Data Center Core Switch RG-S12000 Series Datasheet

Ruijie Networks Co., Ltd.

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1 Product Pictures

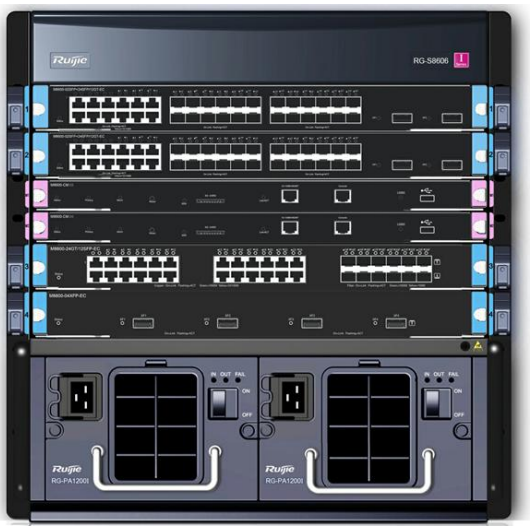


Figure 1-1 RG-S12006

Figure 1-2 RG-S12010

2 Product Overview

Data center is a "production factory" that provides services through networks. As the entire world increases the use frequency of cloud computing, its scale becomes bigger and bigger, and the network also becomes foundation of the data center and cloud computing. But the traditional network architecture limits the current development of data center because the traditional framework tries to cope with surge in applications, servers, storage and network traffic. A large number of devices, applications occupy the power supply, cooling and space and increase the cost and complexity, but also hinder the network formation of cloud computing.

For the current problems and trends, Ruijie Networks launched switch products for next-generation data centers and cloud computing. Ruijie Networks started from "converged networks, virtualization, non-blocking switching and intelligence" for the development of next-generation data centers to address the problems of excessive network equipment, high cost, and sudden increase in flow in traditional data centers, thus laying the foundation for building cloud computing networks.

RG-S12000 Cloud Computing Series Switches are the first series of Ruijie in the industry that support next-generation data center and the cloud computing network features.

RG-S12000 Cloud Computing Series Switches are the first in the industry to support 40G and 100G standard modules; the series also support the industry's highest single-board 48-port Gigabit modules, realizing non-blocking switching of the future data center and cloud computing network. For the surge of traffic in next-generation data center, each port has a large cache configuration, which can realize 200ms data cache to meet the requirements of network burst traffic of data centers and high-performance computing networks, and also more suitable for Map-Reduced algorithm in the cloud computing network.

Around the network data center and cloud computing virtualization trend, Ruijie Networks adopted innovative virtualization technology VSU (Virtual Switch Unit) to virtualize multiple high-end devices into one logical unit to effectively realize migration of virtual machines without network interrupting and support 802.1Qbg features to ensure high performance of the data center. It solves the problem of poor performance of traditional virtual machines. In addition, it supports VRF virtualization, enabling data center network to change from one to more than one, and multi-services to be isolated safely.

It has full support for TRILL (Transparent Interconnection of Lots of Links) protocol transparent switching technology, which can effectively simplify the network design, improve network scalability and flexibility, and lay a foundation for building a large network of virtualization cloud computing.

At the same time, along with the trend of converged networks of data centers, RG-S12000 series can provide servers with FCoE (Fiber Channel over Ethernet) access and Ethernet access services to help users easily integrate two heterogeneous LAN and SAN networks and reduce data center costs and complexity.

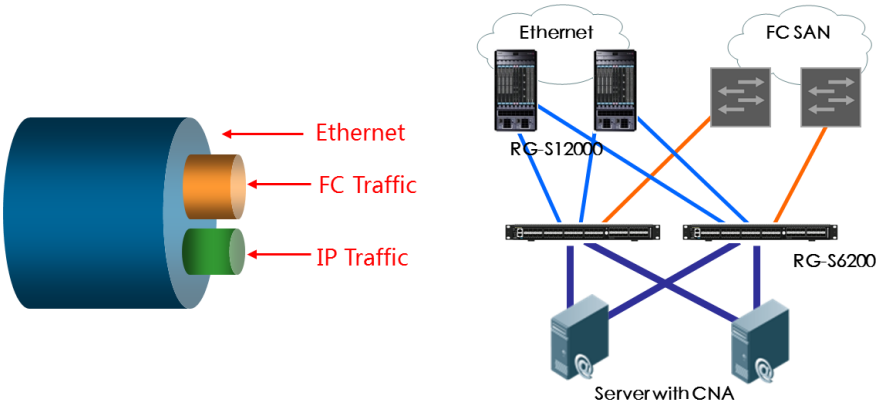
RG-S12000 series products, including RG-S12006 and RG-S12010 two models, can adapt to different-size network port density and performance requirements, providing effective equipment guarantee for data center network building. It combines Ruijie router, switches, security, and storage to provide a full range of security solutions for the data center network.

3 Product Features

Unified Switching, Integrated Storage and Ethernet

RG-S12000 Cloud Computing Series Switches are developed for next-generation data center and cloud computing product line, and can provide the server with FCoE (Fiber Channel over Ethernet) with access and Ethernet access services to help users easily integrate heterogeneous LAN and SAN two networks, reduce the number of devices in the network, so the series can not only realize the integration of data center network architecture, but also fully protect users' existing investments.

What is different from traditional data center switches is that the hardware chips support FCoE features, so as to meet the requirements of next-generation data centers.



Building Non-Blocking Data Center CLOS Network, and Powerful Caching Capability

Wire-speed products for next-generation data center and cloud computing are in line with the "north-south" development trend of data center traffic, and suitable for next-generation data centers with large flow.

RG-S12000 Cloud Computing Series (core) + RG-S60 (Gigabit access) + RG-62 (10 Gigabit access), from the access to the core, build the industry's first data center non-blocking network (Clos Network, origin: design of Mr. Clos from Bell Labs, for the telephone network, to achieve non-blocking switching. The true meaning of Clos Network is to realize entire-network non-blocking) rather than non-blocking of a single product)

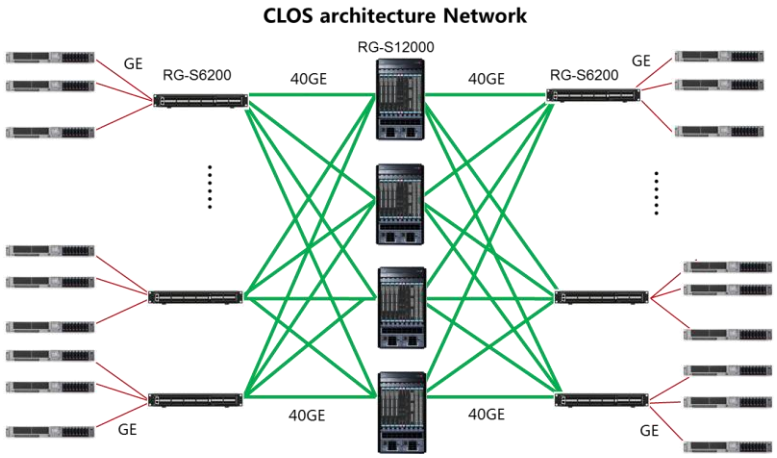
- Core: RG-S12000 Series achieve 40G/100G wire speed, 48-port 10 Gigabit wire

speed, building full wire-speed 100G core network.

- Gigabit Access: RG-S6000 series support 48-port Gigabit downlink, 4-port 10 Gigabit wire-speed uplink, meeting the network environment of Gigabit server non-blocking uplink of data center.

- 10 Gigabit Access: RG-S6200 series support 32-/48-port 10 Gigabit downlink, 4-/8-port 40G/100G wire-speed uplink. It fully meets the network environment of 10 Gigabit server non-blocking uplink of large data centers.

RG-S12000 Cloud Computing Series are the first in the industry to support 40G and 100G standard modules; the series also support the industry's highest single-board 48-port Gigabit modules, realizing non-blocking switching of the future data center and cloud computing network. For the requirements of non-blocking transmission of large-volume data in the data center, RG-S12000 can provide a strong cache capacity, and support advanced caching mechanism to maximize effective use of equipment cache capability.



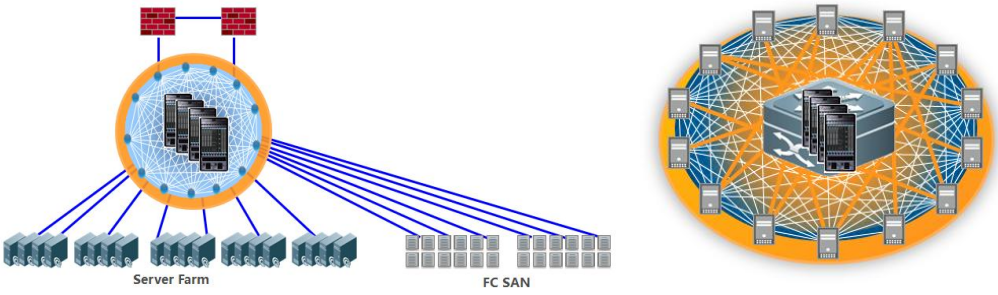
Data Center Virtualization Features

The RG-S12000 Cloud Computing Series Switches support VSU, or virtual switching unit, change from one to multiple, integrate the entire data center into one network, and make the network simpler. They can replace the core/aggregation switches of the traditional network with VSU, and VSU and the aggregation layer switches can be connected by aggregation links, and virtualize multiple physical devices to a single logical device, enabling unified operation, so as to reduce network size and improve network reliability. Also it can better address the disruptions of virtual machine migration of data center.

The RG-S12000 Cloud Computing Series Switches support VEPA (virtual Ethernet port aggregation, IEEE standard), and the standard returns the switching function of virtual

machines to network equipment, so that new generation of data center solutions can better adapt to the virtual computing environment. They resolve the problem of low-efficiency Ethernet switches with virtual internal server CPU and inconsistent network policies of the data center.

VRF virtualization features are supported to change from one to multiple of the data center network. Security isolation of multiple services on the same data center network can be achieved.



Building TRILL Transparent Switching Network and Laying Foundation for Virtualization Cloud Computing

The growing data center has to face at least three network challenges: more bandwidth, more flexible and simpler management, implementation of TRILL protocol that is being developed by IETF. The series solved these three challenges.

TRILL is a multihop standard Ethernet based on the routing architecture with the shortest path, and its purpose is to eliminate the possible blocking problems in tree topology network architecture, especially when the architecture is built in a virtual environment. This lays the foundation for building a virtual network of large-scale data centers or virtualization cloud computing network.

Full range products of Ruijie Networks are for next-generation data centers and cloud computing switching, including the RG-S12000 series whose hardware chips support the TRILL protocol. The full range of communications products, through the TRILL protocol, can effectively simplify network design, improve network scalability and flexibility, thus laying foundation for building a large network of virtualization cloud computing.

Environment-friendly Design

The RG-S12000 supports intelligent power supply management and features efficient power supply system architecture to achieve up to 95% power conversion efficiency, thus saving energy. The unique power monitoring function enables users to install power supply systems as required. It allows users to power on boards in sequence. It reduces power surge arising from simultaneous power-on of boards, thus helping extend equipment's lifecycle and decreasing electromagnetic radiation. It controls power-off of boards, isolates faulty/idle boards, and cuts down power consumption.

The RG-S12000 is integrated with intelligent temperature-controlled fans that support stepless speed regulation. The RG-S12000 collects board temperature, calculates fan speed regulation curve, and sends a speed regulation command to the fan frame. The RG-S12000 can monitor fan status, including rotating speed monitoring and fault alarms. The RG-S12000 divides fans into several zones for speed regulation according to ambient temperature and board configuration. This reduces power consumption and running noises of equipment. It also effectively lowers ambient noises and extends fans' lifecycle.

The RG-S12000 supports automatic detection of internal ports. When a slot does not house an interface board or a port is not connected to a cable, the RG-S12000 can shut down the corresponding internal port and cut down power consumption of the entire equipment. The RG-S12000 features a low power consumption chip. Most of switches used in data centers are integrated with 65 nm chips, which can save over 20% of energy consumption than traditional switches.

Carrier-class Reliability

1. No single-point failure

The RG-S12000 features a passive backplane to avoid single-point failure of chassis. All critical parts, such as engines, power supplies, fans, and crossbars, are redundant. During switchover between two engines, data services can still be forwarded at 10Gbps without interruption, thus effectively guaranteeing network stability. All boards and power supply modules support hot swap without impacting the running services on other boards.

The RG-S12000 supports power supply redundancy, embedded redundant power supply modules and modular fan components. All interface boards, power modules, and fan modules support hot swap without impacting normal equipment running. In addition, the RG-S12000 can detect faults of power supply systems and fans, and report alarms accordingly. The RG-S12000 adjusts fan speeds as the temperature changes, thus better running in data centers. The RG-S12000 features reliability at both equipment level and link level. The RG-S12000 is protected against overcurrent, overvoltage, and overheat.

2. Resilient Ethernet technology

The RG-S12000 Cloud Computing Series Switches support RERP, combining SDH self-healing capability with cost-effective feature and large bandwidth of Ethernet. On the RERP network, the RG-S12000 Cloud Computing Series Switches support IPv4/IPv6 routing protocols and MPLS. This guarantees less than 50 ms fault switchover in the case of services at 10G line speed, thus preventing real-time services such as voice and video services from being affected by network convergence,.

The RG-S12000 Cloud Computing Series Switches support REUP. The equipment supports IPv4/IPv6 and MPLS, while enabling millisecond switchover of the services when two links are connected to uplink equipment. Network convergence time is free from the carrying of multiple services and large traffic, thus guaranteeing proper service provisioning.

3. High reliability of routing protocols

The RG-S12000 Cloud Computing Series Switches support OSPF/IS-IS/BGP graceful restart and provide millisecond switchover. The series allows ECMP/WCMP and helps users to use multiple links. This helps raise transmission bandwidth and back up data transmission on failed links without delay and packet loss, thus enabling load balancing and redundant backup. The series allows dynamic routing protocols, cross-board port aggregation, and VRRP, guaranteeing rapid and reliable running of the whole network.

Comprehensive IPv6 Solution

The RG-S12000 Cloud Computing Series Switches have distributed line cards that support 10G IPv6 forwarding at wire speed. The series supports IPv6 protocol suite and addressing structure, neighbor discovery (ND), ICMPv6, Path MTU Discovery, DNSv6, DHCPv6, and other IPv6 features.

The RG-S12000 Cloud Computing Series Switches support IPv6 static routing, RIPng, OSPFv3, IS-ISv6, BGP4+ and other IPv6 unicast routing protocols as well as MLD v1/v2, MLD Snooping, PIM-SM/DMv6, PIM-SSMv6, and other IPv6 multicast features, delivering a complete range of IPv4/IPv6 solutions.

The RG-S12000 Cloud Computing Series Switches feature a variety of IPv4 to IPv6 transition technologies, including IPv6 manual tunnel, 6to4 tunnel, ISATAP tunnel, IPv4 over IPv6, enabling smooth transition from IPv4 networks to IPv6 networks.

The RG-S12000 Cloud Computing Series Switches support rich IPv6 management

features and supports SNMPv6, Ping/Traceroute v6, IPv6 TACACS+/RADIUS, Telnet/SSHv6, and NTPv6, thus enabling equipment management of the pure IPv6 network.

IPFIX Flow Transparency Solution

The RG-S12000 Cloud Computing Series Switches are the first to support the latest generation of international flow monitoring standard IP Flow Information Export (IPFIX). The IPFIX multi-service module uses a high-performance NP to monitor 10G service flow.

Combining Ruijie flow analysis system, IPFIX can take statistics of all flows in networks for analysis, detect flow exceptions, and generate various network flow analysis reports, including flow use report, history report, interface report, resolvable host address, flow analysis, and variable display. IPFIX helps administrators rapidly analyze network problems in the case of exceptional network behaviors, thus providing objective and accurate basis for decision-making on network capacity planning, network application monitoring, and fault diagnosis. In this manner, network traffic can be visual.

Ruijie switches are flexibly installed with the IPFIX multi-service module that uses an independent hardware platform. As a result, data services are normally forwarded when the IPFIX multi-service module is maintained or faulty, thus guaranteeing high reliability of core equipment.

Application Data Protection

Ruijie firewall module is the first firewall module in the industry that supports data transmission at the rate of more than 10G, which can be installed in the RG-S12000 Cloud Computing Series Switches. Integrating with firewall, application security domain, virtual firewall, and NAT, the RG-S12000 Cloud Computing Series Switches combine the network with security equipment, enhancing security control at core switching layer and delivering comprehensive protection.

Ruijie firewall module prevents external attacks, protects intranets, and detects status, thus effectively protecting networks. The module detects connection status of each network service in real time, and provides email alarms, attack logs, flow logs, and network management & monitoring, facilitating network management. The module is integrated with basic network equipment, featuring plug-and-play and powerful scalability. This facilitates management and lowers maintenance cost.

4 Technical Parameters

	RG-S12010	RG-S12006
Module slots	10 (2 for management engine)	6 (2 for management engine)
Switching capacity	7.68T	3.84T
Packet forwarding rate	5714Mpps	2857Mpps
Next-generation data center and cloud computing features	802.1Qbb (PFC), 802.1Qaz (ETS, DCBX), 802.1Qau (CN/QCN), FCoE, TRILL, VSU, VEPA, 802.1Qbg Non-blocking CloS network, 40G and 100G Ethernet modules supported, 48 ports 10G module supported Multi-layer switch fabric architecture with distributed Crossbar, redundant switch fabric supported	
L2 protocols	IEEE802.3 (10Base-T), IEEE802.3u (100Base-T), IEEE802.3z (1000Base-X), IEEE802.3ab (1000Base-T), IEEE802.3ae (10GBase), IEEE802.3ak, IEEE802.3an, IEEE802.3x, IEEE802.3ad (LACP), IEEE802.1p, IEEE802.1x, IEEE802.1Q, IEEE802.1D (STP), IEEE802.1w (RSTP), IEEE802.1s (MSTP), IGMP Snooping , Jumbo Frame(9Kbytes), IEEE802.1ad (QinQ, selective QinQ), GVRP	
L3 protocols (IPv4)	BGP4, IS-IS, OSPFv2, RIPv1, RIPv2, LPM Routing, PRB, Route-policy, ECMP, WCMP, VRRP, IGMP v1/v2/v3, PIM-SSM/SM/DM, MSDP, Any-RP	
IPv6 basic protocols	ND, ICMPv6, Path MTU Discovery, DNSv6, DHCPv6, ICMPv6, ICMPv6 redirection, ACLv6, TCP/UDP for IPv6, socket for IPv6, SNMPv6, Ping/Traceroute v6, IPv6 TACACS+/RADIUS, Telnet/SSHv6, FTP/TFTP v6, NTPv6, IPv6 MIBs, VRRP IPv6, IPv6 ACL&QoS	
IPv6 routing protocols	Static route, ECMP, PBR, OSPFv3, RIPng, BGP4+, MLDv1/v2, PIM-SMv6, PIM-DMv6, PIM-SSMv6, Route redistribution	
IPv6 tunnel features	Manual tunnel, ISATAP, 6to4, IPv4 over IPv6, IPv6 multicast over IPv4 tunnels	
MPLS features	LDP, MPLS L3 VPN, VLL, VPLS/H-VPLS, PE/P functions, RFC2547bis, CE dual homing, Cross-domain MPLS VPN	
QoS	IP precedence, 802.1P, DSCP, ToS, EXP, FIFO, PQ, CQ, SP, RR, WRR, DRR, SP+WRR, SP+DRR, WRED/RED, CAR, LR, GTS	
High availability	VSU, GR, In-Service Software Upgrade, RERP, REUP, RLDP, TPP, LD, Dual engines hot backup, NSF, Power supply redundancy, Passive backplane, Fan system redundancy, All modules hot swap, Switching fabric redundancy	
Security	NFPP, CPP, Anti-DDoS attack, Illegal packet detection, Data encryption, Anti-source IP spoofing, Anti-IP scanning. Standard/extended ACL, Ingress/Egress ACL, VLAN ACL, Plain text authentication and MD5 authentication for OSPF/RIP/BGP, Telnet login and password mechanism for limited IP address; uRPF, Broadcast suppression, DHCP snooping, Radius/TACACS	
Management	Syslog, Reporting alarms and self-recovery after faults, USB, SNTP/NTP, RMON group 1,2,3,9, SNMPv1/v2/v3c; Console/AUX/Modem/Telnet/SSH2.0, WEB management, FTP/TFTP, xModem, SPAN/RSPAN/ERSPAN, IPFIX	
Other protocols	DHCP Client, DHCP Relay, DHCP Server, DNS Client, UDP helper, ARP Proxy	

	RG-S12010	RG-S12006
Dimensions (D x W x H) (mm)	436.8 × 448 × 933	436.8 × 508 × 489
Power supply	RG-PA1200I: 90 VAC–264 VAC, 47–63Hz, power: 1400W RG-PA2000I: 90 VAC–264 VAC, 47–63Hz, power: 2000W	
MTBF	> 200,000 hours	
Temperature	Operating temperature: 0℃–40℃ Storage temperature: –40℃-70℃	
Humidity	Operating humidity: 10%-90%RH Storage humidity: 5%-95%RH	

5 Ordering Information

1. Chassis and Management Engine

Select the chassis and management engine according to the requirement.

Model	Description
RG-S12000 Series Master Chassis and Management Engine	
S12006-ISeries	Intelligent Series 6-slot Chassis (without power supply), Fan System
S12010-ISeries	Intelligent Series 10-slot Chassis (without power supply), Fan System
M12000-CM	S12000 High-performance Generation I Engine
M12000-CM III	S12000 High-performance Generation III Engine

2. Power Supply Configuration

Select AC power supply power supply according to the requirement.

Model	Description
RG-PA1200I	AC Power Supply Module (1200W)
RG-PA2000I	AC Power Supply Module (2000W)

3. Line Cards

Select the line cards according to the requirement.

Model	Description
Enterprise-level line cards, which support distributed IPv4, IPv6, MPLS, and IPFIX	
M12000-02XFP24SFP/12GT-EA	S12000 Interface Module (EA), 2 Ports 10GE (XFP), 24 Ports 1000BASE-X (SFP, LC), 12 Combo Ports 10/100/1000BASE-T (RJ45), Enhance Module
M12000-48GT/4SFP-EA	S12000 Interface Module (EA), 48 Ports 10/100/1000BASE-T (RJ45), 4 Combo Ports 1000BASE-X (SFP, LC)

M12000-24SFP/12GT-EA	S12000 Interface Module (EA), 24 Ports 1000BASE-X (SFP, LC), 12 Combo Ports 10/100/1000BASE-T (RJ45)
M12000-24GT/12SFP-EA	S12000 Interface Module (EA), 24 Ports 10/100/1000BASE-T (RJ45), 12 Combo Ports 1000BASE-X (SFP, LC)
M12000P-48GT/4SFP-EA	S12000 Interface Module (EA), 48 Ports 10/100/1000BASE-T (RJ45, PoE), 4 Combo Ports 1000BASE-X (SFP, LC)
M12000-04XFP-EA	S12000 Interface Module (EA), 4 Ports 10GE (XFP)
Data center line cards, which support next-generation data center and cloud computing features	
M12000-16XS-DA	S12000 Interface Module (DA), 16 Ports 10G (SFP+)
M12000-48XS-DA	S12000 Interface Module (DA), 48 Ports 10G (SFP+)
M12000-04QXS-DA	S12000 Interface Module (DA), 4 Ports 40G (QSFP+)