RuggedVPN Firmware Release 2019120570/2020052350 for Viprinet and Wantastic products; June 2020

This is our second firmware release this year, and it won't be the last.

Compared to 2018's release still done under the Viprinet brand, internally, a lot has changed in our firmware – this update is the result of over 10.000 hours of development work. A lot of code was rewritten to be faster and more future proof. Most importantly, the code for supporting 3G/4G modems had to be rewritten to be ready for supporting 5G chipsets in the future.

Due to this high amount of changes, it is crucial to be well prepared before doing the update. Please take a config backup of your router. It is preferable to do the update locally (through the LAN interface), instead of doing it via VPN.

Important pre-installation instructions:

- **Protect the Elderly:** Very old routers (6+ years), especially Multichannel VPN Router 300 units that have been operated at sub-optimal temperature ranges often will have a faulty/very aged flash memory, and sometimes drained batteries or capacitors. Quite often they still work absolutely normally, but as soon as the flash is written, it fails. For those old routers installing this firmware update may cause the flash to finally die, with the router no longer starting.

  Therefore when updating those routers, please take extra care. Make sure you have taken a config backup, and have a replacement device in case something goes wrong.

  Please consider retiring old 300 Routers soon. Our VLM Support system allows your for very cost-efficient upgrades to the current 310 model.

- All code in regards of LTE modules has been rewritten. We have tested all UMTS/LTE module variants of the last 15 years extensively, but there may be problems, especially if you use custom APNs. If you are updating a router that is only connected via LTE modules, do it locally, not remotely via the VPN Tunnel.

- Very old "LTE/UMTS/HSPA+/GPRS/EDGE" modules running a modem firmware version from 2011 are no longer supported with this release. Before upgrading to this firmware, use the 2018 Viprinet firmware release, and using that, upgrade the modems firmware to version 03.05.24. Afterwards you may upgrade to the current Viprinet firmware. Please note that this is the final release still supporting this very old LTE modem module.

- This firmware release is backward-compatible to the 2018 one. This means you can first upgrade the Hub, and then upgrade the Node router at a later point. Please note however that all performance enhancements will only be seen once both sides are updated.

Changes compared to the March 2020 Release:

In case you had already previously updated to March's release (2019120570/2020030850) here are the changes compared to that. If you are still running the 2018 firmware, please skip over this section.

- Fix for QoS getting sometimes stuck with very slow lines and lots of QoS classes
- Fix for WAN Optimizer connections from Youtube streaming suddenly eating 100% CPU
- Unsupported LTE modem firmware is reported as such
- Removed forgotten debug for congestion notifications
- Fixed initialization code of LTE modules. Before it would try to connect the module when it wasn't ready yet (SIM card not read, or currently scanning networks etc). This fixes sometimes the modules not coming up after a router power cycle on Toughlink.
- Fixed a rare bug where an LTE module with lots of reconnects or cell tower changes while driving caused the tunnel suddenly to no longer work without any of our watchdogs coming to the rescue.
- Fixed VLAN issues with the WAN Optimizer. The problem occurred when VLANs were used on both sides and these were also transported through the tunnel but were not the default VLAN of the tunnel. We incorrectly handled the VLANs in some places and partially reset them to the default VLAN setting of the tunnel.
- Removed debug log messages
- The default DHCP server configuration got optimized, and work-arounded problems that occurred with some DHCP clients (notably FireTV sticks)
- Removed check for link as it is not working with bridged interfaces.
- This fixes "router is unreachable after LAN restart" for all routers with bridged interfaces (aka those with WLAN Aps).
- The VPN Bypass code could on massive LTE module reconnects or powercycles cause the routing core to stop working without any of our watchdogs kicking in.
- Removed the code that will reset the LTE module if it goes to low-power mode. This is because a failed firmware update can cause this, and constantly resetting the module makes it harder to make it live again. We haven't seen modules going to lpm in other cases for a while, so this should be safe.

- Removed "switch to sim a/b" buttons for Toughlink devices

- Sometimes some or all of the web interface tools (download, ping, traceroute etc) would not work. This especially happened with low-speed or long-distance Browser connections to the web interface. This problem is fixed, all web interface tools now always work.

Changes compared to 2018's Releases:

Known issues:

- The LTE module firmware updater is not stable yet. Sometimes for 4.5G LTE modules it may happen that after an firmware update of it, the module no longer comes up but complains about having turned to low-power mode after an update. Our support team is able to remotely correct this problem. Due to this bug, please always only update one LTE module at the time and check if it is coming up again. If you router is only connected through the single LTE module, don't do the update. This problem will be fixed in the next router firmware release.

New features and improvements:

- Dramatic improvements in product bonding performance. For this release, the highest speed-ups can be seen on 310 routers, which in real-life scenarios now have been seen to be able to bond up to 250 Mbit/s instead of the 100 Mbit/s they have been sold with. More speed-ups with a focus on other products will follow in later firmware releases.

- The system now supports LTE modules with multiple SIM card holders

- The system now supports the "Simergy" system of virtual remote SIMs.

- The LTE module firmware updater has been re-written and is now also able to flash LTE-A modules. Please update your LTE-A modules to the latest firmware.

- On the Multichannel VPN Router 52x and Toughlink 25xx series, or using a dedicated Simergy LTE Module on modular routers, you may now instead of having a local SIM inside the router use a physical SIM stored in a remote data center.

  This is not to be confused with the eSIM system, where you would still provision a SIM onto the modem itself, which would then stay there. Instead you can buy cheap SIM cards and store them locally in your office or data center in a rack, and whereever your routers are, they will automatically fetch the remote SIM card best matching the currently seen LTE networks.

- The system makes managing a large pool of SIMs much easier, and provides a massive benefit for mobile routers travelling across country borders.

- The Gigabit Ethernet V2 module with Realtek chipset is now supported and works very well. This module has been created as the existing Gigabit Ethernet modules chipset had compatibility problems related to pause frames with various switches, and more importantly with some external routers (DSL, Cable).

Those customers affected of getting low speeds using an external DSL or Cable modem on a Gigabit Ethernet module may upgrade to this new module as soon as Viprinet has started selling it.

- Added support for an upcoming new WLAN Client module.

- The whole system is now using UTF8 encoding, and therefore should be supporting Unicode characters everywhere.

- The web interface is internally using Websockets and is responding much faster.

- Bonding multiple channels with very different bandwidth values now works properly, as does channel auto-tuning for those.

  Long explanation:

  Whenever a channel was fully used for a moment (no tokens left) at this point in our calculation for the total potential bandwidth of a QoS class the bandwidth of this channel would not be taken into account for that moment. Due to this, the maximum allowed bandwidth per QoS would fluctuate or even oscillate: Due to the QoS class using the wrong total bandwidth, it would not use the actual speed the channels have available. This in turn means that some channels might not be used to their full current autotuning amount, which would result in these channels not increasing their autotuning.

- Increased aggressiveness of rapid autotuning so it tunes up speed faster.

- The logic that manages traffic flows has been rewritten and now should both correctly release flows and be much faster with a high number of flows, as flows that are idle are now tracked separately from those who are sending traffic. Having millions of concurrent flows no longer should be a performance problem.

- The maximum number of traffic flows per IP has been increased to 50.000. The timeout for UDP DNS queries has been lowered. In combination this should make sure heavily used DNS servers running behind a Viprinet router will no longer run out of flows.

- The SSL/TLS specification only allows a maximum TLS record size of 16kb. We've always "violated" this specification by using up to 32k records, which was still compatible.

- WAN modules now use the NCSI system to detect if Internet connectivity is available on a WAN module that is up. It will notify you both if you have a WAN link that has no Internet (for example because your LTE contract ran out of traffic) and if the provider is redirecting traffic to a captive portal (to provide a login page for WiFi hotspots, or for your LTE provider offering you to buy a traffic package).

  The system will report NSCI progress using the monitoring tool, too.

- LTE modems now send status messages to the monitoring tool on network scans.

- Most Collections (Lists) inside the web interface now feature an import/export from/to MS Office and Libreoffice. This is an experimental feature that still has problems.

- All collections and objects now allow to backup and restore.

- The routing logic has changed to now do a "smallest prefix match" instead of "first match".

  Smaller networks are now winning over larger networks if both are matching.

  As an example: Source IP 192.168.0.1 is tried to be routed.

  We have 2 Routing rules:
  192.168.0.0/24 -> Tunnel A
  192.168.0.0/26 -> Tunnel B

  This logic now selects Tunnel B instead of Tunnel A which was the case previously (because of first match).

- The dynamic routing system now also transfers the local received metrics and also takes the administrative distance (different for BGP, ospf etc.) into account for selecting the active route.

- Drastically increased the number of WAN Optimizer connections supported. We now support a total of 8192 WAN Optimizer connections.

- The APN auto-detection database has been updated, and will now provide correct APNs for far more networks.

- The decision if a channel is to be encrypted or unencrypted is now negotiated between Hub and Node (in a hopefully backward-compatible way). You no longer can end up in a situation where encryption is enabled on one side, but disabled on the other, causing the channels to constantly disconnect.

- The tunnel protocol will now send the MTU that the reporting router as able to accept. The default is 1500 to provide backward-compatibility to routers not yet knowing this command. This is in preparation of an upcoming release which will allow Jumbo Frames through the tunnel.

- Adapted the default QoS templates to not to use WAN Optimizer on Hubs, and to have less complex bonding priorities. To see this, use the "Restore Manufacturing Defaults" function of the QoS template.

  Hint: The WAN Optimizer setting is direction-dependent. Typically you want Wan Optizimizer on in your QoS on the Node, but off on the Hub. This way connections going out from the LAN will use the WAN Optimizer, but network scans coming in from the outside Internet won't get optimized.

- Set the default bonding priority for newly create Tunnels to cost only, which is more intuitive, as with no user configuration change after install this means all channels will be fully used.

Bug fixes:

- TCP SYN scans triggering the WAN Optimizer could result in WAN Opt connections never getting freed, causing the "GOWITHTHEFLOW" debug messages.

- The WAN Optimizer had a bug that could cause any TCP connection where the server instead of the client sends the first message to fail. Normally clients send first (HTTP, IMAP), but for SMTP the server first sends a banner.

- Dynamic routing now respects the "distributed" flag for all types of routes.

- Fixed sometimes broken LTE network names coming with 7 Bit encoding.

- Various fixes and improvements for SMS support.

- If a tunnel is disabled, it will now be forgotten after a disconnect immediately. This way a deleted tunnel (which must be disabled before deleting it) can no longer cause the router to crash if the node is reconnecting to it.

    This fixes:
    "Deleting a tunnel, that has been connected within the last 3 min crashes the hub."

- Increase maximum socket number on ARM products (Wantastic, 510, 520). This should fix these devices running out of file descriptors and rebooting after a while when using the WAN Optimizer heavily.

- Added detection and warning if VVH hypervisor does not have AES-NI (which it must have).

- WAN Optimizer was sometimes losing packets internally. This could reduce WAN Opt performance especially in cases where there was a lot of distance/latency outside of the tunnel (downloading from a server far away). The buffers have been increased.

- When selecting multiple objects of a collection in the tree view of the web interface, you would after selecting a couple get a stupid "do you wish to move to a different object blabla" pop-up message.

- Fixed internal errors in HTTP server if HEAD requests were received. OPTIONS now also is supported for CORS.

- In very rare cases the generation date of VLM licenses could cause a VLM license not to be accepted by a Router.

- When loading existing VPN Client accounts from the configuration on Router startup, important data was not set, potentially causing all kinds of weird problems on Hubs with VPN Clients. On Virtual Hubs it was impossible to enable such clients, too.

- Fixed problems of some LTE module settings sometimes getting lost on router restart.

- Fixed a bug in the SFTP code which might have caused certain SFTP backup scripts used to copy the router configuration to not work.

- If a tunnel was forced to reconnect (Reconnect-Button in the web interface), WAN Optimizer connections existing at this point may had kept sending traffic over the tunnel and also cause internal errors.

- Fixed a possible reason for sometimes the Hub thinking that their is a stacking split brain situation on the Node side, when there actually isn't.

- Various improvements and bugfixes for the SFTP subsystem. Now compatible with both OpenSSH, WinSCP and Filezilla. Uploads don't yet work and therefore are disabled.

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