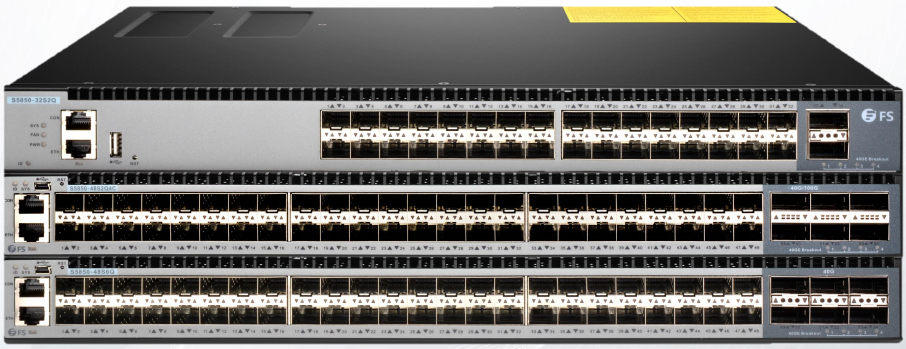
S5850 Series Switches

10GbE ToR/Leaf Ethernet Switches for Data Center



Overview

The FS S5850 Series are high performance Ethernet switches to meet next generation Metro, Data Center and Enterprise network requirements, which support L2/L3/IPv6/Data Center/Metro features. The S5850 Series Switches come with complete system software with comprehensive protocols and applications to facilitate rapid service deployment and management for both traditional L2/L3 networks and Data Center networks.

The S5850 Series Switches are cost-effective Ethernet access and aggregation platform to Enterprise, Data Center and Metro application. The S5850 Series are also ready for IPv6 deployment.

Key Features

- Triple-Play Services
- Layer 2 VPN Service
- Superior Redundancy for Fault Backup
- High-Performance IP Routing
- Bandwidth Optimization
- Robust Multicast Control
- Advanced QoS
- Comprehensive Security Solutions
- Superior Manageability

Primary Features and Benefits

I. Rich Software Features to Provide Flexible Deployment Options

The FS S5850 Series Switches provide rich software features to meet kinds of deploy requirements. Such as enterprise, datacenter, metro Ethernet networks.

II. System Design for Green and Energy Saving

The S5850 Series Switches support the fans with speed control as well as power consumption adjustment which is based on the flow status of the ports (According to the temperature inside the box). Both can highly save the energy and go for green.

III. Customized Profile for Different Deployment Scenarios

The Flexible Table Management (FTM™) technology employed by S5850 Series Switches offer multiple table size configuration profiles as optimized choices for different network scenarios. S5850 Series Switches could support up to 128K MAC address table or 32K IP routing table.
Besides these pre-defined profiles, application-specific profile is also applicable with FS Advanced Service.

IV. Data Center Features

S5850 Series Switches support many new Data Center features, such as NVGRE/VXLAN/ GENEVE, Priority Flow Control (PFC), and Data Center TCP. MLAG features are also good candidates for TOR switch in data center network.

V. Uninterrupted Performance Assurance and Multi-Node Redundancy and Robust Fault Protection System

Hardware

- Hot-swappable power modules.
- Power module supports AC 1+1 redundancy.
- Fans support N+1 redundancy.
- Real-time environment monitoring for chipset temperature, status of fan and power, etc.

Software

- LACP, ECMP, VRRP, VARP, STP/RSTP/MSTP, Smart Link, BFD, ERPS and loadbalancing.
- FS-patented Sysmon for CPU status monitoring and protection upon unpredictable fault.

VI. Outstanding QoS Control with Flexible Classification and Queuing Mechanism

Rich QoS mechanisms are implemented in S5850 Series Switches including flow classification based on source/destination MAC, source/destination IP address, protocol type, TCD/UDP port number to meet complicated network requirements.
Moreover, S5850 Series Switches provide 8 hardware queues per port to support multi-stage scheduling (WDRR, SP) and Tail Drop/WRED. 2-stage shaping (queue/port) can be applied for flow management. Meanwhile, ingress and egress policer provide bandwidth monitoring with a granularity of up to 32 Kbps. Both srTCM (Single Rate Three Color Marker) and trTCM (Two Rate Three Color Marker) can be supported.

VII. Triple-play Service Support with Bandwidth Guaranty for High Quality Application

The FS S5850 Series Switches offer high bandwidth for Triple-Play services such as IPTV, video monitoring. The built-in QoS capabilities and flexible queuing technologies guarantee high quality of services.
Rich multicast protocol set (IGMP Snooping, IGMP v1/v2, PIM-SM) supports up to 16K multicast groups, 1K physical replications and 4K logical replications per group. With FSOS software, IPTV service and multicast time-delay control is fully supported.

VIII. Comprehensive Network Security Policy

The S5850 Series Switches support subscriber-class, switch-class and network-class security control.
Basic IPv4/MAC ACL is employed to filter IPv4/Non-IP packet respectively and can be applied to both port and VLAN. Besides that, extended IPv4 ACL is also available. In a single ACL rule, both IP and MAC ACE can take effect to filter IP and Non-IP packets simultaneously.
FS ARP Inspection and IP Source Guard features prevent network from malicious ARP attack. CPU Traffic Protection, Storm Control features optimize CPU load. Centralized 802.1x authentication forbids illegal user access to the network.

Primary Features in FSOS Software Images

Basic Switching and Routing	IPv6 Features	Data Center Features
L2 Switching/VLAN/Vlan Classification/QinQ/ERPS	NDP IPv6 Static Route	NVGRE/VXLAN/GENEVE
Static Link Aggregation/LACP *STP/Smart Link/ MLAG	RIPnG/OSPFv3	Open API/OVSDB
L2 and L3 Multicast	MLD/MLD Snooping/PIM-SMv6	IEEE 802.1Qbb PFC
Static IPv4 Routing RIPv1&v2/OSPF/BGP Route Map/PBR/ VRF/VRRP	Static Tunnel / ISTAP Tunnel / 6to4 Tunnel	-
BFD for Static Route& OSPF	-	-
ACL, QoS/Storm Control/Port Security/DHCP Snooping/IP Source Guard/ARP Inspection/CPU Storm Protection/802.1x/Radius	-	-
Telnet/TFTP/NTP/SSH/DNS/SNMPv1&v2&v3/ RMON/Port&Vlan Mirror/sFlow	-	-

Technical Specification

	S5850-48S2Q4C	S5850-48S6Q	S5850-32S2Q
Ports Attributes			
10GbE SFP+ Ports	48	48	32
40GbE QSFP+ Ports	2	6	2
100GbE QSFP28 Ports	4	N	N
Max. 10GbE Density	72	72	40
Max. 40GbE Density	6	6	2
Max. 100GbE Density	4	N	N
Performance			
Switch Fabric Capacity	1.92 Tbps	1.44 Tbps	800 Gbps
Forwarding Rate	1200 Mpps	1072 Mpps	596 Mpps
CPU	Freescale PowerPC P1010	Freescale PowerPC P1010	Freescale PowerPC P1010
Latency	612ns	612ns	612ns
Packet Buffer Memory	9 MB	9 MB	9 MB
Flash Storage Memory	2 GB	2 GB	2 GB
System Memory	1 GB	1 GB	1 GB
MTBF (Hours)	99936.04	97210.07	108822.22
Jumbo Frame	9600 Bytes	9600 Bytes	9600 Bytes
Typical/Max Power Draw	160W/200W	150W/190W	120W/150W
Forwarding Technology	Store and Forward/ Cut-Through	Store and Forward/ Cut-Through	Store and Forward/ Cut-Through
Airflow Direction	Front-to-Back	Front-to-Back	Front-to-Back
Chassis			
Rack Mount	1 RU	1 RU	1 RU
Dimensions (W x D x H)	470 x 440 x 43.6 mm (18.5 x 17.32 x 1.72")	470 x 440 x 43.6 mm (18.5 x 17.32 x 1.72")	440 x 400 x 43.6 mm (17.32 x 15.75 x 1.72")
Unit Weight	22lbs (8.3kg)	22lbs (8.3kg)	15lbs (7.0kg)

Specifications

	S5850-48S2Q4C	S5850-48S6Q	S5850-32S2Q
Environmental Characteristics			
Operating Temperature	0 to 45 ℃ (Long term) -5 to 55 ℃ (Short term)		
Power Supply Range (AC)	Operating Voltage: 100 ~ 240V; 50/60Hz Maximum Voltage: 90 ~ 264V; 47~63Hz		
Power Supply Range (DC)	Operating Voltage: 36 ~ 75Vdc Input		
Storage Temperature	-40 to 70 ℃		
Relative Humidity	0 to 95% (non-condensing)		
Acoustic Noise	International Organization for Standardization (ISO) 7779: < 50dB		
Safety and Compliance			
Safety Certifications	Ready to ETL Marking Ready to CE Marking		
Electromagnetic Emissions Certifications	Ready to FCC Part 15 Class A Ready to CE		
Warranty	5 Years		

Descriptions and Specifications

Feature	Benefit
Triple-Play Services	• Advanced QoS functionalities provide differentiated class of service treatment to support triple-play service. • Multicast VLAN Registration (MVR) continuously sends multicast streams in a multicast VLAN while isolating the streams from subscriber VLANs to reduce overall bandwidth requirement for multicast distribution in ring based network. • Comprehensive security solution to provide protection of subscribers, switch, and network at the network edge.
Layer 2 VPN Services	• FS Selective QinQ feature strictly conforms to 802.1Q and 802.1ad and provides more flexibility to customers while classifying VLAN based on port, original VLAN or L2/L3 information for the purpose of segregating subscriber traffic in the network. • VLAN translation in both ingress and egress translates VLAN IDs carried in the data packets between different virtual LANs or between VLAN and non-VLAN encapsulating interfaces at Layer 2.
Data Center	• 802.1Qbb PFC (Priority Flow Control) • Layer 2 network scalability: MLAG • NVGRE/VXLAN/GENEVE • OpenAPI(Json-RPC) • OVSDB

Feature	Benefit
Superior Redundancy for Fault Backup	• Multi-Chassis Link Aggregation(MLAG) is supported to logically aggregate ports across two switches. • IEEE 802.1d Spanning Tree Protocol (STP) support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance. • IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) allows a spanning-tree instance per VLAN, for Layer 2 load sharing on redundant links. • IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) provides rapid spanning-tree convergence independent of spanning-tree timers and also offers the benefit of distributed processing. • Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad. • Equal-Cost MultiPath (ECMP) works for routing packets along multiple paths of equal cost for load balancing and redundancy. • Virtual Router Redundancy Protocol (VRRP) is supported to create redundant, failsafe routing topologies. • FS-patented Sysmon mechanism monitors real-time CPU status and pauses switch work while unexpected fault happens. • ERPS (Ethernet Ring Protection Switching) is used to create a fault tolerant topology by configuring a primary and secondary path for each VLAN. • SmartLink is a fault tolerant topology for two uplink application, can provide < 50ms protection time. • Virtual-ARP(VARP) allows multiple switches to simultaneously route packets from a common IP address in an active-active router configuration.
High-Performance IP Routing	• Basic IP unicast routing protocols (static, Routing Information Protocol Version 1 [RIPv1], and RIPv2) are supported for small-network routing applications. • Advanced IP unicast routing protocols (Open Shortest Path First [OSPF] and Border Gateway Protocol Version 4 [BGPv4]) is supported for load balancing and constructing scalable LANs. • Protocol Independent Multicast sparse mode (PIM-SM) for IP multicast routing is supported. • Up to 256 switch virtual interfaces (SVIs) are supported; all physical ports can be routed port. • Proxy Address Resolution Protocol (ARP) allows to answer the ARP queries from a network host. • Gratuitous Address Resolution Protocol (ARP) assists in the updating of other machines' ARP tables and helps detect IP conflicts and ensure load balancing on incoming traffic in some cases.

Feature	Benefit
Bandwidth Optimization	• Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance. • Equal-cost routing facilitates Layer 3 load balancing and redundancy across the stack. • Switch-port auto recovery automatically attempts to reactivate a link that is disabled because of a network error. • Up to 55 Link Aggregation groups are supported with 16 member ports per group.
Robust Multicast Control	• Internet Group Management Protocol (IGMP) snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • IGMP Snooping TCN provides quick response capability to topology changes so that the service provider's multicast service will not be paused even the topology is altered temporarily. • IGMP immediate leave overrides the normal checks to see if there are other hosts or proxy devices on the local segment interested in the multicast group and shorten the time of changing channels for IPTV services. • IGMP filtering provides multicast authentication by filtering out non-subscribers and limits the number of concurrent multicast streams available per port. • IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces to allow users on any downstream network to join an upstream sourced multicast group. • Multicast VLAN Registration (MVR) allows one single multicast VLAN to be shared among different subscriber VLANs on the network which improves bandwidth utilization by reducing multicast traffic in the subscriber VLANs and simplifies multicast group management.

QoS and Control

Feature	Benefit
Advanced QoS	• FS QoS queuing mechanism differentiates flows according to any L2/L3/L4 identity and enqueues flexibly; meanwhile modifies CoS/DSCP and limits throughput. • Ingress and egress policer is provided based on 802.1p Class of Service (CoS), Differentiated Services Code Point (DSCP), VLAN ID and QoS ACLs (IP ACLs or MAC ACLs), which can include source and destination IP address, source and destination MAC address, Layer 4 TCP/UDP information, or any combination of these fields. • Ingress and egress aggregate policer reinforces traffic policing across all of the applied ports. QoS applies the bandwidth limits specified in an aggregate policer cumulatively to all the flows matching the criteria. • Weighted Random Early Detection (WRED) generally drops packets selectively based on IP precedence and packets with a higher IP precedence are less likely to be dropped than packets with a lower precedence; WRED ensures higher priority traffic to be delivered with a higher probability than lower priority traffic. • Queue and port based two-stage traffic shaping contributes to up to 64 Kbps granularity. • Weighted Deficit Round Robin (WDRR) extends the quantum idea from the DRR to provide weighted throughput for each queue. Different queues have different weights and the quantum assigned to each queue in its round is proportional to the relative weight of the queue among all the queues serviced by that scheduler. • Strict Priority queue (SP) provides strict-priority queuing for a traffic class that enables delay-sensitive data, such as voice, to be sent before packets in other queues are sent. The priority queue is serviced first until it is empty. • In contrast to WRED, Tail Drop provides per QoS class congestion avoidance at the queues before a disruption occurs. • Strict priority queuing helps ensure that the highest-priority packets are serviced ahead of all other traffic. • 8 egress queues per port help enable differentiated management of up to 8 traffic types across the stack. • Support 8 differ-service domain, could provide flexible differ service for the ports. • There is no performance loss when using advanced QoS functionalities.

Network Security

Feature	Benefit
Comprehensive Security Solutions	• **Subscriber Security** - IEEE 802.1x allows dynamic, port-based security by providing user authentication. - IEEE 802.1x and port security are provided to authenticate the port and manage network access for all MAC addresses, including that of the client. - DHCP Snooping prevents malicious users from spoofing a DHCP server and sending out bogus addresses. This feature is used by other primary security features to prevent a number of other attacks such as Address Resolution Protocol (ARP) poisoning. - DHCP Snooping helps administrators with consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database and to rate-limit the amount of DHCP traffic that enters a switch port. - Dynamic ARP Inspection helps ensure user integrity by preventing malicious users from exploiting the insecure nature of the ARP protocol. - IP Source Guard prevents a malicious user from spoofing or taking over another user's IP address by creating a binding table between client's IP and MAC address, port, and VLAN. • **Switch Security** - Secure Shell (SSH) Protocol, Kerberos, and Simple Network Management Protocol Version 3 (SNMPv3) provide network security by encrypting administrator traffic during Telnet and SNMP sessions. - Multilevel security on console access prevents unauthorized users from altering the switch configuration. - RADIUS authentication facilitates centralized control of the switch and restricts unauthorized users from altering the configuration. - Three MAC based security mechanisms are offered to control access: MAC filtering/ MAC port binding MAC number limitation per port CPU traffic protection refuses abnormal data flow to avoid malicious attack. • **Network Security** - FS ACLs allows for multiple layer rules coexistence such L2 with L3, or even with L4. - FS security VLAN ACLs on all VLANs prevent unauthorized data flows from being bridged within VLANs. - Port-based ACLs for Layer 2 interfaces allow security policies to be applied on individual switch ports.

Network Security

Feature	Benefit
Comprehensive Security Solutions	- Three different mechanisms are supported to protect the STP topology from loops or undesired topology changes caused by addition of switches, mis-configuration of devices or even malicious attempts to override the current Spanning Tree Root Bridge. - Bridge Protocol Data Unit (BPDU) Guard - Bridge Protocol Data Unit (BPDU) Filtering - Root Guard - BPDU Guard and BPDU Filtering protect against possible loops created by switches added on ports configured with the STP Port Fast feature. Root Guard protect against added switches attempting to become the Root Bridge.

Manageability

Feature	Benefit
Superior Manageability	• FSOS Software CLI support provides common user interface and command set with all FS routing switches. • Layer 2 traceroute eases troubleshooting by identifying the physical path that a packet takes from source to destination. • Network Timing Protocol (NTP) client guarantees accurate and consistent time synchronization with the whole network. • File Transfer Protocol (FTP) / Trivial File Transfer Protocol (TFTP) reduce the cost of administering software upgrades by downloading from a centralized location. • Dynamic Host Configuration Protocol (DHCP) Relay allows a DHCP relay agent to broadcast DHCP requests to the network DHCP server. • Multifunction LEDs per port for port status; half-duplex and full-duplex mode; and 10BASE-T, 100BASE-TX, 1000BASE-T, 10GBASE-LR indication as well as switch-level status LEDs for system, redundant-power supply, and bandwidth utilization provide a comprehensive and convenient visual management system.

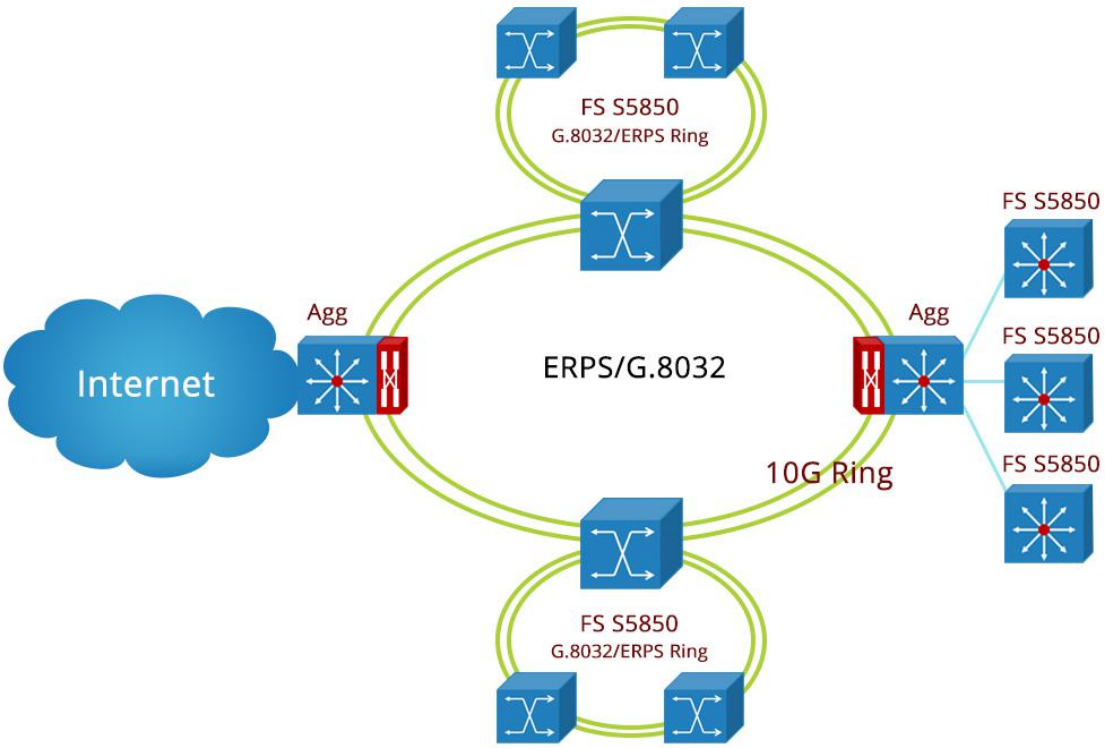
Applications

I. Network Application 1: Metro L2 Ring Network

Ring network topology allows service provider to establish robust network and operate multiple services.

Figure 1 shows the deployment example using the S5850 Series Switches for Metro L2 ring network topology as Aggregation or Access devices. S5850 Series Switches mainly use QinQ/ERPS etc. features to deliver Metro Ethernet service.

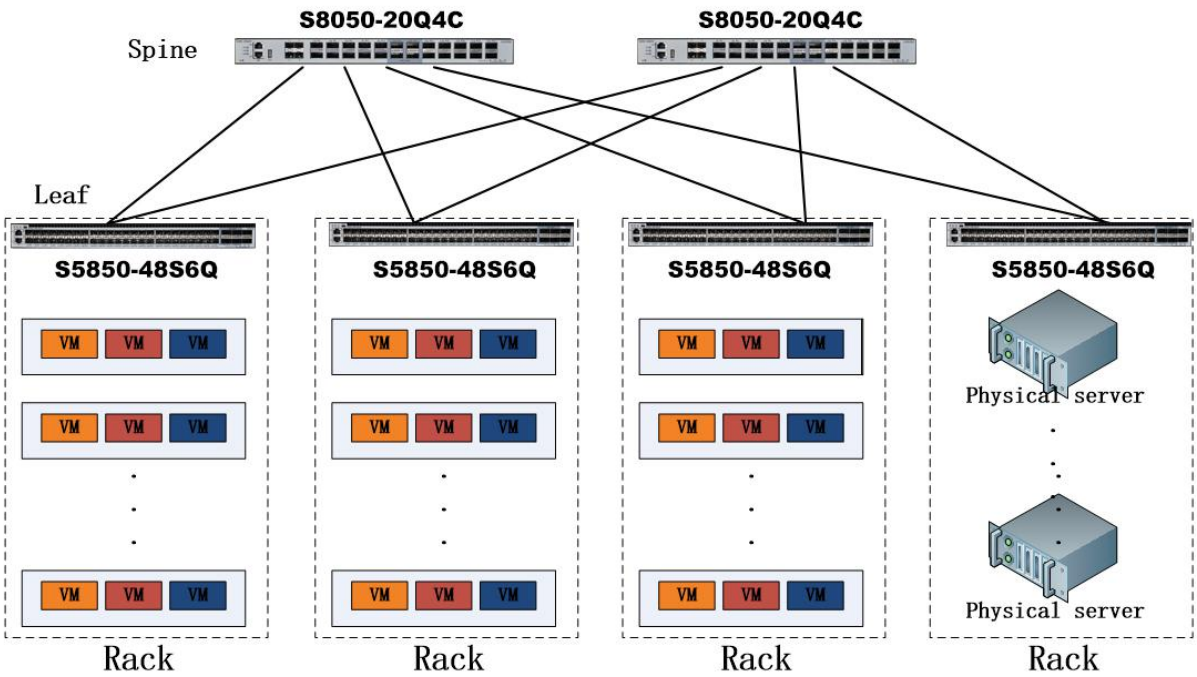
Figure 1-Metro L2 Ring Network Topology with the S5850 Series Switches



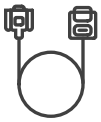
II. Network Application 2: Enterprise Data Center Network

S5850 Series Switches can provide access ports for high density 10GE servers, and 40GE uplink ports to Aggregation or Core switches. Figure 2 shows a deployment example using the S5850 Series Switches for Data Center Access network topology as TOR access devices. The S5850 Series Switches may use the following features: VLAN, LACP, RSTP&MSTP, MLAG, DCB Features (PFC/QCN/ETS, Data Center TCP), OSPF, QoS, NVGRE/VXLAN/GENEVE etc.

Figure 2-Data Center Servers Access Network with S5850 Series Switches



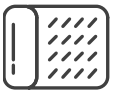
Accessories


Console Cable*1


Power Cords*2


Rack Mount Brackets*2


Bracket Screws*10


Rubber Pads*4

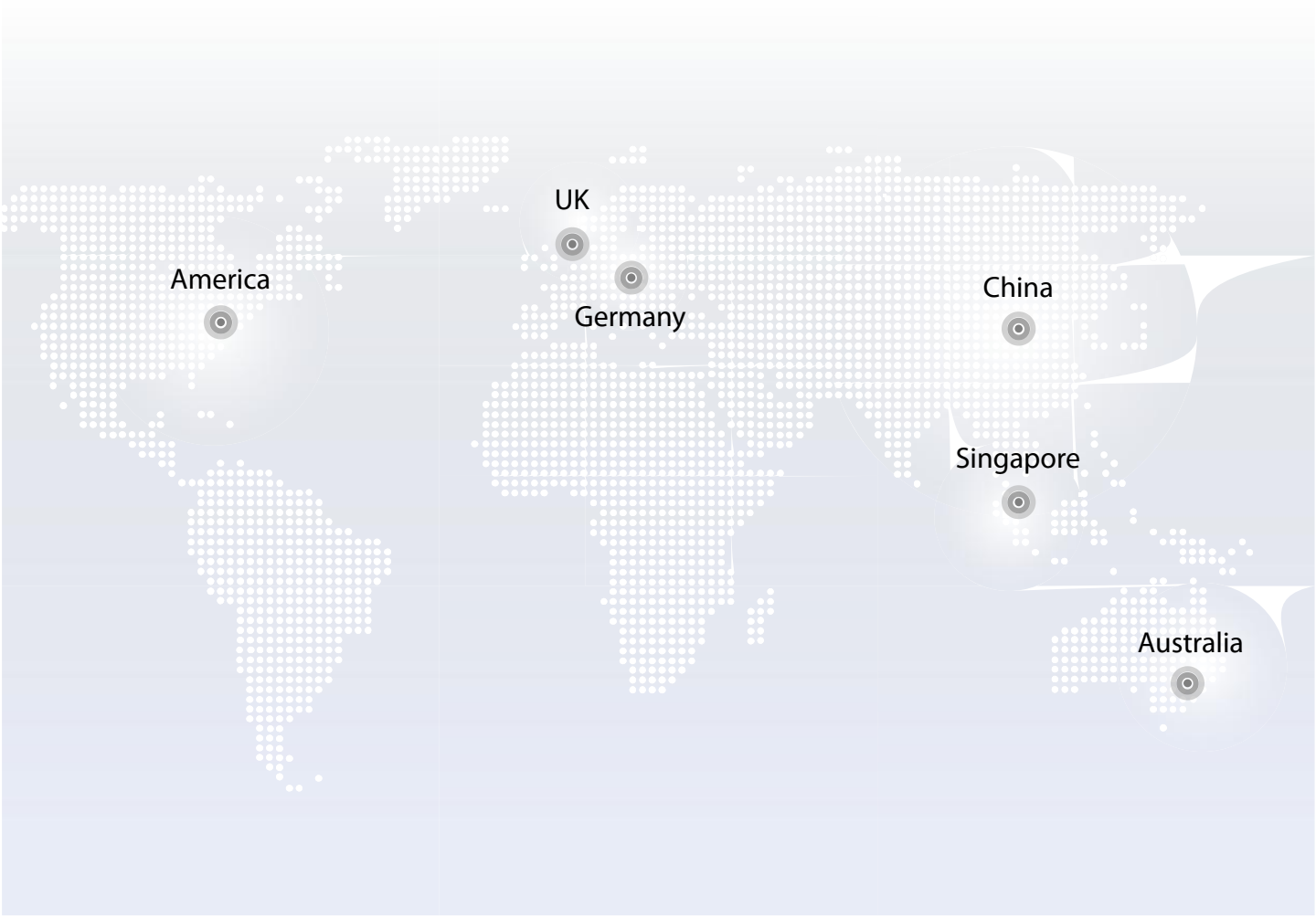

Cat5e Cable *1


Grounding Cable*1


User Manual*1

Get started today

Getting started with FS S5850 series switches is easy. In fact, you can explore and test them without spending too much time.
Try FS S5850 series switches, they will lower the total cost of your ownership, and bring your network with high scalability and agility as well.



https://www.fs.com

All statements, technical information, and recommendations related to the products here are based upon information believed to be reliable or accurate. However, the accuracy or completeness thereof is not guaranteed, and no responsibility is assumed for any inaccuracies. Please contact FS for more information.