FEATURES

- Unique distributed processor architecture delivers high content switching performance and scalability
- Wire-speed Layer 2, 3, and 4 switching – up to 2.4 M TCP sessions per second
- Industry leading Layer 7 content switching technologies
- Up to 128 Gbps aggregate switch capacity
- Up to 336 Fast Ethernet or 60 Gigabit Ethernet ports
- Capacity for 4 M concurrent active sessions
- Routing protocols RIP2, OSPF, DVMRP, IGMP
- Flexible control of IP traffic using per-port packet filtering rules
- 224 packet filtering rules per Web switching module
- Scales server capacity, ensures application availability, meters bandwidth and server resources, and protects servers from malicious attacks using Web OS services
- Multi-level resiliency
- Dedicated VLANs running on distributed MLT from router to web switching module to speed delivery, isolate traffic, and provide link redundancy

Layer 2 Switching

- IEEE 802.1d Spanning Tree
- Multiple Spanning Tree Domains
- Spanning Tree Fast Start for quick transition in case of configuration changes
- VLANs based on Port, Protocol, IP Subnet and MAC addresses
- IEEE802.1Q VLAN tagging
- Multi-Link Trunking for aggregation
- Distributed MLT for redundancy across cards

Layer 3 Routing

- IP Static Routing
- IP RIPv1 and v2
- OSPF
- VLSM
- CIDR

Alteon 780

HIGH DENSITY CONTENT SWITCH

The Alteon 780 Content Switch is designed specifically for high-volume Web Data Centers. The Alteon 780 combines Alteon's award-winning content switching technology, including Layer 4-7 Web OS software and the Web IC network processor, with Nortel's best-of-breed high-density routing switch to create a complete, high capacity, carrier-class switching system of unprecedented scale. The Alteon 780 is a modular, 10-slot chassis with up to 128 Gbps of scalable bandwidth across up to 336 Fast Ethernet ports or 60 Gigabit Ethernet ports. Service providers, hosters, content providers, e-businesses and enterprises can now get state-of-the-art Web OS Traffic Management while aggregating large numbers of 10/100/1000 Ethernet connections to servers, routers, firewalls, and caches.

Web OS – Internet Traffic Control with the Power of Layer 4-7 Switching

Leading the industry, the Alteon Web OS enables the processing of entire Web sessions at blazing speeds using Layer 4 through 7 information such as TCP port numbers, URLs, HTTP headers, and HTTP cookies. The Alteon 780 can process up to 2.4 million Web connections per second through the use of Alteon's next-generation network processing ASIC, the WebIC™. The Alteon 780 Web Switching Module features 10 purpose-built WebICs, 20 RISC processors, and 48MB of memory for processing session traffic.

The Alteon 780 supports all of Alteon's best-in class Web OS functions. Server Load Balancing optimizes existing servers, enables transparent additions, and features linear performance increases as more servers are added. Firewall Load Balancing extends these benefits to firewalls as well, while comprehensive health checking ensures that all devices are operating at peak efficiency. Web Cache Redirection enables the use of transparent Web caches wherever possible, and improves performance by moving them out of the data path. Innovative Content Intelligent Switching allows traffic management based on content attributes including HTTP headers, HTTP cookies, and URLs, enabling session-level persistence, virtual hosting, and the best use of resources. Bandwidth Management features enable the creation of guaranteed or preferential bandwidth services based on Layer 7 attributes, while Global Server Load Balancing directs the user to nearby mirrored content.

The Best of Layer 2-3 Switching and Routing

The Alteon 780 delivers wire-speed switching and routing over copper and fiber media, supporting a high-performance Layer 2 and Layer 3 switching architecture that delivers 56 Gbps of switching capacity, scalable to 128 Gbps. Wire-speed switching and routing between any two ports on the switch is performed with a latency of less than 10 microseconds, improving website performance. The Alteon 780 supports Multiple Spanning Trees, as well as a rich, flexible set of VLAN configuration options, including those based on port, protocol, IP Subnet, and MAC address. The Alteon 780 supports the configuration of virtual router ports between VLANs, without performance degradation. A variety of high-end routing features include OSPF for fast convergence in the case of topology changes, with low network overhead. Additional features include accept/announce policies for RIP and OSPF to control the exchange of routes. Full DVMRP support, coupled with IGMP snooping and pruning, maximizes IP multicast performance to enable dynamic content distribution.

Highest Availability in the Data Center – And in the Chassis

Alteon's 780 is designed to enable a highly available data center with no single point of failure. Central to that design is the use of the Virtual Router Redundancy Protocol (RFC 2338) on all modules, ensuring fast failover in the event of failure. Alteon 780 Web switching modules can operate in active/active, active/standby, and hot standby modes to ensure non-stop operations while providing parallel processing of Web traffic.

The Alteon 780 is also designed to provide high availability within the chassis itself. The platform delivers a highly available infrastructure with N+1 redundant load sharing power supplies, dual removable fan trays, and hot-swappable modules. The system accommodates two Switch Fabric/CPU cards, offering aggregate switch capacity with the second CPU at the ready in Hot Standby mode to support failover in less than one second. Distributed Multi-Link Trunking provides the ability to aggregate bandwidth between fan-out cards; in the case of failure, traffic is redirected over the remaining trunk links in less than a second. Enhanced Spanning Tree FastStart reduces convergence time on Layer 2 links in the event of a topology change.

Performance Through Distributed Architecture

The Alteon 780 offers premium performance - no matter what the switching task. Alteon's purpose-built WebIC integrates a hardware engine for packet processing with two RISC processors to handle Layer 4-7 switching demands, providing one WebIC per port. Processors

- VRRP
- IP Flow Filters
- IPX Routing
- Concurrent support for bridging and routing on the same port (router support)

Layer 4-7 Web OS Features

- Server Load Balancing
- Firewall Load Balancing
- Web Cache Redirection
- Health Checks
- Content Intelligent Switching
- Bandwidth Management
- Global Server Load Balancing

Easily Integrated With Alteon iSD platforms, to provide:

- SSL acceleration
- Content routing and site selection

ALTEON 780 MODULES

Ten-Slot Chassis
Accepts up to two switch fabrics, eight input/output modules, two fan trays, and three load-balancing power supplies. Ideal system for network configurations where high levels of availability and scalability are absolutely essential.

Switch Fabric/CPU System Module
Delivers high-performance (Layer 2 and Layer 3) traffic switching capability. One per chassis is required; two for redundancy.

10/100 Base-TX Auto-Sensing Module
For aggregation and server applications –48 ports per module.

1000 Base-SX Gigabit Ethernet Module
For backbones and server farms using multi-mode fiber – 8 ports per module.

Eight-Port Gigabit Ethernet Module
For backbones and server farms using gigabit interface converters (GBICs) Type SX for multi-mode fiber, LX for single-mode fiber, XD for single-mode fiber, long distance, and ZX for single-mode fiber, extended distance – 8 ports per module.

share the traffic load using Alteon's innovative Virtual Matrix Architecture, which allows linear scaling of processing capabilities as Web traffic grows. Using VMA, each Alteon Web Switching module supports up to 300,000 sessions per second. For data centers performing even more compute-intensive tasks, such as the decryption and encryption of SSL traffic, the Alteon 780 is easily integrated with Alteon's revolutionary Integrated Service Director (iSD) platform.

For more traditional Layer 2/3 switching, the Alteon 780 features a distributed switching architecture that avoids the bottlenecks found in systems designed around a centralized processing architecture. All packet classification and routing decisions are handled at the port level by wire-speed ASICs, resulting in significantly faster processing than is possible using software-based products. All modules feature ASICs that support eXpress Classification (XC), a hardware-based filtering mechanism for security and traffic classification at wire-speed for Layers 2-4, supporting up to 8 hardware-based queues per port for prioritized traffic. These ASICs maintain forwarding information for bridged and routed traffic, with up to 32K entries using 4MB output buffer memory per Gigabit fan-out port, or shared among 8 FE fan-out ports to speed processing even further. Multi-Link Trunking (MLT) offers bandwidth aggregation. Internal MLT pathways can be tied in as dedicated VLANS to deliver traffic from the router directly to the Web switching module, offering aggregated bandwidth, redundancy, and isolation of traffic.

The Ultimate in Flexibility for QoS - Filters, Prioritization, and Policy Setting

The Alteon 780 features a powerful policy engine that is the basis for capabilities including access control lists that support filtering, network address translation, QoS tagging and traffic redirection/policy routing. Since Layer 4-7 filtering is done on a session basis, instead of packet-by-packet, the Alteon 780 delivers unrivaled filtering performance. The Alteon Web Switch module supports 224 filters, all of which can be applied to one or several ports without performance degradation. The Alteon 780 supports 802.1p CoS and IETF DiffServ support, as well as IEEE 802.1p to DiffServ mapping, so policies are easily maintained.

S P E C I F I C A T I O N S

Standards Supported

Spanning Tree (IEEE 802.1d), MAC Bridges (IEEE 802.1D), VLAN tagging (IEEE 802.1q), Logical Link Control (IEEE 802.2), CSMA/CD (IEEE 802.3),10BASE-T (IEEE 802.3i),100BASE-T (IEEE 802.3u), 1000BASE-SX and 1000BASE-LX (IEEE 802.3z), RMON (RFC 1757), SNMP, IP, RIP1,RIP2, OSPF, DVMRP, IGMP-based multi-cast pruning

Chassis Technical Specifications

Power Supplies:
Three power supplies for redundant configuration
Two power supplies for non-redundant configuration with fully populated chassis
Weight (System):
Minimum 85 lbs (39 kg)
Maximum 200 lbs (91 kg)
Physical Dimensions:
Height: 22.9 in. (58.2 cm)
Width: 18.5in. (47.0 cm)
Depth: 19.9 in. (50.5 cm)
Cooling System Specifications:
2 fan trays, with 8 fans per tray

Model Specifications – All Modules

Microprocessor: PowerPC 740
Memory
Processor DRAM: 64MB
Flash Memory: 16MB
Performance Specifications (64-byte packets)
Aggregate System Throughput: 96 Mpps
Port Forwarding Rate
- Switched 10 Mbps: 14,880 pps
- Switched 100 Mbps: 148,810 pps
- Switched 1000 Mbps: 1,448,100 pps

Latency - for minimum packet length at 100 Mbps: 10 microseconds
Data Rate and Encoding
10 Mbps Manchester encoding
100 Mbps 4B/5B encoding
1000 Mbps 8B/10B encoding

Switch Fabric/CPU System Module

MTBF Rating: 119,047 hours

Weight: 7.2 lbs (3.3 kg)

10/100 Base-TX Auto-Sensing Module
MTBF Rating: 117,411 hours
Weight: 8 lbs (3.6 kg)

1000 Base-SX Gigabit Ethernet Module

MTBF Rating: 96,609 hours
Weight: 8 lbs (3.6 kg)

Eight-Port Gigabit Ethernet Module
MTBF Rating: 96,609 hours
Weight: 8 lbs (3.6 kg)

1000BASE-SX Multi-Mode Fiber
- Gigabit Link Power Budget: 7.5dB
- Gigabit Cabling Operating Distance:
  - Specification - 50 micron MM fiber, Minimum – 550 meters
  - Specification - 62.5 micron MM fiber, Minimum – 260 meters

1000BASE-LX Multi-Mode Fiber
- Gigabit Link Power Budget: 7.5dB
- Gigabit Cabling Operating Distance:
  - Specification - 50 micron MM fiber, Minimum – 550 meters
  - Specification - 62.5 micron MM fiber, Minimum – 550 meters

1000BASE-LX Single-Mode Fiber
- Gigabit Link Power Budget: 8.0dB
- Gigabit Cabling Operating Distance: Specification - 10 micron MM fiber, Minimum - 5 kilometers

1000BASE-XD Single-Mode Fiber
- Gigabit Cabling Operating Distance: Specification - 10 micron MM fiber, Minimum - 50 kilometers

1000BASE-ZX Single-Mode Fiber
- Gigabit Cabling Operating Distance: Specification - 10 micron MM fiber, Minimum - 70 kilometers

Physical Dimensions

Height: 1.5 inches (3.8 cm)
Width: 15.4 inches (39.1cm)
Depth: 18.5 inches (47.0cm)
Weight: 9 lbs. (4 kg) approx.

Electrical Specifications
Line Frequency 47 to 63 Hz
Input Power 100 W (max)
Thermal Rating 340 BTU/hr

Environmental Specifications
Operating Temperature: 5° to 40° C
Storage Temperature: -25° to 70° C
Operating Humidity: 85% maximum relative humidity, non-condensing
Storage Humidity: 95% maximum relative humidity, non-condensing
Operating Altitude: 10,000 ft (3,000 m) maximum
Storage Altitude: 10,000 ft (3,000 m) maximum
Free Fall/Drop: ISO 4180-s, NSTA 1A
Vibration: IEC 68-2-6/34
Shock/Bump IEC 68-2-27-29

Certifications
Emissions: FCC CFR47 Part 15, Subpart B, Class A, ICES-003, Issue-2, Class A, AS/NZS 3548:1995, Class A, VCCI-V3/97.04, Class A, CNS13438, Class A, EN 55 022 (CISPR 22:1985), Class A, CE Mark, EN 50082-1,1992
Safety: UL 1950, CUL CSA 22.2 #950, CB with all national deviations, NOM NOM -019-SCFI 1994