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Enterprise Networking

Solutions and Cases

Huawei Technologies Co., Ltd.

HUAWEI

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1 Overview

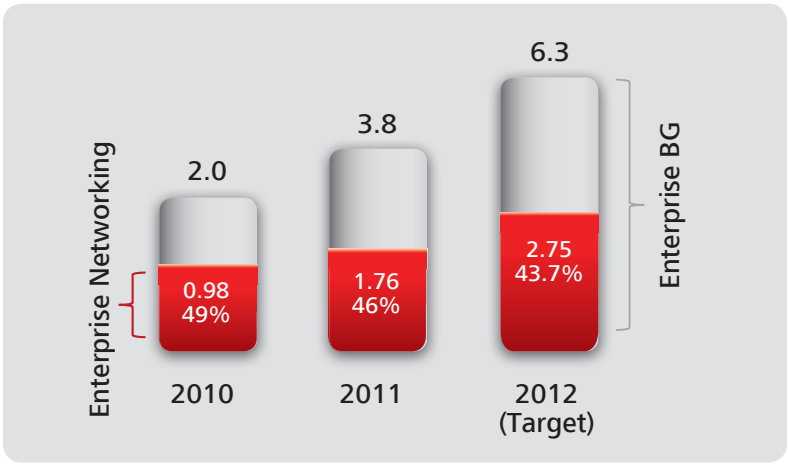
Enterprise Networking: Connecting with Channel Partners for Mutual Success

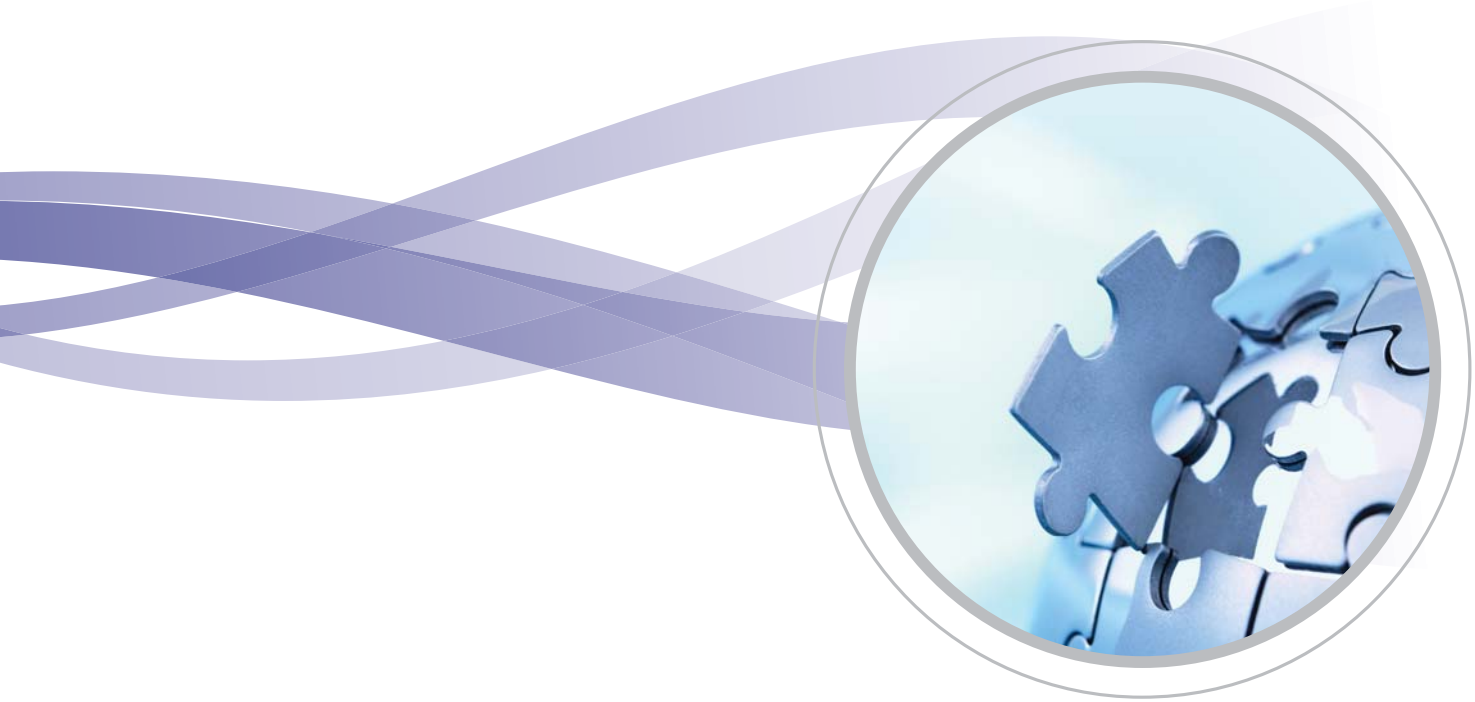
Today, more than ever, enterprises across a spectrum of industries and government agencies, need cost-effective, innovative, secure and reliable networking solutions. Leveraging more than 20 years of technical expertise and deep understanding of customer requirements and services, Huawei is committed to creating commercial win-win situations, together with enterprise customers and partners, through unprecedented levels of openness and cooperation.

In 2011, the Huawei Enterprise Networking Product Line (Enterprise Networking), a business unit (BU) under the Enterprise Business Group (Enterprise BG), contributed 46% of the Enterprise BG's total sales revenue. Enterprise Networking provides verticals (such as government, transportation, electric power, energy, finance, and large enterprises) and partners with end-to-end network solutions, which cover an impressive range of switches, routers, optical transport devices, and access network devices. Based on the network architectures, these solutions are classified into a campus network solution, a wide area network (WAN) interconnection solution, an enterprise branch access solution, and a data center network solution.

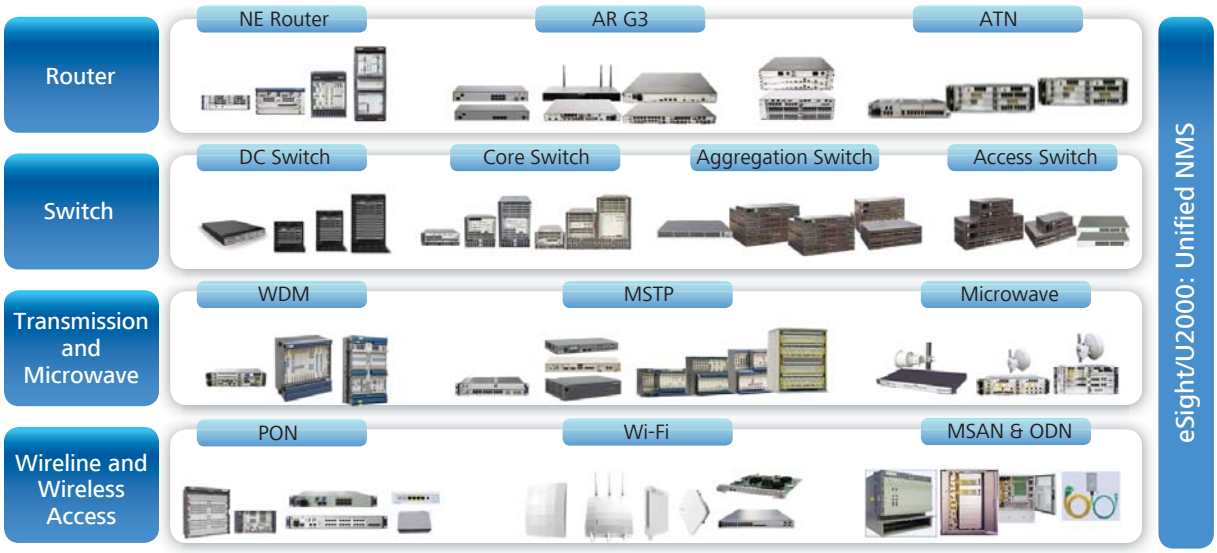
Total Sales and 2012 Projections

Unit: US$1 billion

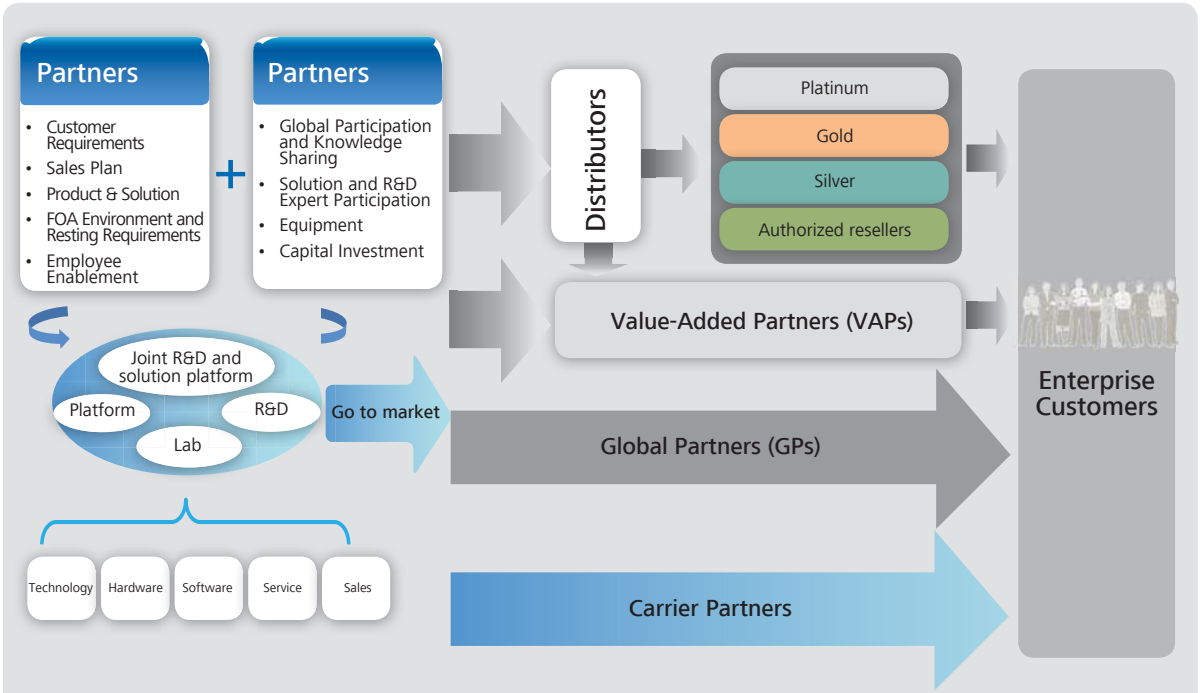




The World's Most Advanced and Comprehensive Global Enterprise Network Products and Solutions



Competitive Advantage Opportunities through "Win-Win" Channel Partner Strategies



- 224 service partners and more than 5,000 certified engineers
- More than 200 senior certification architects
- Collaboration with higher education institutions from more than 30 countries
- 27 Huawei authorized learning partners (HALPs)

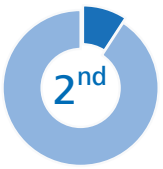
Enterprise Partner

A Rising Star: Committed to the Future of the Global Enterprise Networking Market

With more than 140,000 dedicated employees worldwide, Huawei has established 14 regional offices and more than 140 branches, including 20 R&D centers and 36 training centers. More than 43,600 employees focus specifically on R&D for products and solutions, and more than 20,000 employees are dedicated to enterprise business. Four new competency centers in the United States, Europe and China (Beijing and Shanghai) will further fortify Huawei's industry solution capabilities.

Number Two in the Global Enterprise Router Market

Gartner



9.2%

Data source: Gartner's consulting report *Enterprise Traditional Routers, Vendor Revenue, Worldwide,* 2010-2011

Quickly Gaining Ground in the Global Enterprise Switch Market

IDC
Analyze the Future

2.1%

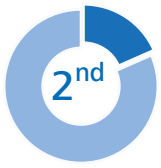
Data source: According to IDC's report, Huawei ranked Number 5 in the global enterprise Ethernet switch market in 2012 Q1.

- Shipped 40 million switch ports in 2011.
- Delivered 800,000 switches worldwide in 2011.
- Witnessed a year-on-year sales revenue increase rate of 527 percent in 2011.

After only one year, Huawei has risen to being a TOP 5 switch vendor, starting from "zero" market share.

Number Two in the Global Carrier Router Market

OVUM



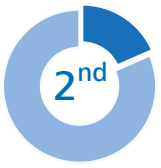
18%

In 2011 Q4, Huawei ranked Number Two in terms of IP router sales revenue.

Data source: OVUM's 2011 Q4 report.

Number Two in the Global Carrier Switch Market

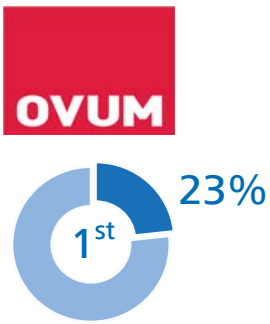
INFONETICS RESEARCH



19%

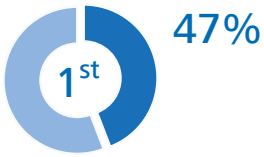
Data source: Infonetics, 2011 Q3 report.

Number One in WDM for Three Consecutive Years



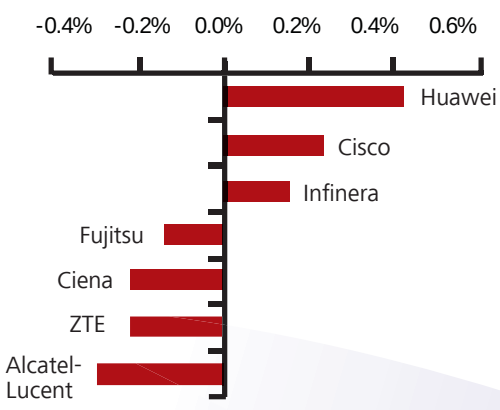
Data source: OVUM's consulting report, 2011 Q2–2012 Q1.

Number One in the Global GPON Market



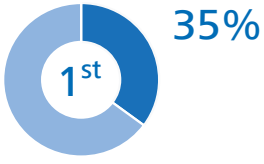
According to Infonetics' report on the worldwide 2.5 GPON market share, Huawei ranked Number1 in GPON shipments in 2011.

Number One in WDM Market Share Growth



Data source: OVUM's consulting report, 2011 Q1–2011 Q4.

Number One in the Global EPON Market



According to Infonetics' report on the worldwide 1.25 G / 2.5 EPON market share, Huawei ranked Number One in EPON shipments in 2011.

Data source: Infonetics' consulting report *PON, FTTH, and DSL Aggregation Equipment and Subscribers Market Share, Size, and Forecasts,* 2011 Q4 report, released on January 20, 2012.

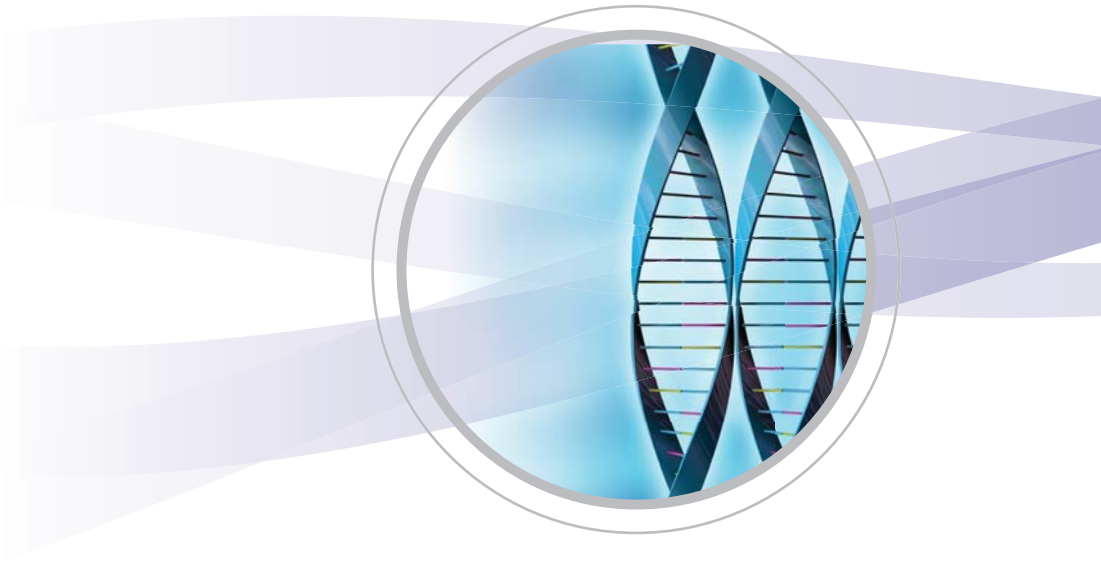
Huawei: Sole Challenger in LSW and WLAN

After only one year in the enterprise market, Gartner has listed Huawei in the fourth quadrant of its Magic Quadrant, signifying that Huawei has become Cisco's *only* serious challenger in the LSW and WLAN markets.

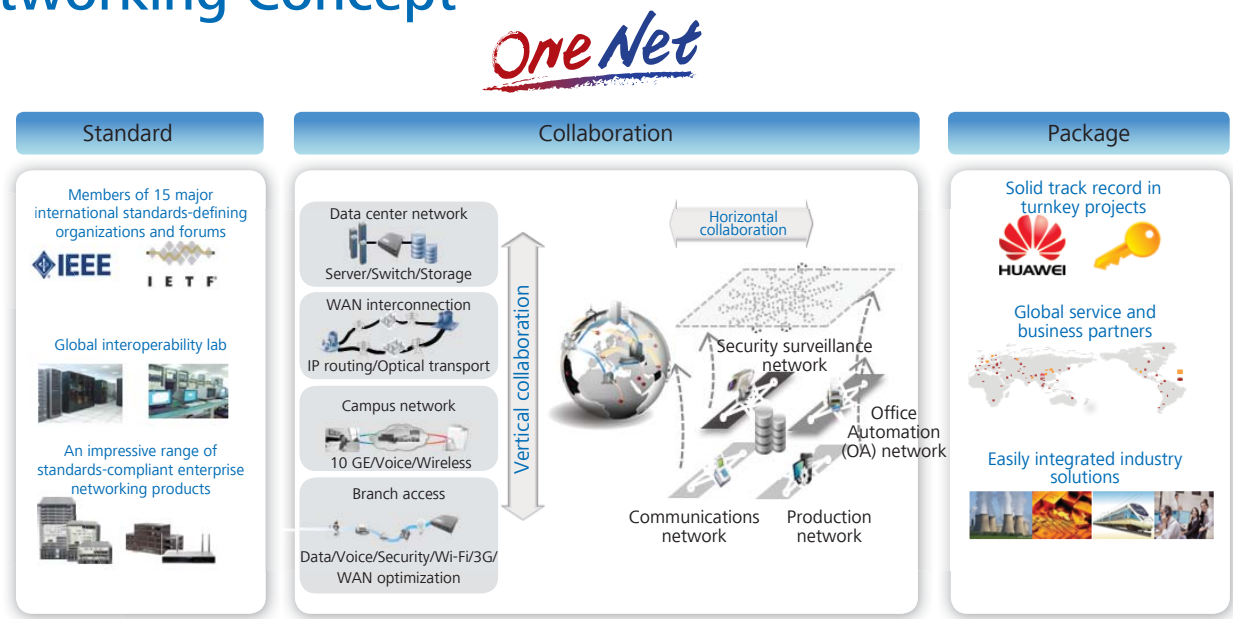
According to Gartner:

"With a strong carrier heritage, Huawei has a rich portfolio of products and the resources to deliver to new markets."

"Huawei can deploy a single architecture with its Enterprise Network Solution, which includes network management, security, firewall and guest access for wired and wireless connectivity, as well as a single-policy enforcement application for enterprises looking for one vendor."



One Net: Huawei's Leading Enterprise Networking Concept

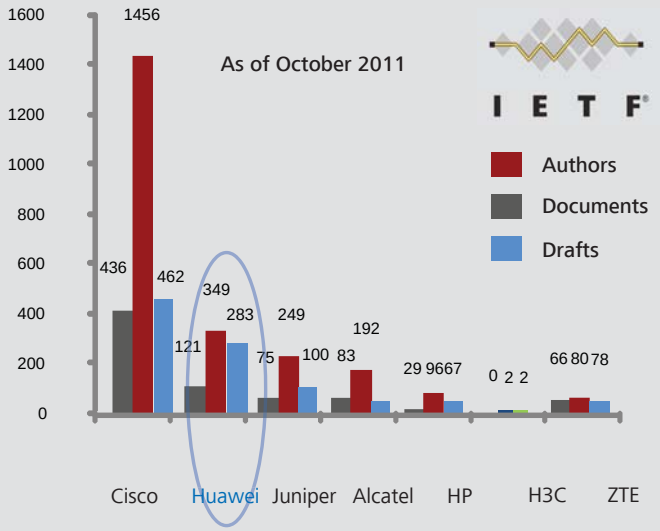


One Net focuses on creating benefits for enterprises and aims to constantly increase their efficiencies, reduce costs, and improve service experience under diverse applications, devices, standards, environments, and experience scenarios. The One Net solution has three major features: standard, collaboration, and package.

- Standard: Ensures openness and encourages interoperability to reduce network buildout costs and drive network convergence.
- Collaboration: Simplifies network architecture and brings a "one network" user experience. Through vertical collaboration, this feature unleashes "cloud-pipe-device" boundaries to achieve intelligent linkage of network components. Through horizontal collaboration, it consolidates the customer's multiple networks.
- Package: Works with partners in an open, cooperative, and mutually beneficial arrangement to provide enterprises with a package of solutions.

One Net Concept: Standard

Second Highest Contributor to the Internet Engineering Task Force (IETF)



349 authors for IETF, ranking No. 2 behind Cisco

- 25,000-plus standard proposals (as of June 30, 2011)
- Member of 148 international standards-defining organizations
- Boards of Directors (BOD) member at IEEE, CCSA, ATIS, BBF, ETSI, OMA, and WiMAX Forum
- 150-plus important positions at IETF, ITU, 3GPP, OMA, ETSI, ATIS, etc.
- 3200-plus patents in the transmission field

One Net Concept: Collaboration

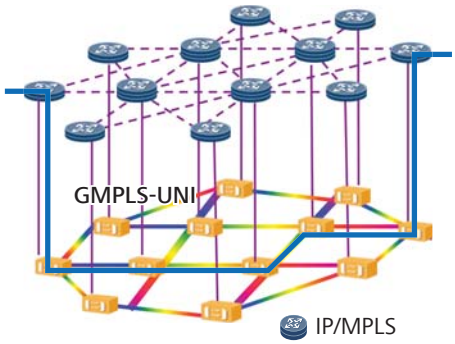
Wireline and Wireless Collaboration

Flexible, secure wireline and wireless access (including 3G, Wi-Fi, and VPN) through AR G3

iAccess mobile office

Smartphone 3G office

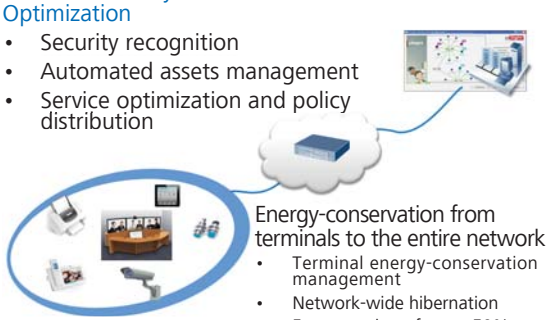
IP and Optical Collaboration



Terminal and Network Collaboration

Terminal Security and Service Optimization

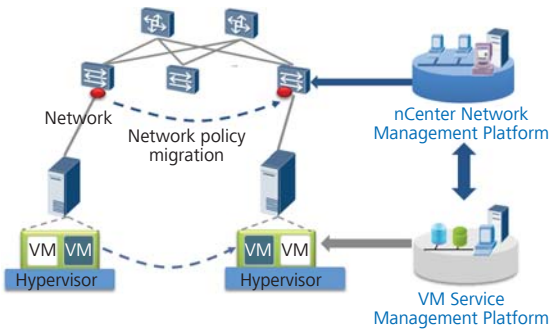
- Security recognition
- Automated assets management
- Service optimization and policy distribution



Energy-conservation from terminals to the entire network

- Terminal energy-conservation management
- Network-wide hibernation
- Energy saving of up to 50%

VM Migration Collaboration



High Marks for Huawei Enterprise Networking Products from Leading Industry Authority

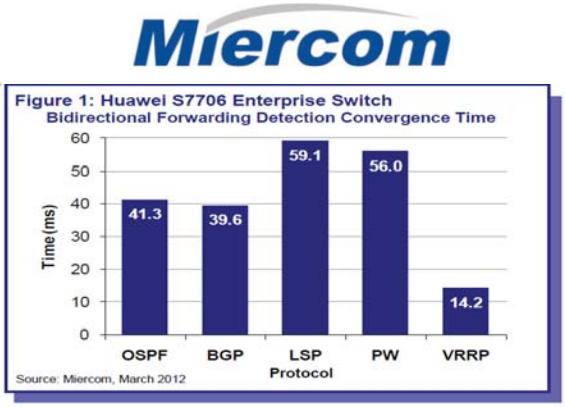
- Huawei switches have been tested and granted the prestigious Miercom Performance Verified Award.

Testing Result for the Huawei S7706 Switch

Key findings and conclusions:

- Huawei S7706 switch supports patented Cluster Switching System technology for high availability
- Smart Ethernet Protection (SEP) protocol is supported with highly advanced capabilities
- Interoperable with switches from other manufacturers
- Supports a variety of high performance interface boards, including 40*-, 16*- and 12*10GE blades
- Hardware BFD and OAM exhibited perfect performance in fault detection and switchover

The S7706 switch exhibited perfect performance in fault detection and switchover.



The chart above shows failover convergence times with protocols. Network resiliency is improved with lower times.

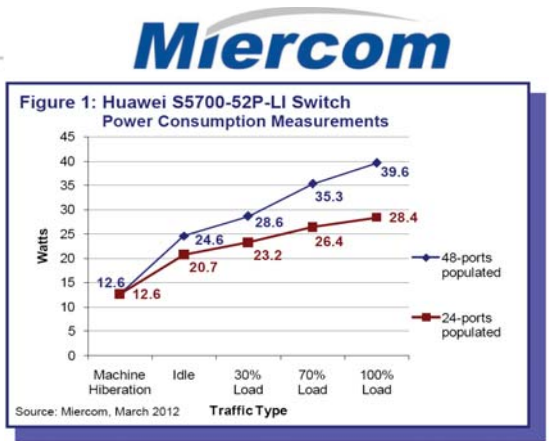
The following Huawei chassis-shaped switches have passed Miercom's testing: S7706 / S9306.

Testing Result for the Huawei S5700 Switch

Key findings and conclusions:

- Advanced Hibernation Management (AHM), Energy Efficient Ethernet (EEE) and flexible time-based strategy for energy savings reduce power consumption by 50%
- Unique Dying Gasp feature provides immediate notification of switch power off with SNMP
- Ring network fault convergence time is less than 50ms using G.8032, SEP and other interoperable protocols
- iStack bandwidth shows 10Gbps throughput
- Batch updating allows software upgrades en masse to switches

Advanced Hibernation Management (AHM), Energy Efficient Ethernet (EEE), and flexible time-based strategy for energy savings reduce power consumption by 50 percent.



The above graph shows the power consumption of the S5700-52P-LI switch. The numbers represent actual readings with 24 or 48 ports populated. The implementation of Energy Efficient Ethernet (EEE) significantly cuts power usage.

"In recent tests of seven series of Huawei switches, Miercom was impressed with the high performance, large capacity, interoperability and high availability of the Huawei products. Having resiliency, energy efficiency, and low latency, the switches met the required criteria to achieve the Miercom Performance Verified Award." -- "Huawei Switches provide Enterprise and Carrier class solutions," http://www.miercom.com/2012/03/huawei-switches-provide-enterprise-and-carrier-class-solutions/, Posted on 05 March 2012 by Miercom.

About Miercom

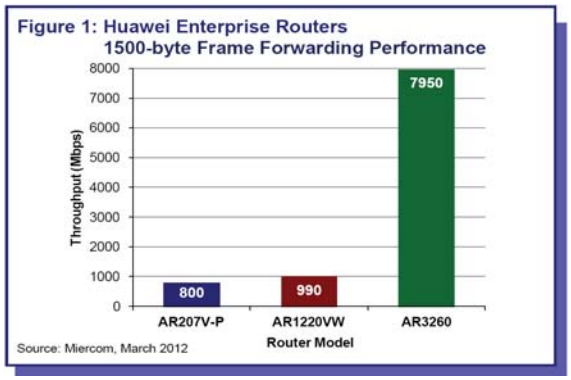
Miercom is recognized as the world's leading and most respected independent private testing organization, performing competitive product comparisons and product evaluations. Miercom's findings are published in major network trade journals.

Testing Result for Huawei AR G3 Series Routers

Key findings and conclusions:

- Huawei AR207V-P router achieved 177.5 Mbps throughput with IMIX traffic and IPsec security enabled
- Using 1500-byte frames, the AR1220VW router was capable of forwarding 990 Mbps
- AR3260 forwarding rate was 7,950 Mbps using 1500-byte frames, exceeding vendor specifications
- Hot-swappable fan modules and interface cards, as well as LACP load balancing on LAN cards, reduce downtime and maintain high availability in networks

Miercom verified the performance and reliability of Huawei AR Series of routers. In hands-on testing, Huawei demonstrated exceptional performance.



Comparison of 1500-byte forwarding performance for the AR207V-P, AR1220VW, and AR3260. Product testing proved all routers exceed the rated specifications.

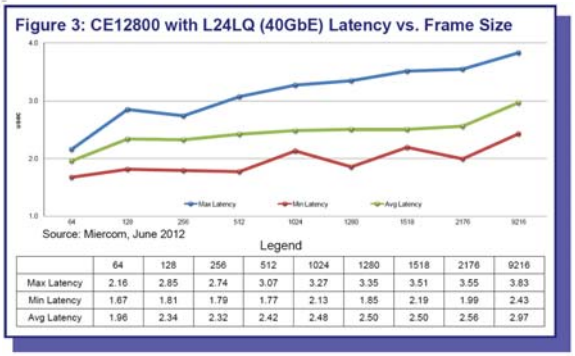
The following Huawei AR G3 routers have passed Miercom's testing: AR207V-P / AR1220VW / AR3260.

Testing Result for CE12812 Data Center Switch

Key findings and conclusions:

- Huawei CloudEngine 12812 proved full line rate throughput at 2 Tbps per line card without loss using traffic pairs on the same line card as well as traversing cards
- CE12800 is a high performance, scalable core switch supporting up to 1152*10GbE or 288*40GbE port connections, up to 47.52 Tbps of line rate traffic and 28,800 Mpps forwarding rate
- Ultra low latency of 2-5 usec and low jitter even during high volume traffic tests and regardless of frame size
- Highly reliable Core Data Center Switch with hot swappable components including line cards, power supplies, cooling fans and redundant processing modules
- CE12800 is highly energy efficient with power consumption 50% better than the industry average for core switches

*CE12800 is a high performance, scalable core switch supporting up to 1152*10 GbE or 288*40 GbE port connections, up to 47.52 Tbps of line rate traffic and 28,800 Mpps forwarding rate.*



	64	128	256	512	1024	1280	1518	2176	9216
Max Latency	2.16	2.85	2.74	3.07	3.27	3.35	3.51	3.55	3.83
Min Latency	1.67	1.81	1.79	1.77	2.13	1.85	2.19	1.99	2.43
Avg Latency	1.96	2.34	2.32	2.42	2.48	2.50	2.50	2.56	2.97

The CE12800 switch exceeded the industry average latency for switches in its class for 9216 byte traffic, approximately 10 µs, achieving a far superior store and forward latency of less than 3 µs.

The following Huawei data center switches have passed Miercom's testing: CE12812 / CE6850.

The following Huawei box-shaped switches have passed Miercom's testing: S1700-28GFR-4P / S2700-EI / S5700-EI / S5700-LI / S6700-EI.

Enterprise Networking Products Certified through Extensive Testing

Huawei Next-Generation (NG) WDM Products: IBM GDPS and STP Interoperability Testing (IOT) Certified

2455 South Road
Poughkeepsie, New York 12601
August 21, 2008

BM® GDPS® and Server Time Protocol (STP) Application Qualification support for the Huawei OptiX OSN 6800 / OSN 3800 V100R004 Dense Wavelength Division Multiplexing (DWDM) Platform

International Business Machines Corporation and Huawei Technologies Co. Ltd. have successfully completed application qualification testing of the Huawei OptiX OSN 6800 / OSN 3800 V100R004 Dense Wavelength Division Multiplexing (DWDM) Platform for the following IBM Parallel Sysplex and Geographically Dispersed Parallel Sysplex (GDPS) IBM System z10, z9 and IBM eServer zSeries 990 and 890 environments:

- GDPS / Peer-to-Peer Remote Copy (PPRC) (Metro Mirror) using ESCON or Fibre Channel Protocol (FCP), IBM Sysplex Timer and InterSystem Channel-3 (ISC-3) for synchronous remote data copy applications.
- GDPS / Peer-to-Peer Remote Copy (PPRC) (Metro Mirror) using ESCON® or Fibre Channel (FCP) for remote data copy and ISC-3 Peer Mode links with STP message passing for server time synchronization.
- GDPS / Extended Remote Copy (XRC) (z/OS Global Mirror) using FICON for asynchronous remote copy.

Distances for the protocols supported for these GDPS applications are defined in the Qualification Results Summary below. Although STP applications have been successfully tested to a distance of 200 km, IBM requires an RPQ (8P2263) to assure applications between 100 km and 200 km adhere to the bounds of our qualification. This is due to the critical requirement of assuring that no more than 900m of differential delay was introduced into the network. It may also be possible to support some protocols at greater distances, such as FICON, FCP, ESCON and InterSwitch Links (ISLs) if approved by IBM RPQ 8P2263.

Internationally Certified Enterprise Networking Products