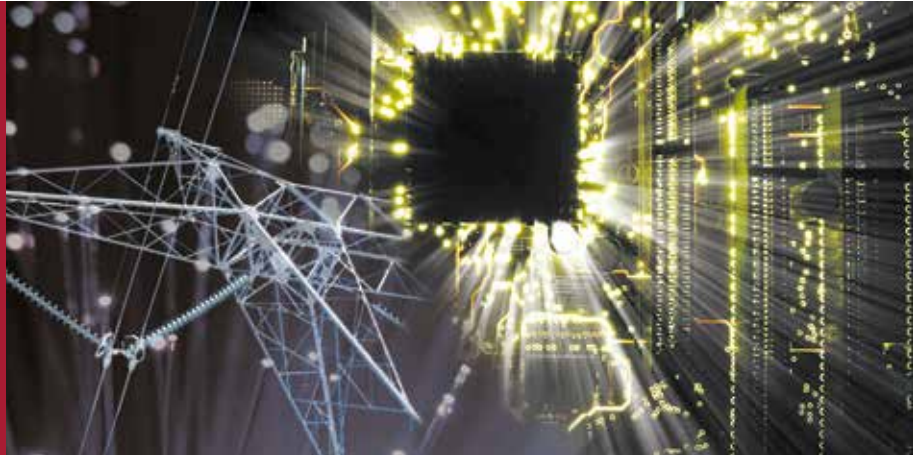# SW3

Gigabit/Fast Ethernet Switch

IEC 61850 Substation Switch

- L2 or L2/L3 capabilities

- High flexibility in port arrangement

- Supports IEEE 1588v2 standard

- Complies with IEEE 1613 and IEC 61850-3 standards

SW3

Description

Product overview

The SW3 is a Gigabit/Fast Ethernet switch specially designed to perform switching functions (L2) and IPv4 routing functions (L3).

Level 2 capabilities enable deployment of big scale LANs when the main requirements are:

- port density,
- switching performance, and
- logical complexity.

Level 3 capabilities offer:

- Routing functionality between two or more configured VLANs, with each VLAN being made up of a set of local ports (Ethernet and Gigabit Ethernet).

  The routing process is performed by hardware, that is, at wire speed for unicast traffic.

As a level 2 switch, SW3 brings the necessary capabilities to implement the automation of electrical substations according to the **IEC 61850** standard.

The SW3 supports the **SNMPv1**, **SNMPv2c** and **SNMPv3** management protocols, as well as other protocols and services such as **LLDP, GARP/GMRP**, **IGMP**, **DHCP**, **NTP/SNTP**, **TACACS+** and **RADIUS**. L3 model also supports the **RIPv1**, **RIPv2**, **OSPFv2** and **BGPv4** routing protocols, and the **VRRP** redundancy protocol.

The SW3 can be managed locally and remotely, through a **console** or a built-in **web server** (HTTP/HTTPS), **SSH** and **Telnet** server.

The SW3 is provided in a **19"** shelf that is **1 s.u.** in height, prepared for rack mounting.

Key features:

- **Switch with L2 & L3 capabilities.**

- **Supports IEEE 1588v2 clock synchronization (Precision Time Protocol) standard.**

- **Flexibility in number and type of ports.**

- **Complies with EMC standards of IEEE 1613 and IEC 61850-3.**
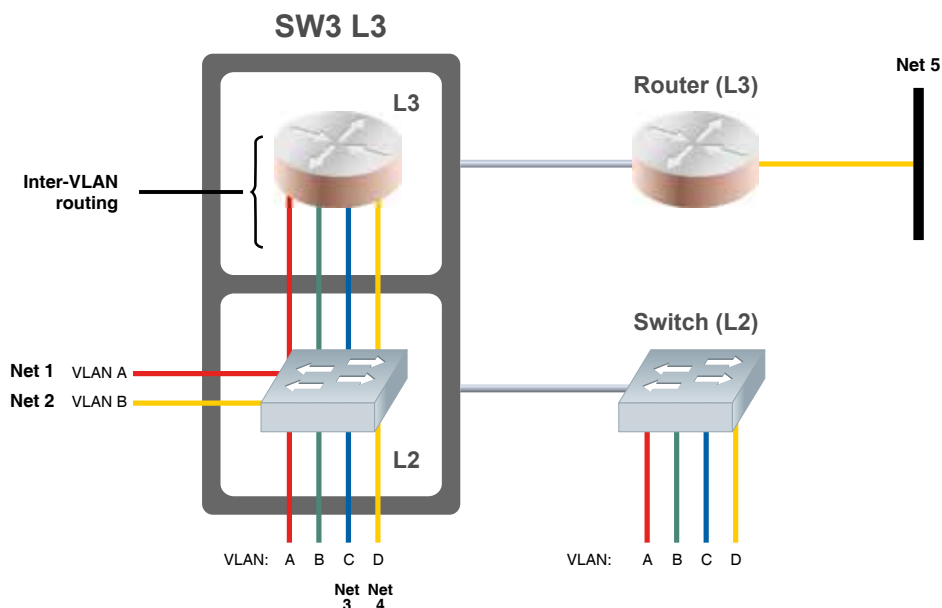
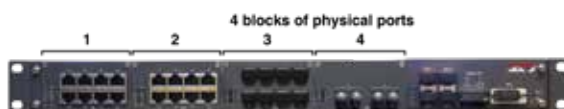Inter-routing between two or more VLANs

Equipment interfaces

4 Gigabit Ethernet **SFP bays**, front or rear, and up to **32** Fast Ethernet **ports**, front or rear, which are the result of the combination of:

- **8**, **16**, **24** or **32** ports type **10/100Base-Tx** with **RJ-45** connector. Up to 8 **PoE** ports (four and four).

- **4**, **8**, **12**, **16**, **20** or **24** ports type **100Base-Fx multimode** (1300 nm) with **MT-RJ** connector.

- **2**, **4**, **6**, **8**, **10**, **12**, **14** or **16** ports type **100Base-Fx multimode** (1300 nm) with **ST** or **SC** connector.

- **4**, **8**, **12**, **16**, **20** or **24** ports type **100Base-Fx multimode** (1300 nm) with **LC** connector.

- **4**, **8**, **12**, **16**, **20** or **24** ports type **100Base-Lx single mode** (1300 nm) with **LC SM** connector.

Or up to 24 ports prepared for IEEE 1588 (Precise Time Protocol) which are the result of the combination of:

- **6** ports type **10/100Base-Tx** with **RJ-45** connector.

- **4** ports type **10/100Base-Tx** with **RJ-45** connector and **2 Gigabit Ethernet SFP bays**.

- **4** ports type **10/100Base-Tx** with **RJ-45** connector and **2 ports** type **100Base-Fx multimode** (1300 nm) with **MT-RJ** connector.

- **4** ports type **10/100Base-Tx** with **RJ-45** connector and **2 ports** type **100Base-Fx multimode** (1300 nm) with **LC** connector.

- **4** ports type **10/100Base-Tx** with **RJ-45** connector and **2 ports** type **100Base-Lx single mode** (1300 nm) with **LC SM** connector.

- **4** ports type **10/100Base-Tx** with **RJ-45** connector and **2 ports** type **100Base-Fx multimode** (1300 nm) with **ST** or **SC** connector.

4 blocks of physical ports

Options of physical ports (Fast Ethernet or PTP)

8 ETHERNET · 2 ST · 4 ST · 4 LC (MM/SM) · 8 LC (MM/SM)
4 MT-RJ · 8 MT-RJ · 2 SC · 4 SC · 6 ETHERNET
4 ETHERNET & 2 SFP · 4 ETHERNET & 2 MT-RJ · 4 ETHERNET & 2 ST · 4 ETHERNET & 2 SC · 4 ETHERNET & 2 LC

Key features:

Availability of electrical (RJ 45), optical ports (MT-RJ, ST, SC, LC, LC SM) and IEEE 1588 (Precise Time Protocol) ports.

Up to 8 electrical PoE ports

SW3

Description

IPv4 routing. (L3 only)

The SW3 model L3 is an IPv4 router for unicast traffic.

The data for the routing function may have two sources; static data of a permanent nature (configured by the user) and dynamic data, obtained by the equipment itself through executing the standard routing protocols: RIP, OSPF and BGP. All this protocols can be active simultaneously.

In addition to routing function, the equipment has the VRRP redundancy protocol, so that it may be part of one or various virtual routers.

IPv4 traffic filtering. (L3 only)

All traffic processed by the SW3 takes into account the filtering rules that the user might configure. Filtering rules admit conditions in many fields.

Grouping of services and architectures.

Services may be grouped and discriminated, some not being accessible with others, through the configuration of different VLANs.

The SW3 may adapt to different network architectures, such as: star, double star, ring, double ring, and linked rings.

Broadcast traffic limitation.

In order to avoid the network flooding, the SW3 establishes maximum volume limits for different combinations of broadcast, multicast, and flooding messages, in each one of their ports.

Multicast traffic.

The SW3 has two protocols for adapting the multicast traffic to the desired interfaces. The protocols are: GARP/GMRP (IEEE 802.1D 2004) and IGMP.

The SW3 also establishes the multicast flows in an explicit and manual way (static configuration).

Port mirroring.

The SW3 resends traffic copies of one or more ports to another one, the monitoring port, being able to establish incoming or outgoing traffic copies in each monitored port in an independent manner.

Critical services and security.

The SW3 has Quality of Service (QoS), which identifies critical services, guaranteeing that all traffic receives the appropriate priority.

The SW3 implements different security features that prevent unauthorized access to the traffic system, such as: port disabling, traffic restriction according to MAC addresses, authentication protocols (TACACS+, RADIUS), etc.

Q-in-Q operation.

The SW3 includes two functions that provide Q-in-Q operation (double-tagged). In this operation mode, the frames include the original tag (C-TAG), either generated by the client equipment or assigned by the switch itself at the moment is received, and a second tag, the tag of the provider (S-TAG), which will be the tag used in the network of the service provider.

Link aggregation by LAG function.

The Link Aggregation Group (LAG) function allows grouping several links into a single aggregated link identifier.

Link aggregation can be created for any of the planned interface functions: user (edge, untag), inter-switch link (trunk or native) and those associated to the Q-in-Q functionality (access and core). Once the LAG is established, the set of parameters of the interface selected as Leader determines the behaviour of the group.

Key features:

L3 offers:

– **Routing capabilities for unicast traffic.**

– **RIPv1, RIPv2, OSPFv2 and BGPv4 routing protocols.**

– **VRRP redundancy protocol.**

Technical specifications

- 1 service console (DCE mode)

- 4 front or rear Gigabit Ethernet SFP bays and

- Up to 32 front or rear Fast Ethernet ports type 10/100Base-Tx (RJ-45), 100Base-Fx (MT-RJ, ST, SC and LC) and 100Base-Lx (LC SM) or Up to 24 ports prepared for IEEE 1588 (Precise Time Protocol).

- PoE power-supply option in eight electrical front ports (four and four). Maximum PoE power: 12W.

- 1 I/O connector.

- Full Duplex Wired Speed switching core.

- Port speed automatic detection.

- STP and RSTP for resolving loops in the network an operation in rings.

- Multiple VLANs (250 simultaneously).

- QoS:
  - The SWT can use the priority fields included in the IEEE 802.1p tag,
  - as well as the DSCP identifier included in the IP header.

- Broadcast and Multicast (Broadcast Storm Control) traffic limitation.

- MAC access control lists and 802.1x use authentication.

- Q-in-Q operation (double-tagged)

- Link aggregation by LAG function, static, according to IEEE 802.1ad

- Port mirroring

- Supports standard IEEE 1588v2 (Precision Time Protocol), in Transparent Clock (TC) P2P mode.

- Links in VLAN Native mode.

- Interoperability with IEDs (Intelligent Electronic Device) that complies with the IEC 61850 requirements.

- Traffic filtering (Access Control List).

- IPv4 traffic filtering. (L3 only)

- RIPv1, RIPv2, OSPFv2 and BGPv4 routing protocols. (L3 only)

- VRRP redundancy protocol. (L3 only)

- Local and remote management through a console (115200 bit/s) or built-in web server (HTTP/HTTPS), SSH and Telnet server.

- Supports the SNMPv1, SNMPv2c and SNMPv3 management protocols, as well as other protocols and services such as LLDP, GARP/GMRP, IGMP, DHCP (L3 only), NTP/SNTP, TACACS+ and RADIUS. TLS 1.2.

- Complies with IEC 61850-3, IEEE 1613 and IEC 61000-6-5.

- 19" rack enclosure. Height: 44 mm; Width: 440 mm; Depth: 287 mm.

- Power supply: 36-72 V_{DC} (48 V_{DC} nominal) or multirange (80-360 V_{DC}, 80-260 V_{AC}). Redundant power-supply option.

- Maximum consumption at 48 Vdc: 40 W

- Temperature range: -25°C to +70°C.

- Weight: 3.4 kg

- Material: Grey (RAL 7024) zinc-plating iron

Key features:

Complies with IEC 61850-3, IEEE 1613 and IEC 61000-6-5

www.zivautomation.com

Headquarters

**Parque Tecnológico, 210
48170 Zamudio, Bizkaia, Spain
T: +34 94 452 20 03
F: +34 94 452 21 40**

ziv@zivautomation.com

7 Manufacturing facilities & 14 Customer support centers

Chicago (USA)	**Dublin (IRL)**	**Paris (FRA)**	**Zamudio (ESP)**	**Dubai (ARE)**
Mexico (MEX)	**Newcastle (GBR)**		**Madrid (ESP)**	**Ryhad (SAU)**
Niteroi (BRA)			**Barcelona (ESP)**	**Bangalore (IND)**
				Singapore (SGP)
				Yakarta (IDN)

Making the Smart Grid Real *...with you*