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

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)

<table>
<thead>
<tr>
<th>Frame Sizes</th>
<th>Throughput (% line rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>64-Byte</td>
</tr>
<tr>
<td>S1700-16R with 16 FE Ports</td>
<td>100%</td>
</tr>
<tr>
<td>S1700-24R with 24 FE Ports</td>
<td>100%</td>
</tr>
<tr>
<td>S1700-26R-2T with 24 FE Ports + 2 GbE Ports</td>
<td>100%</td>
</tr>
<tr>
<td>S1720-20GFR-4TP-AC with 20 GbE Ports</td>
<td>100%</td>
</tr>
<tr>
<td>S1720-28GFR-4TP-AC with 28 GbE Ports</td>
<td>100%</td>
</tr>
</tbody>
</table>

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.

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 4K VLANs.

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.

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

<table>
<thead>
<tr>
<th>Performance (Forwarding Capability)</th>
<th>Basic Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1700-16R: 1.6Gbps</td>
<td>One-touch Reset</td>
</tr>
<tr>
<td></td>
<td>Reset button on S1720 switches</td>
</tr>
<tr>
<td>S1700-24R: 2.4Gbps</td>
<td>LLDP on S1720 switches</td>
</tr>
<tr>
<td>S1700-26R: 4.4Gbps</td>
<td>Virtual Cable Test (VCT) on S1720 switches</td>
</tr>
<tr>
<td>S1720-20GFR-4T-P-AC: 20Gbps</td>
<td>SNMPv3 on S1720 switches</td>
</tr>
<tr>
<td>S1720-28GFR-4T-P-AC: 28Gbps</td>
<td></td>
</tr>
</tbody>
</table>

### Ethernet Features

<table>
<thead>
<tr>
<th>MAC Table Capacity</th>
<th>Device Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Aggregation Control Protocol (LACP) on S1720 switches</td>
<td>Syslog host on S1720 switches</td>
</tr>
</tbody>
</table>

### MAC Table Capacity

<table>
<thead>
<tr>
<th>VLAN Capacity</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADIUS authentication</td>
<td>DHCP Limit on S1720 switches</td>
</tr>
</tbody>
</table>

### Power Saving

<table>
<thead>
<tr>
<th>Energy Efficient Ethernet (EEE)</th>
<th>MAC Security (limit the number of MAC addresses can be learned from a port) on S1720 switches</th>
</tr>
</thead>
<tbody>
<tr>
<td>save up to 30% power consumption on the S1720 switches</td>
<td>Attack Source Tracing, Alarm function of attack source tracing, and Attack source tracing punishment on S1720 switches</td>
</tr>
</tbody>
</table>

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

Source: Tolly, December 2014

Table 2
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 a 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 - Administrators can configure attack source punishment to discard or shut down the interface that received attack packets.

Test 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.
Terms of Usage

This document is provided, free-of-charge, to help you understand whether a given product, technology or service merits additional investigation for your particular needs. Any decision to purchase a product must be based on your own assessment of suitability based on your needs. The document should never be used as a substitute for advice from a qualified IT or business professional. This evaluation was focused on illustrating specific features and/or performance of the product(s) and was conducted under controlled, laboratory conditions. Certain tests may have been tailored to reflect performance under ideal conditions; performance may vary under real-world conditions. Users should run tests based on their own real-world scenarios to validate performance for their own networks.

Reasonable efforts were made to ensure the accuracy of the data contained herein but errors and/or oversights can occur. The test/audit documented herein may also rely on various test tools the accuracy of which is beyond our control. Furthermore, the document relies on certain representations by the sponsor that are beyond our control to verify. Among these is that the software/hardware tested is production or production track and is, or will be, available in equivalent or better form to commercial customers. Accordingly, this document is provided "as is", and Tolly Enterprises, LLC (Tolly) gives no warranty, representation or undertaking, whether express or implied, and accepts no legal responsibility, whether direct or indirect, for the accuracy, completeness, usefulness or suitability of any information contained herein. By reviewing this document, you agree that your use of any information contained herein is at your own risk, and you accept all risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from any information or material available on it. Tolly is not responsible for, and you agree to hold Tolly and its related affiliates harmless from any loss, harm, injury or damage resulting from or arising out of your use of or reliance on any of the information provided herein.

Tolly makes no claim as to whether any product or company described herein is suitable for investment. You should obtain your own independent professional advice, whether legal, accounting or otherwise, before proceeding with any investment or project related to any information, products or companies described herein. When foreign translations exist, the English document is considered authoritative. To assure accuracy, only use documents downloaded directly from Tolly.com. No part of any document may be reproduced, in whole or in part, without the specific written permission of Tolly. All trademarks used in the document are owned by their respective owners. You agree not to use any trademark in or as the whole or part of your own trademarks in connection with any activities, products or services which are not ours, or in a manner which may be confusing, misleading or deceptive or in a manner that disparages us or our information, projects or developments.