Commissioned by
Ruijie Networks Co., Ltd.

Ruijie RG-S2910 Series Switch
Performance Evaluation and Feature Validation

EXECUTIVE SUMMARY

Ruijie RG-S2910 is Ruijie's next-gen family of Gigabit switches architected for superior security, high performance and outstanding energy efficiency. The series delivers full Gigabit access and unparalleled scalability to 10G performance. With the all-new hardware architecture and Ruijie's latest RGOS11.X modular operating system, the RG-S2910 switches offer large table capacity, fast hardware processing performance and an easy operating experience. The RG-S2910 switches guarantee high-density user access and leading aggregation performance with ease.
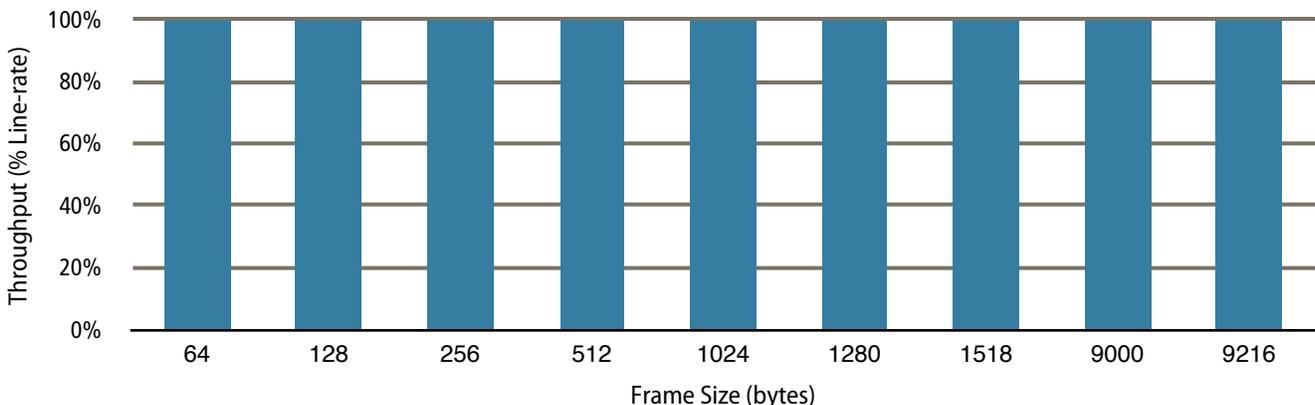
Tolly engineers verified that the Ruijie RG-S2910 switches supported 100% line-rate forwarding with all GbE and 10GbE ports, less than 50ms failover time for link or node failure with VSU, large MAC, ARP and FIB capacity, static route and RIP routing protocol, OpenFlow 1.3 SDN capability, and the Energy Efficient Ethernet feature for power saving.

THE BOTTOM LINE

The Ruijie Networks' RG-S2910 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 basic Layer 3 routing

4 Supported the Energy Efficient Ethernet (EEE) feature to reduce power consumption up to 36%

Ruijie RG-S2910 Series Switch Layer 2 Throughput
with 24/48 GbE ports and 2/4 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-S2910 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-S2910C-24GT2XS-HP-E: 24*GbE + 4*10GbE (2*10GbE ports are on one interface module. Other ports are fixed ports);

RG-S2910C-24GT2XS-P-E: 24*GbE + 4*10GbE (2*10GbE ports are on one interface module. Other ports are fixed ports);

RG-S2910-24GT4XS-E: 24*GbE + 4*10GbE (all fixed ports);

RG-S2910C-48GT2XS-HP-E: 48*GbE + 4*10GbE (2*10GbE ports are on one interface module. Other ports are fixed ports);

RG-S2910-48GT4XS-E: 48*GbE + 4*10GbE (all fixed ports).

See Table 1 for all results.

Layer 2 Multicast Latency

The Layer 2 multicast latency for the RG-S2910 switch was 3.94µs to 15.56µs 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-S2910 series switches support Ruijie's Virtual Switching Unit (VSU) technology for stacking with up to nine switches in a stack (exclude 10 ports models). Tolly engineers verified that the failover time for tested link or node failures were always under 50ms.

In specific, when two RG-S2910 switches were in a stack, the convergence time was 28ms for uplink failure, 5ms for master node failure, and 2ms 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-S2910 switch supported 16,000 addresses in the MAC table.

ARP Table

Tolly engineers verified that the RG-S2910 switch supported 1,000 entries in the ARP table for 24 or 48 ports models and 500 entries for 10 ports models

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FIB

Tolly engineers verified that the RG-S2910 switch supported 500 dynamic routes in FIB for 24 or 48 ports models and 64 entries for 10 ports models. Traffic matching all FIB entries was forwarded without traffic loss.

VLAN Interface

Tolly engineers verified that the RG-S2910 switch supported 500 VLAN interfaces (VLANIFs) for 24 or 48 ports models and 64 VLANIFs for 10 ports models. Each VLAN interface served as a gateway for one subnet and traffic passed between the VLANs without traffic loss.

ACL Entries

Tolly engineers verified that the RG-S2910 switch supported 1,500 inbound Access Control List (ACL) rules for 24 or 48 ports models and 750 rules for 10 ports models.

RG-S2910 Series Switch 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)	3.94	4.45	5.47	7.52	11.61	13.66	15.56

Source: Tolly, August 2016   Table 1

Ruijie RG-S2910 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-S2910C-24GT2XS-HP-E: 24*GbE + 4*10GbE (2*10GbE ports are on one interface module. Other ports are fixed ports)
✔	RG-S2910C-24GT2XS-P-E: 24*GbE + 4*10GbE (2*10GbE ports are on one interface module. Other ports are fixed ports)
✔	RG-S2910-24GT4XS-E: 24*GbE + 4*10GbE (all fixed ports)
✔	RG-S2910C-48GT2XS-HP-E: 48*GbE + 4*10GbE (2*10GbE ports are on one interface module. Other ports are fixed ports)
✔	RG-S2910-48GT4XS-E: 48*GbE + 4*10GbE (all fixed ports)
Virtual Switching Unit (VSU) High Availability	
✔	Up to 9 Switches in a VSU Stack (excluding S2910-10GT2SFP-UP-H and S2910-10GT2SFP-P-E)
✔	Uplink Failure Convergence Time: 28ms Recovering Convergence Time: 0ms
✔	Master Node Failure: 5ms Recovering Convergence Time: 0ms
✔	Standby Node Failure: 2ms Recovering Convergence Time: 0ms
Capacity	
✔	MAC Table: 16,000 MAC addresses
✔	ARP Table: 1,000 entries for 24 or 48 ports models 10 ports models: 500 entries
✔	FIB: 500 routes for 24 or 48 ports models 10 ports models: 64 routes
✔	VLANIF: 500 VLAN interfaces with IP addresses for 24 or 48 ports models 10 ports models: 64 VLAN interfaces with IP addresses
✔	ACL: 1,500 rules for 24 or 48 ports models 10 ports models: 750 rules
Features	
✔	Static Routes
✔	RIP Routing Protocol
✔	OpenFlow 1.3
✔	Energy-Efficient Ethernet (EEE)
✔	ERPS Link Failure Convergence Time 7ms
✔	Hot Patch (exclude S2910-10GT2SFP-UP-H and S2910-10GT2SFP-P-E)

Source: Tolly, August 2016   Table 2

Features

Static Routes

The Ruijie RG-S2910 switch supported static routes.

RIP

The Ruijie RG-S2910 switch supported the RIP routing protocol.

OpenFlow 1.3

The RG-S2910 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 36% on one RG-S2910 switch.

ERPS

The failover convergence time was 7ms for a link failure in an ERPS ring with RG-S2910 switches.

Devices Under Test

Standard Models

RG-S2910-24GT4XS-E

RG-S2910-24GT4XS-PS-E

RG-S2910-48GT4XS-E

PoE Models

RG-2910C-24GT2XS-P-E

RG-S2910C-24GT2XS-HP-E

RG-2910C-48GT2XS-HP-E

RG-S2910-10GT2SFP-P-E

HPoE Models

RG-S2910-24GT4XS-UP-H

RG-S2910-24GT4SFP-UP-H

RG-S2910-10GT2SFP-UP-H

Source: Tolly, August 2016

Figure 2

Hot Patch

The RG-S2910 switch supported hot patch (exclude 10 ports models). 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.

Multicast Latency

One RG-S2910 24 or 48 ports switch was used for test.

VSU High Availability

RG-S2910 series 24 and 48 ports switches were used for test. 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

RG-S2910 series 24 and 48 ports switches were used for test. 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.

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.

Visit Tolly on the Internet at: http://www.tolly.com

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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