DECNIS 500/600 Migration Whitepaper

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1. Introduction

The DECNIS 500/600 multiprotocol router first shipped in May 1992. Since then, many thousands of DECNIS have been sold to hundreds of customers world wide who use the product in their production networks.

We started to plan the End of Sale of the DECNIS product in December 1997 and started to communicate the plan to customers, Digital Services and Manufacturing soon afterwards.

As of October **16th October 1998, we have stopped accepting new orders for the DECNIS products.**

We plan to provide long term support of DECNIS hardware and software for between 3 and 5 years:

Hardware support – Digital Services have put in place a 5 year hardware support plan

Software support – we will continue to provide software support for at least 3 years and for up to 5 years for specific customers by negotiation.

We shipped the DECNIS V4.1 software release in January 1998. Please note that **no new functionality** is planned for the DECNIS other than minor incremental functionality and software fixes. V3.0 of the clearVISN DECNIS Configurator was released in July 1998. This configuration utility is available free of charge for download from the DECNIS Home Page:

http://www.networks.digital.com/dr/cdc

This document outlines the migration path to new products for DECNIS customers. It compares the functionality of the proposed migration products with the existing product and outlines any migration limitations.

2. Outline of the Migration Strategy

The migration strategy for DECNIS customers is based on the existing RouteAbout products and the new GIGAswitch Router product as shown below.

- For customers using predominantly DECnet, OSI and IP protocols and low speed (T1/E1 or below) wide are networks with X.25, PPP or Frame Relay datalinks, the migration is to the existing RouteAbout Central EW and EP products.

- For customers using predominantly IP and IPX protocols in LAN environments and high speed (T1/E1 and above) wide are networks with PPP or Frame Relay datalinks, the migration is to the GIGAswitch/Router product. New WAN interface modules, including multiport synchronous and high speed synchronous interfaces, will be available in December 1998.

- For customers using predominantly IP and DECnet protocols in backbone environments and who have high performance requirements, there are two migration options:

- GIGAswitch/Router in conjunction with DECswitch 900 products. In this case the DECswitch 900 provides DECnet routing capability and the GIGAswitch/Router provides IP routing and high speed WAN capability.

- GIGAswitch/Router in conjunction with RouteAbout Central products. In this case the GIGAswitch/Router provides IP routing and LAN backbone connectivity and the RouteAbout Central provides DECnet routing and WAN connectivity.

3. Interoperability Testing

Interoperability between the DECNIS and the RouteAbout products was completed shortly after the RouteAbout products first shipped.

We plan to carry out the following interoperability testing between the DECNIS and the GIGAswitch/Router:

- RIP, OSPF, BGP-4
- IP Multicast: PIM Dense Mode
- IPX RIP and SAP
- 802.1d bridging
- PPP
- Frame Relay (RFC 1490 point-to-point)

Further interoperability testing will be carried out when new features become available on the GIGAswitch/Router.

4. Long Term Migration

The long term migration path for DECNIS customers is to the GIGAswitch/Router. Planned features under discussion for this product include:

- I-IS-IS with support for IP initially (approx 1Q CY99)
- I-IS-IS with support for DECnet (approx 2Q CY99)
- AppleTalk routing (approx 2Q CY99)

Plans for the other features will be communicated when available.

5. Product Comparisons

The following tables compare the DECNIS 500/600 configurations to the RouteAbout and GIGAswitch/Router configurations.

DECNIS 500/600

The DECNIS 500/600 was designed as a multiprotocol backbone router for DECnet/OSI and IP environments. The DECNIS supports a wide range of wide area backbone technologies such as leased lines, Frame Relay, X.25, SMDS and ATM. The DECNIS software provides a number of features that greatly improve network resilience and redundancy in mission-critical network environments.

DECNIS 600

Both the 500 and 600 consist of a rackmount 19" chassis with single high reliability PSU and a common backplane; the 500 has 4 slots and the 600 has a 9 slots. Two slots are occupied by a processor and a memory card. This gives 2 slots on the 500 and 7 slots on the 600 for network interface cards.

The following network interface cards are available:

DECNIS 500

• LANcontroller 601	Single port 10M Ethernet
• LANcontroller 602	Dual port 10M Ethernet
• FDDIcontroller 621	Single port, dual slot FDDI
• ATMcontroller 631	Single port, dual slot OC3
• WANcontroller 614	4 x 128K synchronous
• WANcontroller 618	8 x 128K synchronous
• WANcontroller 622	2 x 2M synchronous
• WANcontroller 622/HS	2 x 10M synchronous
• HSSIcontroller 641	1 x HSSI, dual slot, synchronous

For more information about the DECNIS 500/600 see:

http://www.networks.digital.com/dr/npg/dnsfm-mn.html

5.1 GIGAswitch/Router

GIGAswitch/Router

The industry leading GIGAswitch/Router was designed as a next generation high speed L2/ L3/L4 switching router to address today's high performance IP backbone requirements.

Built for the enterprise backbone, the GIGAswitch/Router combines wire-speed routing at gigabit rates, control of application flows, and superior routing capacity to meet the needs of today's and tomorrow's networks. The GIGAswitch/Router delivers full function, wire-speed IP/IPX routing - both unicast (IP:RIP, OSPF, BGP, IPX:RIP) and multicast (IGMP, DVMRP, PIM-DM, PIM-SM). Powered by a non-blocking 16 or 32 Gigabit per second switching fabric based on use of 8 or 16 slot chassis., the throughput of the GIGAswitch/Router exceeds 15 Million packets per second (8 slot), 30 Million packets per second (16 slot) and can be configured with up to 56 or 120 10/100 ports and 14 or 30 Gigabit Ethernet ports. Enterprise backbone requirements are met through massive table capacity and redundancy.

The architecture of the GIGAswitch/Router allows it to route or switch packets based on the application level information in Layer-4 or on the traditional source-destination information in Layer-3. This application level control allows the GIGAswitch/Router to guarantee security and end-to-end Quality of Service (QoS) while maintaining wire speed forwarding. QoS policies may encompass all the applications in the network, groups of users, or relate specifically to a single host-to-host application flow.

The GIGAswitch/Router's rich functionality is easy to use through Java-based network management software that provides configuration and monitoring through intuitive wizards and drag-and-drop operations. The GIGAswitch/Router is fully standards based and completely inter-operable with existing networking equipment.

The 8 and 16 slot versions consist of a rackmount 19" chassis with dual redundant power supplies and a common backplane. The chassis supports the use of redundant switch control processors. This gives up to 6 slots or 14 slots for the following LAN interface cards:

• DGSRT-AA	8 port 10/100BaseTX, 4MB
• DGSRT-AB	8 port 10/100BaseTX, 16MB
• DGSRF-AA	8 port 100BaseFX, 4MB
• DGSRF-AB	16 port 100BaseFX, 16MB
• DGSRS-AA	2 port 1000BaseSX, 4MB
• DGSRS-AB	2 port 1000BaseSX, 16MB
• DGSRL-AA	2 port 1000BaseLX, 4MB
• DGSRL-AB	2 port 1000BaseLX, 16MB

The following WAN interface cards will also be available in Dec 1998:

DG***-**	4 x 2M sync with hardware compression
DG***-**	4 x 2M sync with hardware compression and encryption
DGSRH-AA	2 x HSSI synchronous

For more information about the GIGAswitch/router see:

http://www.networks.digital.com/dr/npg/dgsra-mn.html

5.2 RouteAbout Central EW and EP

RouteAbout Central EW

RouteAbout Central EP

The DIGITAL RouteAbout Central EW and EP are central site routers that connect large numbers of remote branch offices over leased line, Frame Relay, X.25 or ISDN connections.

The RouteAbout Central EW and EP support all major protocols found in today's networks—including TCP/IP, Novell, IPX, DECnet OSI, and AppleTalk. The RouteAbout Central family supports advanced Telesaving features to maximize the use of WAN bandwidth while minimizing the costs. These include features such as Bandwidth on Demand, Data Compression, WAN Reroute/Restoral, Triggered RIP, IPX Spoofing, NetBIOS Filtering, Bandwidth Filtering and Bandwidth Reservation. They are ideally suited to use of switched WAN services such as ISDN and Frame Relay services.

The RouteAbout Central EW can connect to many remote sites using Frame Relay PVCs, with up to 8 serial lines for larger sites that require hgh speed leased line connections. The RouteAbout Central EP can connect to as many as 60 remote sites over ISDN, with 4 serial lines for larger sites that require high-speed Frame Relay or leased-line connections. A hardware compression coprocessor ensures that all 60 channels and the serial ports can handle fully compressed data simultaneously. A Time of Year clock supports advanced Telesavings features, to maximize bandwidth and minimize transmission costs.

The RouteAbout Central products support multiprotocol backbone routing for central sites for DECnet/OSI and IP environments. Both the Central EW and Central EP can be used standalone, in a 19" rack, or in the MultiSwitch 900 chassis. When used standalone or rack mount, they use a DEChub ONE PSU; when used in the MS900 chassis they can use the redundant PSU features of the MS900.

The Distributed Routing Software used on the RouteAbout Central routers will form the basis for a new family of router products that will provide enhanced features such as support for Virtual Private Networks, (VPNs) and Voice over IP (VoIP).

The Central EW and EP have the following fixed configurations:

Central EW
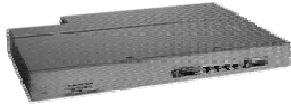
- 2 x Ethernet ports
- 8 x synchronous ports

Central EP

- 2 x Ethernet ports
- 4 x synchronous ports
- 2 x ISDN PRI ports

For more information about the RouteAbout Central products, see:

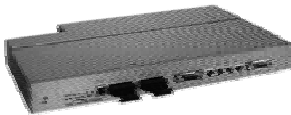http://www.networks.digital.com/dr/npg/dezfm-mn.html

5.3 DECswitch 900 EE and DECswitch 900 EF

DECswitch 900 EE

The DECswitch 900 EE provides multiple Ethernet connectivity and the DECswitch 900 EF provides multiple Ethernet and FDDI connectivity. Both products provide multiprotocol backbone routing for DECnet/OSI and IP environments. The DECswitch 900 EE and EF can be used standalone, in a 19" rack, or in the MultiSwitch 900 chassis alongside RouteAbout Central routers.

Together, the DECswitch 900 EE, the DECswitch 900 EF and the RouteAbout Central provide equivalent connectivity and functionality to a DECNIS 600 with Ethernet, FDDI and synchronous cards.

DECswitch 900 EF

When used standalone or rack mount, the DECswitch 900 EE uses a DEChub ONE PSU and the DECswitch 900EF uses a DEChub ONE MX PSU; when used in the MS900 chassis, both use the redundant PSU features of the MS900.

The DECswitch 900 EE and EF consist of the following fixed configurations:

DECswitch 900 EE

- 6 x Ethernet ports

DECswitch 900 EF

- 6 x Ethernet ports

- 1 x FDDI port

For more information about the DECswitch 900 EE and EF products, see:

http://www.networks.digital.com/dr/npg/defba-mn.html

5.4 DEChub ONE and DEChub ONE MX

DEChub ONE MX

The DEChub ONE docking station accommodates a single RouteAbout Central or DECswitch module and is suitable for standalone or rack mounting. An console port supports remote network management. It provides one 15-pin AUI port (supports optional MAUs for twisted-pair, fiber-optic, or ThinWire).

The DEChub ONE supplies Ethernet-only connectivity through an integral AUI port, AC power, and out-of-band management and setup ports. Optional Ethernet MAUs can be used in conjunction with the DEChub ONE to convert from a 15-pin AUI to fiber optic, ThinWire, or twisted-pair cable.

The DEChub ONE-MX offers redundant power capability and supports both FDDI and Ethernet. To achieve redundancy, two chassis can be configured in piggy-back using the H9519-AA hardware kit. It also has a 6-pin MJ optical bypass relay port for connecting to an OBR device.

For more information about the DEChub ONE and DEChub ONE MX products, see:

http://www.networks.digital.com/dr/npg/def1h-mn.html

5.5 MultiSwitch 900 Chassis
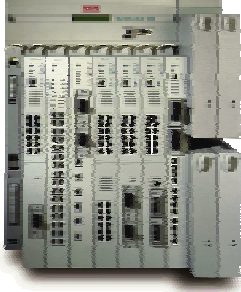
MultiSwitch 900 Chassis

The Digital MultiSwitch 900 system accommodates up to eight RouteAbout Central or DECswitch modules. It consists of a 19" rack mounted backplane that supports multiple LAN technologies, hot swappable, full N+1 redundant PSUs, an SNMP network management agent, and a console port for out-of-band management.

A single DIGITAl MultiSwitch 900 chassis occupies approximately the same amount of rack space as a DECNIS 600 system with distribution panel. However, because it accepts up to eight RouteAbout Central or DECswitch modules, it offers a much higher port density for the same rack space.

The DIGITAL MultiSwitch 900 system can also deliver multigigabit switching performance — regardless of networking technology — and is designed for wiring closet and data center configurations. Whether your switching requirements include Ethernet, Fast Ethernet, FDDI, or ATM, the DIGITAL MultiSwitch 900 maximizes network performance across all these technologies.

For more information about the MultiSwitch 900 chassis, see:

http://www.networks.digital.com/dr/npg/dmhub-mn.html

6. Migration Options and Ordering Information

The following tables show the suggested migration options for DECNIS 500 and DECNIS 600 with product descriptions, part numbers and benefits of the suggested migration.

6.1 DECNIS 500

DECnet/OSI environments, multiprotocol routing and bridging over Ethernet, PPP, X.25 or Frame Relay, X.25 gateway *			
DECNIS 500 Description and Part Numbers		**Migration Product Description and Part Numbers**	
DECNIS 500-SPX	DNSBE-CC/CD	RouteAbout Central EW	DEZ8R-RB
or	**or**	**or**	**or**
DECNIS 500-HPX	DNSBE-DC/DD	RouteAbout Central EP	DEZPR-RB (T1)
Plus	**plus**		DEZPR-RC (E1)
LANcontroller 601 or LANcontroller 602	DNSAE-AA or DNSAE-BA/BB	**and**	**and**
And	**and**	DEChub ONE Module	DEHUA-**
WANcontroller 614 or WANcontroller 618 or WANcontroller 622	DNSCA-BA or DNSCA-A* or DNSCB-A*		
The benefits of the proposed migration include lower cost per port, smaller footprint and less rack space, DEChub ONE form factor, and future product enhancements.			
For software, documentation, adapter cables, and country kit codes, see: http://www.networks.digital.com/dr/npg/dezfm-mn.html#part_nos_table http://www.networks.digital.com/dr/npg/dezpr-mn.html#part_nos_table			
* Customers using DECNIS 500-HPX with MPC-III systems for high performance X.25 with large numbers of SVCs should consider using an Alpha system running X.25 for Digital UNIX.			

DECNIS 500

DECnet/OSI environments, multiprotocol routing and bridging over Ethernet			
DECNIS 500 Description and Part Numbers		**Migration Product Description and Part Numbers**	
DECNIS 500-SPX **or** DECNIS 500-HPX **Plus** 2 x LANcontroller 601 or LANcontroller 602	DNSBE-CC/CD **or** DNSBE-DC/DD **plus** 2 x DNSAE-AA or DNSAE-BA/BB	DECswitch 900 EE **and** DEChub ONE Module	DEBMP-DA **and** DEHUA-C*
The benefits of the proposed migration include lower cost per port, smaller footprint and less rack space, DEChub ONE form factor, and future product enhancements.			
For software, documentation, adapter cables, and country kit codes, see: http://www.networks.digital.com/dr/npg/debmp-mn.html#part_nos_table			

6.2 DECNIS 600

| DECnet/OSI environments, multiprotocol routing and bridging over Ethernet and FDDI, PPP, X.25, Frame Relay, X.25 gateway *			
DECNIS 600 Description and Part Numbers		**Migration Product Description and Part Numbers**	
DECNIS 600-SPX	DNSBA-CC/CD	RouteAbout Central EW	DEZ8R-RB
or	**or**	**or**	**or**
DECNIS 600-HPX	DNSBA-DC/DD	RouteAbout Central EP	DEZPR-RB (T1)
Plus	**plus**	**plus**	DEZPR-RC (E1)
n x LANcontroller 601 or LANcontroller 602	DNSAE-AA or DNSAE-BA/BB	DECswitch 900 EE	**and**
and/or	**and/or**	**and/or**	DEBMP-DA
n x FDDIcontroller 621	DNSAF-**	DECswitch 900EF	**and/or**
and/or	**and/or**	**and**	DEFBA-DA
n x WANcontroller 614 or WANcontroller 618 or WANcontroller 622	DNSCA-BA or DNSCA-A* or DNSCB-A*	MultiSwitch 900 chassis	**and** DMHUB-**
The benefits of the proposed migration product include lower cost per port, higher density for the same rack space, the flexibility of the MS900 form factor, and future product enhancements.			
For software, documentation, adapter cables, and country kit codes, see: http://www.networks.digital.com/dr/npg/dezfm-mn.html#part_nos_table http://www.networks.digital.com/dr/npg/dezpr-mn.html#part_nos_table http://www.networks.digital.com/dr/npg/dmhub-mn.html#part_nos_table			
* Customers using DECNIS 600-HPX with MPC-III systems for high performance X.25 with large numbers of SVCs should consider using an Alpha system running X.25 for Digital UNIX.			

DECNIS 600

High performance IP/IPX routing and bridging over Ethernet, high speed PPP or Frame Relay, ATM over WAN			
DECNIS 600 Description and Part Numbers		**Migration Product Description and Part Numbers**	
DECNIS 600-SPX	DNSBA-CC/CD	GIGAswitch/Router 8 slot	SSR-8
or	**or**	**or**	**or**
DECNIS 600-HPX	DNSBA-DC/DD	GIGAswitch/Router 16 slot	SSR-16
Plus	**Plus**	**plus**	**plus**
n x LANcontroller 601 or LANcontroller 602	DNSAE-AA or DNSAE-BA/BB	10/100BaseTX or 10/100Base FX card	SSR-HTX12-08 SSR-HFX11-08
and/or	**and/or**	and	and
n x WANcontroller 614 or WANcontroller 618 or WANcontroller 622	DNSCA-BA or DNSCA-A* or DNSCB-A*	n x 4 x 2M sync card or n x 4 x 2M sync card with compression & encryption	SERC-04 or SSR-SERC-04 or SSR-SERCE-04
and/or	**and/or**	**and/or**	**and/or**
HSSIcontroller 641	DNSAC-BA	2 x HSSI sync card	SSR-HSSI-02
and/or	**and/or**	**and/or**	**and/or**
ATMcontroller 631	DNSAC-A*	2 x ATM OC-3 card	T.B.S.
The benefits of the proposed migration product include lower cost per port, support for 100M Ethernet and GIGAbit Ethernet, higher performance, support for Quality of Service via L3/L4 flows, and future product enhancements.			
For more information about the GIGAswitch/router see: http://www.networks.digital.com/dr/npg/dgsra-mn.html			

7. Combined Strategy

For customers using predominantly IP and DECnet protocols in backbone environments and who have high performance requirements, there are two migration options.

7.1 Option 1- GIGAswitch/Router in Conjunction with DECswitch 900
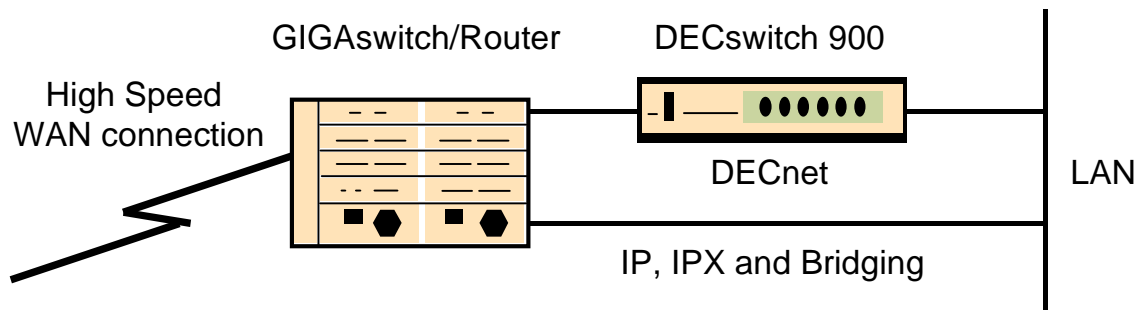
In this case the DECswitch 900 running multiprotocol routing software provides DECnet routing capability and the GIGAswitch/Router provides IP routing and high speed WAN capability. All IP, IPX and Bridging traffic is directed to specific ports on the GIGAswitch router. The DECswitch 900 routes the DECnet traffic. Any DECnet traffic that needs to traverse the WAN is directed to a specific port on the GIGAswitch/Router and is bridged across the WAN using Frame Relay or PPP. GIGAswitch/Router Quality of Service features can be used to provide traffic shaping.

This solution is recommended when a small amount of DECnet traffic needs to cross the WAN. DECnet routing parameters may need to be adjusted on the DECswitch 900 to reduce the number of hello and DECnet routing update messages traversing the WAN.

7.2 Option 2 - GIGAswitch/Router in Conjunction with RouteAbout Central
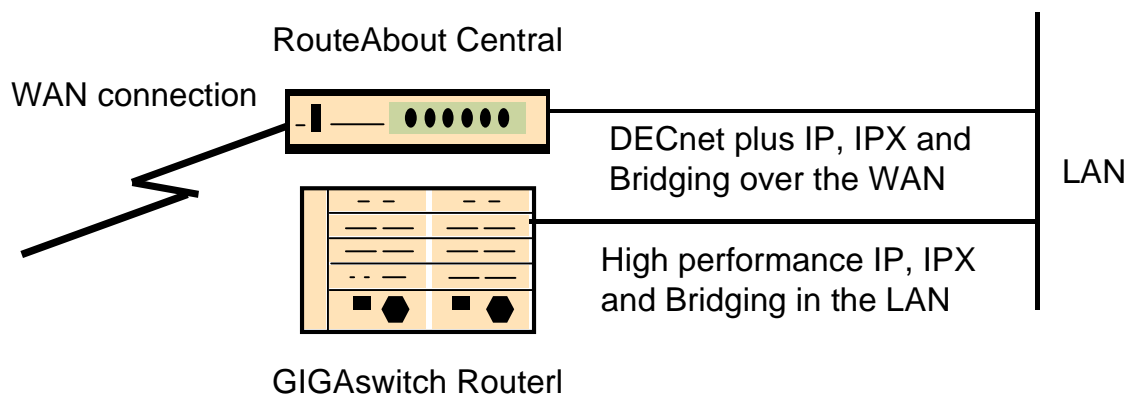
In this case the RouteAbout Central provides DECnet routing and WAN capability and the GIGAswitch/Router provides IP, IPX and bridging in the backbone LAN. All IP, IPX and Bridging traffic for the LAN is directed to specific ports on the GIGAswitch router. The RouteAbout Central

routes all DECnet traffic, both across the LAN and the WAN. Any IP, IPX or Bridging traffic that needs to traverse the WAN is directed to the RouteAbout Central. RouteAbout Bandwidth Reservation can be used to provide packet prioritization across the WAN. The full WAN capabilities of the RouteAbout Central can also be used such as Frame Relay, PPP, X.25, backup and top up, etc.

This solution is recommended when a large amount of DECnet traffic needs to cross the WAN as it provides better control of DECnet routing.

8. Migration Issues

Note that there are currently some DECNIS 600 configurations and applications for which there are no current migration paths. Examples include:

- FDDI and Appletalk routing (No FDDI Interface)

- Multiprotocol routing between FDDI and ATM (No FDDI or ATM Interfaces at this time)

- Multiprotocol routing and bridging over ATM (at this time)

- Classical IP over ATM

- Secure Firewall Connections and DEC Security Gateway capabilities

Customers using any of these configurations and applications who need an immediate migration path should consider alternative solutions.

There are also some proprietary DECnet protocols for which there is no migration path. See *Proprietary DECnet Protocols* for more information.

9. Proprietary DECnet Protocols

Please note that customers using DECNIS with DECnet proprietary protocols and datalinks will not be able to migrate to the RouteAbout or GIGAswitch/Router without upgrading their network and applications to use industry standard protocols. However, we will continue to support DECNIS customers who use these protocols as outlined above.

The following DECnet proprietary protocols are not and will not be supported on the RouteAbout and GIGAswitch/Router products:

- DDCMP -- DECnet Phase IV datalink protocol. Replaced by PPP.

- DEC HDLC -- DECnet/OSI Phase V datalink protocol. Replaced by PPP.

- VCP -- Vitalink Control Protocol. Replaced by PPP.

- X.25 GAP -- Gateway Access Protocol used by X.25 Phase IV products. Replaced by X.25 LLC2.

- MOP -- Maintenance Operation Protocol used for loading from a DECnet load host. Replaced by Bootp/TFTP.

10. Functionality Comparisons

The following tables compare the functionality of the DECNIS with the RouteAbout and GIGAswitch/Router products and a combined use strategy of both products.

10.1 IP Protocol Comparison

IP Protocols	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Strategy
OSPF – Open Shortest Path First V2 Protocol RFC 1247	Yes	Yes	Yes	Yes
Use of OSI IS-IS for Routing in TCP/IP and Dual Environments RFC 1195	Yes	Yes	Planned	Yes
BGP4 – Border Gateway Protocol RFC 1771	Yes	Yes	Yes	Yes
RIP– Routing Information Protocol RFC 1058	Yes	Yes	Yes	Yes
EGP – Exterior Gateway Protocol RFCs 827,888, and 904	Yes	Yes	No	Yes
ICMP Internet Control Message Protocol RFC 792	Yes	Yes	Yes	Yes
UDP – User DataGram Protocol RFC 768	Yes	Yes	Yes	Yes
ARP – Address Resolution Protocol RFC 826	Yes	Yes	Yes	Yes
IP Datagram Transmission over X.25 Networks RFC 877	Yes	Yes	No	Yes
Broadcasting Internet Datagrams in the Presence of Subnets RFC 922	Yes	Yes	Yes	Yes
Internet Standard Subnetting Procedure RFC 950	Yes	Yes	Yes	Yes
BOOTSTRAP Protocol (BOOTP) RFCs 951 and 1395	Yes	Yes	Yes	Yes
TFTP Protocol (Revision 2) RFC 783	Yes	Yes	Yes	Yes
Requirements for Internet Gateways RFC 1009	Yes	Yes	Yes	Yes

IP Protocols	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Strategy
Using ARP to Implement Transparent subnet gateways RFC 1027	Yes	Yes	Yes	Yes
Requirements for Internet Hosts RFC 1123	Yes	Yes	Yes	Yes
Compressing TCP/IP headers for Low Speed Serial Links RFC 1144	No	Yes	No	Yes
Path MTU Discovery RFC 1191	Yes	Yes	Yes	Yes
MIB for Network Management of TCP/IP based Internets (MIB-II) RFC 1213	Yes	Yes	Yes	Yes
OSPF V2 Management Information Base RFC 1253	No	Yes	Yes	Yes
Inverse Address Resolution Protocol RFC 1293	Yes	Yes	Yes	Yes
Assigned Numbers RFC 1340	Yes	Yes	Yes	Yes
TFTP Protocol V2 RFC 1350	Yes	Yes	Yes	Yes
BGP-4/IDRP for IP-OSPF Interaction RFC-1745	No	Yes	No	Yes
Classical IP and ARP over ATM RFC 1577	Yes	No	Planned	
The Transmission of Datagrams over the SMDS Service RFC 1209	Yes	No	No	No

10.2 IPX Protocol Comparison

IPX RFCs	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Strategy
Advanced NetWare V2.0 Internetwork Packet Exchange Protocol	Yes	Yes	Yes	Yes
Advanced NetWare V2.0 Service Advertising Protocol	Yes	Yes	Yes	Yes
Tunneling IPX Traffic Through IP Networks RFC 1234	Yes	Yes	No	Yes
PPP Internetwork Packet Exchange Protocol (IPXCP) RFC 1552	No	Yes	Yes	Yes
Inverse Address Resolution RFC 1293	Yes	Yes	Yes	Yes
Novell IPX Management Information Base RFC	No	Yes	No	Yes

10.3 DECnet Protocol Comparison

DECnet RFCs	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Strategy
Digital Network Architecture Phase IV Routing Layer Functional Specification V2.0.0	Yes	Yes	Planned	Yes
DECNet Phase V Network Routing Layer Functional Specification V3.0.0	Yes	Yes	Planned	Yes
ISO 8473 – Connectionless Mode Network Service	Yes	Yes	Planned	Yes
ISO 9542 – End System to Intermediate System Routing Exchange Protocol	Yes	Yes	Planned	Yes
ISO 10589 – IS to IS Intermediate System to Intermediate System Intra Domain Routing Information Exchange Protocol	Yes	Yes	Planned	Yes
FIPS PUB 146 – GOSIP U.S. Department of Commerce, August 24, 1988	Yes	Yes	No	Yes
RFC 1139 – An Echo Function for ISO 8473	Yes	Yes	No	Yes
RFC 1195 – Use of OSI IS-IS for Routing in TCP/IP and Dual Environments	Yes	Yes	No	Yes

10.4 Appletalk Protocol Comparison

Appletalk RFCs	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Strategy
AppleTalk Phase 1 protocols	Yes	Yes	Planned	Yes
AppleTalk Phase 2 protocols	Yes	Yes	Planned	Yes
Routing Table Maintenance Protocol (RTMP)	Yes	Yes	Planned	Yes
Zone Information Protocol (ZIP)	Yes	Yes	Planned	Yes
Name Binding Protocol (NBP)	Yes	Yes	Planned	Yes
Network and Zone Filters	Yes	Yes	Planned	Yes
Transition Gateway	No	Yes	Planned	Yes
Apple Address Resolution Protocol (AARP)	Yes	Yes	Planned	Yes
Inverse Address Resolution Protocol RFC 1293	Yes	Yes	Planned	Yes
AppleTalk Control Protocol for PPP (ATCP) RFC 1378	No	Yes	Planned	Yes
IP Encapsulation over WAN Links	Yes	Yes	Planned	Yes
AppleTalk Half Router on PPP Links	No	Yes	Planned	Yes
AppleTalk over Frame Relay RFC 1490	No	Yes	Planned	Yes
AppleTalk Management Information Base RFC 1243	No	Yes	Planned	Yes

10.5 802.1d Transparent Bridging Protocol Comparison

802.1d Standards	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Stragegy
IEEE 802.1d Spanning Tree Protocol	Yes	Yes	Yes	Yes
IEEE 802.1d-Media Access Control (MAC)	Yes	Yes	Yes	Yes
IEEE 802.1d-Source Routing Transparent Bridge Extension	No	Yes	No	Yes
Bridge Management Information Base RFC 1286	Yes	Yes	Yes	Yes
Bridging over Frame Relay RFC 1490	Yes	Yes	Yes	Yes

10.6 Frame Relay Comparison

Frame Relay	DECNIS 500/600	RouteAbout	GIGAswitch Router	Combined Strategy
ANSI T1.617 – DSSI Signaling Specification for Frame Relay Bearer Service	Yes	Yes	Yes	Yes
ANSI T1.617 Annex D – Additonal Procedures for Permanent Virtual Connections (PVCs) Using Unnumbered Information Frames	Yes	Yes	Yes	Yes
ANSI T1.618 DSSI – Core Aspects of Frame Protocol for Use with Frame Relay Bearer Service	Yes	Yes	Yes	Yes
ITU Q.933 Annex D – DSSI Signalling Specification for Frame Mode Basic Call Control	Yes	Yes	Yes	Yes
Inverse Address Resolution Protocol RFC 1293	Yes	Yes	Yes	Yes
Frame Relay DTE Management Information Base RFC 1315	No	Yes	Yes	Yes
Multi Protocol Interconnect Over Frame Relay Networks RFC 1490	Yes	Yes	Yes	Yes
Frame Relay Specifications with Extension Document V1.0 September 9, 1990	Yes	Yes	Yes	Yes
Frame Relay Forum User Network Interface agreement	Yes	Yes	Yes	Yes
ITU-T Q.933 ISDN Data Link Signaling Spec for Frame Mode Bearer Services	No	Yes	No	Yes (Option 2)
ITU-T Q.933 ISDN Signaling Specificaton for Frame Mode Bearer Services (including PVC management)	No	Yes	No	Yes (Option 2)

10.7 X.25 Protocol Comparison

X.25 Protocol	DECNIS 500/600	RouteAbout	GIGAswitch Router	Combined Strategy
TCP/IP over X.25 RFC 877 and 1356	Yes	Yes	No	Yes (Option 2)
DECnet IV over X.25 (only when the router is configured as a pure Phase IV router)	Yes	Yes	No	Yes (Option 2)
Data Link Mapping (DLM) – over switched virtual circuits	Yes	Yes	No	Yes (Option 2)
DECnet/OSI (PhaseV) over X.25 (only when the Router is configured as a pure DECnet/OSI router)	Yes	Yes	No	Yes (Option 2)
IPX over X.25	No	Yes	No	Yes (Option 2)
OSI over X.25	Yes	Yes	No	Yes (Option 2)
Encapsulation and Addressing Procedures RFC 877, RFC 1356	Yes	Yes	No	Yes (Option 2)
Defense Data Network X.25 Host Interface Specification	Yes	Yes	No	Yes (Option 2)
IPX support via Call User Data (CUD) in accordance with RFC 1356	No	Yes	No	Yes (Option 2)
X.25 Data compression	No	Yes	No	Yes (Option 2)
ITU Recommendaton X.25 1980 and 1984 (Mutilink Protocol and Operation of the D-bit protocol are not supported)	Yes	Yes	No	Yes (Option 2)
ISO/IEC 8208 X.25 Packet Level Protocol for Data Terminal Equipment	Yes	Yes	No	Yes (Option 2)
ISO/IEC 10589 – Intermediate System to Intermediate System (IS-IS) Intra Domain Routing	Yes	Yes	No	Yes (Option 2)
Exchange Protocol for Use in Conjunction with ISO 8473	Yes	Yes	No	Yes (Option 2)

10.8 Point-to-Point Protocol (PPP) Comparison

Point to Point Protocol	DECNIS 500/600	RouteAbout	GIGAswitch Router	Combined Strategy
The Point-to-Point Protocol (PPP) RFC 1548	Yes	Yes	Yes	Yes
The PPP Internet Protocol Control Protocol (IPCP) RFC 1332	Yes	Yes	Yes	Yes
PPP Authentication Protocols RFC 1334	Yes (PAP only)	Yes	Yes	Yes
Novell IPX Over Various WAN Media (IPXWAN) RFC 1362	Yes	Yes	Planned	Yes (Option 2)
PPP DECnet Phase IV Control Protocol (DNCP) RFC 1376	Yes	Yes	Planned	Yes (Option 2)
OSI Network Layer Control Protocol (OSINLCP) RFC 1377	Yes	Yes	No	Yes (Option 2)
MultiLink PPP RFC 1717	No	Yes	Planned	Yes (Option 2)
PPP Compression Control Protocol (CCP) RFC 1962	Yes	Yes	Planned	Yes (Option 2)
STAC LZS V5.0 RFC 1974	No	Yes	Planned	Yes (Option 2)

10.9 SNMP Comparison

SNMP Standards	DECNIS 500/600	RouteAbout/ DECswitch	GIGAswitch Router	Combined Strategy
Structure and Identification of Management Information RFC 1155	Yes	Yes	Yes	Yes
Simple Network Management Protocol RFC 1157	Yes	Yes	Yes	Yes
Management Information Base for Network Management of TCP/IP Internets RFC 1213	Yes	Yes	Yes	Yes
Appletalk MIB RFC 1243	No	Yes	No	Yes
OSPF Version 2 MIB RFC 1253	No	Yes	Yes	Yes
FDDI MIB RFC 1285	No	Yes	No	Yes
Bridge MIB RFC 1286	Yes	Yes	Yes	Yes
Frame Relay DTE MIB RFC 1315	No	Yes	Yes	Yes
RS232-Like hardware device MIB RFC 1317	No	Yes	No	Yes
PPP Link Control Protocol MIB RFC 1471	No	Yes	Yes	Yes
Evolution of the Interfaces Group of MIB II RFC 1573	Yes	Yes	Yes	Yes
Ethernet MIB RFC 1623	No	Yes	Yes	Yes
SDLC MIB RFC 1747	No	Yes	No	Yes
Bandwidth Reservation System Private MIB	No	Yes	No	Yes
Distributed Routing Software Private MIB (Resource Group, ELS Group, and Traps)	No	Yes	No	Yes
Data Link Switching (DLSw) MIB	No	Yes	No	Yes
LLC MIB Internet Draft Version 01	No	Yes	No	Yes
Novell IPX MIB	No	Yes	Yes	Yes
Novell RIP-SAP MIB	No	Yes	Yes	Yes