

Prepared by <b>Joachim Nilsson</b>	Document <b>Release Notes WeOS 4.9.1</b>	
Approved by	Date <b>July 13, 2012</b>	Document No <b>089604</b>

# Release Notes WeOS 4.9.1

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## About

Westermo WeOS is a network operating system designed for industrial grade rugged Ethernet switches and routers. Based on the Cricket 3<sup>rd</sup> generation software platform with support for RedFox, 2<sup>nd</sup> generation Wolverine and Viper, Lynx switches, and the Falcon VDSL2 router.

Cricket is a Linux based platform and has been in operation since 2006 on custom made RedFox Mil, RedFox Aero and RedFox Rail products. With the advent of the RedFox Industrial line of products the platform was given a major overhaul to improve standards compliance as well as compatibility requirements with existing Westermo product offerings. The result is WeOS, the Westermo Operating System.

For more information about Westermo and other product offerings see <http://westermo.com>.

## Version Number Format

WeOS version numbers have three digits. The main reason for the third digit is to emphasize the difference between feature and bug fix releases.

The generally available (GA) releases are named 4.X.Y. The number four (4) denotes the platform generation, which currently is Cricket. The X is the feature release number, where new functionality is introduced, and Y is the patch revision number, reserved for security and bug fix releases. E.g., 4.9.1 would be the first patch release in the 4.9.0 series.

For customers in our beta release program it is worth pointing out that previously version numbers 9.00 – 9.99 were used for beta releases and developer builds. This custom has now been replaced by the more common –betaN notation, for internal and limited distribution beta releases, and –rcN, for release candidates. We believe this to be easier to keep track of since the base release version is visible in all stages of the release cycle.

## Technology Previews

WeOS contains hidden and undocumented features called technology previews. Westermo provides no support for undocumented features. Features specifically marked as tech previews can be completely redesigned, removed or changed in such a way that upgrading is *not guaranteed* to work!

The following is by no means a complete list, but details features that are likely to become supported in the next upcoming major release.

- Certificate handling, import/export in WebUI (section 2.2).
- SSL VPNs using OpenVPN, CLI only (section 2.7).
- Limited support for L2TP/PPTP VPNs, server only, CLI only (section 2.7)
- PPPoE server, CLI only (section 2.14).

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- USB boot, CLI only (section 2.3). Separate feature from "USB Autobackup/restore" and "USB Configuration Deployment"!
- IEEE 802.1AX/802.3ad Link aggregation with FLHP link qualification (section 2.9).
- IEEE 802.1AX/802.3ad Link aggregation over SHDSL links (section 2.9).
- Emergency Freeze (EMF) functionality for SHDSL ports (section 2.6).

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## 1 News

WeOS 4.9.0 introduces official support for LACP, LLDP, PPP for serial links, VRRPv3 with sub-second failover support and static multicast routing. As well as official support for the new Wolverine DDW-142 SHDSL Ethernet extender.

More changes and additions are listed below. Also, see section 5, for details on bug fixes and other changes not mentioned here.

### 1.1 Link Aggregation – Static and LACP

Link aggregation is used to bundle links together to increase bandwidth of an network connection and will provide redundancy in case of a link fail. Network links can be bundled together dynamically with the LACP protocol or configured statically.

### 1.2 LLDP – Link Layer Discovery Protocol

LLDP is a layer 2 protocol that advertises information and capabilities about the device to neighbouring devices. LLDP also collects information about neighbouring devices that are using LLDP. This information is stored internally and in the LLDP-MIB. See section 2.10 for CLI syntax and section 2.4 for SNMP support.

### 1.3 SHDSL

**PAF – PME Aggregation Function** functionality can only be used for DDW-142, mentioned in section 2.1.1. PAF is used to aggregate the 2 SHDSL ports in DDW-142 to achieve higher bandwidth. The "bonded" ports can reach rates from 64 Kbit/s to 30,6 Mbit/s. See section 2.6 for CLI syntax.

**Low Jitter function** is a SHDSL port specific function that can be used in applications where high accuracy of the Ethernet packet jitter is needed. If enabled, the jitter of the latency over the SHDSL link will be minimized.

This functionality is using a different SHDSL mode compared to default setting, thus the Low Jitter configuration must be set on both SHDSL ports sharing the physical cable.

See section 2.6 for CLI syntax.

**Lower SHDSL rates** have been added. The SHDSL ports supports three new rates below 192 Kbit/s.

The new rates are 32 Kbit/s, 64 Kbit/s and 128 Kbit/s and can be configured on any SHDSL port.

See section 2.6 for CLI syntax.

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## 1.4 VRRP – VRRPv3, Synch Groups and Multicast Control

**VRRPv3 – Subsecond Failover Support** As of WeOS 4.9.0 support for VRRPv3 has been added. The additions to VRRPv3 is shorter advertisement interval (faster failover) and IPv6 support (not supported in WeOS). VRRPv3 allows sub-second intervals (in steps of 100 ms) in range 0.1-40 seconds. See section 2.11 for CLI syntax.

**VRRP Synchronization Groups** VRRP synchronisation is a function to keep the VRRP role (master vs backup) the same for different VRRP instances on the same device. The VRRP instances on a device will only take the master role if it considers itself to have the highest VRRP priority for both instances. See section 2.11 for CLI syntax.

**VRRP Multicast Failover Support** Multicast failover support is a feature that only allow the master router to forward incoming multicast traffic from the configured VRRP interface. The backup router will prevent the packets from being forwarded. See section 2.11 for CLI syntax.

## 1.5 Static Multicast Routing

WeOS 4.9.0 adds support for static IPv4 multicast routing. Up to 128 routing entries can be specified. See section 2.12 for CLI syntax.

## 1.6 PPP – Dial In/Out via Serial Port and External Modem,

**External modems** can be used in three different modes. In *dial-in* mode, the system will wait for an incoming call. In *dial-out* mode, the system will initiate the connection to a remote machine, either when configured or on-demand when packets need to be routed out over the modem connection. The third mode is a combined *dial-in/out* mode. The system waits for an incoming call but is also able to initiate an upstream connection if one should be needed to route outgoing packets. See section 2.13 for CLI syntax.

**Null modem** links are now supported using PPP. This can be used to create an IP connection between two WeOS devices equipped with serial ports. See section 2.13 for CLI syntax.

## 1.7 Serial over IP – AT Command new features

**Synchronized connections** This function allow two units to synchronize connections, both connect message and DCD signal (if supported) are synchronized.

**DTR Drop** This adds support for DTR drop of connections. This setting is enabled it the Serial over IP context.

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## 2 Summary of Changes

### 2.1 Support for new Hardware

#### 2.1.1 Wolverine DDW-142

- The new WeOS based Ethernet extender, DDW-142, adds advanced functions and flexibility to the Westermo Wolverine series. Westermo Ethernet extender technology based on SHDSL makes it possible to reuse many types of pre-existing copper cables for long reach with high datarates.

The Wolverine DDW-142 allows Ethernet networks to be created over long distances at data rates up to 15.3 Mbit/s on a single twisted pair cable. By using PAF on two pairs “bonded” this rate can be doubled up to 30.6 Mbit/s, see more about the new SHDSL Software Features in sections 1.3 and 2.6.

The unit allows 2 Ethernet devices to be attached and a RS-232 port allows for a legacy piece of equipment to be incorporated into the IP network.

#### 2.1.2 New Viper Variants

- WeOS 4.9 introduce support for some new Viper variants, Viper-112-T3G and Viper-212-T3G which is 12 port Vipers with three gigabit ports. Also introduce support for Viper-112-T3G-P8, which is the same as above but with PoE support on 8 ports.

#### 2.1.3 10/100 Copper SFPs

- Support for a new 100Mbps copper SFP (article number 1100-0172) is introduce in WeOS 4.9. This SFP is a 10/100 transceiver with autonegotiation for speed and duplex. This transceiver works in both gigaslots (Lynx/Lynx-DSS SFP slot and RedFox SX board) and 100FX slots, i.e. Lynx/Lynx-DSS SFP ports and in all RedFox SFP ports.
- WeOS 4.8 and older version had only support for a fixed speed gigabit copper SFP (article number 1100-0148). This transceiver works only in gigaslots and can not autonegotiate to 10/100 Mbps. The fixed gigabit transceiver works only in Lynx/Lynx-DSS SFP ports and in the RedFoxes with gigabit SFP slots, all RedFoxes with the -F4G in the product name like RFI-14-F4G.
- The FRNT reconfiguration time is slower for the copper SFP than for fiber SFP’s. The reconfiguration time for FRNT with the copper SFP’s is around 300-500ms.

## 2.2 Platform

- As of WeOS 4.9.0 it is not possible to change the configured speed on gigabit copper (RJ45) ethernet ports, this only affected units from the redfox series with fixed RJ45 gigabit Ethernet.

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- There has been a known bug with ingress rate limit, the configuration and the actual limit has differed, this has been fixed in 4.9.0.

## Technology Previews

- Tech preview of custom certificates for HTTPS. This allows you to upload your own certificates and they will be used in the HTTPS traffic. Useful if you want to remove all certificate warnings in a unified network environment. If not specified, the default Westermo self-signed certificates will be used. Only supported from the CLI.

**Syntax:** `config/web> certificate <LABEL>`

- The DDNS client, inadyn, now has untested support for a few more DDNS providers: 3322, zoneedit, easydns, and dnsomatic. This in addition to the still supported: dyndns, freedns, and no-ip. This addition should come in handy now that DynDNS has, more or less, removed the free accounts many users have relied on so far.

## 2.3 CLI

- The recommended way of pasting in configurations into the terminal is to use the Juniper style command:

**Syntax:** `copy console running-config`

- The CLI format version has been stepped up to v1.9 in all .cfg files saved using WeOS 4.9.x.

- Upgrade from devices with a USB port is supported from the CLI only.

**Syntax:** `upgrade <pri|sec|boot> usb://image.ext`

- USB Deploy is officially available from WeOS 4.9.0. The layout is similar to the auto backup function:

```
/usb/
  '-- westermo/
    |-- backup/                <-- USB Auto Backup & Restore
    |   |-- cfg/               <-- Configuration files
    |   '-- crt/               <-- Certificates
    '-- deploy/                <-- USB Deploy
      |-- cfg/
      |   |-- <FILE>.cfg       <-- Actual configuration file
      |   '-- startup-config.lnk <-- Windows style .lnk file
      '-- crt/
      '-- ...
```

The .lnk file format used in WeOS is:

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- No leading directories, to avoid any / or \ confusion
- No end-of-line after file name, to avoid any DOS/UNIX/Mac confusion
- File name stored at first position in file, e.g., config0.cfg

There is currently no CLI or WebUI function for setting up a USB Deploy memory stick for use with WeOS. Meanwhile the easiest way might be to perform a USB backup and then rename the backup directory to deploy.

## Technology Previews

- Another exciting USB function is also available. Instead of using the USB stick as (continuous) backup, it can also be used to boot from. This has been available from WeOS 4.6.0, but is still only a technology preview. The directory structure used in 4.6.0 has changed in 4.8.0. To activate this, on the unit, simply log in to the CLI.

**Syntax:** `boot <usb|flash>`

## 2.4 SNMP

WeOS 4.9.0 adds read-only support for the following LLDP objects of the LLDP-MIB (IEEE 802.1AB):

- *lldpConfiguration(1)*: Read-only supports for all *lldpConfiguration* objects except *lldpPortConfigTable(6)* (WeOS 4.9.0 does not include per port LLDP settings), and *lldpConfigManAddrTable(7)* (WeOS 4.9.0 only announce the IP address of the ports default VLAN).
- *lldpStatistics(2)*: Read-only support for all *lldpStatistics* objects.
- *lldpLocalSystemsData(3)*: Read-only support for all *lldpLocalSystemsData* except *lldpLocalManAddrTable*.
- *lldpRemoteSystemsData(4)*: Read-only support for all *lldpRemoteSystemsData* except *lldpRemoteUnknownTLVTable* and *lldpRemOrgDefInfoTable* (these tables contain information on incoming TLVs which are not recognized by the receiving LLDP agent).

## 2.5 Web

- Routing configuration is now available via the web interface. Both dynamic and static routing is supported.

## 2.6 SHDSL

- PAF is a DDW-142 specific function that aggregates the 2 SHDSL ports to achieve higher bandwidth. The setting is only available on port *dsl1* but will set both channels in this mode. Port *dsl2* must be configured to the same *role* (CO/CPE) as *dsl1* to get the functionality working.

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If configured in the WEB the *role* demand will be automatically configured.

**Syntax:** `config/port/dsl1> paf`

- Low Jitter mode can be enabled on any SHDSL port from this release. The unit will be configured for a different SHDSL mode compared to the default setting, thus the Low Jitter configuration must be enabled on both SHDSL ports sharing the physical cable.

**Syntax:** `config/port/dsl1> low-jitter`

- Three new rates have been implemented for support of lower rates on the SHDSL ports.

**Syntax:** `config/port/dsl1> rate <32k|64k|128k>`

### Technology Previews

- Tech preview of *Emergency Freeze* is configurable, from the CLI only, on any SHDSL port. This allows a WeOS unit to detect exception situations on the SHDSL links. The detection temporarily freeze the SHDSL transceiver parameters to keep the link up. With this function enabled the unit might avoid a complete SHDSL retrain that could take up to a minute. The unit might loss data even with this functionality enabled but only for short period of time.

**Syntax:** `config/port/dsl1> emf`

## 2.7 VPN

### Technology Previews

- Tech preview of upcoming *OpenVPN* support, from the CLI only. This allows a WeOS unit to be an OpenVPN client or server (with or without RADIUS backend). Currently only routed mode is supported. Not bridged, however, bridged mode is a future target.

**Syntax:** `config/tunnel> ssl [ID]`

- Limited support for L2TP/PPTP VPNs, server only. See the online help for more details.

To be able for a PPTP/L2TP client to connect to a local network when firewall is enabled, you have to disable the firewall for the forward chain, since it not is possible to create rules explicit for the PPTP/L2TP interfaces yet.

**Syntax:** `config/tunnel> pptp`

**Syntax:** `config/tunnel> l2tp`

## 2.8 Serial over IP

- When a TCP client lost the connection without a proper reset, the server refused reconnect for 16 minutes in some cases, this has been fixed in 4.9.0, now the server will allow new connections immediatly.

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## 2.9 IEEE 802.1AX/802.3ad Link aggregation

Link aggregation can bundle links together dynamically with the LACP protocol or configured statically. Syntax to configure an aggregate is shown below.

```
config/aggregate-a1#>
config/aggregate-a1#> ports <PORTS>
config/aggregate-a1#> type <static | lacp | flhp>
```

### Technology Previews

- FLHP is a Westermo proprietary protocol used to qualify if a link has full connectivity and can be used to qualify if a link should be a member of an aggregate. It is only at technology preview function and is not a supported function.
- As a technology preview it is possible to use 802.1AX link aggregation on SHDSL links. Note: On SHDSL products with PAF support, it is recommended to use PAF instead (see section 2.6).

## 2.10 LLDP – Link Layer Discovery Protocol

- As of WeOS 4.9.0 there is a new syntax for enable/disable LLDP.

- The old syntax ...

```
config#> lldp
config/lldp#> end
```

- ...is replaced by:

```
config#> lldp
config/lldp#> enable
config/lldp#> end
```

- LLDP is now enabled on all Ethernet and DSL ports by default.

## 2.11 VRRP – VRRPv3, Synch Groups and Multicast Control

### VRRPv3 – Subsecond Failover Support

- In order to set advertisement intervals shorter than 1 second, you first need to set VRRPv3. To set an interval shorter than 1 second you need to use the msec command. Valid intervals are intervals in steps of 100-milliseconds. Example: *interval 100 msec* would give an interval of 0.1 seconds.

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**Syntax:**

```
config/iface-vlan1/vrrp-1#> version <2 | 3>
config/iface-vlan1/vrrp-1#> interval <interval> [msec]
```

**VRRP Synchronization Groups**

- For VRRP synchronization groups, two vrrp-instances is needed. By enabling vrrp sync for one instance, both instances gets grouped as a synchronized group. NOTE: The parameter to the sync command is VRRP ID.

**Syntax:**

```
config/iface-vlan1/vrrp-1#> [no] sync <VRRP ID>
```

**VRRP Multicast Failover Support**

- The setting is applied per interface, hence that it is not recommended to configure more than one instance per interface as this may lead to unpredictable results.

**Syntax:**

```
config/iface-vlan1/vrrp-1#> [no] mroute-ctrl
```

**2.12 Static Multicast Routing**

- **Syntax:** mroute <group GROUP> <src SENDER> <in IFNAME> <out IFNAME[,...]>
- Examples:  
redfox:/config/ip/#> mroute group 225.1.2.3 src 192.168.2.99 in vlan1 out vlan2,vlan3  
would route multicast traffic to address 225.1.2.3 coming from 192.168.2.99 via interface vlan1 onto interfaces vlan2 and vlan3.
- *Wild-card source IP:* it is possible to skip the source IP address for static multicast route entries:  
**Syntax:** mroute <group GROUP> [src SENDER] <in IFNAME> <out IFNAME[,...]>
- Examples:  
redfox:/config/ip/#> mroute group 225.1.2.3 in vlan1 out vlan2,vlan3 would do the same as in the example above, except that traffic from any source would be accepted.

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## 2.13 PPP – Dial In/Out via Serial Port and External Modem

- External modems and null modem connections are configured from the modem context.

### Syntax:

```
config#> [no] modem <ID>
```

- Specify the port to which the external modem or null modem cable is connected.

```
config/modem-0#> [no] port <ID>
```

- The dial-mode determines the overall behaviour of the instance.

```
config/modem-0#> no dial (Null modem)
config/modem-0#> dial in (Dial-in)
config/modem-0#> dial out (Dial-out)
config/modem-0#> dial in out (Combined dial-in/out)
```

- When using an external modem it is possible to configure an initialisation string which will put the modem in the desired state. When using the modem to initiate connections it also possible to specify the AT command sequence for dialing the remote machine.

```
config/modem-0#> init-string <AT-CMD>
config/modem-0#> dial-string <AT-CMD> (Usually ATD<NUMBER>)
```

- To configure a *null modem*, simply create the modem instance.

```
config#> modem 0
```

If needed, change the port and local address.

```
config/modem-0#> port 2
config/modem-0#> address 10.0.0.1
```

- To configure a *dial-out connection* using an external modem, create the modem instance and specify the dial mode.

```
config#> modem 0
config/modem-0#> dial out
```

If needed, change the port.

```
config/modem-0#> port 2
```

To have the link brought up on-demand, specify the demand timeout in seconds.

```
config/modem-0#> ppp-advanced
config/modem-0/ppp-advanced#> demand 60 (1 minute idle timeout )
```

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## 2.14 PPPoE – Changed syntax for PPPoE client and tech preview of PPPoE server

- The syntax for PPPoE (client) has changed. The changes are backwards compatible (upgrading from WeOS 4.8.2 to 4.9.0 will work), but not forward compatible (downgrading from WeOS 4.9.0 to 4.8.2 will not work).
  - The old syntax ...

```
config#> ppp 0
config/ppp-0#> type pppoe vlan1
config/ppp-0#> username alice
config/ppp-0#> password opensesame
```
  - ...is replaced by:

```
config#> pppoe 0
config/pppoe-0#> iface vlan1
config/pppoe-0#> identity alice password opensesame
```
  - New interface name: PPPoE interface ppp0 is replaced by pppoe0
  - Configuring username and password for your PPPoE client is no longer required by WeOS.
- Of the new PPP options described in section 2.13, some also apply to PPPoE.

### Technology Previews

- Tech preview of *PPPoE Server* is configurable, from the CLI only. This allows a WeOS unit to serve up to 16 PPPoE clients, using a local user database for client authentication and authorisation.
  - **Syntax:** `config/pppoe-0#> server` (Enables PPPoE server)
  - By default, the PPPoE server will have address 10.2.0.1, and hand out addresses in range 10.2.0.2-10.2.0.9: **Syntax:**

```
config/pppoe-0#> address 1.2.3.4 (Set local IP address)
config/pppoe-0#> pool 1.2.3.10 10 (Using size)
config/pppoe-0#> pool 1.2.3.10 1.2.3.19 (Using range)
```
- **Syntax:** `config/pppoe-0#> aaa-auth local-db 0`  
Use local user database "0" to authenticate/authorise PPPoE clients. See section 2.15 for information on how to create and manage local user databases.

## 2.15 Local User Databases – Authenticating PPP peers

- It is now possible to configure local user databases. For now the use of these database lists is limited to PPP authentication/authorisation. In future WeOS releases these local lists may be used for other authentication of other services, e.g., IEEE 802.1X.

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- Passwords are stored in plain text. Support for hashed passwords in the local databases is postponed until a future WeOS release.

- **Syntax:**

```
config/aaa#> local-db 0
config/aaa/local-db-0#> username bob bobpw123
config/aaa/local-db-0#> username charlie charliepw456
```

## 2.16 Wake-On-LAN

- A simple Wake-on-LAN (WOL) tool is added (Web and CLI). WOL allows a computer to be woken by a magic packet.

- **Syntax:**

```
#> wake-on-lan vlan1 00:07:7c:02:0e:61
```

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### 3 Known Limitations

This section includes known reported bugs and missing features, which may not necessarily be *limitations*, in many cases they may constitute severe operational drawbacks.

#### 3.1 Platform

- A system with many VLANs setup requires more time at boot. This was first reported in #3291, but even after having fully optimized all data paths there still remains a significant delay. E.g., creating 128 VLANs on a RedFox Industrial takes apx. 6 seconds longer than creating a single VLAN.
- On some computers, with some operating systems, the Westermo console port USB cable can block the boot sequence. Disconnect the USB-to-console cable when no terminal program, e.g., PuTTY is running. Issue #5984.
- The new alarm configuration lacks support for RMON triggers. Furthermore the community string that can be configured for each SNMP alarm action is missing in the actual trap.
- Running an FRNT ring over copper SFPs is not recommended, due to slow response time from copper SFPs.
- No CLI configuration support for managing multiple users and their capabilities.
- Limited support for low-level interaction with PHYs and link partners.
- Moving ports from one VLAN to another can change the MAC address of the corresponding VLAN interface leading to loss of connectivity. The symptoms are that Web and SSH connections to the device suddenly “freeze” due to stale ARP caches. The effects of which can take several minutes to resolve.

WeOS 4.3.0, and later, include support for gratuitous ARP on MAC address changes. However, not all client systems allow gratuitous ARP, although configurable, for security reasons. For cases where this effect is undesirable, e.g. a management interface, it is recommended to set a static MAC address using the CLI.

- Port monitoring fails to preserve the VLAN priority. Fix planned for a later release.
- When toggling bridge priority on the elected root bridge storm is easily provoked, issue #4203. Fix planned for a later release.
- In some setups when RSTP gets link up it has been reported to take very long to reconfigure, issue #4707. This may however be fixed in #5625.

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- Default routes learned from DHCP or PPPoE (primary interface) are set as “kernel routes”. This is not expected to cause any problems, but may cause some confusion when listing the ip routing table. Issue #6956.
- Issue #6917 describes a problem with link event triggers. To ensure proper function when, e.g., used with VRRP, it is recommended that the trigger has a “dummy action” defined. The dummy action could be set to do nothing, but it will ensure that the trigger actually fires as expected.
- The traffic types configurable for port ingress rate limit has side effects. Selecting multicast will also rate limit broadcast. Selecting unknown unicast will also limit broadcast and multicast. This behavior will likely change in a later release. Issue #6939.
- In very rare cases the system may fail to bring up the VLAN interfaces even if all ports are up, to avoid this do not “copy <FILE> running-config” several times in a row, wait a few seconds before do the command again. Investigation ongoing. Issue #8395.

## 3.2 CLI

- When issuing, e.g., `show running` not all settings are shown. This is due to WeOS 4.3.0 and later only showing differences to the system default. Support for `show running [all]`, where the optional 'all' keyword would list everything, is planned for a later release.
- The on-line help is not only insufficient, it is sometimes even misleading. E.g., some commands do not support the `no` prefix, some commands do not support `show` and no commands in configure context support `repeat`. Cleanup and improvement is a work in progress.
- No support for displaying SNTP status, NTP server stats. Best way currently is to manually check system time against another SNTP synchronized computer. The syslog is also a possible location to see what is going on. See “show log”.

## 3.3 SNMP

The SNMP chapter of the WeOS Management Guide lists supported standard MIBs, including limitations to specific tables for some MIBs. Additional deviations from the standard MIBs may exist.

## 3.4 Web

- Inspecting RMON counters in the Port Statistics page may need a manual reload before the actual values are displayed.

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### 3.5 IPConfig Tool

Limitations in current v10.4.0 of IPConfig Tool for Windows™.

- The WeOS version is encoded in the old version numbering format to be fully compliant in all Windows™ releases. E.g., version 4.3.0 is encoded as 4.03 and version 4.3.1 is also encoded as 4.03. Hence, version 4.10.0 would be encoded as 4.10.
- Due to limitations in the version field of IPConfig the patch level of the WeOS version is not visible in the tool. No fix planned.  
**Workaround:** Verify patch revision from Web, CLI or SNMP.
- Limitations in field length causes problem with upgrade from IPConfig Tool, i.e. too long file names are not supported. No fix planned.  
**Workaround:** Rename image file name to a shorter name before attempting upgrade. Note, the file name is *not* used in any way to encode any information for the upgrade process.

### 3.6 SHDSL

- SHDSL link can sometimes on older DDW-225/226 hardware be lost due to slowly dropping SNR margin, issue #5317. This seems to be caused by high traffic load on the link. Fixed on boards with hardware revisions 3 or newer, DDW-225 (5013-0750) and DDW-226 (5013-0740). This board update was introduced in production from serial number 4645 on the DDW-225 (3642-0250) respectively 4931 for the DDW-226 (3642-0240).

### 3.7 Firewall

- Port forwarding does not work well with interfaces using DHCP assigned IP addresses. A fix is planned for a later release.
- New NAPT syntax introduced in 4.6.0 may break IPsec tunnel setups. When NAT is setup at the same time as an IPsec tunnel on the same interface the IPsec traffic should not be NAT:ed. To ensure proper IPsec operation all NAT rules must declare the interface for inbound traffic. Issue #6971.

### 3.8 VPN

- In some cases when one of the IPsec endpoints closes the tunnel the connection cannot be reestablished automatically. This may occur when the connection is configured with static peer IP addresses on both end points and the tunnel uses NAT traversal.  
**Workaround:** The IPsec connection on one or both peers have to be restarted manually. In the CLI this is done in admin-exec context using: `tunnel ipsec restart`

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- MTU override may not work as expected, sending a message over the IPsec tunnel will not respect mtu override on the other end. **Workaround:** Always have the same MTU on the interfaces on both ends of the tunnel.
- The remote IP address of the IPsec gateway may in some circumstances not be reachable from an IP address associated with the IPsec tunnel. Issue #5987  
**Workaround:** Always connect to an IP on the IPsec gateway that is reachable from within the tunnel.
- It should be impossible to select “clear” as dpd-action on an initiator, it is however currently available as a configurable option. (Also, “hold” as dpd-action should work, but currently does not.)

### 3.9 Serial over IP

- All configuration changes on a Serial over IP profile will disrupt your communication on all configured Serial over IP profiles temporarily. This is due to that the daemon needs to be restarted, resulting in that the TCP connections will have to be renegotiated.

### 3.10 Link aggregation

WeOS supports link aggregation in line with IEEE 802.3ad. However, the current support for link aggregation contains several limitations such as:

- VLAN support: There is no support to add a link aggregate to a VLAN. Instead, each of the individual member links need to be added to the appropriate VLANs.
- Port settings: There is no support to configure port settings for the link aggregate. Instead, each of the individual member ports need to be configured uniformly, e.g., with respect to port speed/duplex mode.
- Only link aggregation of Ethernet ports is supported. Aggregation of SHDSL ports is provided as technology preview. Configuration of xDSL ports (ADSL/VDSL) ports in an aggregate, or mixing Ethernet and SHDSL/xDSL ports, an aggregate may be possible, but this is not supported and the behaviour is undefined, issue # 8117.

### 3.11 Software Upgrade

- No support (yet) for scheduled upgrades, i.e. ability to upgrade @02:30 to limit downtime during regular office hours. Feature request registered in issue #3363. Support planned for a later release.

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## 4 Known Issues

Issue	Category	Description
#3248	System	No warning in CLI/Web when other users are managing the system
#4203	RSTP	Storm occurs quite frequently when toggling RSTP bridge priority
#4707	RSTP	Long reconfiguration time for RSTP at link up, up to 32 sec
#4895	RSTP	RSTP show blocked port on LED when port is in forwarding state
#4929	RSTP	Looping admin edge ports causing a storm
#4951	FRNT	FRNT goes down during sustained high network load
#5649	RSTP	Non root switch sends out BPDUs with the same bridge ID as the root
#5818	DSL	Auto-negotiated SHDSL link does not respect the desired SNR criteria
#5984	System	Unit does not boot if console is attached to system w/o running terminal client
#5987	VPN	IPSec: Wayward ARP caused by IPsec added route
#6112	VPN	IPsec initiator dpd-action hold and clear does not work
#6180	System	RedFox 8FX: System instability issues with 1000Mbps fiber in 100Mbps SFP slot
#6223	Ports	Unit crashes when traffic is looped back to the interface it came from
#6431	Serial over IP	Improved status information of serial over ip connections
#6920	PPP	PPPoE termination message (PADT) from server not handled properly
#7090	Serial	Serial hardware flow control only works in one direction
#7275	System	Fiber patch cable connected to 100 Mbps in one end and 1000 Mbps in the other cause complete systems lockup
#7276	VPN	[CUST] IPsec "no remote network" causes NAPT rules to be bypassed
#7322	USB	USB autobackup/restore can restore configuration of a Lynx to a RedFox => FAIL
#7367	System	DDNS client does not resolve the registered DNS name at every update
#7379	Alarm	Trap community in alarm action does not override SNMP default trap community
#7453	PoE	Viper sometimes fails to toggle ports during over-allocation of power
#7500	VPN	IPsec with certificates and identity using 'auto' will not work
#7537	DHCP	Short manual Circuit ID strings in Option82 settings handled incorrectly
#7634	IPConfig	IPconfig in web and SSH does not show all of the switches in the ring but IPConfig tool does
#7723	Ports	Auto negotiate gives faster link up than static speed/duplex setting
#7760	SNMP	VRRP monitoring is not available in SNMP on WeOS
#7896	IpConfig	DDW-142 shown as DDW-225 in IPConfig Tool (10.4.0)
#7916	System	Problems with NAT and conntrack for multicast routes when using VRRP
#8086	VRRP	Not possible to use virtual IP as DNS server
#8093	System	Broken USB-stick causes failure in WeOS
#8095	Link Aggregation	Changing aggregate type from LACP to static is not clearing the BLOCKING state on the ports
#8117	Link Aggregation	Possible to aggregate links of different type (Ethernet and DSL)

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Issue	Category	Description
#8118	Link Aggregation	Splitting member links of one aggregate to other aggregates set member ports in forwarding state
#8155	DSL	Link alarm on PAF:ed SHDSL port gives wrong status upon creation
#8161	IP Multicast	Wildcard multicast routing cause packet loss when initially used.
#8164	Link Aggregation	Performance issues when qualifying lacp links
#8202	Alarm	Link Alarm on link aggregates (802.1AX) has incorrect startup behaviour
#8212	LLDP	LLDP crashes on Wolverine
#8224	Link Aggregation	Changing RSTP cost for link-aggregate does not (always) take effect
#8228	CLI	CLI hangs after configuration and repeat show in RMON
#8245	System	Rmon counters for blocked gigabit ports on RFI in constantly increasing.
#8253	Link Aggregation	LACP does not deactivate ports with lower speed-duplex
#8258	LLDP	Mgmt-IP not initialized nor updated correctly.
#8260	VLAN	Removing forbid on dynamic vlans not working
#8265	VRRP	Sync group subject to thrashing/flapping
#8281	WEB	Not possible to set up or reconfigure link-alarm for aggregates
#8285	Alarm	Trigger without source prohibits other triggers to fire.
#8286	Link Aggregation	Combining dynamic VLANs (AVT) and link aggregates does not work
#8293	LED	Port alarm LED does not light up for aggregated port
#8305	CLI	Problems with port qualifiers on Falcon/DDW-142 when using aggregates
#8353	DSL	SHDSL link does not always come up
#8395	VLAN	Sometimes VLAN interfaces can be down despite corresponding ports are forwarding
#8426	Kernel	After a Multicast storm, the unit sometimes fail and require reboot

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## 5 Fixed Issues

### 4.9.1

Fixed issues from WeOS v4.9.0

Issue	Category	Description
#8436	CLI	Grammatical error in multicast route warning
#8432	Link Aggregation	LACP sometimes get stuck at BLOCKING after getting a new link partner via RFR relays
#8201	SNMP	Traps for link-alarms on link-aggregates contain dummy ifIndex
#8415	DHCP	Configured default gateway, name server and domain name options are not sent by server when using Option 82 selector
#8416	VRRP	Booting up a high prio unit with link down will make it master
#8291	VRRP	Changing priority does not take effect when using sync groups
#8303	WEB	In some cases it is possible to add outbound interface "lo" to static multicast routing
#8311	WEB	Link aggregation creation (not) made easy.
#8313	WEB	Disabling the DHCP relay agent on a port breaks startup configuration.
#8376	WEB	PPPoE interface is not set to primary when configuring PPPoE with Basic Setup
#8290	CLI	Deleting last VRRP instance causes VRRP status to time out
#8279	Modbus	Modbus Server doesn't discard serial data when no TCP session is active
#8271	Link Aggregation	Add lock for using link aggregates in mac "limit" argument (aaa/mac-auth)
#8124	Link Aggregation	Missing locks for adding member ports from different switchcores to same link aggregate
#8207	CLI	Configured link aggregates in static fdb entries not recognized after reboot
#8239	CLI	conf t: With many vlans, "show vlans" requires interaction, should be non-interactive
#8240	RSTP	Path cost for aggregates is wrong
#8259	LLDP	LLDP reports "WLAN Access point" capability on all WeOS devices.
#8193	IP Multicast	User is not warned if multicast routes are entered but multicast forwarding is not enabled
#8354	SNMP	A full walk with SNMP may sometimes fail

Fixed issues from WeOS v4.8.2

Issue	Category	Description
#8297	QoS	Layer 3 QoS delays and packet loss of prioritised traffic at overload
#8183	System	Temperature sensor reports 255 degrees after configuration
#8274	WEB	Cannot use ping tool when alarm ping trigger is configured
#6894	WEB	Alarm: Outbound 'Default gateway' does not work
#8238	WEB	802.1X: Web shows server method NULL
#8213	WEB	Deleting static route web page looks unfinished or corrupt

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Issue	Category	Description
#8208	WEB	Unable to upgrade firmware from FTP on WEB
#8204	Alarm	VRRP ping-trigger tracking does not always work
#8169	OSPF	SECURITY: Port patches to CVE-2011-3325 and CVE-2011-3326 ...
#8179	Kernel	Critical kernel fixes in new Linux 3.0.32 patch release
#8231	Firewall	Possible race condition in firewall cause problems for RIP
#8248	LED	Port LEDs with link alarms is initially broken if the link is down.
#8144	Serial over IP	Modem replacement user specified AT commands does not work in the web (cli???)
#8143	Serial over IP	The Modem replacement AT interpreter does not handle value characters other than numbers correctly
#8147	Serial over IP	AT&Cn command not supported in Modem replacement (soip).
#8145	Serial over IP	Modem replacment AT interpreter does not handle trailing characters after the dial command correctly.
#8060	VRRP	Synchgroups and ping trigger is not possible to combine
#7927	WEB	DDNS and DHCP web pages flash up another page before showing correct page
#7421	WEB	Allocated power not shown in web.
#7520	Alarm	Link alarm still operational even though port is disabled
#8128	CLI	show ip mroute crashes when receiving multicast traffic from non-matching source IP
#7414	CLI	PoE classes misaligned in CLI
#8096	System	Port slot number miss-match on Wolverine.
#7941	CLI	Limited listing of outbound interfaces of static multicast routes
#8131	WEB	Remove PoE Web configuration profile setting. - closed.
#8050	CLI	no target led in alarm action context removes all targets if non-interactive mode is enabled
#8087	CLI	CLI refuse to enter firewall context in certain cases
#7998	CLI	Router syntax not compatible with help text
#7883	DHCP	The link-local daemon, zcip, does not retry using any previously used address
#8101	LLDP	LLDP crashes on assert
#8078	Alarm	Alarm ping trigger still present in "show alarm" output after deletion
#7815	Alarm	trigger/action: Reboot timing does not match settings
#7981	System	show version contains the word dirty
#7928	IGMP	Implicit MAC multicast entry not removed when disabling multicast-routing
#6917	Alarm	Actionless link event trigger does not work as expected, e.g., with VRRP
#8051	VRRP	Configure VRRP on DHCP interfaces is allowed, but break configuration
#7990	VRRP	Virtual interface is not removed when vrid or vlan is changed on the vrrp instance
#7946	System	Link connectivity fails when running ipsec auto tests
#7986	Ports	Port speed mismatch between MAC and PHY on gigabit board TX port

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Issue	Category	Description
#8003	Ports	The new switchcore module prints out a "switchcore: Error unhandled interrupt 157" message in the init phase
#8004	CLI	CLI help text for "repeat" states "every second", but repeats every other second
#8001	CLI	"no triggers" in alarm is bad CLI syntax
#7988	System	The LED does not work on Viper12 212-T3G and Viper12 112-T3G.
#7225	LLDP	Incorrect MgmtIP in LLDP message
#7895	CLI	The command show port type Ser 1/1 makes the CLI crash.
#7971	System	Interfaces does not always come up even if all ports is up
#7581	DHCP	DHCP server config not updated after DHCP relay agent config changes
#7368	Serial over IP	DCD in modem mode not working (Falcon, Lynx-108/208)
#7591	WEB	Add description field for MAC patterns (Web)
#6262	FRNT	FRNT ports and shown as DOWN / Disabled when a link is established towards a non-FRNT enabled unit
#7945	WEB	using Web GUI to import pem certificates from PC desktop causes certificate import to fail
#7870	CLI	Port type specifier ignored in vlan port settings if ports are not seperated by white-space
#7957	Ports	All copper 1000 ports are always in FORWARDING state
#7519	Ports	Disabled port remains in forwarding state
#7925	CLI	CLI crash when trying to configure non-existing interfaces
#7224	Serial over IP	Serial over ip accepts invalid multicast groups (both cli and web)
#6281	Serial over IP	AT mode CONNECT messages completely unsynchronised
#7848	VRRP	Vrrp Auth String has problems
#6899	Ports	SFPs are only detected during boot
#7369	Serial over IP	DTR/DSR not used in modem mode
#7727	System	When turning ports on and off a great many times, WeOS goes unstable
#7404	WEB	802.1x Radius button text on web pages not centred
#7540	WEB	Unused drop-down menu when configuring RADIUS groups.
#7648	SNMP	Snmp returns Wrong Type
#7773	System	A lot of error-messages when booting Wolverine
#3411	WEB	Configuration of static routing
#7728	System	Add support for three new Viper12 variants. Viper-112-T3G, Viper-212-T3G and Viper-112-T3G-P8
#7507	System	RFR12-FB : Show the version of the FPGA in the show system command.
#7756	Ports	Ports on Viper does not always come up
#6131	System	Possible to configure Autonegotiate for 100Mbit fiber SFP's
#7612	LED	RFR12-FB : The ON LED don't behave correct.

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<b>Issue</b>	<b>Category</b>	<b>Description</b>
#7557	WEB	DHCP-relay port specific settings not correctly displayed when editing common settings
#7440	SNMP	Make "no trapcommunity" result in setting "trapcommunity trap" (CLI and Web)
#7463	CLI	Unmatched > in threshold help text
#7502	PoE	PoE port priority order should be X1-X10
#7433	PoE	Viper reboot sometimes gives error message
#6928	Ports	Configured ingress rate limit and outbound traffic shaping do not always match actual limit
#7493	LED	VPN Led show status RED even if all tunnels disabled
#7475	VPN	IPsec: Possible to select unsupported certificate method in aggressive mode
#7303	System	System will not function properly if time is before 1970.
#6953	CLI	Copy paste modbus mappings crashes CLI

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## 6 Accessing the Command Line Interface

The RedFox switch supports a classic Command Line Interface (CLI) that can be accessed via the console port at 115200@8N1 or Secure Shell (SSH), for details see the Secure Shell RFC4251. WeOS supports protocol version 2 only.

Issue `help` or `show tutorial` at the prompt to access the built-in help and tutorials. See the WeOS Management Guide for more information.

### Recommended Clients

**UNIX** OpenSSH, <http://www.openssh.com>

**Win32** PuTTY, <http://www.chiark.greenend.org.uk/~sgtatham/putty/>, note that PuTTY is also useful for connecting to serial port consoles.

Please follow the directions for installation and usage applicable to your system and client.

### Logging In

To gain access to the CLI you need:

- An SSH client
- The switch IP#
- The user name and password

Units shipping with WeOS have by default all ports assigned untagged to VLAN 1, RSTP enabled on all ports and a static IP address: 192.168.2.200 with netmask 255.255.255.0.

Use the IPConfig tool, an LLDP client or nmap to find your device. If you have a DHCP server available you can set it up to hand out a known IP addresses for the registered devices MAC addresses. Each unit comes with 16 or 32 MAC addresses assigned, depending on the port count, the base address should be printed on the box and on the unit itself.

The unit is fairly quick to boot, in under 10 seconds is the unit up requesting an IP address — depending on the existence of a DHCP server the fall back to link-local address can take a while. To be on the safe side while scanning for your device, expect it to take anything from 30 seconds to one minute after power-on.

The following example illustrates how to login to the switch using OpenSSH from a GNU/Linux based host system. The process is similar with PuTTY or other SSH clients.

The operator lists the running configuration with the command `show running`, an overview of ports, vlans and interfaces is available by typing `show ports`, `show vlans` and `show ifaces`. See the `help` or the `show tutorial` for more on line help.



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## 7 Firmware Upgrade

Firmware upgrade is supported from the CLI, Web and IPConfig tool. All of them support FTP/TFTP upgrade, but the Web also supports CGI upload from the browser – making it the ultimate choice if you have no FTP/TFTP server available or do not care to set one up.

Note, the secondary CPU image and the boot loader firmwares can only be upgraded from the CLI. The version string listed in the output from the `show system-information` command is only updated after reboot.

### 7.1 What Firmware Image to Use

The image file names are currently limited in length to what the IPConfig tool is capable of handling. This is an intermediate limitation before introducing support for longer human-readable file names in a future IPConfig replacement. The file names are built around the product name and the model, or operating system, it is based upon.

#### Primary and Secondary

List of primary and secondary CPU firmware images.

**fw4XY.img:** Falcon, WeOS 4.X.Y

**lw4XY.img:** Lynx+, WeOS 4.X.Y

**rw4XY.img:** RedFox, WeOS 4.X.Y

**ww4XY.img:** Wolverine DDW-142/225/226, WeOS 4.X.Y

#### Boot Loader

The boot loader firmware can only be upgraded from the CLI. The current version (updated at boot) is visible in the output from the `show system-information` command.

Please note, the boot loader firmware does not follow the WeOS version numbers, it has its own version numbering scheme and is also very CPU platform specific. Also, unless the release notes explicitly recommends it you should not upgrade the boot loader. List of bootloader firmware images:

**imx27-redboot-4.XX.bin:** Falcon, Lynx+, Lynx 1400G, Wolverine DDW-142/225/226

**xscale-redboot-2.XX.bin:** All RedFox products

Use the command `upgrade boot <ip-addr> <firmware>` to upgrade the bootloader.

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## 7.2 Upgrading early RedFox units to 4.3.0 or later

Early RedFox units (Industrial and Rail) delivered with WeOS 4.0.0, comes with a flash memory partition unsuitable for the larger firmware image size of WeOS 4.3.0 and later.

You find information on your product's type of *model*, *article number*, and *serial number* via the Web interface (Menu path: Home ⇒ Details), or via the CLI `show system-information` command.

Model	Article number	Serial number
RFI-18-F4G-T4G	3641-3300	< 1190
RFI-14P-F4G	3641-3200	< 1180
RFI-10P	3641-3110	< 1220
RFI-18P	3641-3100	< 1111

See the management guide for details on how to safely upgrade the system flash table.

## 7.3 Upgrading From the CLI

To be able to upgrade the switch firmware the user must install and run an FTP server or a TFTP server on a network connected to the device. The (T)FTP upgrade uses anonymous login with the password 'support@westermo.se'.

The example below shows that the upgrade command, in CLI, Web and IPConfig first tries FTP and then TFTP, should the FTP connection fail.

```
redfox:/#> upgrade pri 192.168.2.42 rw400.img
Reading MTD partition information from FLASH
netflash: login to remote host 192.168.2.42
ftp: connect: Connection refused
netflash: ftping file "rw400.img" from 192.168.2.42
No control connection for command: Connection refused
netflash: failed to load new image
Trying TFTP instead...
Reading MTD partition information from FLASH
netflash: fetching file "rw400.img" from 192.168.2.42
.....
netflash: got "rw400.img", length=5918720
netflash: Signature OK - Sig = RFox
netflash: CramFS OK - CRC = 0x194F663B
netflash: Flashing primary image, reboot is forced.
netflash: Killing processes to protect FLASH during upgrade...
netflash: programming FLASH device /dev/mtd1
.....
netflash: Updating RedBoot FIS directory
```

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Writing updated MTD partition information to FLASH  
netflash: Rebooting.  
Restarting system.

The system will force a reboot when upgrading the primary image. This to protect against flash corruption issues seen in earlier releases, caused by simultaneous access to the flash during programming or when starting new processes after upgrade.

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

This is how far the release notes goes, please see the management guide for details. Or get in touch with your local distributor, or Westermo for any questions, support or course material.

Good Luck! //The WeOS Team