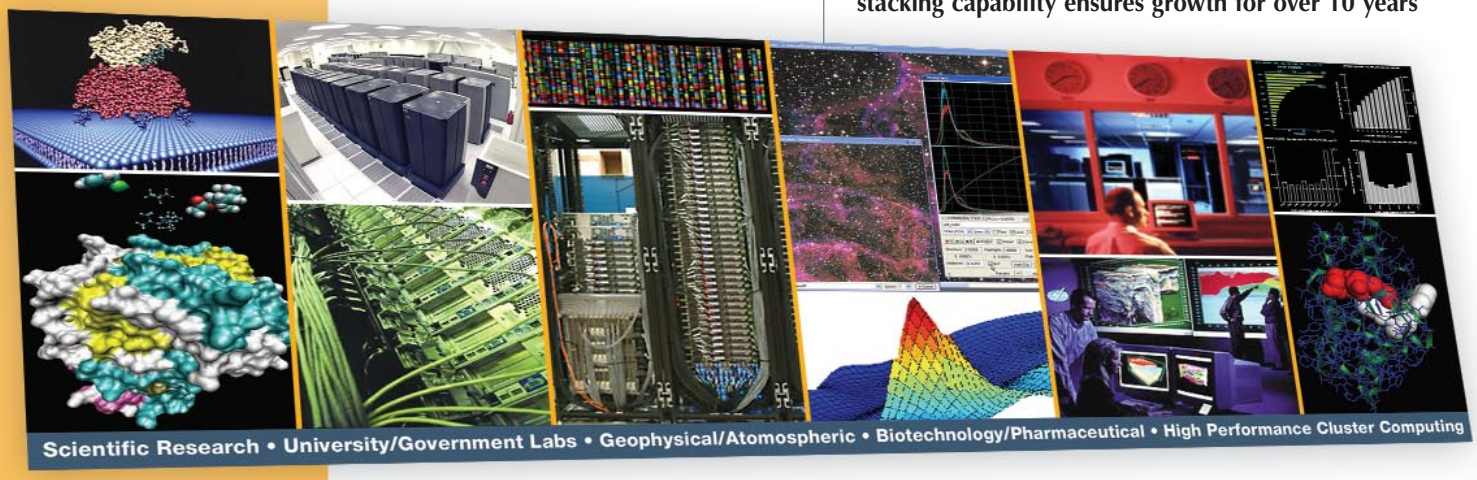
RESEARCH AND EDUCATION

HIGH PERFORMANCE 10 GIGABIT ETHERNET CAMPUS BACKBONES

- Simplify the network topology through industry leading port density and system resiliency
- 100 GbE ready E-Series backplane & S-Series S50 stacking capability ensures growth for over 10 years



High Performance 10 Gigabit Ethernet Campus Backbones

Research and Education networks are the foundation of leading edge research and scientific breakthroughs. High speed, predictable network performance and a secure environment are hallmarks of these high performance networks.

Resilient 10 Gigabit Ethernet is now a key requirement for these environments worldwide. Applications such as high performance cluster computing as well as large data file transfer between research groups need a high speed, congestion free environment.

Force10 Networks uniquely offers a scalable high performance 10 Gigabit Ethernet distribution and campus core solution. Having this critical segment of the network built from one supplier ensures integrated resiliency features, less downtime and lower operational costs.

Terabit Speeds with Zero Packet Loss

Advanced resiliency features for maximum uptime
- E-Series delivers zero packet hitless component failover at terabit speeds
- E-Series 3-CPU RPM achieves predictable performance during dynamic traffic loads
- Delivers redundant physical and logical paths through full suite of standards-based protocols

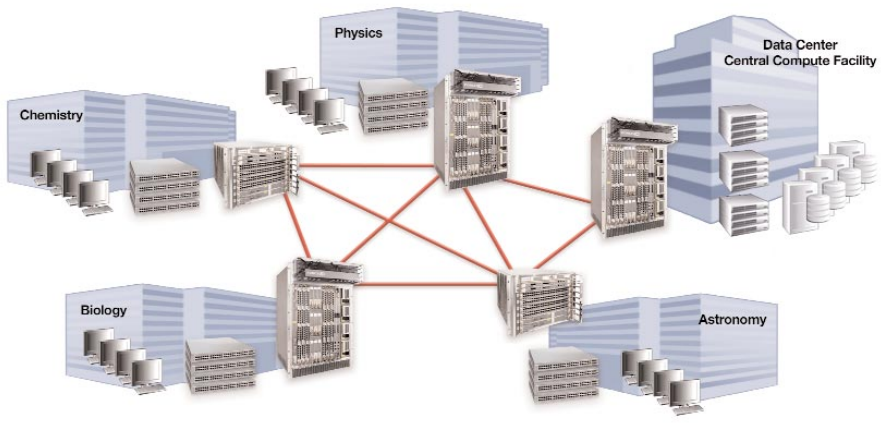
100 Gigabit Ready E-Series Backplane

Scalable IPv6 ready LAN core and stackable distribution layer
- High density chassis and stacking technology provide industry leading capacity
- Pre provisioning and hot insertion features ensure seamless growth
- 100 GbE ready E-Series chassis and backplane ensure real investment protection

Scalable Security & Control at the Distribution Edge

Scalable core security and granular control at the distribution edge
- E-Series technology supports >1 million security filters at line rate
- E-Series control plane protects critical messages during DDoS attacks through rate limiting and prioritization
- E-Series/S50 enables higher security with IEEE 802.1x authentication on every GbE & 10 GbE port

10 Gigabit Ethernet Campus Topology



FORCE10

E-Series E600

E-Series E300

S-Series S50

Force10 E-Series

E600 7 line card slots
Size: 28 h x 17.4 w x 24" d (71.1 x 44.2 x 61 cm)

E300 6 line card slots
Size: 14 h x 17.4 w x 24" d (35.6 x 44.2 x 61 cm)

Common Specifications

Physical

19" front, 19" middle (optional) & 23" middle (E600 only) rack mountable
Maximum Operating Specifications:
- Temperature: 32° to 104°F (0° to 40°C)
- Altitude: no performance degradation to 10,000 feet (3,048 meters)
- Relative humidity: 5 to 85 percent, noncondensing
- Shock: Bellcore GR-63
- Vibration: Bellcore GR-63

Maximum Non-operating Specifications:
- Temperature: -40° to 158°F (-40° to 70°C)
- Maximum altitude: 15,000 feet (4,572 meters)
- Relative humidity: 5 to 95 percent, noncondensing
- Vibration: Bellcore GR-63

E600 Redundancy/Availability

1+1 redundant Route Processor Modules (RPM)
8+1 redundant Switch Fabric Modules (SFM)
1+1 redundant DC Power Entry Modules (PEM)
3+1 redundant AC power supplies (E600 only)
Online insertion and removal of all components
Built-in cable management
Environmental self-monitoring

E300 Redundancy/Availability

1+1 redundant Route Processor Modules (RPM)
1+1 redundant DC Power Entry Modules (PEM)
2+2 redundant AC power supplies (E300 high line operation only)
3+1 redundant AC power supplies (low line and high line operation)
Online insertion and removal of all components
Built-in cable management
Environmental self-monitoring

IEEE Compliance

802.3ae	10 Gigabit Ethernet
802.3ab	1000Base-T
802.1p/q	VLAN Tagging
802.1s	Multiple Spanning Tree Protocol
802.1w	Rapid Spanning Tree Protocol
802.3ad	Link aggregation (static)
802.1d	Bridging
802.3x	Flow Control

Designed for NEBS

On board thermal and voltage monitoring
GR-63-Core: NEBS, physical protection
GR-1089-Core: EMC and Electrical Safety for Network Telecommunications Equipment
SR-3580 NEBS criteria levels (Level 3 compliance)

Safety

UL listed (UL 60950, 3rd Edition)
CUL CSA 22.2 #60950
CDRH 21
CFR 1040
EN 60950
EN 60825-1 Safety of Laser Products – Part 1: Equipt. Classification Req., and User's Guide
EN 60825-2 Safety of Laser Products – Part 2: Safety of Optical Fiber Communication Systems

EMC

USA:	FCC CFR47 Part 15, Subpart J, Class A
Canada	ICES-003, Issue-2, Class A
Europe:	EN 55022 1998 (CISPR 22: 1997), Class A
Japan:	VCCI V3/01.4 Class A

Immunity

EN 300 386 V1.3.1 (2001-09) EMC for Network Equipt.
EN 55024 1998
- EN61000-4-2/IEC-1000-4-2
- EN61000-4-3/IEC-1000-4-3
- EN61000-4-4/IEC-1000-4-4
- EN61000-4-5/IEC-1000-4-5
- EN61000-4-6/IEC-1000-4-6

Force10 S-Series S50

48 line rate ports 10/100/1000Base-T
4 ports SFP (miniGBIC, shared with 1000Base-T)
Optional Module, 2 line rate ports 10 Gigabit Ethernet XFP
1 RJ-45 Console/management port with RS-232 signaling
2 ports 10 Gigabit stacking
Size: 17.32 w x 16.73 d x 1.73" h (440 x 425 x 44 mm)

Redundancy

Redundancy in stack connectivity (self healing ring)
Redundancy with 2 port 10 Gigabit Ethernet uplinks
Redundancy with 1 Gigabit uplinks – using Link Aggregation
External Redundant Power redundancy

Performance

Layer 2/MAC Addresses:	16K
Layer 3 forwarding entries:	4K
Switching Fabric Capacity:	192Gbps
User traffic capacity:	136 Gbps
Forwarding Rate:	> 130 Mpps
Jumbo Frame Support:	9216 byte packet support
Link Aggregation:	8 links per Link Aggregation Group & 32 groups per system
Stacking port capacity:	10 Gbps per port
Queues per port:	8
VLANs	1024 VLANs with 4096 tag value support

Safety

CUS 60950, 3rd edition (US NRTL through CSA)
CSA 60950, 3rd edition
CE Mark (EN 60950)
CB Report, all country deviations
EN 60825-1 Safety of Laser Products-Part 1: Equipment Classification Requirements and User's Guide
EN 60825-2 Safety of Laser Products-Part 2: Safety of Optical Fibre Communications Systems
21 CFR 1040.10 and 1040.11 FDA laser device requirements

EMC

USA: FCC CFR47 Part 15, Subpart J, Class A
Canada: ICES-003, Issue-2, Class A
Europe: EN55022 1998 (CISPR 22: 1997), Class A
Japan: VCCI V3/01.4 Class A

EN 61000-4-2 ESD
EN 61000-4-3 Radiated Immunity
EN 61000-4-4 EFT
EN 61000-4-5 Surge
EN 61000-4-6 Low Frequency Conducted Immunity
EN 300 386 V1.3.1 (2001-09) EMC for Network Equipment
EN 55024 1998

Telecoms

JATE (for Japan)

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