



Product Advisor

Force10 - Terascale E-Series 1200

Enterprise Infrastructure - U.S./Europe

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Current Analysis

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Current Perspective

The Force 10 TeraScale E1200 is competitive in the market because it provides industry leading performance and density, but for now Force 10 has limited itself to the high-performance data center vertical. This means that Force 10 and the E1200 in particular will not be a competitive threat to most enterprise accounts. The E1200 provides up to 56 line-rate 10 Gigabit Ethernet ports and up to 672 line-rate Gigabit Ethernet ports. For example, the Cisco Catalyst 6500 holds a maximum of 576 Gigabit Ethernet ports, and a maximum of 32 10 Gigabit Ethernet ports, counting those on the Supervisor module, and the Extreme BlackDiamond 10808 can provide 480 Gigabit Ethernet ports and 48 10 Gigabit Ethernet ports per chassis. The E1200, using oversubscribed cards, can support up to an astonishing 1260 Gigabit Ethernet per chassis at a 2:1 oversubscription rate on RJ-21 ports. The bottleneck of oversubscription is actually the forwarding engine, not the switch backplane.

With this level of density and performance, the E1200 is a hard act to beat in terms of investment protection. In addition to the usual bevy of redundant fans, power supplies, and redundant fabrics, the E1200 uses a multi-processor design to prevent attacks on the switch from crippling more than any one CPU. This is a unique design among switch vendors.

However, Force 10 is a young company with very little mind share outside the high performance/capacity market. Many customers may feel insecure with a company in start-up status without public financial information such as Force 10. Competitors will categorize Force 10 as either an interesting start-up with no real future or a dangerous upstart that cannot be trusted with the core of the network. Force 10 will need to promote not only the TeraScale E-Series, but also its own reputation and viability in order to have success in the enterprise.

Strengths

- The Force 10 E1200 offers densities in line rate 10 Gigabit Ethernet and Gigabit Ethernet ports that are the highest in the industry, offering significant savings in not only chassis purchases and management, but in facilities costs such as power and cooling.
- Force 10 offers a 90-port Gigabit Ethernet line card with 2:1 oversubscription for customers that need additional ports but do not require line speed. This reduces costs and makes it less expensive per port to deploy Gigabit Ethernet. It should be noted that this line card uses a split pair breakout cable which requires specialized cabling between the switch and the patch panel. Competitors that have tried using this port configuration have not found much success in the market.
- Force10 is joining other vendors such as Extreme Networks in recommending a two-tier architecture for data centers. Eliminating the aggregation layer results in cost savings, but it's unlikely that this will be a factor outside of greenfield installations.
- The TeraScale product provides investment protection for "100 Gigabit Ethernet" ports in the future, should that

standard be approved.

Weaknesses

- As larger and more established competitors begin to bring modular switches to market that rival the capacity and density of the E1200 series, the allure of the product begins to fade and Force 10's start-up status will be more and more of an issue.
- New competitors on the market such as Extreme's BlackDiamond 8800 and Foundry's BigIron RX series have densities that rival the E1200, but do so in a much smaller form factor than the E1200, allowing more chassis per industry standard rack.
- Force 10 is a new player on the market, and a start-up company. Customers are going to have to think long and hard about entrusting the core of their network to a company that may be bought or acquired in the long run. In addition, for ease of maintenance, purchasing, and administration, enterprises tend to buy their networking solutions from one vendor and Force10 does not have a complete solution portfolio, which will limit interest in the product.
- The enterprise demand for high density 10 Gigabit Ethernet is still relatively small right now, and the kind of densities that Force 10 is offering may simply not be appealing or necessary at this time for mainstream enterprises.

Buying Criteria

Performance

- The fabric of the E1200 is 1.68 Tbps and provides 56.25 Gbps non-blocking bandwidth to each line card slot. This amount of bandwidth is currently the leader among Enterprise High Capacity Switch/Routers.
- The E1200 offers up to 672 line rate non blocking Gigabit Ethernet ports and 1260 Gigabit Ethernet ports at an oversubscription rate of 2:1. At 10 Gigabits, the E1200 offers a maximum of 56 line rate non blocking XFP ports.
- The Force 10 E-series used a passive copper backplane that can be scaled up to a maximum bandwidth of 5 Tbps in future releases of the platform.
- Each slot in the Force 10 E-Series 1200 provides 56.25 Gbps per slot, regardless of features enabled on the line card in the slot.
- The Force 10 E1200 can forward over a billion packets per second, making it one of the fastest modular chassis on the market.

Scalability

- The Force 10 E1200 offers 14 open line card slots, and has two separate dedicated slots for fabric/control modules.
- At just short of 25u, the E1200 is one of the largest modular chassis on the market, and only two units can be housed in a single industry standard rack.
- The E1200 supports a forwarding table of 256k routes on the current generation of route management modules. However, competitors such as Foundry's BigIron MG8 provide more than 2 million routes, proving that scale is more than just chassis port density.
- The E1200 features three processors on the route management modules, one for L2 traffic, one for L3 traffic, and one for management traffic. This design allows each processor to perform more operations in its domain than a single all-encompassing processor could in standard designs.

Management/Ease of Use

- The E1200 uses FTOS (Force 10 Operating System) for system control. FTOS is a monolithic operating system designed to provide an industry standard CLI for management as well as traffic management, system accounting, and system diagnostics.
- It is not currently possible to do a hitless code upgrade to the E1200. A reboot of the system is required to take advantage of updates to FTOS. For customers that require non-stop operation, and almost any customer in the enterprise high capacity switch router class would, this is a significant downside.
- Force 10 has the Force10 Management System (FTMS) available to handle management of single or multiple Force10 products. FTMS can manage configurations, system accounting, performance, and security management from a single point, easing the overall management of Force10's systems. FTMS comes in standalone cross-platform Java or can be used from a Web-based client.
- The E1200 features three processors on the route management modules, one for L2 traffic, one for L3 traffic, and one for management traffic. This means that any given attack cannot cripple more than one processor, allowing for corrective action to be taken when other architectures may have become so overburdened that they no longer respond.

Total Cost Of Ownership

- Force 10 offers maintenance contracts for the E1200 series for approximately 7% of list price of the product for ongoing software updates as well as 24/7/365 support.
- Because the E1200 backplane is scaleable to a possible 5 Tbps, the E1200 provides investment protection all the way to the future 100 Gigabit Ethernet standard as well as plenty of room for growth in existing technologies.
- Force 10 Networks is a start-up company, and may be bought or acquired in the future. This increases the

long-term risks on a cost-of-ownership basis.

- The E1200 shares line cards and route management modules with the E600, its smaller brother in the TeraScale product family. This allows for easier sparing and line card inventory management.

Port Diversity

- Force 10 offers five line card modules for the E1200 product, making it very middle of the road for port density when contrasted with competitors. I guess the number of modules they have really doesn't equate to port density to me.
- The E1200 offers up to 672 line rate non blocking Gigabit Ethernet ports and 1260 Gigabit Ethernet ports at an oversubscription rate of 2:1. At 10 Gigabits, the E1200 offers a maximum of 56 line rate non blocking XFP ports.
- Force 10 does not offer any service modules for firewall or any other non-switching/routing network functionality. This puts it at a competitive disadvantage when compared to Cisco and Nortel.

Product Metrics

Physical Characteristics	Value
Device Class	Layer-3
Primary Target Market	Enterprise Backbone
Qos Features	Value
Total # of Transmit Queues per Port	8
Total # of Receive Queues per Port	8
One or More Strict Priority Queues	Yes
Rate Limiting Support	Yes
Rate Limiting Granularity	1MB
Classify by IP DSCP/TOS	Yes
Write/re-write IP DSCP/TOS	Yes
Protocol Support	Value
802.1w Fast Spanning Tree	Yes
802.1s per VLAN Spanning Tree	Yes
802.3ad Trunking	Yes

802.1x User Authentication	No
Network Login	No
IGMP Snooping	Yes
IP Routing	Yes
IP Routing Protocols	RIP v1/v2, OSPF, BGP4, PIM DM/SM, DVMRP IS-IS, VRRP
Interface Support	Value
10/100Base-T	None
10/100Base-T with 802.3af	None
100Base-FX	None
10/100/1000Base-T	48-port
10/100/1000Base-T with 802.3af	None
1000Base-X (GBIC or SFP)	48-port
10G - fixed optics	None
10G - XENPAC	None
10G - XFP	2-port, 4-port
10G-Copper	None
Other (specify type and port count)	None
Special Modules (non-line-cards)	None
Chassis: Specific Characteristics	Value
Total # of Slots in Chassis	14-Slot
Reserved Slots	None, separate slots
Chassis: Fabric Module	Value
Fabric Type	Cross-bar
Fabric Location	SFMs (Switching Fabric Modules)
Fabric Redundancy	Optional, supported in all models
Chassis: High Availability	Value
Hot-Swap Fan Trays	Yes
Hot-Swap Line Cards	Yes
Hot-Swap Management Module	Yes
Hot-Swap Fabric Module	Yes
Hot-Swap Power Supplies	Yes

Hot-Swap Other	Not applicable
Minimum # of Power Supplies	1
Maximum # of Power Supplies	2
Power Supply Load Distribution	50% when two are employed
Non-Stop Code Upgrade	No
Chassis: Performance	Value
Backplane Size	1.68 Tbps
Forwarding Rate	1000 Mpps
Switch Forwarding Latency	Data Unavailable
Support	Value
Standard Warranty	~ 7% of list
Enterprise Maintenance Contract	Typically handled either by IBM or channel partners and resellers
Product Class Ratings	Value
Performance	5
Scalability	4
Management	3
TCO	4
Port Diversity	4