

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
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WeOS 5.14.0 Release Notes

Contents

1	Summary of Changes	5
1.1	News in 5.14.0	5
1.1.1	Configurable SSH Failure Delay	5
1.1.2	Configurable Port Description	5
1.1.3	Conditional Domain Forwarding for DNS Proxy	6
1.1.4	Increased Number of SSL VPN Instances	6
1.1.5	TLS v1.2 Required on Web Clients for HTTPS Web Access	6
1.1.6	'Here I am' LED Flash available in Web	6
1.1.7	Support for SNMP-FRAMEWORK-MIB	6
1.1.8	Fixed CVEs	7
2	Fixed Issues	8
2.1	WeOS 5.14.0	8
3	Known Limitations	10
3.1	SSH Public Key Lost When Disabling Built-in User	10
3.2	Available ports for boot specific functionality	10
3.3	Routing Hardware Offloading	10
3.4	SNMP	11
3.5	FRNT	11
3.6	RSTP	11
3.7	IEC 61375	11
3.8	LLDP	12
3.9	Port Monitoring	12
3.10	Media Redundancy Protocol (MRP)	12
3.11	10G SFP Ports	13
3.12	Search function in User Guide	13
4	Known Issues	14
4.1	List of known issues	14
4.2	#18163: Work-around for OSPF NSSAs convergence issue	15

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

5	Quick Start Guide	16
5.1	Default User and Password	16
5.2	General	16
5.3	CLI	17
6	Firmware Upgrade	19
6.1	WeOS Image	19
6.2	Boot Loader	19
7	Significant differences between WeOS 4 and WeOS 5	20

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

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Important User Information

This section details important user information, directed in particular to new users of WeOS 5:

- WeOS 5.14.0 has been interoperability tested with WeOS 4.32.1. For mixed WeOS 5 and WeOS 4 networks these are the recommended WeOS versions.
- When using WeConfig to manage WeOS 5.14, WeConfig 1.15.0, or later is recommended.

For help with getting started using WeOS 5, refer to the Quick Start Guide in section 5.

User Guide

In WeOS 5, the primary user documentation is referred to as the *WeOS 5 User Guide*. Compared to the *WeOS 4 Management Guide*, the User Guide is a web first publication focusing on use-cases, documented in stand-alone “HowTo:s”, and configuration guides for all supported sub-systems.

The User Guide is included in the release Zip file in the sub-directory: `user-guide/`. To access the documentation, open the following file in your web browser:

`file://Downloads/WeOS-5.14.0/user-guide/index.html`

The *User Guide* is also available online at <https://docs.westermo.com/weos/weos-5/>.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

1 Summary of Changes

This section details new features added in this major release.

Users new to WeOS 5 are recommended to read section 7 carefully, as it highlights some of the major differences between WeOS 4 and WeOS 5.

1.1 News in 5.14.0

1.1.1 Configurable SSH Failure Delay

WeOS 5.14.0 enables configuration of the *mean* SSH login failure delay, i.e., the delay occurring after a failed login attempt. The default setting (2 seconds) is fine for most use cases, but can now be increased to mitigate some brute force attacks.

Below is an example where the mean failure delay is set to 10 seconds.

```
example:/#> configure  
example:/config/#> management  
example:/config/management/#> ssh  
example:/config/management/ssh/#> fail-delay 10
```

For more details on the SSH login failure delay and its configuration, see the "Secure Shell (SSH)" section in the WeOS User Guide, found via menus "Configuration Guides" ⇒ "Management".

1.1.2 Configurable Port Description

With WeOS 5.14.0 it is possible to configure the port description string for Ethernet ports. This can be useful to document the intended usage of a port, e.g., what equipment is attached.

The string can be up to 32 characters long and printable ASCII characters in range 32-126 can be used ('space' (ASCII 32) and '?' (ASCII 63) can not be entered via CLI, only Web).

```
example:/#> configure  
example:/config/#> port eth0  
example:/config/port-eth0/#> description PLC-45  
example:/config/port-eth0/#> leave
```

The *port description* string is reflected in the *ifAlias* OID (IF-MIB).

For more information on configuration of the port description string, see the "Port" section in the WeOS User Guide, found via menus "Configuration Guides" ⇒ "General".

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

1.1.3 Conditional Domain Forwarding for DNS Proxy

WeOS 5.14.0 includes support for conditional forwarding of DNS queries based on the domain name in the query. Up to 1024 forwarding rules can be configured.

```
example:/#> configure  
example:/config/#> dns  
example:/config/dns/#> server  
example:/config/dns/server/#> domain-forward example.net 10.10.10.10  
example:/config/dns/server/#> domain-forward sub1.example.net 20.20.20.20
```

For more information on DNS Conditional Forwarding, see the “DNS” section in the WeOS User Guide, found via menus “Configuration Guides” ⇒ “Services”.

1.1.4 Increased Number of SSL VPN Instances

The maximum number of configurable SSL VPN instances has been increased from 3 to 8 instances.

For information on SSL VPN configuration, see the “OpenVPN Tunnels” section in the WeOS User Guide, found via menus “Configuration Guides” ⇒ “IP”.

1.1.5 TLS v1.2 Required on Web Clients for HTTPS Web Access

For the purpose of increased security, the Web HTTPS access support for TLS v1.0 and v1.1 has been removed. Thus, customers using Web/HTTPS to manage WeOS units are requested to use Web clients supporting TLS v1.2.

1.1.6 ‘Here I am’ LED Flash available in Web

LED flash functionality to visually discover a WeOS 5 unit was introduced as CLI command *ledflash* in WeOS 5.13.0. In WeOS 5.14.0, LED flash capability is also provided via the Web interface (Menu ‘Tools’ ⇒ ‘LED Flasher’).

When LED flash is enabled, all port LEDs blink yellow.

1.1.7 Support for SNMP-FRAMEWORK-MIB

Support for SNMP-FRAMEWORK-MIB is now included. See associated conformance file in the ‘release zip’ for details on scope of support.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

1.1.8 Fixed CVEs

WeOS 5.14.0 includes fixes for the following CVE(s):

- CVE-2022-0778
- CVE-2019-14323
- CVE-2018-20356
- CVE-2018-20355
- CVE-2018-20354
- CVE-2018-20353
- CVE-2018-20352
- CVE-2018-10945
- CVE-2017-11567
- CVE-2017-7185
- CVE-2017-2922
- CVE-2017-2921
- CVE-2017-2891

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

2 Fixed Issues

2.1 WeOS 5.14.0

Fixed issues in WeOS 5.14.0 (as relative to 5.13.0).

Issue	Category	Description
#18728	IEEE1588/PTP	Packet throughput degradation caused by PTP classifier
#18717	Documentation	Some internal links in User Guide are broken
#18714	TCN	Unable to inaugurate a train of more than 20 ETBNs
#18713	WEB	Web interface can be unresponsive when navigating
#18702	System	Removal of 'static routes' is not activated in system (requires reboot)
#18697	TCN	'repeat show ttdp' crashes the CLI and exits the user
#18678	WEB	Previous version Backup config does not save to startup config
#18674	CLI	'configure terminal' not silent when TTDP is enabled
#18668	CLI	Help text for adding a MAC entry to the FDB repeats it self
#18667	CLI	Help text for the CLI timeout states lower limit 1 second (should be 10 seconds)
#18655	DHCP	'dhcp-server flush' clears the known leases list but does not allow for the leases to be distributed again
#18627	AAA	Login incorrect on first login attempt when username is longer than 32 characters
#18601	System	DDNS client configured with SSL transport leaks memory upon HTTPS session failure
#18482	CLI	When creating an alarm trigger "ring" and let protocol be anything else than MRP then CLI crashes
#18445	TCN	ECSP_CONF_REPLY status always set to 0, even after invalid request
#18444	TCN	Re-confirmation with new correction does not update train directory
#18438	SNMP	OID .1.3.6.1.6.3.10.2.1.2 AuthoritativeEngineBoots value always stay at 1
#18415	WEB	Toggle SNMP off/on in Web may change other SNMP settings
#18382	VRRP	Deleting a VLAN interface with an associated VRRP instance breaks the Web configuration of VRRP
#18317	System	Redfox/Lynx does not switch TCP-SYN with payload
#18286	TCN	Multiple tractor vehicles in single consist not supported
#18209	System	Upgrade does not return to original service state after failed upgrade attempt
#18090	Link Aggregation	Flooded traffic is forwarded through detached ports (Lynx/RedFox)

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

Issue	Category	Description
#18037	WEB	Web may activate invalid configuration for services with dependencies
#17985	System	SSDP process crashes due to incoming traffic
#17898	WEB	Environment status page lists power sensor 2 before sensor 1
#17764	RSTP	RSTP configuration can become corrupt when using Link-aggregation (Viper-12A)

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

3 Known Limitations

This section describes known limitations in WeOS.

3.1 SSH Public Key Lost When Disabling Built-in User

WeOS 5.13.0 introduces support for importing SSH public key for built-in users, as well as the ability to enable/disable a user. When disabling a user, the intention is that the user shall be prohibited from logging in, while other user configuration is till kept in the configuration file.

However, the disabling of a user currently implies that any SSH public key associated with the user is removed and needs to be imported again upon enabling the user.

3.2 Available ports for boot specific functionality

The boot loader rescue mode only supports regular copper ports, not SFP ports. On RedFox-5528, ports 1-4 are also not supported until the system has booted.

3.3 Routing Hardware Offloading

The routing hardware offloading support for Viper-TBN introduced in WeOS 5.8 has shown to have instabilities. In particular, when used with dynamic routing, there are issues not yet solved. Therefore hardware offloading has temporarily been disabled by default. For use cases with static routing setups, hardware offloading can be enabled as shown in the example below.

```
viper:/#> configure
viper:/config/#> ip
viper:/config/ip/#> offload
viper:/config/ip/#> leave
```

When offloading is enabled, regular IPv4 forwarding is handled in hardware with some exceptions, see the WeOS 5 User Manual for details (section 'Configuration Guides'/'Routing'/'Offloading').

Use of the WeOS Firewall together Hardware Offloading is not supported and the behaviour of doing so is undefined. The exception is when firewall configuration is limited to *filter input* rules.

Hence, if the Firewall is use to configure *filter forwarding* rules, *NAPT* rules or *port forwarding* rules on a Viper-TBN, it is necessary to disable the hardware offloading (opposite steps to the example above).

```
viper:/#> configure
viper:/config/#> ip
viper:/config/ip/#> no offload
viper:/config/ip/#> leave
viper:/#>
```

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

3.4 SNMP

SNMP in WeOS 5 is read-only.

When configuring SNMPv3 authentication it will not inform the user if the password length is valid (minimum of 8 characters).

The MIBs folder in the release ZIP-file contains a conformance folder listing all supported MIBs and OIDs.

3.5 FRNT

Fastlink must be enabled manually for FRNT (gigabit Ethernet) ring ports.

Fastlink is a unique feature of Westermo products to optimise gigabit Ethernet link-down fail-over times in layer-2 redundancy protocols such as FRNT.

3.6 RSTP

WeOS 5 supports RSTP, compliant to IEEE 802.1D-2004. Due to limitations in the WeOS 4 implementation of RSTP, a WeOS 4 unit will keep ports in blocking mode longer than needed when connected to a WeOS 5 node.

Hence, mixing WeOS 4 and WeOS 5 units in RSTP topologies may exhibit relatively long periods with limited connectivity during topology changes, this applies to both link failure and when a link comes up again.

Link aggregate path-cost use the configured port speed value(s) and not the negotiated speed value. This can lead to RSTP making the non-optimal path selection. Work-around this issue by setting a fixed path-cost in the spanning-tree port configuration.

3.7 IEC 61375

In this release, not all of the recovery use cases, nor the optional cases, are supported.

TTDP and non-TTDP multicast can be used simultaneously in this release, but is considered unstable and is strongly recommended to be avoided.

"Automatic Gap Insertions", when several vehicles have the same name, can lead to unexpected behaviour. This is also true when Ethernet speed on backbone ports is set to Gigabit speed.

When recovery-mode is set to deferred/wait, an ECSC must be running on the configured multicast address. If no ECSC is running and sending data on the configured multicast address, no node will come up at all.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

Gigabit speed on backbone ports limits the handling of lost and recovering middle nodes.

Since hardware offloading was introduced in WeOS 5.8.0, Viper TBN can now route data at a faster rate than the CPU could previously, leading to a potential of overloading the CPU during the time when the offloading tables are being set up. Since this happens during TTDP train inauguration, it is strongly recommended to enable inauguration inhibition on all nodes to reduce spurious re-inaugurations and guarantee a stable train communication.

The “ECSP inhibit sync” function should only be enabled in consists with simple or straightforward ECN configurations. In complex configurations with non-symmetric ETBN/ECN connections and/or configurations where different ETBNs are master routers for different ECNs simultaneously, the backup ETBNs will not be able to unambiguously determine which ETBN is the master router/ECSP, which can in turn lead to unexpected behaviour with regards to the local inauguration inhibition value. In these cases, manually setting the local inauguration inhibition values on the backup ETBNs, via the ETBN_CTRL telegram, should instead be performed.

3.8 LLDP

When using Link Aggregation, the individual member ports will transmit LLDP frames using the MAC address of the link aggregation interface, i.e. all member links in an aggregate will be using the same MAC address.

3.9 Port Monitoring

It is not possible to utilise port monitoring directly on a link aggregation port interface. However it is still fully possible to monitor the individual member ports that constitute any given link aggregate.

Therefore, in order to fully monitor an aggregate, monitoring must be configured for each of the aggregate member ports.

3.10 Media Redundancy Protocol (MRP)

- *MRM not supported for MRP 30 profile:* WeOS 5 units can be configured to operate in MRP 200 or MRP 30 profile. However, for MRP 30 profile, configuring the WeOS 5 unit as MRP Master (MRM) is not supported. A WeOS 5 unit can be used as MRP Client (MRC) with MRP 30 profile with MRMs from other vendors.

More details: When a link comes up between two MRP clients, the clients send *link-up* messages to the MRP master. The MRP 30 ms profile only gives the MRP master 4 ms to block its secondary port from the time the MRP clients send their first *link-up* message. The WeOS 5 MRP Master

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

is not always capable of doing that, resulting in a short transient loop in the MRP ring when the ring is healed.

To avoid this, it is recommended to use the MRP 200 ms profile instead. For link-down scenarios, MRP 200 ms profile conducts failover as fast as the 30 ms profile, given that MRCs in the ring are capable of sending MRP *link-down* messages (WeOS units have this capability).

- *Use of MRP with virtual L2 ports (SSL VPN ports):* MRP is specified for use with Ethernet ports (full duplex, 100 Mbit/s or higher). WeOS enables the use of running MRP over SSL L2 VPNs, but requires the VPN to run over a high-performance network to work well. Furthermore, only the MRP '200 profile' can be used with SSL VPNs.

3.11 10G SFP Ports

The 10G SFP ports on RedFox-7528 have the following limitations:

- IEEE 1588/PTP is currently not supported on 10G SFP ports.
- 10G SFP ports are only to be used for 10G Fiber SFPs or 1G Fiber SFPs, not copper SFPs or 100 Mbit/s Fiber SFPs.
- Status of MDI/MDIX and polarity shows value 'Invalid' ('N/A' or 'Not Applicable' would be more appropriate).

3.12 Search function in User Guide

The User Guide included within the release-zip is Web based. The Search function in the User Guide navigation pane only works if you make the pages available via a Web Server. That is, the Search function does not work when opening the User Guide via your local file system.

At <https://docs.westermo.com/weos/weos-5/> you can browse the WeOS 5 User Guide online, with Search function included.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

4 Known Issues

4.1 List of known issues

Issue	Category	Description
#18756	VPN	Configuring SSL-VPN client identity/password results in corrupt configuration file
#18735	IP Multicast	Multicast packet loss in network with IGMP, FRNT and VRRP
#18675	Link Aggregation	Long failover time (member link up/down) in link-aggregate interoperability case
#18665	NTP	NTP server refuses client request when rebooted after first being synchronized
#18643	IEEE1588/PTP	RedFox 5528/5728 fiber ports (Eth1-4) have more jitter in the correction field accuracy than the other fiber ports
#18638	CLI	CLI does not allow "?" when configuring local user accounts password using clear-text
#18637	Ports	Gbit copper link does not come up after reboot towards some third-party products
#18622	FRNT	Rebooting two neighbor FRNT nodes simultaneously occasionally gives short storm
#18620	TCN	etbTopoCnt sometimes inconsistent within ETBN upon device reconfiguration
#18614	TCN	TTDP NAT rules incorrectly modifies packets between local CNs
#18593	VRRP	VRRP fail when run over Tagged ports on the FRNT ring
#18530	WEB	Compressed log files downloaded from web can not be opened
#18479	TCN	Asymmetric ECN configuration in consists with 'inverse' orientation results in incorrect inauguration results
#18377	Logging	Syslog events may be missed during syslogd restart
#18374	IGMP	IGMP and Link aggregates with member ports on multi-switchcores has problems with runtime changes (Viper-12A)
#18362	TCN	Broken/missing ECSPs in train composition handled incorrectly
#18356	General	mDNS is not functional when configured to listening on specific interfaces
#18275	VRRP	Not possible to match on VRRP interface in firewall
#18166	IGMP	Delayed loss of IGMP multicast in FRNT ring when switch in ring restarts
#18164	Documentation	VLAN priority listed as setting although not supported
#18163	OSPF	Routes to 'redistributed connected E1 routes' lost within NSSA areas upon topology change

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

Issue	Category	Description
#18151	Logging	Long-running programs log events to syslog with the wrong time stamp on timezone changes
#18127	TCN	Topology frames may not be sent out on the backbone if a lag in direction 2 is physically up but logically down.
#18076	MRP	Probing MRP status (30 ms profile) during heavy load may cause reboot (Viper-TBN)
#18069	QoS	ARP packets treated with lowest priority and may be missed/dropped under load
#18068	VRRP	VRRP frames may be missed/dropped under high load
#18024	System	DDNS service crashes if there are special characters in password
#17995	System	Service discovery not available in safe-config
#17982	IGMP	IGMP snooping may occasionally fail to store learnt group MAC addresses in FDB (Viper-TBN)
#17941	IP Multicast	Manual FDB MAC entry skips CPU port and automatically adds all ports with a VLAN with IGMP snooping disabled (Viper-TBN)
#17353	Alarm	Link Alarm can fail when included in aggregate

The following issue has been removed from the list of known issues in 5.14.0, and is instead listed as a known limitation, see section 3.10.

Issue	Category	Description
#18289	MRP	On MRC link-up with profile 30 ms MRM responds too slow resulting in short transient storm

4.2 #18163: Work-around for OSPF NSSAs convergence issue

When using OSPF Not-So-Stubby Areas (NSSAs), failover when a router goes down may take a lot longer time than expected. There are two possible work-arounds until this bug is fixed:

- Alternative 1: Let each router get an address on its loopback interface, and include them in the OSPF area, e.g., use OSPF setting “network 192.168.1.5/32 area 1” for a router in (NSSA) area 1 with address 192.168.1.5/32 assigned to its loopback interface (lo).
- Alternative 2: Use ‘regular’ OSPF areas instead of NSSA areas.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

5 Quick Start Guide

WeOS 5 devices are intended to be usable out-of-the-box as a switch. All access ports are assigned to the same VLAN (untagged) and the device tries to acquire a management IP address via DHCP. It also acquires a link-local address (in the 169.254.x.x range). These addresses are advertised with mDNS (Linux/Apple), SSDP (Windows), and LLDP.

5.1 Default User and Password

user: admin

password: admin

5.2 General

Apple, Linux, and Windows users with mDNS installed, can either use an mDNS client to find the device's IP address, or connect using a web browser:

- <http://weos.local>
- <http://redfox-4d-3b-20.local>

The first example is not available if there are many WeOS devices on the same LAN. The latter, and more reliable address, is a combination of the hostname and the last three octets of the device's MAC address in that LAN. In this example the hostname is `redfox` and the MAC address is `00:07:7c:4d:3b:20`.

Windows users without mDNS have SSDP to discover WeOS devices. In Windows 7 there is the *Network and Sharing Center* where a clickable icon for each discovered WeOS device should appear under *Network Infrastructure*. The PC must, however, be in the same subnet (DHCP or link-local) for this to work. Windows users also have the Westermo WeConfig tool to manage their WeOS devices.

Expert users can also use `nmap`, a port scanner, to scan the network for the device. Be aware though that this might be frowned upon should your device be located on a shared network.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

```
redfox-4d-3b-20:/config/#> iface vlan2
```

To show or change the interface and VLAN properties the user enters the command: `iface vlan2` and `vlan 2`, respectively, with an optional “show” as prefix. E.g. `show iface vlan2`.

```
redfox-4d-3b-20:/config/iface-vlan2#> help inet
```

The help command is always available. Use it stand-alone or with a context-specific setting to get more detailed help.

To leave a level use the command `end` to save or `abort` (or Control-D) to cancel. To save and exit all levels, and go back to admin-exec, use `leave` (or Control-Z).

```
redfox-4d-3b-20:/config/iface-vlan2#> leave
```

Applying configuration.

Configuration activated. Remember "copy run start" to save to flash (NVRAM).

The CLI, unlike the WebUI and WeConfig, has a concept of a running configuration. This is an activated but volatile (RAM only) file that must be saved to built-in flash (non-volatile storage) before rebooting. Many separate config files can be saved, but only one can be the selected startup-config. For details, see the built-in help text for the admin-exec copy and show commands.

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

6 Firmware Upgrade

Firmware upgrade is supported from the CLI, WebUI, and WeConfig tool. The CLI only supports FTP/TFTP upgrade but the WebUI and WeConfig tool can also upgrade via CGI upload – making them the ultimate choice if you have no FTP/TFTP server available or do not care to set one up.

6.1 WeOS Image

WeOS devices run from a built-in flash disk and usually comes with three partitions: primary, secondary, and boot. The latter is for the boot loader (see below) and the primary is the main WeOS image partition. Should this ever get corrupted, e.g. due to power-loss during upgrade, the device will boot using an image from the secondary (or backup) partition. This is a very appreciated, but mostly unknown, robustness feature.

```
redfox-4d-3b-20: /#> upgrade primary <SERVER-ADDRESS> WeOS-5.14.0.pkg
```

The system must reboot when upgrading the partition image the system started on. This protects against flash corruption issues seen in earlier releases, caused by simultaneous access to the flash during programming or when starting new processes after an upgrade. Also, WeOS warns when one of the partitions has an image with invalid CRC. Attempting to upgrade the partition with the OK CRC is discouraged, upgrade the partition with the invalid CRC first.

As usual, when upgrading from an earlier release, we always recommend backing up your configuration beforehand.

Note: The version string listed in the output from the `show system-information` command in the CLI, or the System Details page in the WebUI, is only updated after reboot.

6.2 Boot Loader

The boot loader firmware has its own version numbering scheme and is CPU platform specific. Please note, unless the release notes explicitly recommends it, there is usually no need to upgrade the boot loader.

The boot loader firmware is included in the WeOS-5.14.0.pkg.

Current boot loader: *Barebox 2017.12.0-8*

```
redfox-4d-3b-20: /#> upgrade boot <SERVER-ADDRESS> WeOS-5.14.0.pkg
```

Prepared by Jon-Olov Vatn	Document Release Notes WeOS 5.14.0	
Approved by Fredrik Pettersson	Date April 29, 2022	Document No 224004-g17df35d

7 Significant differences between WeOS 4 and WeOS 5

Some aspects of the CLI are different between WeOS 4 and WeOS 5. Here are some examples:

- Access port names have changed, e.g. `Eth 1` is now `eth1`. Similarly, on products with M12 ports, `Eth X1` is now `ethX1`.
- Port ranges (lists) have changed, e.g. `Eth 1-8` is now `eth1..eth8`
- Server and Internet port settings are now usually input as `ADDR:PORT`
- IGMP settings have been renamed from `igmp-foo` to `multicast-foo` due to the included MLD snooping support. Hidden compatibility aliases exist to ease the transition
- Stateless NAT (NAT 1-to-1) has moved out from the firewall context
- Enabling management services per interface has moved to each specific service
- Configuration of management services have moved to a separate management sub-context
- New discovery services, in addition to LLDP, are mDNS and SSDP. The latter is for discovery on Windows systems, see also section 5
- The DHCP relay agent CLI syntax has changed considerably
- The `show running-config` command now lists an actual file, in JSON format as mentioned previously. An optional keyword now lists the first level JSON object, and more advanced keywords can also be given in `jq` syntax¹. For more information, see the CLI online help text for `help running-config`

¹For more information on `jq`, a JSON query tool, see <https://stedolan.github.io/jq/>