

Prepared by Jonas Johansson	Document Release Notes WeOS 4.11.1	
Approved by Raimo Gester	Date January 21, 2013	Document No 089604

Release Notes WeOS 4.11.1

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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 3rd generation software platform with support for RedFox, 2nd 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 fields. The main reason for the third field 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., 4.11.1 would be the first patch release in the 4.11.0 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 This custom has now been replaced by the more common –betaN notation, for internal and limited distribution beta releases, and –rcN, for release candidates.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 may become supported in the next upcoming feature release.

- *IPsec Backup Peer*: IPsec initiators may now be configured with two responder addresses (section 3.3).
- *Certificate handling, import/export in WebUI*: See section 3.1.
- *SSL VPNs using OpenVPN*: CLI only (section 3.3).
- *Limited support for L2TP/PPTP VPNs*: Server only, CLI only (section 3.3)

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- *PPPoE server*: CLI only (section 3.5).
- *USB boot*: CLI only (section 3.2). Separate feature from "USB Autobackup/restore" and "USB Configuration Deployment"!
- *IEEE 802.1AX/802.3ad Link aggregation with FLHP link qualification*: See section 3.4.
- *IEEE 802.1AX/802.3ad Link aggregation over SHDSL links*: See section 3.4.

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1 News

WeOS 4.11.1 contains bugfixes for IPsec DPD and adds a new feature in IPsec.

WeOS 4.11.0 introduces official support for six new Lynx 10x/20x switches from Westermo:

- Lynx L106-F2G/L206-F2G has 4 Fast Ethernet ports and 2 Gigabit capable Ethernet SFP ports.
- Lynx DSS L106-S2/L206-S2 has 4 Fast Ethernet ports and 2 serial ports.
- Lynx DSS L105-S1/L205-S1 has 4 Fast Ethernet ports and 1 serial port.

More changes and additions are listed below. Also, see section 6, for details on bug fixes and other changes not mentioned here.

1.1 SHDSL Emergency Freeze

This feature was a technology preview in 4.9.x. Now added as official service.

The Emergency Freeze (EMF) feature detects exception situations on the SHDSL interface.

This detection triggers a temporary freeze of the SHDSL transceiver and helps to keep the link up. Instead of a full retrain for about 30..45 seconds, the link is just interrupted for a few seconds only during the impairment, and it can continue with normal operation much quicker.

See section 2.3 for more information and CLI-syntax.

1.2 SHDSL G.HS Threshold Granularity

Using the CLI, custom G.HS threshold values are now configurable per port. Custom values are shown in the web management tool, but not configurable. Current settings (low, medium, high) still work

See section ?? for more information and CLI-syntax.

1.3 Serial over IP - Extended Modem Replacement Mapping Table

The AT command mode mapping table now may host 250 modem replacement mappings (in total).

See section ?? for more information.

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2 Summary of Changes

2.1 IPSec protocol/port

Support for specifying protocol and port that should be associated with the tunnel. A very useful example is to only allow GRE traffic to enter the tunnel, this is done by specify the protocol number for GRE(47). This will allow only traffic enter the tunnel that is of type GRE, this setting needs to match on both ends of the tunnel or the tunnel will not come up.

2.2 Support for new Hardware

2.2.1 New Lynx Variants

All the new Lynx variants are available in two software levels (1xx/2xx).

- Lynx L106-F2G/L206-F2G has 4 Fast Ethernet ports and 2 Gigabit capable Ethernet SFP ports.
- Lynx DSS L106-S2/L206-S2 has 4 Fast Ethernet ports and 2 serial ports (one RS-232 and one RS-232/RS-422/RS-485 combo).
- Lynx DSS L105-S1/L205-S1 has 4 Fast Ethernet ports and 1 serial port (RS-232).

2.3 SHDSL Emergency Freeze

The Emergency Freeze (EMF) feature detects exception situations on the SHDSL interface.

This detection triggers a temporary freeze of the SHDSL transceiver and helps to keep the link up. Instead of a full retrain for about 30..45 seconds, the link is just interrupted for a few seconds only during the impairment, and it can continue with normal operation much quicker.

Syntax: config/tunnel/ipsec-0> local-protocol 47

Syntax: config/tunnel/ipsec-0> remote-protocol 47

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3 Technology Previews

3.1 Platform

- 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.

3.2 CLI

- 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>`

3.3 VPN

- IPsec Backup Peer This is a technology preview of upcoming IPsec redundancy support. IPsec initiators may be configured with two responder addresses. If IPsec fails to connect to the primary responder, it will try to connect to the backup responder. The primary responder will periodically be checked, and a switch back is initiated if possible.
- 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.

Syntax: `config/tunnel> pptp`

Syntax: `config/tunnel> l2tp`

Since WeOS 4.11.0 it is possible to add firewall rules on the PPTP/L2TP interfaces, no longer required to disable the firewall to use PPTP/L2TP.

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Some clients (for example iPhone) has the option to send all traffic through the tunnel. To get this to work you need to add a name-server in the PPTP-configuration.

It is not currently possible to use the PPTP server as name-server.

Syntax: config/tunnel/pptp> ppp name-server 8.8.8.8

3.4 IEEE 802.1AX/802.3ad Link aggregation

- 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. LACP link aggregation does not work for DSL ports on DDW-142.

3.5 PPPoE

- 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.

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4 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.

4.1 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.
- The new alarm configuration lacks support for RMON triggers.
- 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.
- 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.

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4.2 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”.

4.3 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.

4.4 Web

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

4.5 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.

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4.6 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).

4.7 Firewall

- Port forwarding does not work well with interfaces using DHCP assigned IP addresses. A fix is planned for a later release.

4.8 VPN

- 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.)

4.9 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.

4.10 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.

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- 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.

4.11 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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5 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
#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
#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 contrack 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)
#8118	Link Aggregation	Splitting member links of one aggregate to other aggregates set member ports in forwarding state

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Issue	Category	Description
#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
#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
#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
#8604	System	OSPF injected VRRP route causes static default gateway to become inactive
#8691	Link Aggregation	Reconfiguring a static link aggregate to use LACP may induce temporary link state fluctuations

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6 Fixed Issues

4.11.1

Fixed issues from WeOS v4.11.0

Issue	Category	Description
#9113	IPsec	DPD on Initiator doesn't restart connection

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7 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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8 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.

8.1 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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8.2 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.

8.3 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 rw492.img
Upgrade in progress, console disabled: Please stand by...
Reading MTD partition information from FLASH
netflash: login to remote host 192.168.2.42
ftp: connect: Connection refused
netflash: ftping file "rw492.img" from 192.168.2.42
No control connection for command: Connection refused
ftp: bind: Address family not supported by protocol
netflash: FTP failed.

Trying TFTP instead...
Reading MTD partition information from FLASH
netflash: fetching file "rw492.img" from 192.168.2.42
.....
netflash: got "rw492.img", length=10416128
netflash: Signature OK - Sig = RFox
netflash: CramFS OK - CRC = 0x82975A33
netflash: Flashing primary image, reboot is forced.
netflash: Killing processes to protect FLASH during upgrade...
```

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```
netflash: Programming FLASH device /dev/mtd1
.....
netflash: Updating RedBoot FIS directory
Reading MTD partition information from FLASH
Updating MTD partition information
Unlocking and erasing MTD partition information in FLASH
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