware.

2.9.2 Full Changelog for meinbergOS *2024.05.0*

NTP/PTP

- Native PRP now supports PTP (IEEE 802.3 only; lan2 + lan3); including support for NTP on the same interfaces.
- PTP Power Profiles can now cross-reference one another in redundant setups while in holdover
- IEEE 802.3 PTP instances no longer require a VIF (IP address).
- Support added for dual PTP timeReceivers (lan2 + lan3).
- Native PRP Linux kernel module used for redundant interface setups.
- State handling in PTP Multicast Auto Mode is now fixed when using PTP as the exclusive reference source.
- Offset calculation in IEEE 802.1AS timeReceiver mode is now fixed.

Web Interface

- Warning banner now displayed when trying to downgrade to a firmware version below OSV.
- Session timeout countdown displayed in top navigation bar.
- Monitoring configuration and state sections added to Web Interface (Events/SNMP/Syslog).
- Clock configuration section added to Web Interface (Initialization/Output Behavior/Time Zone).
- Unequipped power supplies are no longer displayed in device view.
- Reference source statistics are now displayed in the Web Interface.
- Support for configuration backup and restore added to Web Interface.
- Certificates can now be managed via Web Interface (CA certificates/SSL/TLS certificate).
- Module firmware updates can now be performed via the Web Interface.
- General accessibility improvements in the Web Interface.

System

- Added support for mbgNMS device discovery
- Prevent transmission of network packets with incorrect MAC address at device startup
- Replaced original ISC DHCP Client (*dhclient*) with *dhcpcd* due to the ISC client being declared End-of-Maintenance.
- SyncE ESMC messages are now sent exactly once per second.
- The ability to perform factory resets locally using a USB drive has been added.
- Leap second information is now restored even if the GNSS antenna is not connected after a power cycle.
- Support for external authentication has been added (LDAP/Radius/TACACS+).
- Power supply monitoring is now possible via the Web Interface, REST API, and SNMP.

Command Line

- New command line tool "`fwmgmt`" is now available for managing firmware versions.

Component Version Updates

- Updated to Linux Kernel 6.1.69

3 Cipher Lists

To be able to establish an **SSL/TLS connection** once your device is updated, your browser must support at least one of the listed TLS 1.2 and TLS 1.3 cipher suites under meinbergOS *2024.05*:

TLS 1.2	ECDHE-RSA-CHACHA20-POLY1305
	ECDHE-RSA-AES256-GCM-SHA384
	ECDHE-RSA-AES128-GCM-SHA256
TLS 1.3	TLS_CHACHA20_POLY1305_SHA256
	TLS_AES_256_GCM_SHA384
	TLS_AES_128_GCM_SHA256

To be able to establish an **SSH connection** once your device is updated, your SSH client must support at least one of each of the cryptographic algorithms listed below (i.e., SSH cipher, key exchange algorithm, host key algorithm, message authentication code).

Ciphers	chacha20-poly1305@openssh.com
	aes256-gcm@openssh.com
	aes128-gcm@openssh.com
	aes256-ctr
	aes192-ctr
	aes128-ctr
Key Exchange Algorithms	curve25519-sha256
	curve25519-sha256@libssh.org
	ecdh-sha2-nistp512
	ecdh-sha2-nistp384
	ecdh-sha2-nistp256
	diffie-hellman-group16-sha512
	diffie-hellman-group14-sha256
	kex-strict-s-v00@openssh.com
	kexguess2@matt.ucc.asn.au
Host Key Algorithms	ssh-ed25519
	rsa-sha2-512
	rsa-sha2-256
MACs	hmac-sha2-512
	hmac-sha2-256

4 meinbergOS 2024.05 Component Versions

meinbergOS *2024.05* comprises several software components, some of which are provided by third parties. The most important third-party software packages included in meinbergOS *2024.05* are listed below alongside their version numbers in each patch release.

Component upgrades are marked in **bold and underlined**.

	Application	Version 2024.05.0	Version 2024.05.1	Version 2024.05.2	Version 2024.05.3	Version 2024.05.4	Version 2024.05.5	Version 2024.05.6	Version 2024.05.7	Version 2024.05.8
Operating System Kernel	Linux kernel	6.1.69	6.1.69	6.1.69	6.1.69	6.1.69	**6.1.99**	6.1.99	6.1.99	**6.1.128**
SSL/TLS Cryptography	OpenSSL	3.0.13	3.0.13	3.0.13	3.0.13	3.0.13	3.0.13	3.0.13	3.0.13	**3.0.16**
SSH Server/Client	Dropbear	2022.83	2022.83	2022.83	2022.83	2022.83	2022.83	2022.83	2022.83	2022.83
SSH Protocol Library	libssh	0.9.6	0.9.6	0.9.6	0.9.6	0.9.6	0.9.6	0.9.6	0.9.6	0.9.6
NTP Server/Client	NTP	4.2.8p17	4.2.8p17	4.2.8p17	4.2.8p17	4.2.8p17	4.2.8p17	4.2.8p17	4.2.8p17	4.2.8p17
Python Interpreter	Python	3.10.13	3.10.13	3.10.13	3.10.13	3.10.13	3.10.13	3.10.13	3.10.13	**3.10.16**
Unix Standard Utilities	BusyBox	1.35.0	1.35.0	1.35.0	1.35.0	1.35.0	1.35.0	1.35.0	1.35.0	1.35.0
Web Server	nginx	1.24.0	1.24.0	1.24.0	1.24.0	1.24.0	1.24.0	1.24.0	1.24.0	1.24.0
SNMP	Net-SNMP	5.9.3	5.9.3	5.9.3	5.9.3	5.9.3	5.9.3	5.9.3	5.9.3	5.9.3
DHCP Client	dhcpcd	9.4.1	9.4.1	9.4.1	9.4.1	9.4.1	9.4.1	9.4.1	9.4.1	9.4.1
Text Editor*	GNU nano	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2

* A feature-reduced version of the *vi* text editor is also included as part of the BusyBox suite.