



NEWS INSIDE

PAGE 1

Equinix Launches Nationwide 10 Gigabit Ethernet Upgrade with Force10 TeraScale E-Series

Force10 Brings Unprecedented Scalability and Investment Protection to Networks

PAGE 2

Service Provider True Deploys Force10 in 10 Gigabit Ethernet Core Upgrade

Force10 Powers 23 of the World's Fastest Supercomputers

PAGE 3

Running Clusters & Grids on Ethernet Networks

PAGE 4

Force10 Deployed in NOAA'S National Climatic Data Center

PAGE 5

CEO Column: Information Everywhere but Where Are the Answers?

PAGE 6

Upcoming Events

Force10 Contact Information

Equinix Launches Nationwide 10 Gigabit Ethernet Upgrade with Force10 TeraScale E-Series



Equinix, the leading provider of network-neutral data centers and Internet exchange services, has deployed the industry-leading Force10 TeraScale E-Series family of switch/routers in a 10 Gigabit Ethernet upgrade to its Washington, D.C. area Internet Business Exchange (IBX) center, with planned deployments to IBX centers in the New York, Silicon Valley and Chicago areas by the end of 2005.

"Many of our customers are experiencing increasingly high volumes of traffic on their networks and will need the capacity 10 Gigabit Ethernet provides to guarantee service on their own networks," said Jay Adelson, chief technology officer of Equinix. "After more than a year of rigorous testing, we chose Force10, which provides a reliable, high density solution with a long lifespan, enabling us to deliver 10 Gig services to our customers without continual network upgrades."

More than 200 networks serving over 90% of the world's Internet networks and users operate at Equinix, offering customers the opportunity to choose from numerous network providers and services. The Force10 TeraScale E-Series provides the high line-rate density and resiliency that

Continues on page 4, see Nationwide Equinix 10 GbE Exchange

Force10 Brings Unprecedented Scalability and Investment Protection to Networks with Industry-Leading 1,260 Gigabit Ethernet Ports

Force10 Networks is radically altering the economics of networking with the industry's first high density 90-port Gigabit Ethernet line card. The new card increases the density of the Force10 TeraScale E-Series family of switch/routers to 1,260 Gigabit Ethernet ports per chassis, nearly three times the density of competitive solutions. As the first entry in Force10's new High Density portfolio, the 90-port line card sets a new industry benchmark for Gigabit Ethernet density and brings an unsurpassed level of scalability to the TeraScale E-Series.

"As our data processing needs grow, we require a network that can both accommodate today's traffic and scale to support future increases without overly complicating our infrastructure," said Preston Carter, senior network engineer at the National Oceanic and Atmospheric Administration's National Climatic Data Center, the world's largest weather data archive. "With the high Gigabit Ethernet density of the TeraScale E-Series, we have the capacity to scale far into the future to accommodate the projected growth of our network without an upgrade or even the need for additional systems."

The Force10 high density 90-port Gigabit Ethernet card, combined with the industry-leading 14-slot capacity of the TeraScale E-Series, delivers unmatched investment protection, allowing IT managers to cost effectively build an unprecedented level of scalability into their networks. With 90 ports of Gigabit Ethernet on a single line card, IT managers can process more traffic per input slot while conserving space for future use. And with 14 slots per system, the TeraScale E-Series provides more capacity to accommodate increasing demand for bandwidth well into the future.

Continues on page 6, see Industry-Leading 1,260 GbE Ports



Service Provider True Deploys Force10 in 10 Gigabit Ethernet Core

True, a Netherlands-based colocation and hosting service provider, has deployed the Force10 TeraScale E-Series in an upgrade of its network to 10 Gigabits per second. Leveraging Force10's high density 90-port Gigabit Ethernet cards, which increase the density of the TeraScale E-Series to 1,260 ports, True (formerly TrueServer) is collapsing its aggregation and core layers to simplify its network and build in a new level of resiliency.

"The high Gigabit Ethernet density of the TeraScale E-Series combined with the reliability of both Layer 2 and Layer 3 functions enables us to collapse our aggregation and core networks into a single layer, reducing our network from 13 systems to four," said Vincent Houwert, CEO at True. "With our traffic expected to double in the next six months, Force10's 90-port Gigabit Ethernet card allows us to connect more servers to a single line card, conserving additional slots that will allow us to scale as traffic continues to increase."

True provides colocation and hosting services to enterprises across Europe. To accommodate the recent surge in traffic, driven in large part by the significant demand for Internet radio and television, True is deploying the Force10 TeraScale E-Series in a full 10 Gigabit Ethernet mesh between its TeleCity-2 and Redbus Interhouse colocation and IP points of presence (POPs), ensuring full redundancy and high network availability. Additionally, the TeraScale E-Series provides the first 20 Gigabit Ethernet connections from both POPs to the Amsterdam Internet Exchange (AMS-IX).

Each True hosting facility provides servers with redundant Gigabit Ethernet links and 10 Gigabit Ethernet uplinks to deliver the highest reliability without compromising performance. With the Force10 TeraScale E-Series, True is increasing the resiliency of its network while collapsing the aggregation and core layers into a single layer. By utilizing the high density Gigabit Ethernet line cards, True consumes fewer line card slots today, providing scalable capacity to accommodate future growth. F10

"The TeraScale E-Series enabled us to reduce our network from 13 systems to four."

Vincent Houwert
CEO, True

TRUE

Force10 Powers 23 of the World's Fastest Supercomputers

The Force10 TeraScale E-Series family of switch/routers power seven of the top 50 fastest supercomputers in the world, including one in the top five, according to a list published by Top500.org that ranks the performance of the world's fastest computers. In all, 23 of the top 500 fastest supercomputers in the world rely on the Force10 TeraScale E-Series.

Most notably, the Force10 TeraScale E-Series anchors the MareNostrum cluster installed at the Barcelona Supercomputing Center in Spain, delivering the reliability and predictable performance the national supercomputing center needs to conduct scientific research on medicine, climate change, contagious diseases and materials science. Ranked fifth on the updated list, the MareNostrum cluster is Europe's fastest supercomputer with a capacity of 27.91 Teraflops per second. Over the next four years, the Spanish government will invest 70 million Peseta (approximately \$89 million) to continue building out the supercomputing center.

"Seven of the world's top 50 fastest supercomputers rely on Force10 TeraScale E-Series switch/routers."

"A greater percentage of the world's fastest computers are relying on Ethernet to interconnect computer nodes or processors, making high Gigabit and 10 Gigabit Ethernet density and reliability essential," said Stephen Garrison, vice president, corporate marketing at Force10 Networks. "As enterprises increasingly adopt similar clustering architectures for large data center build outs, Force10 is committed to delivering the unmatched resiliency and predictable performance necessary to bring the benefits of cluster computing to enterprise customers."

Continues on page 3, see Fastest Supercomputers



Force10 TeraScale E1200

Running Clusters & Grids on Ethernet Networks

A Grid computer is a hardware and software system that integrates a collection of distributed system components (e.g., computer systems, storage, etc.) making them appear to the user as a single, "virtualized" computing system. The basic "single system" concept may be applied to the construction of centralized "cluster" computers (multiprocessor systems consisting of colocated computers and storage) or a networked Grid of geographically dispersed computers, instrumentation or other resources.

Cluster and Grid applications are probably more dependent on network performance characteristics than any other enterprise application. Elapsed time to run large HPC batch applications may be fairly long (up to hours or days), requiring the network to deliver consistently high performance and non-stop availability over long periods of time. Therefore, designing Ethernet networks for cluster and Grid computing requires Ethernet switch/routers that have the performance and robust features to provide the optimum environment for successful execution of distributed applications. Among the more critical requirements for switch/routers are the following:

- Interface density and scalability
- Non-blocking switch architectures
- Integrated L2 switching and L3 routing
- QoS
- Robustness and high availability

Single-switch Ethernet Clusters

The simplest type of cluster network is built using a single, high-availability Gigabit Ethernet switch/router as the cluster interconnect. Extended ACLs, rate limiting and policing can all be enabled on the Layer 3 interface to further control access to the cluster.

Large Ethernet Clusters

Much larger clusters can be built using meshes of "federated" Ethernet switches that are configured in non-blocking, Constant Bi-sectional Bandwidth (CBB) topologies.

One of the advantages that Ethernet offers for very large clusters is its support for a

wide range of physical media and cable lengths including 1000Base-T, 1000Base-SX, 1000Base-LX, 1000Base-ZX, 10GBase-CX4, 10GBase-SR, 10GBase-LR/LW, 10Gbase-ER/EW, and 10Gbase-ZR/ZW.

Ethernet Grids

The core of the campus LAN is based on meshed Layer 3 switch/routing over 10 GbE links or trunks. Desktop computers and workstations are connected to the campus Grid infrastructure via GbE connections to Layer 2/Layer 3 access/distribution switches at each campus site. Server farms outside of the cluster are connected via GbE, GbE trunks or 10 GbE links to Layer 2/Layer 3 server site switches. Ethernet connectivity to remote sites participating in the Grid may also be provided over the MAN and WAN by 10 GbE over dark fiber, multiple 10 GbE links over CWDM/DWDM over dark fiber, or by telecommunications services that support 10 GbE interfaces.

Some modifications of existing general-purpose campus LANs are often required to maximize the predictability of the service level delivered to Grid traffic. The basic goal should be to give high priority to general Grid traffic while ensuring that IPC traffic and other more critical Grid traffic does not incur any added latency by spending time queued up in a buffer behind less critical traffic.

The first consideration would be to ensure that the network has sufficient capacity for the incremental traffic expected due to the Grid applications. Some of the tools available include:

- Priority queuing
- Rate limiting and policing
- Weighted Random Early Discard (WRED)

Ethernet continues to evolve as a highly cost-effective and flexible technology for building computer clusters, campus Grid networks, Grids-of-clusters and extended multi-site Grids. The high volume of Ethernet products continues to spur rapidly declining prices and a constant stream of enhancements/innovations, including RDMA/TOE-capable NICs, 10GBase-T for 10 GbE over twisted pair and the next generation of Ethernet at 40 or 100 Gbps. F10

For a more complete story, visit the web at <http://force10networks.com/applications/roe.asp>

Fastest Supercomputers

[Continued from p. 2]



MareNostrum cluster (world's fifth fastest supercomputer) installed at the Barcelona Supercomputer Center in Spain

The new list confirms that the architectures and technologies adopted by the research and education communities several years ago are now being more widely deployed. There are now 304 systems categorized as clusters, making this the most common architecture in the Top500. Ethernet also dominated the list with 42.4 percent of all entries leveraging the cost-effective technology to interconnect their processors, an increase from 35.2 percent in November 2004. As further proof that high performance computing architectures are moving into the enterprise, 52.8 percent of the entries are in commercial industries.

For the first time, all systems on the list exceeded one Teraflop per second, and the total combined performance of all 500 systems is now 1.69 Petaflops per second. The supercomputer that is ranked 500 on the updated list has roughly the same computational power as all 500 supercomputers on the first list created 13 years ago combined.

The Force10 TeraScale E-Series leads the industry in density, performance and resiliency. The TeraScale E-Series supports 1,260 Gigabit and 56 line-rate 10 Gigabit Ethernet ports in a single chassis and can process one billion packets per second, the highest in the industry.

The Top500 project was started in 1993 to provide a reliable basis for tracking and detecting trends in high performance computing. Supercomputers are ranked twice a year based on performance. The latest list is available at Top500.org. F10

See www.force10networks.com/news/pressreleases/2005/pr-2005-06-27.asp for the full story.

Nationwide Equinix 10 GbE Exchange [Continued from p. 1]

Equinix requires to flexibly interconnect these providers. Supporting 672 line-rate Gigabit and 56 line-rate 10 Gigabit Ethernet ports, the TeraScale E-Series provides the high level of scalability Equinix requires to expand its services to meet customer demand.

Additionally, the TeraScale E-Series provides the resiliency and traffic monitoring capabilities that enable Equinix to deliver high network availability and rapidly respond to changes in network usage. With the Force10 sFlow feature, Equinix can more effectively control and manage network usage while full redundancy of all key components coupled with Force10's hitless failover feature ensures that the TeraScale E-Series continues to process traffic in the event of a component failure.

"Equinix earned a reputation as one of the premier providers of Internet exchange services by building a high performance network-neutral infrastructure with the industry's most advanced technology," said Stephen Garrison, vice president, corporate marketing at Force10 Networks. "With the Force10 TeraScale E-Series providing unmatched density and resiliency at the core of its new 10 Gigabit Ethernet upgrade, Equinix is continuing to stay ahead of the competition by deploying the most sophisticated technology available."

Equinix operates 15 IBX centers with a total footprint of more than one million square feet in the United States and Asia Pacific, enabling customers to directly interconnect with each other for critical traffic exchange requirements. At Equinix,

customers can leverage premium data center services for secure colocation; diverse, reliable and cost-effective IP connectivity; next-generation traffic exchange and peering; and managed outsourced IT infrastructure services for greater control, improved performance and lowered costs for their network and Internet operations.

The Force10 TeraScale E-Series leads the industry in density, supporting 672 line-rate Gigabit and 56 line-rate 10 Gigabit Ethernet ports. And with the built-in redundancy of all key components, the TeraScale E-Series ensures maximum network availability. Together, the high density and resiliency of the TeraScale E-Series ensure predictable performance, transforming the network into a strategic and competitive asset. F10

See <http://www.force10networks.com/news/presreleases/2005/pr-2005-07-12.asp> for the full story.

Force10 Deployed in NOAA'S National Climatic Data Center



The National Oceanic and Atmospheric Administration's National Climatic Data Center (NCDC) in Asheville, N.C., the world's largest archive of weather data, has deployed the Force10 TeraScale E-Series with the industry-leading 90-port Gigabit Ethernet line cards to add an unprecedented level of scalability to its high performance data center. The high density 90-port line card sets a new industry benchmark by increasing the density of the TeraScale E-Series to 1,260 Gigabit Ethernet ports, nearly three times the density of competitive solutions.

"We process more than 224 gigabytes of new information on a daily basis and need the reliable performance and scalability of the TeraScale E-Series to ensure our network operates as a strategic asset," said Preston Carter, senior network engineer at the National Climatic Data Center. "With 90 Gigabit Ethernet ports on each line card, the TeraScale E-Series brings years of scalability to our network without the complexities or limitations of multiple systems."

The Force10 TeraScale E600 is at the foundation of the NCDC's data center, which archives records dating back 150 years, and connects its Oracle database, advanced applications and high speed tape storage. With unmatched density and resiliency, the TeraScale E-Series delivers the predictable performance and scalability the NCDC requires to provide reliable global weather data.

"With the TeraScale E-Series, Force10 introduced a platform that fundamentally altered the economics of networking," said Stephen Garrison, vice president, corporate marketing at Force10 Networks. "Today, with the 90-port Gigabit Ethernet

card, high performance networking environments like the NCDC can dramatically increase return on their investment and build in a massive amount of scalability while simplifying their network."

With support for 90 Gigabit Ethernet ports on a single line card, Force10 is building a level of scalability that extends the life-cycle of the TeraScale E-Series to ten or more years. By processing more traffic on a single line card, network operators can save additional slots in the TeraScale E-Series to accommodate future growth, providing long term investment protection.

The Force10 TeraScale E-Series combines that density with the industry's highest level of resiliency to guarantee the NCDC always has access to its data records.

The NCDC archives 150 years of data while 224 gigabytes of new information, the equivalent of 72 million pages, is added each day. As part of the National Oceanic and Atmospheric Administration (NOAA), the NCDC archives data from the National Weather Service, military services, the Federal Aviation Administration, the Coast Guard and voluntary observers. F10

Information Everywhere But Where are the Answers?

The Internet revolutionized how the world obtains and disseminates information by providing essentially an online library. But like the libraries in which we researched term papers, without a way to easily search and access that information, the Internet is very much like a room filled with stacks of books.

“A high performance cluster computing architecture that leverages the total processing power of a business is required.”

While the 90s were about information, today is about answers. Answers drive our society. Whether you're an Amazon or a researcher at NOAA, answers are your business and the ability to provide them quickly and cost effectively is a distinct competitive advantage. This is the answer economy.

The answer economy thrives on interpreting, analyzing and rearranging the 0s and 1s that comprise our world. Answers are dynamic and must be accurate. Additionally, the more accurate answers a business can produce in a given time, the more revenue it can generate.



Marc Randall
President and CEO

Today's economy demands answers rapidly and requires that the right people can seamlessly access those answers. Additionally, as the world and workforces disperse there must be fast and reliable connections from anywhere at any time for the answer economy to work efficiently.

Enabling the rise of this new economy are the following technological changes:

- High performance, cost-effective computing
- High-speed storage access and backup
- Embedded security and dynamic denial of service protection
- High-speed, congestion free network
- Virtualizing a centralized network

To ensure accuracy and speed of answers, a high performance cluster computing architecture that leverages the total processing power of a business is required.

With a cluster computing architecture in place, businesses can then feed it with information. The ability to rapidly access stored information and answers is crucial to interpreting available information. This requires high-speed access and backup to a storage network.

If answers are revenue, it is important to ensure that the right people are accessing the right content. Advanced dynamic denial of service protection and embedded security at the system level are required to limit and allow access where, when and by whom it is needed.

Next, making the disparate pieces of the answer economy infrastructure work together requires a high performance network. No longer simply providing transportation, but linking tens of thousands of servers, databases and other computational resources, the network becomes involved in the creation of the answers. As such, it must be both fast and congestion-free to ensure accurate answers are delivered rapidly. And it is resilient, high capacity systems that provide the scalability and reliability to interconnect the pieces of the answer economy infrastructure.

Finally, the distinction between centralized storage and computing versus distributed storage and computing must be transparent to the user community. By enabling anytime access to the network from any external locations, businesses can more effectively leverage their infrastructure to create answers.

In the answer economy, where information transformed into answers is the currency, information technology is regaining its role as a strategic asset that enables competitive advantages. And it is this technology that will ensure businesses are prepared to meet the new challenges and opportunities of the answer economy. F10

UPCOMING EVENTS

SEPTEMBER

IBC2005, Stand 509, Hall 8
Sept. 9–13, Amsterdam, Holland

7th Euro-IX Forum, Sept. 19–20, Prague, Czech Rep.

Fall 2005 Internet2 Member Meeting
Sept. 19–22, Philadelphia, PA

DIA Conference, Sept. 29, DIAC/Bolling AFB,
Washington, DC

iGrid 2005 Workshop, Sept. 26–29, San Diego, CA

NGN 2005 Conference, Sept. 26–30, Washington, DC

OCTOBER

GridWorld/GGF15, Oct. 3–6, Boston, MA

RIPE 51, Oct. 10–14, Amsterdam, The Netherlands

Light Reading's Ethernet Expo 2005, Oct. 12–14,
New York, NY

NANOG 35, Oct. 23–25, Los Angeles, CA

NOVEMBER

SEG Houston 2005, Booth 3016, Nov. 6–11,
Houston, TX

SC2005, Booth 636, Nov. 12–18, Seattle, WA

For a complete list of events, see:
force10networks.com/news/events.asp

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Industry-Leading 1,260 GbE Ports [Continued from page 1]

"Force10's high density portfolio and the unique architecture of the TeraScale E-Series deliver long-term investment protection with revolutionary scalability that can accommodate growth for ten or more years," said Stephen Garrison, vice president, corporate marketing at Force10 Networks.

"With the TeraScale E-Series we have refined the art of high density switching, so it is a natural and logical transition for us to leverage that expertise to broaden our market with the 90-port card."

According to IDC, the data center market will grow from \$5.1 billion in 2004 to \$7.6 billion in 2008 as companies continue to upgrade and build out new infrastructure to support critical business

applications. For the next generation of deployments, data center consolidation and the move to longer product life cycles is driving the demand for high density products that can add years of scalability to the network.

The Force10 TeraScale E-Series delivers unmatched density and performance, processing an industry-leading one billion packets per second. With built-in redundancy and an architecture that distributes switching, routing and management functionality between three processing units, the TeraScale E-Series also delivers the resiliency required to ensure maximum network uptime.

Recently, Force10 launched its S50 data center switch, the industry's first fixed configuration stackable switch purpose-built for the data center. By bringing the performance and resiliency of the TeraScale E-Series to the server edge with the S50, Force10 enables a reliable end-to-end solution for the data center. **F10**

"With 90 ports of Gigabit Ethernet on a single line card, IT managers can process more traffic per input slot."
1,260 GbE Ports