



Rugged Operating system on Linux v2.2.0 Release Notes

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Overview

ROX™ v2.2.0 represents a “Generally Available” (GA) release of RuggedCom’s “second-generation” **ROX™** operating system software. This **ROX™ II** operating system software is required by all models within the RuggedBackbone™ product series (RX5000 / MX5000 / RX1500 / RX1501 / RX1510 / RX1511 / RX1512). It is also available as an upgrade to the RuggedRouter® product series (RX1100) as well as future models to be released with similar architecture.

RX5000/RX15xx models:

- File/Archive name: imagerr2.2.0.tar.bz2
- Build date: September 15, 2011 – 17:41 File size: 86,178,030 bytes

RX1100 models:

- File/Archive name: imagerr2.2.0-i386.tar.bz2
- Build date: September 16, 2011 – 18:24 File size: 84,714,108 bytes

User Guides

All user Guides are available from the RuggedCom Web site at www.ruggedcom.com. Refer to the **Rugged Operating system on Linux v2.2.0** User Guide with this release.

Overview of ROX™ II features

ROX v2.x is not just an update to RuggedCom's current **ROX v1.x** operating-system (built to support the RuggedCom's RuggedRouter RX1100 models), but instead it actually is the "second-generation" of the ROX software series (hence the **ROX™ II** moniker). Here some important **ROX™ v2.x** distinctions:

- running on MPC8360E processor (RX5000 & RX15xx platforms)
- combining IP routing (L3) and Ethernet managed switch (L2) functionality
- providing a telecom-standard command-line-interface (CLI)
- support for modular designs with field replaceable hardware modules
- very high Ethernet port-densities
- incorporating Xenomai real-time Linux extension (to satisfy managed switching 'real-time' performance requirements such as RTSP)
- integrated yet modular Layer 3 hardware switching capabilities
- source code reuse of RuggedCom Intellectual Property (IP) with 10 years of proven field 'hardening' under ROS™
- introduces NETCONF for powerful and secure advanced management
- USB port access
- Removable 1GB Compact Flash card for program & configuration storage
- Enhanced reliability through Data ('forwarding') and Control plane separation
- Single configuration file for easy maintenance and upgrades
- Dual-redundant (multiple partitioned) file systems for greatly improved software-upgrade reliability
- New WEB GUI design facilitates dynamic screen updating using Java scripting, AJAX etc.

Summary of Changes in the v2.2.0 release (3124)

New hardware supported:

1-port and 2-port 3G Cellular Modem support (Future availability)

Type: New Feature
Products: RX1500, RX1501, RX1510, RX1511, RX1512
ID: 3335

ROX 2 support is now added for a variety of Cellular Modem Line Modules including single and dual port LM for use on GSM/EDGE/HSPA networks.

1-port 64/56 Kbps DDS support

Type: New Feature
Products: RX1500, RX1501, RX1510, RX1511, RX1512
ID: 3638

ROX2 support is now added for a single port Digital Data Services (DDS) Line Module configurable for either 64 Kbps or 56 Kbps synchronous-serial line speeds.

6-port RS232/RS422/RS485 Serial LM support

Type: New Feature
Products: RX1500, RX1501, RX1510, RX1511, RX1512
ID: 3282

ROX2 support is now added for a 6-port asynchronous-serial line module with configurable line transceivers.

Note that DNP and MODBUS protocol support is provided for this LM.

4-port/6-port 100FX SFP LM support

Type: New Feature
Products: RX1500, RX1501, RX1510, RX1511, RX1512
ID: 3778

ROX2 support is now added for both a 4-port and a 6-port 100FX SFP line module.



3-port 10FL/100SX LM support

Type: New Feature
Products: RX1500, RX1501, RX1510, RX1511, RX1512
ID: 2691

ROX2 support is now added for a 3-port 10FL/100SX line module (3x 10FL Multimode or 3 x 100SX, 850nm ST 2km).

APE (Atom 1.3Ghz) LM support

Type: New Feature
Products: RX1500, RX1501, RX1510, RX1511, RX1512
ID: 4146

ROX2 support is now added for the Application Processing Engine (APE) line module.

RX1100 Platform support

Type: New Feature
Products: RX1100
ID: 3629

The RX1100 model is now a formally supported target for ROX 2. All existing RX1100 interfaces types are supported in this release EXCEPT for the following: ADSL, POE, Synchronous Serial, and PTP.

Configurable Layer 3 Switching support

Type: New Feature
Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512
ID: 3616, 3617

The RX5000 model and RX15xx Platforms now support explicit static configuration for hardware-assisted IPv4 routing. In addition, hardware-assisted IPv4 Multicast routing (cross-VLAN switching) is also supported.

New routing features:**QoS Support including Traffic Control and Shaping**

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3184

Software now includes support for Quality-of-Service (QoS) features including Traffic Control and Shaping. Two modes of operation are supported: basic and advanced. The 'basic' mode offers a limited set of options and parameters and as such provides a quick way of setting up traffic shaping for many uses. It is the preferred mode for upgrading from the Traffic Priority feature of previous ROX1 versions. The 'advanced' mode offers more granularities to traffic control parameters by defining hierarchies of classes per interface, as well as precise rule definitions to assign packets to classes. A single traffic control configuration (basic or advanced) is applied, when enabled, to the current firewall (enabled/work) configuration.

IPSec / VPN support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 2725

Software now includes support for IPSec / VPN. IPSec provides secure data transfer in the network. Note that the RX1100 platform supports hardware acceleration for AES, while RX5000/RX15xx platform support hardware acceleration for AES, 3DES and hash.

Link-Failover `On-Demand` support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3618

Software now includes support for Link-Failover `On-Demand` feature. The Link-Failover `On-Demand` feature is used to hold a backup interface down until it is required for service. If the backup interface is configured as `on-demand`, it will be held down by default. Link-Failover will bring the backup interface up when needed (e.g. when the main link goes down) and return the backup interface down when it is no longer needed (e.g. when the main link comes back up).

MLPPP support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3632

Software now includes support for Multi-Link PPP (MLPPP) over applicable interfaces.

New IP/Gateway Services:**GOOSE Tunnel support**

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3776

Software now includes support for GOOSE Tunnels to be established over the WAN.

T1/ E1 Bridging for GOOSE Traffic (Ethernet-over-HDLC) support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3776

Software now includes support for T1 Bridging for GOOSE Traffic. In fact any Ethernet traffic type can now be ‘bridged’ over applicable HDLC interface.

‘Virtual Switch’ device support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3776

Software now includes configuration support for ‘Virtual Switch’ interfaces to be defined. The ‘Virtual Switch’ feature enables software-based bridging, as it allows Layer 2/Ethernet traffic to be transferred between multiple interfaces.

Layer 2 Tunneling Protocol Version 2 (L2TP v2) support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3310

Software now includes support for the L2TP version 2.

New Device Control/Status:

Improved SNMPv3 Configuration Interface

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 2536

The SNMP Configuration Interface has been improved. The organization and layout is now more intuitive than the previous SNMP Configuration Interface.

Extended IF-MIB Support to all Interfaces

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3177

The SNMP support for IF-MIB has been extended to all physical interfaces and most logical interfaces.

Additional SNMP MIBs supported

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3517,3502

The SNMP interface now supports the following MIBs: IP-MIB, IP-FORWARD-MIB, TCP-MIB, UDP-MIB, and ICMP-MIB.

Improved Secure File Transfer (HTTPS and SFTP) support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 4131,3624,3721

Software provides a number of new features designed to offer customers new ways to transfer various file types to and from the device. The Web User Interface has two new tabbed utilities for uploading and/or downloading the following file types: Configuration Files (in NETCONF or CLI format), Feature Keys, eLAN Certificates, IPSec Certificates, ca certificates, crl files, Log files, and Rollback files. The files are transferred securely using the HTTPS protocol or the optionally configurable SFTP Server.

CLI “Load Override” and “Load Replace” support

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3625

The Command-Line-Interface (CLI) has added two new options to the existing “Load Merge” capability used to restore saved configuration information.

a) The configuration mode command “load override <filename>” is used to completely change the entire device configuration to a complete configuration previously saved within a CLI formatted configuration file.

NOTE: In turn this file is normally created using a configuration mode “save <filename>” command from the top of the data path

b) The configuration mode command “load replace <filename>” is more “specific” in that it only replaces a partial subset of the configuration underneath a specific point within the data path.

“Edit Exclusive” Mode including confirmed commit operations

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 2989

Software now supports a more advanced configuration editing mode. The “Edit Exclusive” mode enforces that there will only be a single user configuration session at a time. No other users may edit configuration values while an “Edit Exclusive” session is in progress.

The commit phase of an “Edit Exclusive” session allows for an optional timeout parameter – where after a user confirmation is expected, to ensure that the configuration remains in effect. If a timeout is specified, then the device’s configuration will be automatically rolled back to the previous configuration if the user does not send an explicit confirmation that the change was applied correctly. For example, using this mode a newly committed Firewall configuration will automatically revert (rollback to the previous committed configuration) if the connection to the device is inadvertently lost after the commit is performed – and subsequently the user is unable to send the required confirmation response.

SNMP Access Control Feature

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3746

The SNMP Configuration Interface now includes a new “control-community” field within the entries of the snmp-target-address table (for NMS hosts). When a valid community name is used to set this field as part of a target table entry, only SNMP requests from that target’s IP Address will be processed by the system.

SNMP Trap Source Override Feature

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3861

The SNMP Configuration Interface now includes a new “ip-source” field under “admin snmp”. When set, this IP Address will be used to populate the Source IP Address field of all SNMP Trap Messages sent from the device.

Automated Backup and Restore Operations including Job Scheduling

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3721

Software now supports automated backup and restore operations using the new “job-scheduler” feature. This feature allows one to specify a list of CLI formatted commands to be run at specified times and/or time intervals. The “jobs” can also be run automatically on configuration change events.

Improved Webui Support for Ping, TcpDump and Traceroute utilities

Type: New Feature

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512, RX1100

ID: 3736

The Web User Interface now supports tabs with new/improved controls for the following utilities: tcpdump, traceroute, traceroute6, ping, and ping6.



Known Limitations

The following list describes functionality limitations which are 'known' to exist within this software release.

'Hot Swap' support exists only for Power Modules (PM) within this release

Type: Major

Products: RX5000, MX5000, RX1500, RX1501, RX1510, RX1511, RX1512

ID: 3611

Comprehensive 'hot-swap' software support for all line modules is not available within this release. Only the Power Modules (PM) are dynamically 'hot-swappable' (hot insertion & removal). Please see the User Guide for instructions on safely adding and removing Line Modules on these systems.



ROX™ II Upgrade instructions

Upgrading ROX™ II using the RuggedCLI Wizard

ROX II supports a ‘dual-partition’ file- system offering storage redundancy and rollback features. Software upgrades are always performed to the ‘alternate’ partition in order not to disturb your current running system context while will remain operational and intact during the upgrade progress. It should be noted that the upgrade process may also be launched through the WWW and NETCONF interfaces. Details on upgrading using these interfaces are available in the ROX 2.2.0 User Guide.

Follow the steps below to perform an upgrade:

1. From the RuggedCLI prompt enter configuration mode:

```
ruggedcom# config
```

2. Launch the upgrade wizard with the following command:

```
ruggedcom(config)# wizard rox_upgrade
```

3. You will then be prompted to enter the URL of your upgrade server as well as the target release version:

```
The upgrade repository url is set to: http://10.200.17.235/rox/releases
```

```
Press <ENTER> to accept this or type a new address to change it:
```

```
http://10.200.17.235/roxii/releases
```

```
changing repository
```

```
The software release you are upgrading to is: 2.2.0
```

```
Press <ENTER> to accept this or type a different version:
```

```
Warning:
```

```
You are about to commit changes to upgrade settings. If any other modifications to the candidate database are pending, they will be committed too.
```

```
Continue?
```

```
(y/n): y
```

4. The upgrade process will then proceed through three distinct phases: transferring the file-system to the alternate partition, downloading all updated and new packages and installing the packages to the ‘alternate’ partition:

```
Checking for a more recent version of the upgrade system
```

```
Already running the most recent version of the upgrade system
```

```
*****
```

```
Launching ROXII Upgrade.....
```

```
Upgrading system to Partition 2
```

```
Estimating size of upgrade. This may take a few minutes....
```



ROX™ II – v2.2.0 Release Notes

```
21 packages to install, 13220468 bytes to download
6353 files, 301611585 bytes will be copied to Partition 2
Starting upgrade...
```

```
Preparing to transfer files to alternate partition. This may take a few
minutes....
```

```
---- File Transfer Phase: 301611585 bytes, 6353 files ----
```

```
progress: 100%
```

```
File transfer phase complete.
```

```
Starting download of packages...
```

```
---- Package Download Phase ----
```

```
progress: 100%
```

```
Download phase complete.
```

```
Installing packages...
```

```
---- Package Install phase ----
```

```
progress: 100%
```

```
Package installation complete.
```

```
Upgrade to partition 2 completed successfully.
```

```
A reboot is required to run the upgraded partition.
```

```
ruggedcom(config)#
```

5. Reboot the system to boot the upgraded partition

```
ruggedcom(config)# admin reboot
```



ROX™ Firmware/User Guide Version Numbering System

The ROX™ software is labeled with a three digit version numbering system of the form X.Y.Z where each digit is a number starting from zero. The 'X.Y' digits together describe the functional version of ROX™ whereas the 'Z' digit represents firmware updates made within a specific functional version series.

In this release, the 'X' digit identifies the ROX™ series as being series '2' and therefore referring to RuggedCom's next-generation ROX™ II operating system support for the RuggedBackbone™ and future products to be released. The 'Y' digit identifies the major version number and is incremented for a 'major' functional updates of the software. The 'Z' digit represents the minor version number and is incremented for 'minor' software updates including bug fixes, cosmetic enhancements and other minor issues.

ROX™ user-guide documentation will follow the same format. In general, a user guide will have the same 'X.Y' digits as the firmware to which it corresponds.

Type of Changes

Each change to the software is categorized according to the table below which provides guidance as to whether the change justifies upgrading. As well, each change lists an internal RuggedCom change number.

Change Type	Description
Critical	Critical changes fix problems that prevent the basic operation of the device and have no workaround. Any critical changes merit a device upgrade under all circumstances.
Major	Major changes fix problems that prevent the basic operation of the device but do have a workaround. Any major changes merit a device upgrade if the workaround is not acceptable.
New Feature	New features add significant new capability to the device. Such changes may change the basic operation of the device, the user interface, and how the device is configured. New features only merit a device upgrade if the feature is required.
Enhancement	Enhancements improve existing device capability and do not significantly change the basic operation of the device, the user interface, or how the device is configured. Enhancements only merit a device upgrade if the feature is required.
Minor	Minor changes fix non-vital problems that may or may not have a workaround. Minor changes do not necessarily merit a device upgrade unless the specific problem applies.
Cosmetic	Cosmetic changes have negligible impact on device operation and include such updates as spelling mistakes, user interface adjustments, and help text improvements. Cosmetic changes rarely merit a device upgrade.
Security	Security changes usually do not have a discernable impact on normal device operation other than to improve the unit's defensive response to known exploits and vulnerabilities. This might include such updates as enhanced protection against newly discovered denial-of-service (DOS) attacks. It is left entirely to the customer's discretion to decide whether or not a security change is appropriate to merit a device upgrade.



Contacting RuggedCom

For further information on this release or technical support of any nature, please contact RuggedCom at the locations below:

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