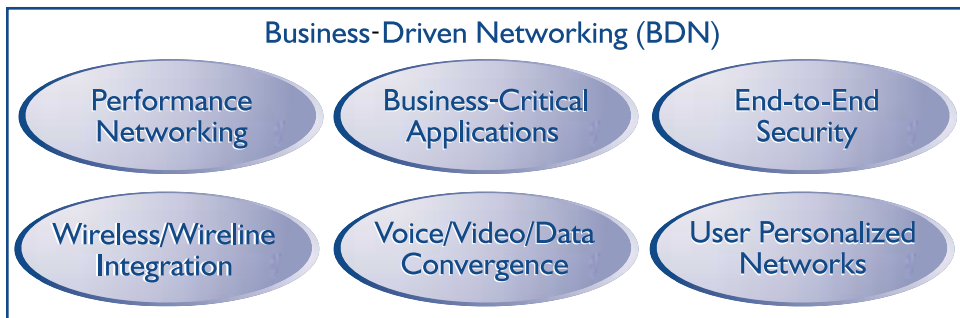# Matrix™ E1: High-Performance, Intelligent, Edge and Distribution Standalone Switch Routers

The Enterasys Matrix E1 Series represents an industry breakthrough in enterprise switching, providing high performance and a robust multilayer feature set. The Matrix E1 Series fixed-modular design provides unprecedented scalability and flexibility. Advanced security and manageability allow network administrators to address the network challenges of today as well as those that will arise in the future.

Ideal for wiring closet, distribution switching and server farm aggregation implementations, the Matrix E1-Series includes four standalone switch routers. The Matrix E1 Series offers a wide range of interfaces including 10/100Base-TX, 10/100/1000 Base-TX, 100Base-FX and 1000Base-X. This enables the Matrix E1 to interoperate in legacy environments while ensuring a smooth migration to the technologies required to support converged IP network infrastructures.

Enterasys Matrix E1-Series Powers *Business-Driven Network*™ Solutions

Business-Driven Networking (BDN)

Performance Networking	Business-Critical Applications	End-to-End Security
Wireless/Wireline Integration	Voice/Video/Data Convergence	User Personalized Networks

Business-Driven Network solutions enabled by Enterasys' Matrix E1-Series include:

- **High-performance desktop computing.** Scientific research labs, publishing companies, media production companies and institutions of higher education are just a few of the organizations that demand high-performance desktop computing.

- **Business-critical applications.** Companies rely on their networks' guaranteed transport of business-critical applications. Applications like Enterprise Resource Planning, digital radiology, automation, and distance education are a vital part of a company's overall success and continue to place demands on the network.

- **End-to-end security.** Government security initiatives are driving companies to reassess the security of their network. Every company, whether it's a hospital, Fortune 500 company or government agency (military or Department of Defense) is working to ensure important corporate assets remain secure. Comprehensive security must be provided at every layer (edge, distribution and core) of the network in order to guarantee end-to-end security.

ENTERASYS
NETWORKS™

- **Voice, video and data converged networks.** Voice-over-IP and broadcast and multicast video applications continue to grow on corporate networks today. These applications require low latency and guaranteed transport through the network, as well as high availability and reliability.

- **User Personalized Networks (UPN).** User Personalized Networks give network administrators the ability to align business needs with the network by providing network access based on an individual user's requirement, including QoS, rate limiting and security.

- **Wireless/wireline integration.** Companies that offer both wireless and wired access to their employees are faced with several challenges. User security, end-to-end QoS, and network management and control all play an important role in the deployment of wireless and wireline network, so being able to support them seamlessly is imperative.

Matrix E1-Series

The Matrix E1 family is composed of four standalone switch routers, leveraging Enterasys' industry-leading "fixed-modular" design:

- Matrix E1 Workgroup Switch-24 (WS-24) offers 24 10/100 ports (RJ45) with one expansion slot.

- Matrix E1 Workgroup Switch-48 (WS-48) offers 48 10/100 ports (RJ45) with three expansion slots.

- Matrix E1 Gigabit Workgroup Switch (GWS) offers 6 10/100/1000 ports (RJ45) with three expansion slots.

- Matrix E1 Gigabit Distribution Switch (GDS) offers 6 Gigabit Ethernet ports (mini-GBICs) with three expansion slots.

The scalability and flexibility of this fixed-modular design is provided via the expansion modules:

- 16 10/100 (RJ-45) ports

- 8 100FX MMF ports

- 2 10/100/1000 (RJ-45) ports

- 2 GBIC/MGBIC ports

Any combination of expansion modules may be installed in the base system. This provides five different configurations on the Matrix E1 WS-24, where typical "fixed" configuration switches support 24 10/100 ports with 2 GbE uplinks. Expansion usually requires more boxes. The Matrix E1 WS-48 offers 34 different configurations, when typical fixed switches offer 48 10/100 ports with 2 GbE uplinks. The Matrix E1 GWS and GDS also each support 34 different configurations, when typical "fixed" configuration switch offer only one or two options.

This flexibility allows the Matrix E1 switches to address varied network requirements:

Edge Deployment—Typical Connectivity

- 24-port 10/100 with two GBICs (Matrix E1 WS-24)

- 64-port 10/100 with four GBICs (Matrix E1 WS-48)

- 80-port 10/100 with two GBICs (Matrix E1 WS-48)

- 24-port 100FX with six GBICs (Matrix E1 GDS)

- 10-port 10/100/1000 with two GBICs or 8-port 10/100/1000 with four GBICs (Matrix E1 GWS)

Distribution Deployment /Small Network Backbone—Typical Connectivity

- 12 Gigabit Ethernet ports, any copper or fiber combination (Matrix E1 GWS and GDS)

- 10 GBICs and 2-port 10/100/1000 (Matrix E1 GDS)

Server Aggregation Deployment—Typical connectivity

- 10-port 10/100/1000 with two 2 GBICs (Matrix E1 GWS)

- 8-port 10/100/1000 with four GBICs (Matrix E1 GWS)

This flexibility further simplifies network design and reduces the cost of network deployments.

Performance and Capacity

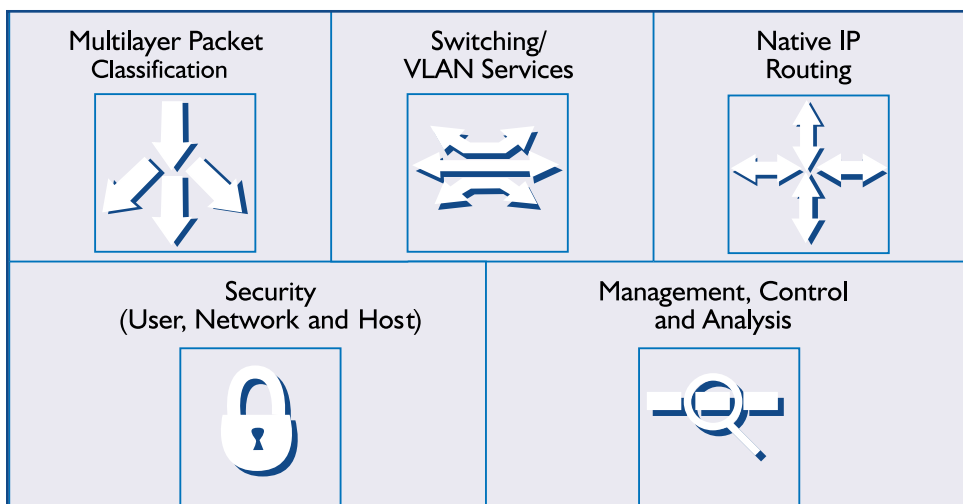|	Matrix E1 WS-24	Matrix E1 WS-48	Matrix E1 GSW	Matrix E1 GDS
Performance	6.5 Mpps	16 Mpps	16 Mpps	16 Mpps
Capacity	10 Gbps	24 Gbps	24 Gbps	24 Gbps
Fixed 10/100 Ports (RJ45)	24	48	0	0
Maximum 10/100 Ports (RJ45)	40	96	48	48
Fixed 1000 Base-X Ports	0	0	0	6
Maximum 1000 Base-X Ports	2	6	6	12
Fixed 100 Base-FX Ports (MTRJ)	0	0	0	0
Maximum 100 Base-FX Ports (MTRJ)	8	24	24	24
Fixed 10/100/1000 Ports (RJ45)	0	0	6	0
Maximum 10/100/1000 Ports (RJ45)	2	6	12	12

Matrix E1-Series Advanced Architecture

The Matrix-E1 Series provides wire-speed performance and industry-leading features that allow seamless integration into any small or medium business, or large enterprise network. All features and functionality are supported on all ports.

Flexibility also means having the physical resiliency of dual integrated power supplies, as well as the virtual resiliency of standards-based switching and routing failover firmware features such as Spanning Tree (802.1D), Rapid Reconfiguration of Spanning Tree (802.1w) and Virtual Router Redundancy Protocol (VRRP). This physical and logical redundancy makes the Matrix E1 an ideal solution for mission-critical networks.

The Matrix E1 ships with full Layer 2 and Layer 3 switching capabilities without the additional licensing costs usually required for equivalent competitive solutions. This routing support enables the Matrix E1 to improve the overall network functionality, reliability, security and performance from the edge to the distribution/core of the network.

Integrated Services Design

Multilayer Packet Classification

Switching/ VLAN Services

Native IP Routing

Security (User, Network and Host)

Management, Control and Analysis

Each Matrix E1 supports:

Multilayer Packet Classification

- Layer 2 through 4 Packet Classification
- QoS Mapping to Priority Queues (802.1p)
    — Strict Priority Queuing, Weighted Fair Queuing, Hybrid Queuing
    — Four TX queues per 10/100 and 10/100/1000 port
- Bandwidth Control (Rate Limiting)
    — Ports, Flows and Classification

Switching/VLAN Services

- Extensive industry-standards compliance (802.1Q, 802.1p, 802.1D, 802.1w, 802.1t, 802.3x and future support of 802.3ad and 802.1s)
- Policy-based switching
- Port trunking

Native IP Routing

- Static routes, RIPv1/RIPv2 and OSPF
- Multicast routing support (DVMRP, IGMP v1/v2)
- VRRP, ICMP, PROXY ARP and DHCP Relay

Security (User, Network and Host)

- User access security (802.1X, MAC Authentication, MAC Port Locking)
- Network security (Extended Access Control Lists, Denial of Service and intrusion prevention)
- Host security (SSH v2, audit trail capabilities, Syslog)

Management, Control and Analysis

- SNMP v1/v2c/v3, RMON
- Industry-standard command line interface
- Automatic configuration
- Webview
- Editable up/downloadable ASCII configuration files
- Port mirroring

User-Based Multilayer Packet Classification/QoS
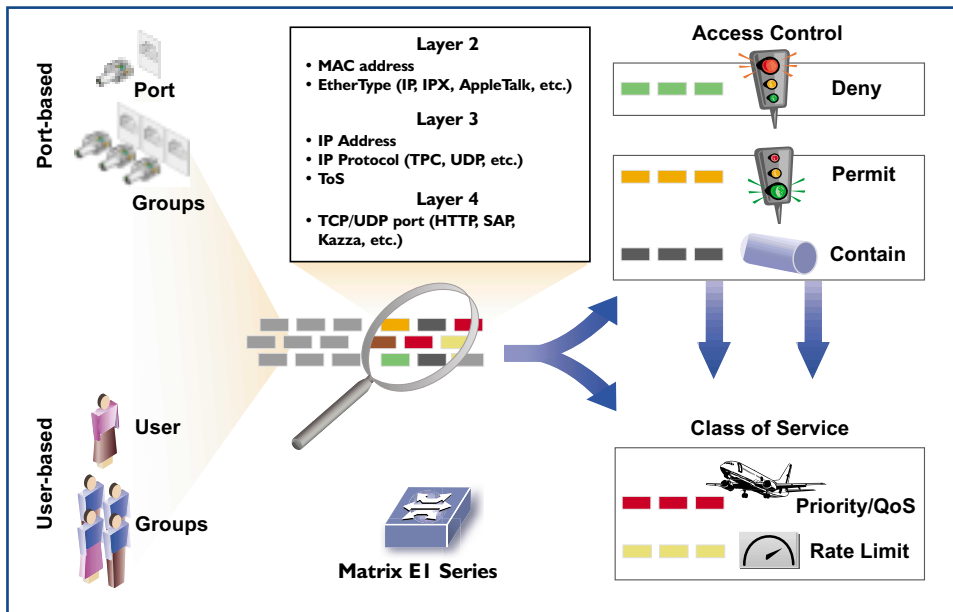
Advanced Multilayer Packet Classification

Another unique feature that separates the Matrix E1-Series from all competitive switches is the capability to provide User-Based Multilayer Packet Classification/QoS. With the wide array of network applications used on networks today, traditional Multilayer Packet Classification by itself is not enough to guarantee the timely transport of business-critical applications.

In the Matrix E1-Series, User-Based Multilayer Packet Classification allows traffic classification not just by packet type, but also by the role of the user to the network. With User-Based Multilayer Packet Classification, packets can be classified based on unique identifiers like "All Users," "User Groups" and "Individual User" thus ensuring a more granular approach to managing and maintaining network traffic flow. User-Based Multilayer Packet Classification is a key component to Enterasys' User Personalized Networking.

Security Services

Superior security sets these mixed platforms apart from all others. Security comes first at Enterasys Networks, as demonstrated by the authentication, encryption and preventive features offered in these multilayer platforms.

Various authentication mechanisms, including MAC address authentication, IEEE 802.1X and RADIUS authentication, allow the identification of users as well as devices (e.g., printers) for total control of network access. Coupled with MAC port locking and traffic classification, unauthorized users and applications are effectively filtered out.

The Matrix E1 allows networks to maintain their integrity with functionality like Denial of Service attack prevention and Extended Access Control Lists.

Secure access to management functions is also essential to making sure no one other than authorized personnel can alter switch configurations. Secured Shell (SSH) allows secure telnet access and SNMPv3 provides with secure, encrypted management.

Network-Wide Configuration, Change and Inventory Management

Most of today's enterprise switches require repetitive, time-consuming management administrative tasks to set-up and maintain the network. Furthermore, upgrading switch firmware is time consuming and tedious. Through this complexity, configuration changes continue to be the number one reason for network outages.

The Matrix E1 natively supports an auto-configuration functionality that eases deployment of switches in a network by automatically configuring multiple switches across a network via a boot server.

Enterasys' NetSight™ Atlas provides the ability to install, troubleshoot, configure and maintain every Matrix E1 in the entire network from a few simple screens and easy-to-use wizards. In addition, it automatically detects, tracks and reports adds, moves and changes. NetSight Atlas can even track hardware (Matrix E1 Series as well as all Enterasys products) inventory, including serial numbers, asset tags, chassis empty slots and firmware revisions from the Network Operation Center without requiring people to go to every single closet.
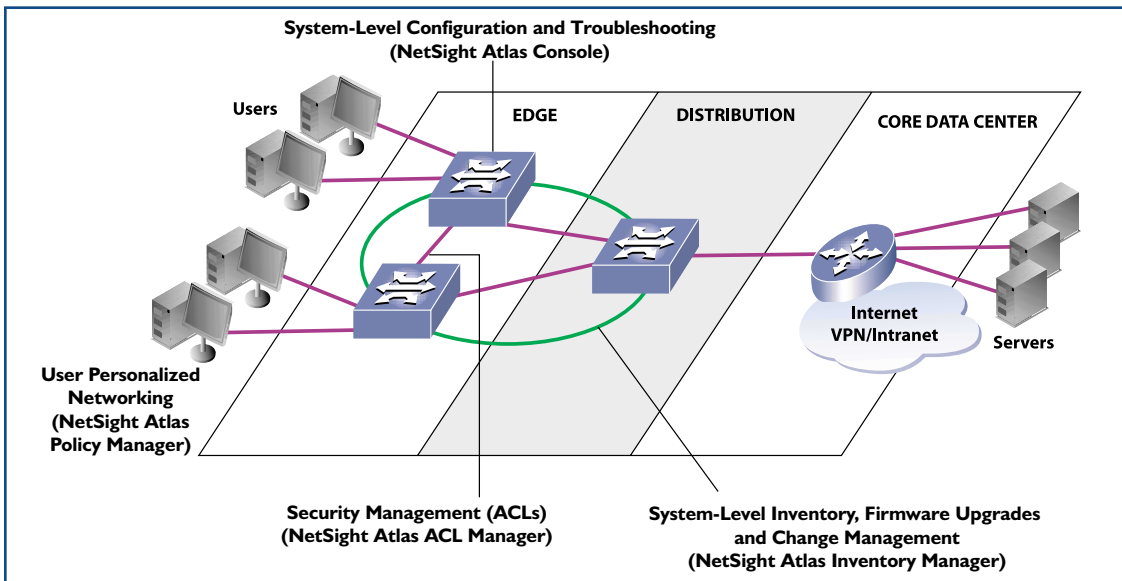
ADDITIONAL INFORMATION

For additional information on the Matrix E1, please visit **www.enterasys.com/products/switching/e1** for the following documents:

• Matrix E1-Series Application Overview

• Matrix E1-Series Frequently Asked Questions

• Matrix E1 Workgroup Switch Data Sheet

• Matrix E1 Gigabit Workgroup Switch Data Sheet

• Matrix E1 Gigabit Distribution Switch Data Sheet

• Matrix E1 Expansion Modules Data Sheet

CONTACT INFORMATION

Contact Enterasys Sales at: **978-684-1000** or **enterasys.com/corporate/contact/contact-sales.html**

Enterasys Networks
Corporate Headquarters
50 Minuteman Road
Andover, MA 01810
USA

e n t e r a s y s . c o m

ENTERASYS
NETWORKS™