

Huawei S1700 Series Enterprise Switches

Feature Validation and Performance Evaluation

Executive Summary

The S1700 series enterprise switches are next-generation energy-saving Ethernet access switches developed by Huawei. The S1700 switches use high-performance hardware and offers various features to help users build secure, reliable and high-performance networks. The S1700 switches are easy to install and maintain which make them ideal for small- and medium-size enterprises, Internet cafes, hotels and schools.

The S1700 series switches consists of unmanaged switches, SNMP-based switches, and a Web-managed switch.

Tolly engineers evaluated Huawei's S1700 series switches in multiple areas including the performance (line-rate forwarding capability), MAC table capacity, VLAN capacity, power saving, Ethernet features, device and user management, security etc.

The Bottom Line

Huawei S1700 Series Enterprise Switches:

- 1 Support line-rate forwarding
- 2 Support the power saving feature EEE to save up to 30% power consumption on the S1720 switches
- 3 Support various security features including ARP limit, DHCP limit, MAC security and Attack Source Tracing on the S1720 switches
- 4 Support Operation and Management (O&M) features including Remote Network Management (RMON) and Syslog on the S1720 switches
- 5 Interoperate with Cisco switches

Huawei S1700 Series Switches Layer 2 RFC2544 Throughput
(as reported by Spirent TestCenter)

Frame Sizes	Throughput (% line rate)						
	64-Byte	128-Byte	256-Byte	512-Byte	1024-Byte	1280-Byte	1518-Byte
S1700-16R with 16 FE Ports	100%	100%	100%	100%	100%	100%	100%
S1700-24R with 24 FE Ports	100%	100%	100%	100%	100%	100%	100%
S1700-26R-2T with 24 FE Ports + 2 GbE Ports	100%	100%	100%	100%	100%	100%	100%
S1720-20GFR-4TP-AC with 20 GbE Ports	100%	100%	100%	100%	100%	100%	100%
S1720-28GFR-4TP-AC with 28 GbE Ports	100%	100%	100%	100%	100%	100%	100%

Note: Zero frame loss in all tests. Full-mesh topology for the same type of ports (FE ports with FE ports, and GbE ports with GbE ports).

Source: Tolly, December 2014

Table 1



Test Results

In this evaluation, all S1720 switches are manageable using the console port with command lines while all S1700 models are unmanaged switches.

Performance

Tolly engineers evaluated the forwarding capability of a few S1700 series switches with 64-, 128-, 256-, 512-, 1024-, 1280- and 1518-byte frame sizes. All switches under test provided 100% line-rate Layer 2 forwarding with 0 frame loss. See Table 1 for detail.

S1700-16R: 1.6Gbps with 16 FastEthernet (FE) ports in full-mesh topology.

S1700-24R: 2.4Gbps with 24 FE ports in full-mesh topology.

S1700-26R-2T: 4.4Gbps with 24 FE ports in full-mesh and 2 GbE ports in full-mesh topology.

S1720-20GFR-4TP-AC: 20Gbps with 20 GbE ports in full-mesh topology.

S1720-28GFR-4TP-AC: 28Gbps with 28 GbE ports in full-mesh topology.

MAC Table Capacity

Tolly engineers verified that the S1700 switches' MAC table capacity was 8K and the S1720 switches' MAC table capacity was 16K.

VLAN Capacity

Tolly engineers verified that the S1720 switches supported 4KVLANs.

Power Saving

Tolly engineers verified that the Energy Efficient Ethernet (EEE) feature could save up to 30% power on the S1720 switches.

Basic Features

One-touch Reset

The S1720 switches provide a Reset button on the front panel. When Tolly engineers long-pressed the button, the switch was reset to run with the out-of-box configuration.

LLDP

The S1720 switches supported the Link Layer Discovery Protocol (LLDP) to discover information of the neighbor devices.

VCT

The S1720 switches supported Virtual Cable Test (VCT) to detect and report cable statistics such as cable length, link status, etc..

SNMPv3

The S1720 switches supported SNMPv3. Tolly engineers used the MIB Browser application on a server to walk the SNMP information tree of the switch.

Ethernet Features

LACP

The S1720 switches supported Link Aggregation Control Protocol. Tolly engineers verified that traffic from different sources was load balanced to all links in the Link Aggregation Group.

Device Management

S1720 Management

The S1720 switches supported SNMP, Web, Telnet and console port management.

Syslog

The S1720 switches supported to work as Syslog hosts. Tolly engineers used a Syslog server to receive the Syslogs from the S1720 switches.

Huawei Technologies, Co., Ltd		
S1700 Series Enterprise Switches		
Feature Validation and Performance Evaluation	<i>Tested December 2014</i>	

RMON

The S1720 switches supported Remote Network Management (RMON). Tolly engineers configured RMON on the S1720 switch to monitor traffic statistics, trigger RMON events, and send alarm traps to the MIB Browser on a server.

User Management

RADIUS

S1720 switches supported RADIUS authentication.

Portal

S1720 switches supported Portal authentication.

Security

Certain types of protocol packets including ARP requests, ICMP, DHCP Discover, etc. are sent to switch's CPU for processing. It's critical that the switch provides certain attack defense features to prevent the CPU from overloading.



Huawei S1700 Series Enterprise Switch Tolly Verified Features, Performance and Capacity

Performance (Forwarding Capability)		Basic Features	
✓	S1700-16R: 1.6Gbps	✓	One-touch Reset Reset button on S1720 switches
✓	S1700-24R: 2.4Gbps	✓	LLDP on S1720 switches
✓	S1700-26R-2T: 4.4Gbps	✓	Virtual Cable Test (VCT) on S1720 switches
✓	S1720-20GFR-4TP-AC: 20Gbps	✓	SNMPv3 on S1720 switches
✓	S1720-28GFR-4TP-AC: 28Gbps	Ethernet Features	
MAC Table Capacity		✓	Link Aggregation Control Protocol (LACP) on S1720 switches
✓	S1700-16R: 8K	Device Management	
✓	S1700-24R: 8K	✓	Syslog host on S1720 switches
✓	S1700-26R-2T: 8K	✓	Remote Network Management (RMON) on S1720 switches
✓	S1720-20GFR-4TP-AC: 16K	User Management	
✓	S1720-28GFR-4TP-AC: 16K	✓	RADIUS authentication
VLAN Capacity		✓	Portal authentication
✓	S1720-20GFR-4TP-AC: 4K	Security	
✓	S1720-28GFR-4TP-AC: 4K	✓	ARP Limit (ARP suppression based on source MAC) on S1720 switches
Power Saving		✓	DHCP Limit on S1720 switches
	EnergyEfficient Ethernet (EEE) save up to 30% power consumption on the S1720 switches	✓	MAC Security (limit the number of MAC addresses can be learned from a port) on S1720 switches
		✓	Attack Source Tracing Attack source tracing, Alarm function of attack source tracing, and Attack source tracing punishment on S1720 switches

Note: S1700 switches are unmanaged or SNMP-based switches. S1720 switches are Web-managed switches.

Source: Tolly, December 2014

Table 2



Tolly. ARP Limit

The S1720 switches supported the ARP limit feature. When the feature was enabled, the S1720 switch only replied ARP requests from a certain source or every source with a certain rate. The switch ignored other ARP requests.

DHCP Limit

When the DHCP snooping and the DHCP limit features were enabled, the S1720 switch was able to limit the forwarding rate of DHCP Discover packets.

MAC Security

When the MAC security feature was enabled on a port, the S1720 switch could only learn certain number of MAC addresses (marked as sticky type by the switch) from that port. Tolly engineers verified that the sticky MAC addresses stayed in the MAC table and never expired even with device reboot. No other new MAC addresses could be learned from that port.

Attack Source Tracing

Three functions of Attack Source Tracing were verified on the S1720 switch by Tolly engineers.

Attack source tracing - Administrators can set the threshold and sampling ratio for attack source tracing. When the number of protocol packets sent from an attack source in a specified period exceeds the threshold, the switch traces and logs the attack source to notify the administrator.

Alarm function of attack source tracking - Alarms can be triggered when the threshold is exceeded.

Attack source punishment - Administrator can configure attack source punishment to discard or shut down the interface that received attack packets.

Test Setup & Methodology

Test Methodology

Attack Source Tracing

ARP request packets, ICMP packets, IGMP report packets, DHCP discover packets, telnet packets, TTL expired packets, and TCP packets with the switch as the destination were used to verify the feature.

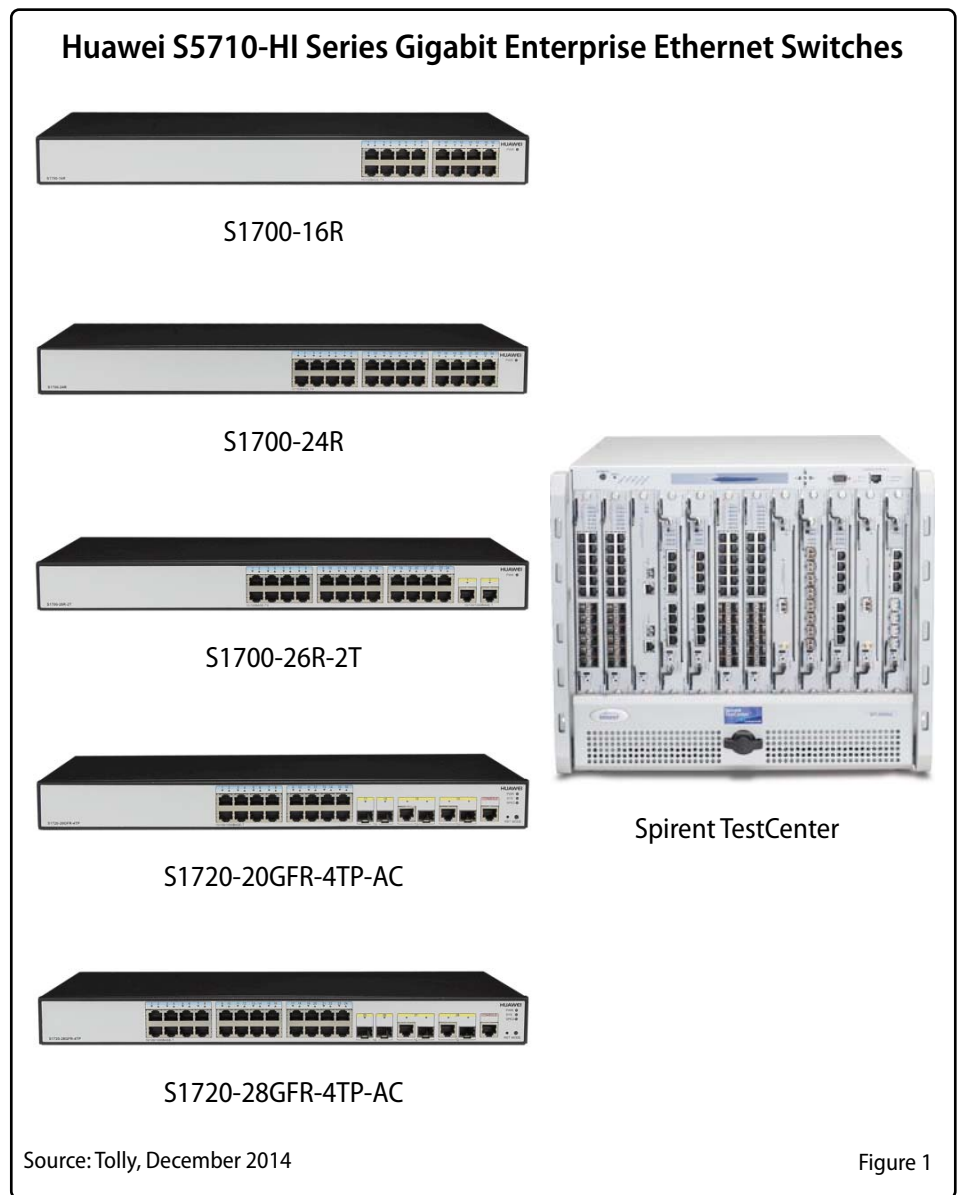


Figure 1



About Tolly


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You can reach the company by E-mail at sales@tolly.com, or by telephone at +1 561.391.5610.

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Test Equipment Summary

The Tolly Group gratefully acknowledges the providers of test equipment/software used in this project.

Vendor	Product	Web
Spirent	Spirent TestCenter	 http://www.spirent.com

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