Vanguard Multi-Service IP Access Routers

Highlights

- Intelligent QoS-enabled IP Services
- Secure Virtual Private Networks (VPN)
- Integrated native IBM/SNA serial protocols
- Advanced routing
- Integrated analog voice and packet voice (VoFR, VoIP)
- Easy to manage
- Modular architecture

Creative Innovative Networking Solutions That Optimize Performance, Security, and Quality of Service While Preserving Yesterday’s Investments

Vanguard Networks offers a complete line of multi-service IP access routers for enterprise networks that enable the integration of secure IP services with legacy data, voice, and video applications over the WAN while optimizing network performance, security, and quality of service (QoS). The Vanguard router family is an ideal solution for enterprises who are looking for innovative networking solutions that preserve their investment in business applications, lower their communications costs, leverage the existing infrastructure, and enable future growth for IP-based applications like VoIP, video streaming, and IP VPNs.

The Vanguard family includes one of the richest sets of technologies and protocols in the industry, providing immediate solutions for WAN access, including: X.25, frame relay, ATM, IP, MPLS, TDM, ISDN, DSL, and voice. The Vanguard family consists of a scalable range of multi-service IP access routers, each providing the flexibility and modular architecture needed in today’s branch office networks. All Vanguard routers include the award-winning Applications Ware™ software, a comprehensive software suite that includes over 30 serial protocols, SNA/SDLC, BSC-to-LLC2 conversion, IP QoS, advanced IP routing, VPN, frame relay, ATM, voice, and encryption.

- Secure Internet, intranet, and extranet access with VPN and IP QoS
- Multi-service converged voice and data networks
- Broadband DSL, cable, and wireless connectivity
- Inter-VLAN Routing (IEEE 802.1 P&Q)
- Voice over IP (VoIP) to offer unified messaging and data services
- IP-enabled frame relay
The Vanguard product portfolio comprises a range of scalable networking platforms that enable the consolidation of voice, IP, and legacy serial data traffic, delivering business-class WAN solutions for small branch offices, mid-size regional offices, and large data centers.

**Vanguard® Product Portfolio**

- **High density multi-service data center or central site access Router**
- **Next Generation Regional data & voice or large branch Router**
- **Multi-protocol data/voice Router for small-to-medium branches**
- **Multi-protocol data Router for small branches**

### Small remote branch offices
Retail, bank branch, and enterprise office locations that require a cost-effective solution for delivering serial and IP traffic over the public network can use the Vanguard 242D for secure broadband access. This feature-rich desktop unit offers the advanced security features offered by the entire Vanguard product family, such as VPN and Firewall support, with the optional hardware-enhanced encryption SIMM card for additional capability and performance.

### Small-to-medium-sized remote branch offices
Retail, bank, branch, and enterprise office locations that require a consolidated connection to transport data and voice traffic efficiently can use the Vanguard 340 series, which consists of the compact and powerful Vanguard 340E and Vanguard 342. Both standalone, modular units are ideally suited for the versatility required by today’s remote locations. The two modular slots accept a wide array of daughter cards to support numerous as DSL, frame relay, ISDN, and leased line technologies offer a flexible choice for connectivity and provide investment protection for network changes.

### Large branch offices or regional data and voice concentration
Large, multi-protocol branch offices and regional data centers that serve as a communication hub between multiple branches are ideally suited for the higher performance of the Vanguard 6400 series and 6800 series. These sites typically have 2 or more dedicated WAN circuits for Internet access, fax, analog/digital voice, and video applications.

The Vanguard 6400 series includes the Vanguard 6435 and Vanguard 6455, which process higher volumes of transactions without compromising performance or security. The next generation Vanguard 6840 series is the new higher class of router platforms in terms of performance, IP VPN capacity and multiservice convergence capabilities. The Vanguard 6800 series includes the Vanguard 6840 and the Vanguard 6841, which is the 6840 enhanced with onboard hardware-accelerated encryption, ideal for enterprises requiring a high volume of secure IP connections.

### High-density multi-service data center or central site access concentration
Enterprise data centers that communicate with many branch office sites or serve as a large WAN access concentration site can use the high-performance Vanguard 7300 series for redundant, secure solutions. The Vanguard 7300 series consists of the Vanguard 7310 and Vanguard 7330; both versions are rack-mountable and include built-in hardware encryption processors and a full suite of VPN and security software, making this an ideal platform for a central site VPN or consolidation of PBX and router trunks. Additional optional high-speed uplinks include DS-3 ATM and Gigabit Ethernet for future growth. The 7300 series products are available with redundant power supplies in either standalone or rack-mount versions.
Key Features

Vanguard Application Ware
Vanguard Application Ware offers modular software solutions that extend across the entire Vanguard family of products. Its extensive suite of protocols and multi-protocol routing features enables enterprises to migrate to new IP services while simultaneously managing their existing legacy applications.

Intelligent QoS and Bandwidth Management
The Vanguard router family includes intelligent QoS features for emerging IP-based WAN networks. CBQ, WFQ, DiffServ, IP ToS, and policy-based routing allow enterprises to prioritize and tier different IP-based applications so that mission-critical or high-value applications—like financial transactions, delay-sensitive VoIP applications, or multicast distribution of new value-added streamed media—can be expedited securely over an IP network. Using a wide range of IETF and RFC industry standards for IP-enabled services also ensures that Vanguard products interoperate with leading router and Ethernet switch solutions.

Firewall Support
The added security of a firewall capability, integrated within the router, will appeal to most customers seeking to prevent unauthorized access to branch office networks. Firewall-Lite is a software-based firewall feature that utilizes the CPU processor in the existing Vanguard Networks router to enable secure Internet access to protected networks. The Firewall-Lite feature protects Layer2/Layer3 traffic by utilizing Basic IP header Sanity Checks and Dynamic Access Controls based on Stateful Firewall Technology. Firewall-Lite keeps general states of a flow (new and established) and allows the access filter to dynamically allow traffic of the return and/or related flow.

Virtual Private Networks
One of the key solutions provided by the Vanguard family is IP-based Virtual Private Networks (VPNs). Its high-performance architecture supports IP and MPLS/BGP VPNs, IPSec, and hardware-based encryption for reliable and secure connectivity. Enterprises can connect, control, and communicate data traffic between larger office sites, intra-company remote branch sites, and business partners, thus enabling a true e-business environment. By building VPNs using the Vanguard family, enterprises can reduce their networking costs and integrate all their voice and data applications securely.

Secure Access with Hardware-based Encryption
The Vanguard family’s comprehensive security suite includes 3DES/AES/DES encryption, RADIUS and PAP/CHAP user authentication, network authentication, and data protection features to ensure secure communications over any IP-based WAN. Enterprises that require remote branches to access the corporate network or extranet applications can use Vanguard’s Internet Key Exchange (IKE) and X.509 digital certificates for additional security.

Advanced IP Routing
The Vanguard products’ versatile architecture supports process-intensive, advanced IP routing protocols such as DVMRP, OSPF, BGP-4 routing, and NAT table look-up, enabling scalable, layer 3 IP VPN and robust IP solutions that are interoperable with the leading edge and core router solutions.

Additional features such as Virtual Router Redundancy Protocol (VRRP), BGP multipath, and IP payload compression ensure that the Vanguard products are delivering IP services in a reliable and cost-effective manner. The products employ 802.1 P&Q VLAN tags to prioritize the incoming LAN traffic and automatically route traffic between the respective VLANs.

Rich Legacy Data Applications
The Vanguard Applications Ware software includes the most extensive suite of legacy serial data protocols in the industry. The unique requirements of retail and financial communication network environments—including BSC 2780/3270, SNA/SDLC, IBM LLC2 conversion services, Tandem host, and AS/400 computing—are supported by the entire Vanguard product family. These serial data applications also operate efficiently with bandwidth-on-demand and QoS features in an IP-enabled network.

Enhanced Voice Support
The Vanguard product family provides connectivity to the traditional circuit switched network (PSTN) and also supports voice in a pure IP or frame relay environment with quality of service to ensure the proper prioritization and integrity of the voice traffic flow. The Vanguard routers support a wide range of toll-quality voice compression choices for packet switched voice services. Traditional analog and digital PBX equipment as well as key systems are supported on all Vanguard products. In addition, Vanguard products can operate as a full-featured Voice over IP (VoIP) or Voice over Frame Relay (VoFR) gateway and are H.323 compliant, allowing standards-based interoperability with next-generation IP voice-enabled networks. Supplementary voice calling features commonly found on PBXs and H.323 gateways—Caller ID, Call Waiting, Call Transfer, and Call Hold—can be supported without requiring a PBX at the branch. By migrating to packet voice technologies, enterprises can reduce costs and save on long distance inter-office charges.

Network Management and Ease of Configuration
Vanguard Networks collaborates with Emprisa Networks, a leading provider of smart network configuration, compliance and change management solutions, to provide customers with an easy-to-use, cost effective solution for network management. Emprisa Networks’ E-NetAware™ is a multi-vendor solution and simplifies and automates Network Change and Configuration Management (NCCM) operations. Users benefit from improved visibility into network change allowing network engineers and managers to quickly identify and remediate unplanned, problematic or non-compliant changes. With E-NetAware, organizations have a single tool that simplifies release and change management, audits and enforces network compliance, automates OS image updates and change workflow processes, proactively assesses the impact of change and enables quick recovery from service impacting changes with a single command.
Applications

IP VPNs
The Vanguard family is an ideal choice for VPNs. Enterprises can build networks consisting of any combination of shared IP, private IP, or public Internet access services with integrated security and VPN capabilities. Connecting larger corporate office sites with remote branch sites and business partners creates a true e-business environment. Cost-effective broadband services such as xDSL, cable, or wireless offer an alternative to frame relay and leased line services for small office or remote user connectivity. Integrated multicast technology enables bandwidth-efficient distribution and delivery of new value-added streamed media applications. Interoperability with next-generation IP and MPLS networks—including BGP-4 VPNs and IPSec standards—ensures non-disruptive solutions as requirements change over time.

IBM SNA/SDLC and BSC Consolidation
The Vanguard product family ensures growth capability for the evolving enterprise’s IBM environments. Vanguard products integrate a rich suite of IBM WAN application software, which includes support for native serial legacy protocols such as BSC 2780/3270 and SNA/SDLC along with LLC2 conversion software functions. This software enables enterprises to operate a single WAN platform that supports a mixed network of IP-based and legacy IBM terminal and host applications simultaneously without compromising performance. Vanguard’s software can also eliminate the expense of upgrading host software and hardware by reusing existing equipment and associated legacy software.

Voice and Data Network Convergence with Intelligent Quality of Service
Converging voice and data networks, thereby integrating multimedia traffic over the WAN, is a proven way to reduce communication costs. Analog and digital voice—and even video streaming applications—can be mixed within the same WAN circuit along with POS, ATM, or inventory data from branch offices or retail stores. Utilizing the Vanguard router’s bandwidth optimization, voice compression, data compression, and protocol spoofing, circuit bandwidth is efficiently utilized without expensive upgrades. Intelligent QoS policy-based routing can prioritize delay-sensitive voice traffic over less-critical applications.
Applications Ware Features

IP Routing & Protocols
- IPv4, RIP1/RIP2, OSPF, BGP4, DVMRP, PIM-SM (IP Multicast)
- Inter/VLAN routing (802.1Q)
- Classless Inter-Domain Routing (CIDR)
- Network Address Translation (NAT)
- Real-Time Transport Protocol (RTP)
- Port Address Translation (PAT)
- Header Compression (RFC 2508)
- IP Payload Compression Protocol (IPPCP)
- Virtual Router Redundancy Protocol (VRRP)
- OnNet Proxy (Router Standby Protocol)
- Multiple IP Addresses per Physical Interface
- ICMP Router Discovery (RFC 1256)
- DHCP Client
- Multi-Link PPP
- PPoE (RFC 2516)
- PPPoA (RFC 1483)
- BGB Communities (RFC 1997 & 1998)

Packet Voice
- Digital Voice (T1/E1/PRI)
- Voice over IP, Voice over Frame Relay, Voice over IP over ATM (All interoperable within same product)
- Voice compression (minimizing bandwidth requirements)
- Digital Private Branch Exchange (PBX) and Public Switched Telephone Network (PSTN) Connections
- G.711, G.723.1, G.729a, H.323v1 and H.323v2 VoIP Signaling Voice Broadcast
- Up to 336/420 (T1/E1) Voice Channels
- QSIG Signaling
- T.38 fax, Group III fax
- DSO Bypass (MFC 5C R2 Compatible)
- Centralized Voice Switching Table
- Dynamic Coder

QoS for Optimization of Data, Voice and Video
- Bandwidth on Demand (BOD)
- Dial on Demand (DOD)
- Link Backup (V.25bis and ISDN)
- Data Connection Protection (DCP) (X.25, Async, SDLC, XDSL) IP Type of Service (IP TOS)
- Class Based Queuing (CBQ)
- Weighted Fair Queuing (WFQ)
- Weighted Random Early Discard (WRED)
- Differentiated Services (DiffServ)
- Packet Classification
- Policy Based Routing
- Fast Path Switching for Voice
- Multi-Link PPP (MLPPP)
- Generic Traffic Shaping (GTS)
- MLPPP Link Fragmentation and Inter-leaving Segmentation
- Support 802.1P for VLANs

Virtual LAN (VLAN)
- Support 802.1Q and 802.1P

IP Virtual Private Networks (VPN)
- VPN Tunneling: IPSec (IP traffic), GRE (non-IP traffic)
- Support IPSec Authentication Header (AH) and IPSec Encapsulating Security Payload (ESP)
- IPSec Encryption: IPSec DES (56 bit) and 3DES (168 bit)
- Advanced Encryption Services (AES): 192, 256 bit key length
- Device Authentication and Key Management: Public Key Infrastructure (PKI) and X.509v3 Digital Certificates
- Firewall Packet Filtering
- Message Authentication through Complex Hashing Algorithms (MD5/SHA-1)
- Dynamic IP Address (Dynamic VPN Tunnels)

ATM (future)
- CBR, VBR-rt, VBR-nrt, UBR, AAL-5

Other Bridging/Routing Protocols
- IPX/Novell IPX WAN, AppleTalk
- Transparent Bridging (Spanning Tree IEEE 802.1d)
- SLIP
- SoTCP
- Async and Sync PPP Network Interface

Frame Relay
- Frame Relay DTE with Traffic Fairness
- Frame Relay Switching (DCE)
- Frame Relay Annex G (AN SI T1.617)
- Frame Relay Annex D (AN SI T1.617)
- Frame Relay Annex A (ITU-T Q.933)
- Frame Relay RFC 1490 (IP/IPX/AppleTalk)
- Local Management Interface (LMI)
- Support BECN, CIR, Bc
- End-to-End Delay
- Frame Relay Auto Learn
- Frame Relay Traffic Shaping (FRTS)
- FRF.8 & FRF.12

X.25
- X.25 DTE
- X.25 Switching (DCE)
- RFC 877/1358 (IP)
- X.25 Translation, CUG, NUI Support
- X.25 on “D” Channel Support
- X.25 Multi-drop

IBM Networking
- SNA/SDLC for Serial Connections
- BSC 2780, 3780, 3270 (HPAD, TPAD)
- QLLC X.25 (IBM NPSI) Point-to-Point or Multi-drop (up to 64 PUs)
- Conversion SDLC to RFC 1490
- Conversion SDLC to LLC2
- Conversion LLC2 to RFC 1490
- Conversion BSC 3780 to SNA
- Conversion BSC 3270 to SNA
- AS/400 5494 Communications Server
- TN3270 Remote Server

Serial
- NCR Bisync
- Burroughs Poll Select
- Transparent COP (TCOP)
- Transparent BOP (TBOP)
- Transparent Pollled Async
- 3201
- 3POS
- TNPP PAD, TNPP Routing
- Siemens HDLC
- Physical Unit (PU) Remapping and Spoofing
- SLIP
- X.44/2 Lottery Protocol

ISDN
- U interface: ANSI T1.601 1992 (2B1Q)
- ST/ITU I.430
- LAPD: ITU Q.921 Compliant
- Integral X.31 Support
- Q.931 Dial Support
- Switches (N11, ESS, DMS-100, ETSI, NTT, Euro Numeris)
- Permanent B for German Monopol Support
- Permanent B for Japan High Speed Digital
- D Channel Packet

User Authentication
- RADIUS
- PAP/CHAP

System Management
- SNMP management
- Configuration Management
- OS Image Management
- Telnet
- TFTP
- GUI
- Embedded Web HTTPD
- SSH2 Server
## Vanguard Multi-Service IP Access Routers

<table>
<thead>
<tr>
<th>Product</th>
<th>VG 242D</th>
<th>VG 340E</th>
<th>VG 342</th>
<th>VG 6435</th>
<th>VG 6455</th>
<th>VG 6840/41</th>
<th>VG 7310</th>
<th>VG 7330</th>
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<td>Small-Medium Branch</td>
<td>Small-Medium Branch</td>
<td>Large or Regional Branch</td>
<td>Large or Regional Branch</td>
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<td>32MB SDRAM</td>
<td>32MB SDRAM</td>
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<td>32MB SDRAM</td>
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<td>Relative Humidity</td>
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<td>5 to 90%</td>
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<td>5 to 90%</td>
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</table>

### Regulatory Compliance


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