

3300, 3700

Service-Aware Industrial Ethernet Switch



Secured Multi-Service Industrial Ethernet Solution

- High-density modular system
- Advanced Ethernet and IP feature-set
- Application-aware firewall per port
- Integrated VPN agent
- Ethernet and Serial interfaces
- Fit to harsh industrial environment
- Supported by a dedicated industrial service management tool (iSIM)

Service-aware Industrial Ethernet Switch

The RADiFlow Service-aware Industrial Ethernet switches, combine a ruggedized Ethernet platform with a unique application-aware processing engine.

As an Industrial Ethernet switch the RADiFlow switches provide a strong Ethernet and IP feature-set with a special emphasis on the fit to the mission-critical industrial environment:

- Fit to the harsh environment conditions
- Robust system design ensuring high reliability of the product
- Support for network resiliency schemes to ensure end-to-end high-availability

In addition the RADiFlow switches have unique service-aware capabilities that enable an integrated handling of application-level requirements such as implementation of security measures.

Such an integrated solution results in a simple network architecture with an optimized fit to the application requirements.

FACTORY INFRASTRUCTURE

Optimization of the manufacturing processes require real-time communication between the enterprise network and the production-floor. Such a connection Ethernet-based infrastructure is an essential basis for the optimization of the manufacturing performance.

With the RADiFlow switches you can implement a simple network solution that addresses all the requirements of the factory application:

- Fit to the industrial environmental conditions
- Scalable resilient network structure using G.8032 Ethernet rings
- App-aware firewall to verify proper access to each industrial end-device
- An integrated VPN agent for secured gateway for connection to the enterprise network and to remote maintenance centers.
- Intuitive Operation and Maintenance of the network using the iSIM tool

UTILITY INFRASTRUCTURE

Communication between distributed utility sites must be resilient and secured. Furthermore in the remote sites a variety of end-devices should be accessible in an outdoor environment.

With the RADiFlow switches you can implement a compact integrated communication center in each site that addresses all the requirements of the distributed utility application:

- Fit to the out-door environmental conditions
- Support for Ethernet-based and Serial-based end-devices over a unified Ethernet network
- Distributed firewalls throughout the network to isolate the various logical functions and to control the traffic that flows between the sites

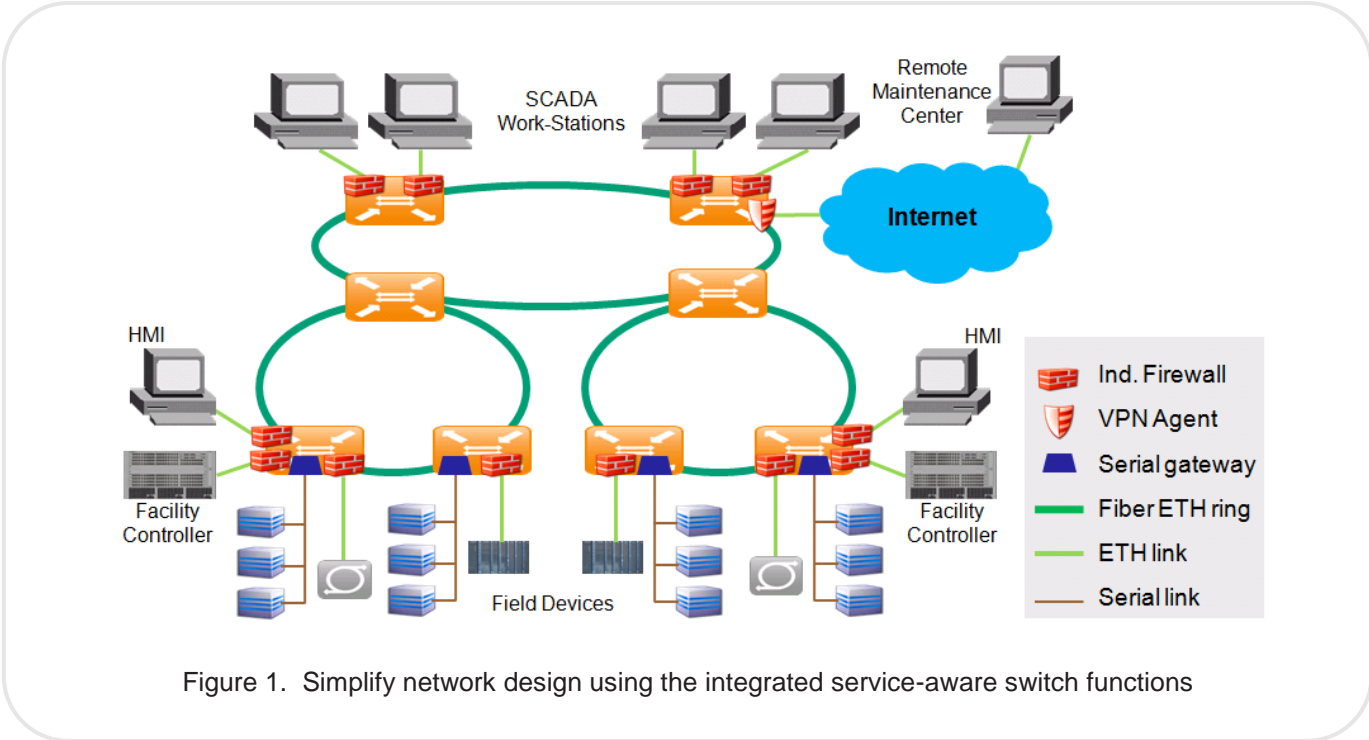


Figure 1. Simplify network design using the integrated service-aware switch functions

HIGH-DENSITY MODULAR SYSTEM

The 3300 and 3700 switches are modular systems with 3 and 7 interface slots respectively. Each interface slot can house either an Ethernet module or a serial RS-232/RS-485 module, enabling a flexible network configuration.

The system overall capacity can scale up to 28xGE full-duplex throughput with wire-speed switching for both Ethernet and IP. Industrial networks should operate reliably under extreme conditions. The RADiFlow switches are specifically aimed to provide a highly reliable infrastructure in an industrial environment designed to fit for DIN-rail mount, IP30 protection level, -40° to +75° operating temperature range with no fans, ATEX class 2 hazardous environment, EMI immunity according to IEC61850-3, etc.

NETWORK RESILIENCY

The RADiFlow switches support Ethernet rings according to the ITU-T G.8032 standard. This standard-based ring protection is the preferred method of data-path resiliency ensuring fast failure detection and switchover regardless of the scale of the network. In order to use a unified Ethernet network across the factory but still isolate the traffic between different groups of devices, service groups are created using Ethernet VLANs. Such network setup enables the enforcement of quality-of-service and security measures on each service group regardless of the scale of the network.

MULTI-SERVICE INTERFACES

The RADiFlow switches support both Ethernet and RS-232/RS-485 serial interfaces with 3 operating modes for the transmission of the serial data-streams:

- Transparent tunneling of the traffic between the 2 remote serial ports
- Bridge tunneling of the encapsulated industrial protocol between several sites
- Service translation connecting the serial end-devices to Ethernet-based devices

APPLICATION-AWARE SECURITY

The RADiFlow switch contain an integrated firewall on each port, providing a network-based distributed security solution equivalent to the use of personal firewalls on all the industrial systems in the factory. The firewall implemented in the switch is "application-aware", meaning that it inspects the contents of the data packets according to the rules of the industrial protocol used. The switch contains a VPN gateway which is customized for the remote operations of the critical industrial environment. The tunnel between the local VPN gateway and the service-center is SSL-encrypted, with user authentication and specific access authorizations. After the SSL tunnel has been established and a specific remote user is authenticated, a session to the target device in the industrial network is created. The VPN agent acts as a proxy between the external session and the internal session and further on-line security checks are performed.

Based on the multi-service capabilities of the switch, the VPN gateway can also act as a terminal server translating the remote session IP traffic to a local serial stream.

SERVICE MANAGEMENT TOOL

The RADiFlow switches are best utilized when implementing the overall infrastructure network with them. To facilitate the usage of the network-wide features of switches the iSIM central management tool is used to minimize the require IT know-how.

The iSIM presents the network topology in a logical tree structure and in a graphical map view. Furthermore the iSIM provides an intuitive wizard for the configuration and operation of G.8032 rings in the network. The iSIM is a powerful tool for provisioning of service connections between the industrial end-devices with detailed security configuration. The user configures application-aware security rules for each pair of end-devices starting from the protocol level and up to the specific parameters of the industrial protocols. The iSIM translates these rules to specific configuration for each switch. The iSIM provides several tools for easy monitoring of the network status and activation of proper responses:

- Aggregated alarm log with correlation to the impacted services
- Log of security violation events with specific analysis tools
- Monitoring of traffic statistics of the network presented in performance graphs

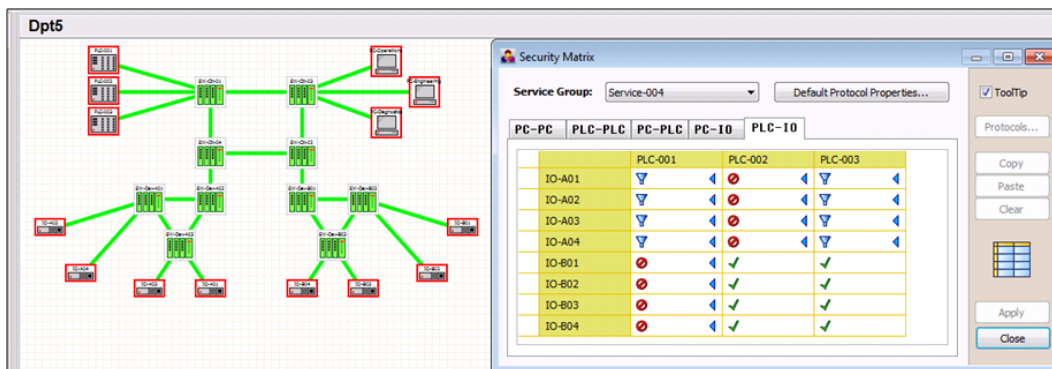


Figure 2. Distributed firewall configuration

Service-aware Industrial Ethernet Switch

Specifications

NETWORKING

ADVANCED LAYER 2 FEATURE-SET

ITU-T G.8032 Ethernet ring (<50mS recovery)

Scalable redundant networks using multi-ring

IEEE 802.1s MSTP

IEEE 802.3ad LAG with LACP

IEEE 802.1q VLAN for traffic segregation

VLAN tagging according to L2/L3 headers

IEEE 802.1p per port queues

OAM EFM IEEE 802.3ah

OAM CFM ITU-T Y.1731/IEEE 802.1ag

IEEE 1588v2 PTP clock synchronization

LAYER 3 FEATURE-SET

L3 Switching

Static routing, OSPF Routing

DSCP to 802.1p QoS mapping

VRRP redundancy scheme

MULTICAST

L2 Multicast with guaranteed QoS

IGMP Snooping for traffic optimization

BRIDGING SERIAL STREAMS

RS-232/RS-485 interfaces

Modbus Gateway - Serial to Ethernet

Bridging of serial industrial protocols between remote segments (Modbus, Modbus+, Profibus)

Transparent tunneling serial streams

SYSTEM PERFORMANCE

Line rate L2/L3 switching throughput

Switching latency <10µSec

32K MAC addresses

4K VLANs

SECURITY

ACCESS CONTROL

Enable/Disable port

Port lock-down after a physical failure

Port access filter per MAC / IP addresses

IEEE 802.1x port-based authentication

Protect against DoS attacks

SERVICE-BASED SECURITY

Egress filtering per VLAN

Application-aware firewall on each port analyzing industrial protocols

Traffic activity recording for Trail audit

INDUSTRIAL REMOTE ACCESS AGENT

VPN gateway using SSL tunnel

Session proxy hiding the local network

On-line session security checks

Translation to a serial-based session

Local alarm monitoring and logging

Traffic activity recording for Trail audit

USER ACCESS CONTROL

Multi-level user passwords

SSH/SNMPv3 Encrypted user authentication

Encrypted data-base for security features

INTERFACES

AVAILABLE INTERFACE MODULES

4 x 10/100/1000 base TX module

4 x SFP module with 100/1000 optional Copper and Optic SFPs

2xRS-232 + 2xRS-485 serial module

PHYSICAL DESIGN

MODULAR SYSTEM DESIGN

3300, 3700 variants (see Table 1)

DIN rail mounting

Optional wall mount or 19" rack mount

2 redundant power supply

Main switch module

Pluggable interface modules

Optional application processing module

INDUSTRIAL ENVIRONMENT

Rugged enclosure - IP 30 rated

Passive cooling - No fans

Operating temperature: -40 to 75°C

Operating Humidity: 5%-95% (non condensing)

DC 24V/48V power supply with 2 power inputs in each power supply unit

IEC 61850-3 EMI, Voltage transients immunity

IEC 60255-21 Vibration and Shock resistance

Fit to ATEX Zone 2 Hazardous environment:

MANAGEMENT TOOLS

NETWORK MANAGEMENT

Network elements auto-discovery

Wizard for Ethernet ring configuration

End-to-End service groups provisioning

Security rules planning per service group

Network performance & diagnostics tools

LOCAL OPERATION

Command-Line configuration tool

Local USB port for emergency boot

Discrete inputs for user-defined triggers

Discrete outputs reporting system alarms

Failsafe output relay reporting critical alarm

Ordering

BASIC UNITS

Modular system basic system with back-plane, power-supply and main switch

See Table 1 for switch variants description

BS-MD<P><S><T>

Legend

P - Power-supply type

- 1 - 24V DC
- 2 - 48V DC

S - System type

- 33 - 3300 switch back-plane
- 37 - 3700 switch back-plane

T - Temperature range

- S - Standard - 0 ÷60°C
- E - Extended - -40 ÷75°C

PLUGGABLE MODULES

Interfaces Modules

Main Switch

Power Supply

Ethernet interface module

Serial interface module

Application processor module

See Table 2 for details

SFPs

Ethernet Optic MM and SM

Ethernet Copper

Contact us for more details

SOFTWARE TOOLS

Embedded service licenses

IP Routing

Industrial Security

iSIM Management tool

iSIM software - Including 10 iSIM points

iSIM Points - 1 point for every managed switch

ACCESSORIES

MK-RM001E

Hardware kit for mounting 3700 switch into 19-inch rack

MK-WM001E

Hardware kit for mounting 3300/3700 switch on the wall

CB-CN009E

Standard RJ-45 to DB-9 control port cable

Table 1. Switch chassis variants

	3700	3300
Functionality	Modular aggregation Industrial Ethernet switch	Modular remote-site Industrial Ethernet switch
Dimensions (HxWxD) [mm]	145*380*139	145*225*139
Interface slots	7	3
Power Supply Units	2	1 (with 2 power inputs)
Licensed Services	IP Routing, App-aware firewall, VPN gateway	IP Routing, App-aware firewall, VPN gateway

Table 2. Pluggable Modules

P/N	Description
MS-GE028S	Main Switch 0 ÷60°C
MS-GE028E	Main Switch -40 ÷75°C
PS-DC024S	Power Supply Unit 0 ÷60°C
PS-DC024E	Power Supply Unit -40 ÷75°C
IF-TP004E	Ethernet interface module - 4x10/100/1000 TX -40 ÷75°C
IF-SP004E	Ethernet interface module - 4xSFP -40 ÷75°C
IF-SL0004E	Serial interface module - 2xRS-232+2xRS-485 -40 ÷75°C
AP-SP002S	Application processor module 0 ÷60°C
AP-SP002E	Application processor module -40 ÷75°C

Note: Some services require a specific combination of modules. See documentation for more details