TEST REPORT

Tolly.

#216162

December 2016

Commissioned by
Ruijie Networks Co., Ltd.

Ruijie RG-S5750-H Series Switch

Performance Evaluation and Feature Validation

EXECUTIVE SUMMARY

Ruijie RG-S5750-H Switch Series is a collection of next-gen multi-service switches, offering remarkable performance and enhanced security. Implementing an industry-leading hardware design and Ruijie's latest RGOS11.X modular operating system, the switches offer large table capacity, high hardware processing performance, and easy user operation. The RG-S5750-H switches, with the outstanding performance-to-price ratio, are ideal acting as aggregation of large-scaled networks, core of small to medium-sized networks, and data center server access.

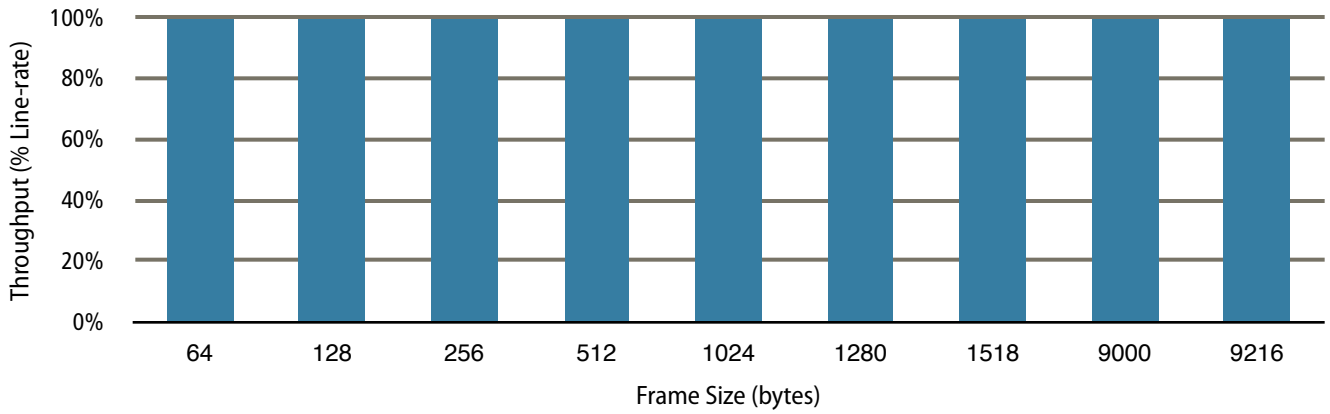
Tolly engineers verified that the Ruijie RG-S5750-H switches supported 100% line-rate forwarding with all GbE and 10GbE ports, less than 50ms failover time for link or node failure with VSU, large MAC, ARP and FIB capacity, OSPF routing protocol, OpenFlow 1.3 SDN capability, and the Energy Efficient Ethernet feature for power saving.

THE BOTTOM LINE

The Ruijie Networks' RG-S5750-H Series Switch:

1. Supported 100% line-rate forwarding with zero frame loss for all 64- to 9216-byte standard frame sizes with all GbE and 10GbE ports
2. Provided less than 50ms failover time for link and node failures in a Ruijie Virtual Switching Unit (VSU) stack
3. Supported Layer 3 routing
4. Supported the Energy Efficient Ethernet (EEE) feature to reduce power consumption up to 25%

Ruijie RG-S5750-H Series Switch Layer 2 Throughput
with 28/48 GbE ports and 4/8 10GbE uplink ports
(as reported by Spirent TestCenter)



Note: 100% line-rate throughput with zero frame loss in all tests. Snake topology was used for each type of ports (GbE with GbE, and 10GbE with 10GbE).

Source: Tolly, August 2016

Figure 1

Test Results

Forwarding Performance

Tolly engineers verified that the Ruijie RG-S5750-H series switches supported 100% line-rate forwarding with zero frame loss for 64-byte to 9216-byte frame sizes with all GbE ports and 10GbE uplink ports. The models we tested were as following.

RG-S5750C-48GT4XS-H: 48*GbE + 8*10GbE (4*10GbE ports are on one interface module. Other ports are fixed ports);

RG-S5750C-28SFP4XS-H: 28*GbE + 4*10GbE (all fixed ports);

RG-S5750C-28GT4XS-H: 28*GbE + 4*10GbE (all fixed ports);

See Table 1 for all results.

Layer 2 Multicast Latency

The Layer 2 multicast latency for the RG-S5750-H switch was 4.62µs to 17.35µs for 64-byte to 1518-byte frame sizes. The First-In-First-Out (FIFO) latency type was reported. See Table 1 for all results.

VSU High Availability

The Ruijie RG-S5750-H series switches support Ruijie's Virtual Switching Unit (VSU) technology for stacking with up to nine switches in a stack. Tolly engineers verified that the failover time for tested link or node failures were always under 50ms.

In specific, when two RG-S5750-H switches were in a stack, the convergence time was 26ms for uplink failure, 27ms for master node failure, and 8ms for standby node failure. In all test runs, the convergence time was always under 50ms for the Ruijie VSU.

The convergence time for recovering from failures was almost always 0ms, that is, instantaneous recovery.

Capacity

MAC Table

Tolly engineers verified that the RG-S5750-H switch supported 64,000 addresses in the MAC table.

ARP Table

Tolly engineers verified that the RG-S5750-H switch supported 10,000 entries in the ARP table when working in the default mode, the route-v4max mode, and the route-v6max mode. It supported 20,000 entries in the ARP table when working in the gateway-max mode.

FIB

Tolly engineers verified that the RG-S5750-H switch supported 12,000 dynamic routes in FIB. Traffic matching the 12,000 FIB entries was forwarded without traffic loss.

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VLAN Interface

Tolly engineers verified that the RG-S5750-H switch supported 2,000 VLAN interfaces (VLANIFs). Each VLAN interface served as a gateway for one subnet and traffic passed between the 2,000 VLANs without traffic loss.

ACL Entries

Tolly engineers verified that the RG-S5750-H switch supported 3,500 inbound Access Control List (ACL) rules.

Features

OSPF

The Ruijie RG-S5750-H switch supported the OSPF routing protocol.

Layer 2 Multicast FIFO Latency
(as reported by Spirent TestCenter)

	64-Byte	128-Byte	256-Byte	512-Byte	1024-Byte	1280-Byte	1518-Byte
FIFO Latency (µs)	4.62	5.14	6.73	9.30	13.73	15.48	17.35

Source: Tolly, August 2016

Table 1

OpenFlow 1.3

The RG-S5750-H switch supported OpenFlow 1.3 features.

EEE

The Energy Efficient Ethernet (EEE) function reduces the power on the electrical interface when the interface is idle and restores the power when the interface starts to transmit data.

Tolly engineers verified that the Energy Efficient Ethernet (EEE) feature could reduce power consumption up to 25% on one RG-S5750-H switch.

Ruijie RG-S5750-H Series Switch
Tolly Certified Performance and Features

Performance	
100% line-rate forwarding with 0 Frame Loss for 64-, 128-, 256-, 512-, 1024-, 1280-, 1518-, 9000- and 9216-byte frame sizes with the following models	
✔	RG-S5750C-48GT4XS-H: 48*GbE + 8*10GbE (4*10GbE ports are on one interface module. Other ports are fixed ports)
✔	RG-S5750C-28SFP4XS-H: 28*GbE + 4*10GbE (all fixed ports)
✔	RG-S5750C-28GT4XS-H: 28*GbE + 4*10GbE (all fixed ports)
Virtual Switching Unit (VSU) High Availability	
✔	Up to 9 Switches in a VSU Stack
✔	Uplink Failure Convergence Time: 26ms Recovering Convergence Time: 0ms
✔	Master Node Failure: 27ms Recovering Convergence Time: 0ms
✔	Standby Node Failure: 8ms Recovering Convergence Time: 0ms
Capacity	
✔	MAC Table: 64,000 MAC addresses
✔	ARP Table: 10,000 entries in the default mode, the route-v4max mode, and the route-v6max mode 20,000 in the gateway-max mode
✔	FIB: 12,000 IPv4 routes
✔	VLANIF: 2,000 VLAN interfaces with IP addresses
✔	ACL: 3,500 rules
Features	
✔	OSPF Routing Protocol
✔	OpenFlow 1.3
✔	Energy-Efficient Ethernet (EEE)
✔	ERPS Link Failure Convergence Time < 50ms
✔	Hot Patch

Source: Tolly, August 2016

Table 2

ERPS

The average failover convergence time was less than 50ms for a link failure in an ERPS ring with RG-S5750-H switches.

Hot Patch

The RG-S5750-H switch supported hot patch. Tolly engineers patched one process and verified that the current traffic had no frame loss.

Test Methodology

Capacity

Each capacity level was evaluated individually in a manner appropriate to that feature.

VSU High Availability

There were load balancing between the two VSU members. So when one uplink or node failed, half of the traffic was not affected. The worst case result (the convergence time for the traffic that had been affected most) was reported.

ERPS

There were load balancing between two routes or the ring. So when one link failed, half of the traffic was not affected. The worst case result (the convergence time for the traffic that had been affected most) was reported.

Systems Under Test

RG-S5750C-48GT4XS-H

RG-S5750C-28SFP4XS-H

RG-S5750C-28GT4XS-H

Source: Tolly, August 2016

Figure 2

About Ruijie Networks

Ruijie Networks (stock code SZ:002396) is a leading network solution supplier of China. We focus on customer benefits and strive to improve the network application experience of our customers through continuous technological innovation. Ruijie Networks provides end-to-end network solutions for telecom carriers, financial services, government agencies, education and enterprises to create values for customer networks.

Ruijie Networks has 38 branches with sales and service covering Asia, Europe, North America, and South America. Currently, we have more than 3,100 employees, of which 1,600 are R&D engineers working in five R&D centers located in Fuzhou, Beijing, Shanghai, Chengdu, and Tianjin.

Ruijie Networks is the only company of data communication to be certified as an innovative enterprise in China. Every year, 15% of sales income is invested in R&D, and 30% of R&D funds in high-tech pre-research. In 2000, Ruijie Networks introduced the first domestic-made modularized switch and the full suite of gigabit switches, which promotes the successful rise of indigenous network brands in China. In 2011, Ruijie Networks rolled out China's first cloud-computing data center switch family, which makes Ruijie Networks a pioneer on the cloud-computing network platform. With continuous improvement on the innovative road of independent R&D, Ruijie Networks leads and promotes the development of cutting-edge network technologies in China.

In the network economy era, we believe that each progress in network technology changes people's life, work, and education. Future-oriented, Ruijie Networks embraces the missions of promoting network technology development, achieving technology and application convergence, and advancing social progress, thereby helping our customers and partners benefit from the new era.

Source: Ruijie Networks, August 2016

About Tolly

The Tolly Group companies have been delivering world-class IT services for more than 25 years. Tolly is a leading global provider of third-party validation services for vendors of IT products, components and services.

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	**TestCenter**	http://www.spirent.com

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