RG-S6500 Switch Series Datasheet

Ruijie's RG-S6500 Switch Series is a high-speed, high-density, 25 or 100 Gigabit Ethernet switch designed to power next-generation data centers and cloud computing services. RG-S6500 series includes RG-S6510-48VS8CQ and RG-S6520-64CQ right now. Both two models provide a strong cache capacity and support advanced cache scheduling mechanism and many features for RDMA lossless data center network. RG-S6510-48VS8CQ has 48 ports 25 Gigabit Ethernet SFP28, 8 ports 100 Gigabit Ethernet QSFP28 and RG-S6520-64CQ has 64 ports 100 Gigabit Ethernet QSFP28. Each QSFP28 can operate at 100 or 40 Gigabit Ethernet.

FEATURE HIGHLIGHTS

- High-density 25G and 100G switches
- Non-Blocking Performance with Powerful Caching Capacity
- Datacenter virtualization
- RMDA low latency forwarding
- High reliability: Hot patches, power and fan redundancy support

Figure 1: RG-S6510-48VS8CQ

Figure 2: RG-S6520-64CQ

PRODUCT FEATURES

Non-blocking Performance with Powerful Caching Capacity

The RG-S6500 Series is a powerful collection of line-rate switches customized to power the next-generation data centers and cloud computing. Within 1RU configuration, RG-S6510-48VS8CQ supports 48 x 25G ports and 8 x 100G ports offering line-rate forwarding from all ports. RG-S6520-64CQ, within 2RU configuration, can also offer line-rate forwarding from all 64 100G ports.

The switches employ an advanced cache scheduling mechanism to maximize the device's cache capability, ensuring truly non-blocking transmission in the increasingly demanding data center environment.
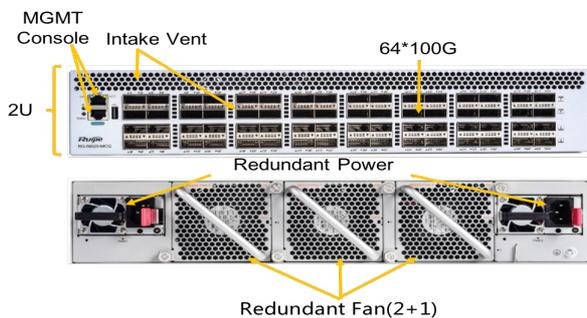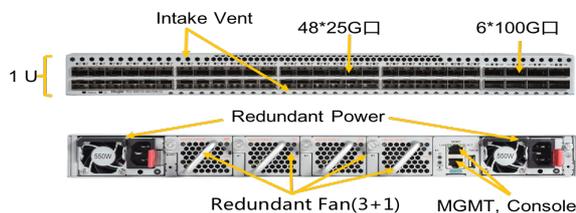

Figure 3: RG-S6520-64CQ

Figure 4: RG-S6510-48VS8CQ

Data Center Virtualization

The RG-S6500 Series adopts the industry-leading Virtual Switch Unit(VSU) technology to achieve unified network management, reduce network nodes and enhance network reliability. The failover time for link failure is within 50 to 200ms to guarantee uninterrupted operation for mission-critical applications. The cross-device link aggregation feature enables access to servers or switches to achieve active-active uplinks.

RDMA Lossless Infrastructure

The TCP/IP protocol stack brings the latency of tens of microseconds. The CPU usage of the server is high due to the TCP protocol stack processing. When the network bandwidth reaches 25 Gbit/s, about 50% of the CPU capability of most servers will be used to transmit data. Remote direct memory access (RDMA) is a direct memory access from the memory of one computer into that of another without involving either one's operating system. RDMA technology reduces the data transmission latency on the server to less than 1 microsecond and the CPU usage of the server will less than 5%. With the technology related to RoCE(RDMA over Converged Ethernet) , the RG-S6500 Series permits high-throughput, low-latency networking, which is especially useful in massively parallel computer clusters.

Fabric-based Flow Visualization

The RG-S6500 Series realizes flow visualization on complicated multi-path and multi-node network. With each flow's path and latency centralized monitored, operators can locate the faults much more efficient.

Carrier-Class Reliability Protection

The RG-S6500 Series supports built-in redundant power modules and modularized fan components. All the interface boards, power modules, and fan modules are hot-pluggable to guarantee undisturbed switching operation. In addition, the switches support fault detection and automatic alarms for the power and fan modules. The rotation speed of the fans automatically adjusts to the ambient temperature. The switches further provide device-level and link-level reliability protection with the over-current, over-voltage, and overheating protection measures.

The RG-S6500 Series also supports features like REUP (Rapid Ethernet Uplink Protection), Graceful Restart (GR) and Bidirectional Forwarding (BFD) mechanisms. All the features ensure the network convergence time is unaffected even when the network bears abundant services and heavy traffic, and therefore ensure normal operation.

IPv4/IPv6 Dual-Stack Multi-Layer Switching

The hardware of the RG-S6500 Series supports line-rate IPv4/IPv6 dual-stack multi-layer switching, and distinguishes and processes IPv4 and IPv6 protocol packets. The switches also support multiple tunneling technologies including manually configured tunnels, automatic tunnels, ISATAP tunnels and so on. The switches provide flexible IPv6 inter-network communication solutions to be realized according the requirement plan and status quo of the IPv6 networks.

The switch series is also applicable to an IPv4-only or IPv6-only network, or a hybrid of IPv4 and IPv6 network, fulfilling the transition requirements from IPv4 to IPv6 network.

The series supports a wide range of IPv4 routing protocols including static routing, RIP, OSPF, and BGP4, which can be selected flexibly according to the network environment. The series also supports an abundant list of IPv6 routing protocols, such as static routing, RIPng, OSPFv3, and BGP4+, which can be selected flexibly either to upgrade the existing network to IPv6 network or to construct a new IPv6 network.

Flexible and Comprehensive Security Policies

The RG-S6500 Series features multiple security features, which effectively defend against and control virus flooding and hacker attacks. These features include anti-DoS attack, validity check of ARP packets on ports, and multiple hardware-based ACL policies.

The switches support hardware-based IPv6 ACLs, which can easily control IPv6 users' access to edge devices even when IPv6 users exist within an IPv4 network. It allows coexistence of IPv4 and IPv6 users on the network and can control access permissions of IPv6 users, such as restricting access to sensitive resources on the network.

The switch series adopts Ruijie's industry-leading CPU Protection Policy (CPP) technology, which is an advanced hardware-based CPU protection mechanism, to distinguish data traffic destined to the CPU and process data according to queue priorities. The switches implement bandwidth control to protect the CPU against unauthorized traffic consumption, malicious attacks and resource consumption and hence to ensure switch security.

The switches also support Telnet access control based on source IP addresses. The measure prevents unauthorized users or hackers from attacking or controlling devices and thereby enhances security of the device NMS. The RG-S6500 Series also implement Secure Shell (SSH) and SNMPv3 to encrypt management information in Telnet and SNMP processes, thereby ensuring security of management device information and preventing hacker from waging attacks or controlling devices.

The series prevents unauthorized users from network access through multiple functions. These functions include multi-element binding, port security, time ACL, and bandwidth limit based on data traffic. The RG-S6500 Series highly strengthens access security and are perfect match for large-sized networks.

Advanced Management

The RG-S6500 Series supports a family of management ports such as Console, MGMT and USB. The switches also support SNMP v1/v2c/v3, a universal network management platform. In addition, the switch console port can be managed via Telnet /

SSHv2, HTTP or HTTPS. The switches enable Command Line Interface (CLI), Telnet, and cluster management, which simplify device management and provide various encryption modes such as SSH2.0 to enhance network security.

The switches support SPAN/RSPAN mirroring and multiple mirroring observation ports, offering users high visibility and transparency for easy maintenance. The switches also provide a wide range of network traffic reports to help users optimize network structure and adjust resources deployment accordingly.

TECHNICAL SPECIFICATIONS

Model	RG-S6510-48VS8CQ	RG-S6520-64CQ
Ports	48 fixed 25G SFP28 ports 8 100G QSFP28 ports	64 fixed 100G QSFP28 ports
Modular Power Slots	2	2
Fan Slots	4	3
Management Ports	1 console port 1 MGMT port 1 USB 2.0 port	
Switching Capacity	4.0Tbps	12.8Tbps
Packet Forwarding Rate	2000Mpps	4400Mpps
Port Buffer	32MB	42MB
RAM	4GB	4GB
ARP Table	Up to 100K	Up to 90K
MAC Address	Up to 96K	Up to 72K
Routing Table Size (IPv4/IPv6)	Up to 28K	
ACL Entries	Up to 4.5K	Up to 1.5K
VLAN	4K VLANs, Port-based VLAN, MAC-based VLAN, Super VLAN, Protocol-based VLAN, Private VLAN, IP subnet-based VLAN, GVRP	
QinQ	Basic QinQ, Flexible QinQ	
Link Aggregation	Support LACP	
Port Mirroring	Many-to-one mirroring, One-to-many mirroring, Flow-based mirroring, Over devices mirroring, VLAN-based mirroring, VLAN-filtering mirroring, AP-port mirroring, RSPAN, ERSPAN	
Spanning Tree Protocols	IEEE802.1d STP, IEEE802.1w RSTP, Standard 802.1s MSTP, Port fast, BPDU filter, BPDU guard, TC guard, TC protection, Loop guard, Root guard,Spanning Tree Root Guard(STRG)	
DHCP	DHCP server, DHCP client, DHCP snooping, DHCP relay, IPv6 DHCP relay	
Multiple Spanning Tree Protocol (MSTP) Instances	64 (not include default 0)	
Maximum Aggregation Port (AP)	Up to 256	
Virtual Routing and Forwarding (VRF) Instances	Up to 2K	Up to 1K
Data Center Unified Network Features	Virtualization: Virtual Switch Unit (VSU), EVPN VXLAN, Open-Flow. Visualization: INT, gRPC, s-FLOW Others: PFC, ECN	Virtualization: Virtual Switch Unit (VSU), Open-Flow. Visualization: INT, gRPC, s-FLOW Others: PFC, ECN

Model	RG-S6510-48VS8CQ	RG-S6520-64CQ
VSU (Virtual Switch Unit)	Support (up to 2 stack members)	
L2 Features	MAC, ARP, VLAN, Basic QinQ, Felix QinQ, Link aggregation, Mirroring, STP, RSTP, MSTP, Broadcast storm control, IGMP v1/v2/v3 snooping, IGMP filter, IGMP fast leave, MLD snooping, DHCP, Jumbo frame, RLDP, LLDP	
Layer 2 Protocols	IEEE802.3x, IEEE802.3ad (link aggregation), IEEE802.1p, IEEE802.1Q, IEEE802.1D (STP), IEEE802.1w (RSTP), IEEE802.1s (MSTP), IGMP snooping, Jumbo Frame (9Kbytes), IEEE802.1ad (QinQ and flexible QinQ), GVRP	
Layer 3 Features	ARP, IPv4/v6, PBRv4/v6	
Layer 3 Protocols (IPv4)	BGP4, OSPFv2, RIPv1, RIPv2, MBGP, LPM routing, Policy-based routing, Route-policy, ECMP, WCMP, VRRP, IGMP v1/v2/v3, DVMRP, PIM-SSM/SM/DM, MSDP, Any-RP, ISIS	
IPv4 Features	Ping, Traceroute, Equal-cost routing, URPF, IPIP, GRE tunnel, VRF	
IPv6 Features	Static routing Equal-cost routing, Policy-based routing, OSPFv3, RIPng, BGP4+, MLDv1/v2, PIM-SMv6, Manual tunnel, Auto tunnel, IPv4 over IPv6 tunnel, ISATAP tunnel	
Basic IPv6 Protocols	ND, ICMPv6, Path MTU Discovery, DNSv6, DHCPv6, ICMPv6, ICMPv6 redirection, ACLv6, TCP/UDP for IPv6, SNMP v6, Ping /Traceroute v6, IPv6 RADIUS, Telnet/SSH v6, FTP/TFTP v6, NTP v6, VRRP for IPv6, IS-ISv6	
IPv6 Routing Protocols	Static routing, Equal-cost routing, Policy routing, RIPng, OSPFv2/v3, BGP4+, IS-IS	
IPv6 Tunnel Features	Manual tunnel, Auto tunnel, 6over4 manual tunnel, 6to4 auto tunnel, ISATAP, IPv4 over IPv6 tunnel, IPv6 over IPv6 tunnel, GRE tunnel	
Multicast	IGMP v1/v2/v3, IGMP proxy, MSDP, PIM-DMv4 (PIM-DM), PIM-SMv4 (PIM-SM, PIM-SSM), PIM-SM v6, MLD, MLD Proxy	
ACL	Standard/Extended/Expert ACL, Extended MAC ACL, ACL 80, IPv6 ACL	
QoS	EXP priority mapping based on 802.1p, DSCP, TOS and IP Precedence; ACL traffic classification; Priority marking/remarking; Multiple queue scheduling mechanisms, such as SP, WRR, DRR, SP+WRR, and SP+DRR	
Reliability	VSU (virtualization technology for virtualizing multiple devices into 1); GR for OSPF/IS-IS/BGP; BFD detection; REUP dual-link fast switching technology; RLDP (Rapid Link Detection Protocol); 1+1 power redundancy; 3+1 fan redundancy; Hot-swappable line cards and power modules, de-stacking	VSU (virtualization technology for virtualizing multiple devices into 1); GR for OSPF/IS-IS/BGP; BFD detection; REUP dual-link fast switching technology; RLDP (Rapid Link Detection Protocol); 1+1 power redundancy; 2+1 fan redundancy; Hot-swappable line cards and power modules
Security	Network Foundation Protection Policy (NFPP); CPU Protection (CPP); DoS protection; Detection of unauthorized data packets; Data encryption; IP source guard; RADIUS / TACACS+; IPv4 / IPv6 ACL packet filtering based on standard or extended VLANs; Plaintext authentication and MD5 cipher-text authentication of OSPF, RIPv2, and BGPv4 packets; Telnet login through limited IP addresses and the password mechanism; u-RPF; Broadcast packet suppression; DHCP snooping, DHCP Option 82;	
Manageability	SNMP v1/v2c/v3; Telnet; Console; Hardware support RCMI (combo interface for MGMT); RMON; SSHv1/v2; FTP/TFTP for file upload and download management; NTP clock; Syslog; SPAN/RSPAN	
Hot Patch	Support	
Smart Temperature Control	Auto fan speed adjustment; Fan malfunction alerts; Fan status check	
Smart Power Supply	Support power monitor	
Other Protocols	DHCP client, DHCP relay, DHCP server, DNS client, UDP relay, ARP proxy, Syslog	
Dimensions (W x D x H) (mm)	442 * 420 * 44	442 * 450 * 88.1
Rack Height	1RU	2RU
Weight	10kg (incl. 4 fan modules and 2 power supply modules)	20kg (incl. 3 fan modules and 2 power supply modules)
MTBF	330K hours	>200K hours
Safety Standards	EN 60950-1, GB4943-2011	
Emission Standards	GB9254-2008 CLASSA, VCCI Class A, EN 300 386, EN 55032, EN 61000-3-2, EN 61000-3-3, EN 55035, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11	

Model	RG-S6510-48VS8CQ	RG-S6520-64CQ
Power Supply	AC input: Rated voltage range: 100V to 240V AC Frequency: 50-60Hz Rated current: 7.2A-3.5A HVDC input: Input voltage range: 192V to 288V DC Input current range: 3.6A	AC input: Rated voltage range: 100V to 240V AC Frequency: 50-60Hz Rated current:10A-5A HVDC input: Input voltage range: 192V to 288V DC Input current range:4.5A
Power Consumption	<300W	<600W
Temperature	Operating temperature: 0°C to 45°C Storage temperature: -40ºC to 70ºC	
Humidity	Operating humidity: 10% to 90%RH	
Operating Altitude	-500—5000 m	

Application

RG-S6500 Series is designed for the data center network in AI, Big Data and Cloud Computing era. With the breakthrough of deep learning algorithm, enormous sample data and HPC(high-performance computing) capabilities are used in the data center. The data center need a network which featured with high throughput, zero packet loss and low latency. With the technologies related to RoCE(RDMA over Converged Ethernet), the RG-S6500 series can be used to help kinds of customers, such as Cloud providers, AI and Big Data companies and HPC users, build a visible and lossless data center.
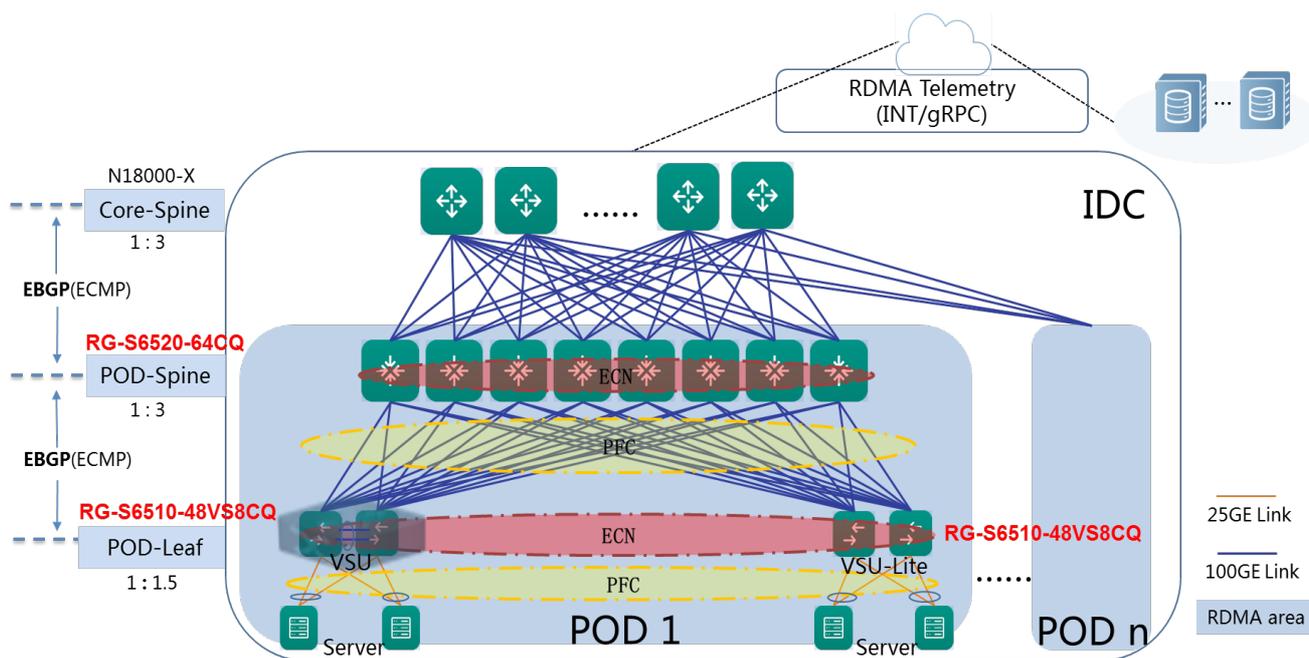

Figure 5: Ruijie 25G/100G Lossless Data Center Network Architecture

Ordering Information

1. Switches, fans, and power modules

Model	Description
RG-S6520-64CQ	64 fixed 100G QSFP28 ports. 2 slots for power supply modules. 3 slots for fan modules. 2 power supply modules and 3 fan modules already included.

Model	Description
RG-S6510-48VS8CQ	48 fixed 25G SFP28 ports, 8 100G QSFP28 ports. 2 slots for power supply modules. 4 slots for fan modules. 2 power supply modules and 4 fan modules already included.
M6510-FAN-F	Fan module for RG-S6510-48VS8CQ, front-to-rear airflow. With up to 4 fan modules, support 3+1 redundancy.
RG-PA550I-F	AC power supply module, front-to-rear airflow. With up to 2 power modules, support 1+1 redundancy.

2. Optional 25G fiber modules and cables

Model	Description
VG-SFP-SR-MM850	25G SR fiber module, SFP28 transceiver, 70m (OM3) / 100m (OM4) (LC, 850nm)
VG-SFP-LR-SM1310	25G LR fiber module, SFP28 transceiver, 10km (LC, 1310nm)
VG-SFP-AOC5M	25G SFP+ Optical Cable (included both side transceivers), 5meter

3. Optional 100G fiber module and cables

Model	Description
100G-QSFP-SR-MM850	100GBASE-SR, QSFP28 transceiver (850nm, 100m with OM4 fiber)
100G-QSFP-LR4-SM1310	100G LR single-mode fiber module, QSFP28 transceiver, 10km (LC, dual-core, 1310nm)
100G-QSFP-iLR4-SM1310	100G iLR fiber module, QSFP28 transceiver, 2km (LC, dual-core, 1310nm)
100G-AOC-5M	100G QSFP28 Optical Stack Cable (included both side transceivers), 5 Meters
100G-AOC-10M	100G QSFP28 Optical Stack Cable (included both side transceivers), 10 Meters

4. Optional 10G and 40G fiber module and cables

Model	Description
XG-SFP-SR-MM850	10G SR Fiber Module for SFP+ ports, 300m
XG-SFP-LR-SM1310	10G LR Fiber Module for SFP+ ports, 10km
XG-SFP-ER-SM1550	10G ER Fiber Module for SFP+ ports, 40km
XG-SFP-ZR-SM1550	10G ZR Fiber Module for SFP+ ports, 80km
40G-QSFP-SR-MM850	40G SR Fiber Module for QSFP+ ports, 100m (OM3) / 150m (OM4) (8 cores, 850nm)
40G-QSFP-LSR-MM850	40G SR Fiber Module for QSFP+ ports, 300m (OM3) / 400m (OM4) (8 or 12 cores, 850nm)
40G-QSFP-LR4-SM1310	40G LR Single-mode Fiber Module for QSFP+ ports, 10km (LC) (2 cores, 1310nm)
40G-AOC-5M	40G QSFP+ Optical Stack Cable (included both side transceivers), 5 Meters

For further information, please visit our website: http://www.ruijienetworks.com