

# NetModule

## General Router Features

Release 4.0  
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## General Router Features

- Fail-safe software update over the air (FOTA)
- Software profile management
- Manual/automatic software and configuration updates
- Module firmware updates
- Update via USB, HTTP, HTTPS, FTP, TFTP, SFTP
- Command Line Interface (CLI) accessible via Telnet/SSH/HTTP(s)
- Time synchronisation with timezone support
- Multiple admin and user accounts
- Remote RADIUS authentication
- Certificate management for Public-Key-Infrastructure
- Simple Certificate Enrollment Protocol (SCEP)
- Logging, Log Rotation, Syslog Client/Server
- Configurable LEDs
- Watchdog supervision
- Licensing mechanism
- OSS License viewer

## Link Management

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- Link prioritization and aggregation
- Multipath Traffic Distribution
- Weighted balancing per TCP/IP session
- Multipath TCP (MPTCP) RFC6824, RFC6356
- Support for IP-Passthrough
- Static address assignment and DHCP
- Maximum Transfer Unit (MTU) configurable
- Link Supervision and high-availability features

## Interfaces

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- Ethernet 100M/1GE with switch/hub functionality
- Virtual LAN (VLAN) according to IEEE 802.1Q/802.1P
- PPP over Ethernet (PPPoE)
- Multi-SIM / Soft-SIM support
- Mobile Interfaces with CHAP/PAP authentication and header/data compression

- Multi-APN support
- Signal strength monitoring
- Modem queries (Hayes AT/USSD)
- ISDN Calls
- WLAN operation mode client, access-point, managed
- WLAN abgn/ac 2.4/5GHz 20/40/80 MHz
- WLAN Multi-client support with authentication mechanisms:
  - WEP (64/128bit)
  - WPA-PSK (802.11i)
  - WPA-RADIUS (EAP-PEAP/MSCHAPv2)
  - WPA-EAP-TLS (802.1x/EAPOL)
- WLAN Multi-SSID support with authentication:
  - WPA-PSK (802.11i)
  - WPA-RADIUS (802.1x/RADIUS)
  - WPA-EAP-TLS (802.1x/EAPOL)
- Support for 802.11w PMF, Hidden SSID, Isolated clients, RADIUS Accounting
- WLAN Configurable antenna gain
- WLAN CAPWAP support
- Pluggable USB storage, serial and ethernet adapters supporting chipsets PL2303, CH341, FTDI, Pegasus, Asix, RNDIS
- RS232/RS485 interface with Serial-to-IP server

- Digital Input/Output ports
- GNSS with active/passive antenna
- GPS standalone and MS-assisted
- GPS server with raw/json mode
- GNSS supervision
- Audio cards
- CAN interfaces
- RS232/RS485 ports

#### IP/Routing Protocols

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- Protocols like IP, TCP, UDP, ARP, ARP, ICMP
- Destination- and policy-based routing
- Multipath routing
- Mobile-IP (MIP) RFC5944 mobile node and home agent
- Open Shortest Path First (OSPFv2)
- Border Gateway Protocol (BGPv4, BGPv4+, BGPv4-)
- Multicast (Static Routing / IGMP Proxy)
- TCP Maximum Segment Size (TCP-MSS) Clamping
- Spanning Tree Protocol (STP)

- Rapid Spanning Tree Protocol (RSTP) IEEE 802.1D-2004
- Transparent Bridging
- Discovery Protocols LLDP, CDP, SONMP, EDP, FDP, IRDP (RFC1256)
- Redundancy VRRPv2 Daemon RFC2338

## QoS

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- Dynamic bandwidth congestion
- Diffserv-based traffic shaping
- Stochastic Fair Queuing (SFQ) classes
- Hierarchical Token Bucket (HTB) qdiscs
- Priority-based queuing (PRIO)

## VPN Protocols

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- OpenVPN routed and bridged (Client/Server) supporting:

TUN/TAP support over UDP/TCP

password/certificate-based authentication

Keepalive monitoring

Gateway redirection

Compression

- IPsec routed (Initiator/Responder) supporting:

NAT traversal

IKEv1/IKEv2

MOBIKE

PSK, PKI, XAUTH

Dead-Peer-Detection, PFS

Extended cipher suites

- PPTP routed and bridged (Client/Server) RFC2637 supporting

PAP, CHAP, MS-CHAPv2

CCP stateless MPPE128

- GRE routed and bridged (Client/Server)

- CSD Dial-In Server

## Firewall

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- Stateful inspection firewall

- Address and port groups

- Connection tracking for AMANDA, FTP, H323, IRC, BROADCAST, SNMP, PPTP, SIP, TFTP
- Network Address Translation (NAT)
- Network Address Port Translation (NAPT)
- Masquerading
- Bridge filtering

## Services

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- Dynamic Host Control Protocol (DHCP) RFC2131/RFC3315 Client/Relay/Server
- DHCP Options 3, 6, 44, 82
- Domain Name System (DNS) Caching Server RFC1035
- Static DNS Hosts
- E-Mail Client RFC821/RFC822 with TLS/MD5 support
- SMS receiver and sender
- Network Time Protocol (NTP) Client/Server with NTPv2, NTPv3, NTPv4 support
- Dynamic DNS (DynDNS), div. Provider, GnuDIP, RFC2136 DNS Updates
- Event Manager with support for sending SMS, E-Mail, SNMP traps
- Telnet Server
- SSH Server with password / public-key authentication



- SNMP Agent (v1,v2c,v3) with MIB support for:

MIB-II (RFC1213), SNMPv2-MIB (RFC3418), IF-MIB (RFC2863),  
IP-MIB (RFC1213),

TUNNEL-MIB (RFC4087), HOST-RESOURCES-MIB (RFC2790), SNMP-  
FRAMEWORK-MIB, SNMPv2-SMI (RFC2578),

LLDP-MIB, LLDP-EXT-MED-MIB, VENDOR-MIB

- HTTP/HTTPS Server

- FTP Server

- Voice Gateway with SIP agent and call routing supporting

Voice-Over-Mobile, SIP registrar, SIP direct, SIP user-agent and  
Audio

- Coovachilli Hotspot

## Programmability

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- System Development Kit (SDK) for customer-specific functions and  
applications.

- Linux Containers (LXC) with support for lightweight virtualization  
of multiple isolated Linux systems

## Troubleshooting

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- Network debugging tools (ping, traceroute, tcpdump, speed-test)
  - Network monitoring and statistics (darkstat)
  - System debugging with adjustable debug levels for particular applications
  - TechSupport for problem analysis