

## Intelligent Layer 2 & 3 Ethernet Switch CableFree Gigabit Layer 2 & Layer 3 Metro Ethernet Switch Overview



### About Wireless Excellence

Founded in 1996 and with headquarters in Oxford UK, Wireless Excellence Limited is a leading designer and supplier of outdoor and indoor Broadband Wireless communication products.

With a complete range of solutions including Radio, Microwave, Millimeter-Wave, Free Space Optics, WiFi and 4G/5G/LTE, customers in over 80 countries have chosen Wireless Excellence as the "one stop shop" solution of choice for dependable wireless networking.

### About Our OFDM Range

CableFree IP/Ethernet solutions deliver the performance, reliable connectivity, and cost-effectiveness that are crucial to modern wireless broadband networks.

Our scalable wireless platform delivers superior performance even in demanding conditions, with the flexibility and features to enable a wide range of applications.

CableFree IP/Ethernet technology combines the best hardware and software technology to ensure best possible network performance.

## System Features

- Powerful Gigabit Layer 2 & Layer 3 Ethernet Switch and Router
- Intended for use in CableFree Wireless networks
- Fully adaptable enclosures, versions including exterior carrier grade
- High-power CPU and networking hardware
- Carrier-class RadioOS and resiliency features
- Five PCI-E Gigabit Ethernet Interfaces in base model
- Scalable to meet industry requirements
- Flexible choice of backhaul interfaces

## Applications

- Safe City networks including Video, Data, Voice
- CCTV Backhaul Networks
- City-Scale Wireless Networks
- Resilient Network Implementation
- Wireless ISP and Hotspots
- Bandwidth control, Authentication, NAT, Routing
- Traffic grooming and shaping
- Traffic Aggregation for Backhaul connections

## Sophisticated Embedded Software Router Platform

Wireless Excellence Internet Routers are high quality enterprise-grade routing products. They embody powerful carrier-class router architecture with advanced features not found in low-cost commercial routers. Such features include:

Choice of Dual Core CPU Architecture up to 2GHz • IP Bridging • Layer3 IP Routing • Border Gateway Protocol (BGP) • Ethernet-over-IP (EoIP) interfaces • Virtual Router Redundancy Protocol (VRRP) • WISP & hotspot –specific features including Walled Garden, Cookies, RADIUS authentication, accounting, control of connection time • uplink and downlink bandwidth control on a per-user basis • DHCP Client and Server • Network Address Translation (NAT); Stateful firewall and NAT; Easy DMZ deployment; IPsec, VPN tunnelling (PPTP, L2TP, EoIP, IPIP), VLAN and PPPoE; Transparent security: multiple STP bridges with packet filtering; many other features

## Optimised for CCTV, Safe City, Wireless Metro Networks and Wireless ISP (WISP) networks

Wireless Excellence Gigabit Switch and Router devices offer major advantages including:

- Optimised features for "Safe City" implementation including video, voice and data feeds to HQ
- Ultra-high Network Resilience including Layer2 and Layer3 features, clustering architectures
- Many features optimised and designed for WISP environment
- Traffic aggregation, grooming and per-user bandwidth controls
- IPV6 and IPV4 Fully supported
- Full support for Multicast Traffic used in CCTV and Video Applications
- Virtual Router Redundancy Protocol (VRRP) allows two routers to be configured with one in 'hot standby' for high-availability applications Hotspot features including Radius authentication and per-user bandwidth controls
- Stateful firewall and NAT; Easy DMZ deployment; IPsec, VPN tunnelling (PPTP, L2TP, EoIP, IPIP), VLAN and PPPoE; Transparent security: multiple STP bridges with packet filtering;
- HTTP and DNS caching proxy; P2P system limitation (Kazaa, Direct Connect and other protocols)

## Standards Compliance

Wireless Excellence Internet routers features advanced features with full standards compliance. Features include:

### Routing Performance

IP Packet transmission performance (switching performance, for 64 byte packets) over 400k pps, over than 3Gbps throughput

### Networking

IEEE 802.1Q VLAN tagging up to 4095 VLANs

IEEE 802.3AD Link Aggregation

### Security

Authentication, authorization and accounting through RADIUS, MAC or/and TACACS for protection remote or local access (RFC 2138, 2139)

Filter for restriction of IP traffic with based the address and TCP/UDP/ICMP port destination and origination (access control lists)

MAC address filtering

Traffic Classification via Mangle (source MAC address, IP address or address range, IP address type, port or port range, IP protocols, protocol options, interface, ToS (DSCP) byte, packet content, packet size)

Peer-to-Peer protocols filtering Firewall

Stateful packet inspection (mangle: L4-7)

Intrusion Detection & Prevention Systems

PAP / CHAP / MSCHAP1 / MSCHAP2

IPSec

IKE (Internet Key Exchange)

Virtual Private Networks (VPNs)

Diffie-Hellman (DH) key exchange protocol (RFC2409)

Authentication Header (AH) protocol

Encapsulating Security Payload (ESP) protocol

General Routing Encapsulation (GRE) protocol

Tunnel and Transport modes

MD5 hash algorithm

Secure hash algorithm (SHA)

VPN through firewall and NAT

DES, 3DES, AES (128, 192, 256 bits) encryption

Optional hardware encryption acceleration

Secure Shell v2 (SSH2) protocol client & server

Network Time Protocol (NTP) (RFC 1305)

### Protocols

IPv4 (50k routes) and IPv6 (25k routes)

(RFC 791, 815, 919, 922, 1191, 2460, 2464, 2463, 2462, 1981, 2473, 2893, 3056)

Frame Relay according (RFC 1490)

ARP, RARP and Proxy ARP (RFC 826, 1027, 1293, 2390, 925,903)

CIDR, ICMP (RFC 950, 792, 1256)

IP over IP Tunnels (RFC 2003)

Point to Point Tunnel protocol (PPTP) with over 100 tunnels supported (RFC 2637)

Point-to-Point protocol (PPP) (RFC 1661, 1662)

Point-to-Point Protocol over Ethernet (PPPoE) with over 100 tunnels supported (RFC 2516)

HDLC

IP encapsulation over X.25 (RFC 1356)

DHCP server, relay and agent (RFC 2131, 3315)

Quality of Service – QoS RFC 2474, 2475, 2597, 2598, 2697, 2698

Network Address Translation (NAT)

RFC 1631, 3022, 2663

RIPv1 and v2

RIPng

OSPFv2, OSPFv3 (RFC 2328, 3101, 2740)

IS-IS

BGPv4

RFC 1771, 1997, 2858, 2545

ECMP (Equal Cost Multi-Path) (RFC 2992)

Explicit Congestion Notification (ECN) marking (RFC3168)

Spanning Tree Protocol (STP) 802.1D

Rapid Spanning Tree Protocol (RSTP) 802.1w

Protocol Independent Multicast (PIMv1 and v2)

IGMP for IP Multicast (RFC 2236, 2362, 3973)

### VOIP support

H.323

SIP (client, location and registrar server)

RFC 3261, 3262, 3263, 3326, 2976, 3311, 2327, 3264

Media Gateway Control Protocol (MGCP)

Gatekeeper Discovery and RAS

SCCP

Media Gateway operation for the protocols, SIP and

H.323

Codecs for ADPCM, G.711, G.723.1, G.726, G.728, G.729 and G.729a

Audio Call Control

Ports FXO when relevant modules installed

Ports FXS when relevant modules installed

### Remote Administration

Command Line Interface (CLI)

Remote Windows graphical user interface (GUI)

Telnet

SSHv2 Client & Server

SNMPv2 and v3, MIB2 and Trap support

RFC 1904, 1905, 1906, 1907, 1213, 2011, 2012, 2013, 2737, 2233, 1215

TFTP Storage and retrieval of management information & operating system; software packages upload/download

Log Management features

Monitoring and mapping of traffic flows

Graphical presentation of statistical parameters; Voltage & Router temperature; CPU Utilisation; Memory Utilisation; Traffic per interface; Daily, weekly, monthly and yearly reports

Visual Indication (LEDs) to monitor router status including power, link speed, status/traffic, alarm

### Diagnostic Tools

Bandwidth measurements

Packet Sniffer

Ping

Real-time Traffic Monitor based on protocol name, source address, destination address, port

Traceroute

Network Monitoring

System Watchdog

### Regulatory Compliance

RoHS compliant, CE compliant

UL 60950, EN 60950

EMC compliance, FCC Class A, EN55022, CISPR22

## Hotspot Applications & Features – Authenticated Internet Access

Hotspot is a Plug & Play access system in RadioOS that allows users to connect to the Internet after providing a username and password. It works in wireless or wired networks, and allows applying rules and restrictions to individual users. Accounting, user database, MAC authentication and much more - perfect for hotels, Internet cafes, airports and schools.

- Easy and flexible solution for hotels, Internet cafes, airports, ships, schools, universities
- Client authentication by user name and password, IP or MAC address, license agreement
- Plug & Play access possible
- Data rate shaping, quota (session-timeout, downloaded/uploaded traffic limit)
- Authentication and accounting locally, or on the RADIUS server
- User accounting by time, data sent/received
- Real-time user status information
- Universal Client
- DHCP server assigned IP addresses
- Customized HTML pages for login (create your own design)
- Walled Garden
- iPass support
- SSL secure web login

## Firewall Functionality – complete data security

Quality of Service features:

- Improved HTB algorithm with burst support for building traffic queue hierarchy
- Traffic grouping using firewall mangle classifiers, (ToS supported)
- SFQ, RED, PFIFO, BFIFO queues  
Per-connection queue for automatic fair data rate distribution between traffic groups Use for:
- Protecting the customer's hosts
- Enforcing the internet usage policy from the customer's network
- Protecting the router from unauthorized access
- Hiding the private network behind one external address (using Masquerading)
- Applying queuing to outgoing traffic



## Accessories

Power Supply	AC or DC Power; Resilient power options, Solar+Battery Off-grid power
O/S Software	Higher level licenses for Public Wireless LAN, Hotspot, etc
Management Suite	Fully SNMP compliant and includes NMS integration

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