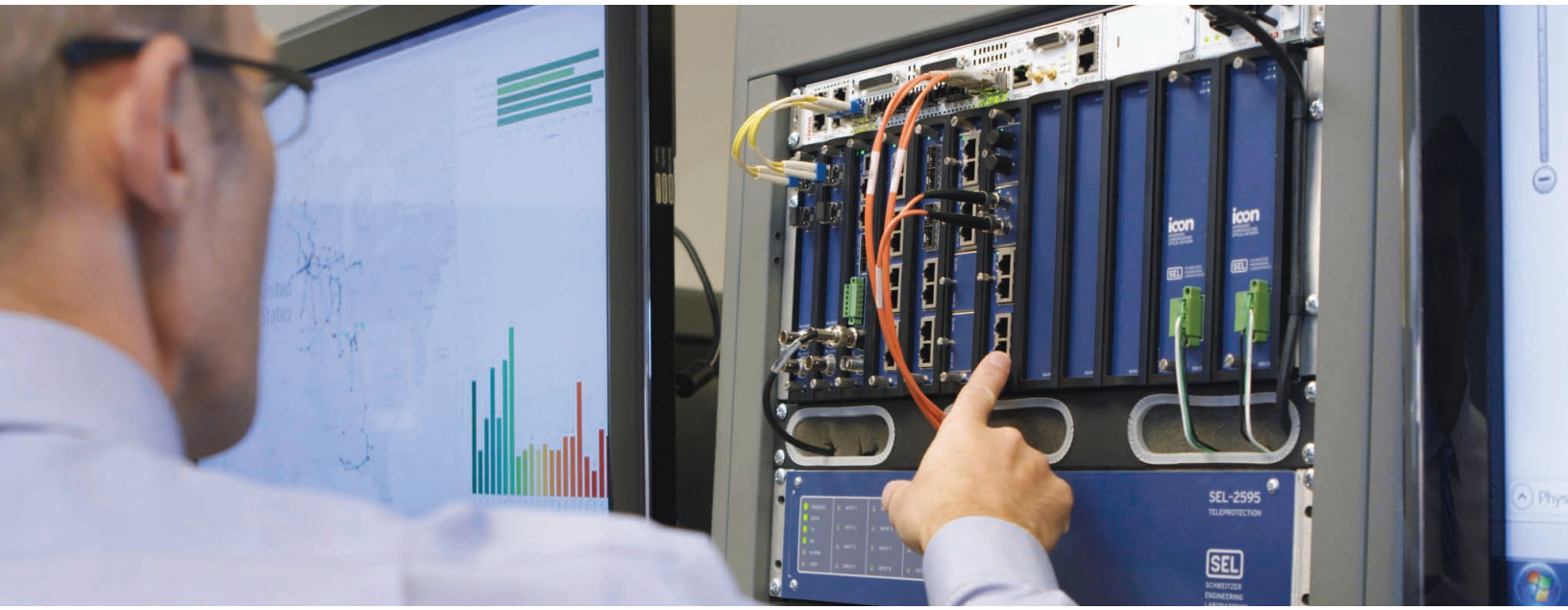
ICON® VSN for Digital Leased Lines



Transition from analog to digital leased lines and improve protection performance

- Deliver <10 ms latency performance for demanding applications like direct transfer trip.
- Retain existing protective relay equipment by adding a cost-effective SEL ICON Integrated Communications Optical Network to each substation.
- Address analog leased line obsolescence concerns.
- Reduce leased line cost and improve reliability by switching to digital.

Switch to Digital

ICON virtual synchronous networking (VSN) makes it easy to migrate from analog to digital leased line services without compromising protection.

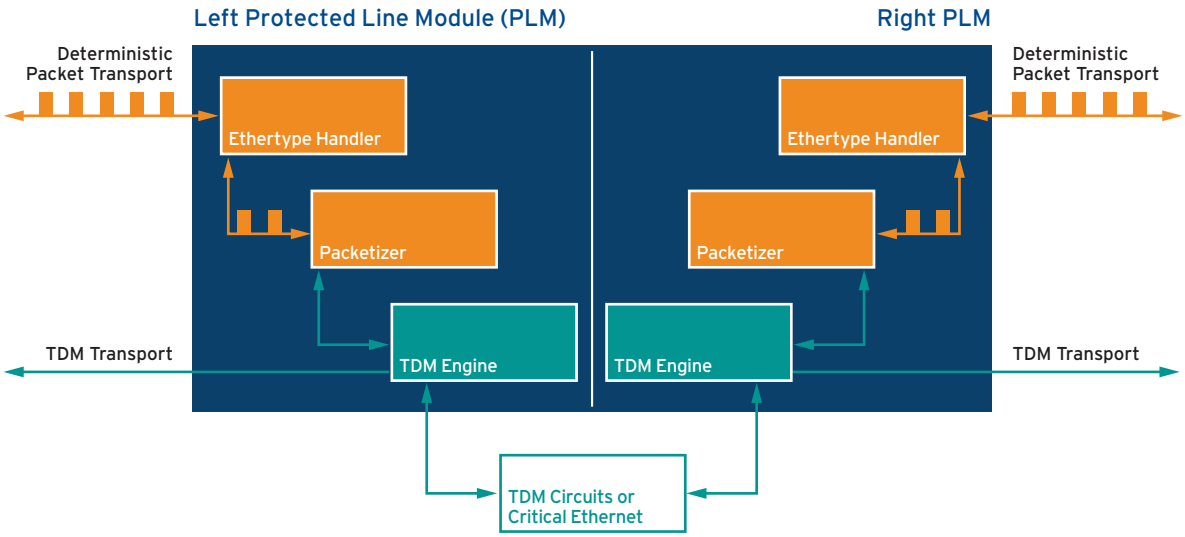
With the major telecom carriers announcing the end of service for leased analog lines, you may be facing a forced transition to leased Ethernet services. Switching to packet-based networking makes it challenging to maintain adequate latency and asymmetry performance for critical analog circuits. The ICON is the solution.

By simply adding an ICON at each end of a digital leased line, you can get the latency, asymmetry, and failover necessary to continue using sophisticated protection schemes like direct transfer trip (DTT).

You can combine ICON deterministic transport with dedicated analog drop interfaces, including 2-wire FXO/FXS, 4-wire analog voice frequency, and DTT. These interfaces allow you to preserve existing analog end equipment and create a low-latency circuit through your digital leased line to maintain end-to-end communications channel performance for critical applications. With the ICON, you can achieve end-to-end latency of less than 5 ms for a contact transfer across leased Ethernet service.

Performance for Protection Networks

ICON VSN technology allows you to use Ethernet transport but preserve performance for time-division multiplexing (TDM) circuits. And it works with any packet technology that your telecom carrier has adopted for core transport, including Multiprotocol Label Switching (MLPS) and Carrier Ethernet.



The ICON efficiently packetizes TDM traffic for Ethernet transport. It does not packetize at the DSO level; it packetizes at increments of an STS (i.e., STS 1—12) and passes that through an Ethertype handler. For transport itself, the ICON uses an innovative method of generating regularly spaced Ethernet frames with each containing packetized TDM information. By maintaining regularly spaced transport, the ICON maintains its synchronous TDM engine, ensuring fast data recovery. The combination of the efficient packetization and regularly spaced transport allows the synchronous transfer of data across a packet infrastructure, preserving TDM performance over the packet-based network.

ICON Specifications

General

Line Modules	**8020-01 Line Module**	Small form-factor pluggable (SFP) ports A/B/C/D: 2.4 Gbps SFP ports E/F: GigE 10/100 Ethernet ports: 8 RJ-45 with 4 Power over Ethernet (PoE) IRIG-B out: 2 BNC
	8021-01 Protected Line Module	SFP ports A/B/C/D: 155 Mbps, 622 Mbps, 1 Gbps, or 2.4 Gbps IRIG-B out: 2 BNC
Server Module	**8030-01 Server Module**	NMS ports: USB and RJ-45 GPS antenna: TNC IRIG-B in: BNC
Chassis and Power Modules	**19-Inch Rack-Mount Chassis**	
	8001-01 Full 19-Inch Chassis	10 available slots
	8011-01 HV AC/DC 120–240 V, IEC C6 Line Cord	Supply voltage: 102–264 Vac (50/60 Hz) or 88–300 Vdc
	8011-02 HV AC/DC 120–240 V, Terminal Block	Supply voltage: 102–264 Vac (50/60 Hz) or 88–300 Vdc
	8011-03 MV DC 24–48 V, Terminal Block	Supply voltage: 18–56 Vdc
	Half-Width Cube Chassis	
	8002-01 Half-Width Chassis	
	8010-01 HV AC/DC 120–240 V, IEC C6 Line Cord	Supply voltage: 102–264 Vac (50/60 Hz) or 88–300 Vdc
	8010-02 HV AC/DC 120–240 V, Terminal Block	Supply voltage: 102–264 Vac (50/60 Hz) or 88–300 Vdc
Access Modules	**8035-01 Ethernet Access Module**	10/100 Ethernet ports: 8 RJ-45 with 4 PoE
	8036-01 Ethernet Bridging Access Module	100/1000 Ethernet ports: 4 SFP 10/100/1000 Ethernet ports: 4 RJ-45
	8051-01 Nx64F Multimode Submodule	ST ports: 1 Rx and Tx Standard: IEEE C37.94 multimode
	8051-02 Nx64F Single-Mode Submodule	ST ports: 1 Rx and Tx Standard: IEEE C37.94 single-mode
	8053-01 Data Async Submodule	Ports: 2 RJ-45 Standards: EIA-232, EIA-422, and EIA-485
	8056-01 G.703 Submodule	Port: 1 RJ-48C
	8065-01 4-Wire VF Submodule	Ports: 2 RJ-45
	8066-01 2-Wire FXS Submodule	Port: 1 RJ-11
	8067-01 2-Wire FXO Submodule	Ports: 2 RJ-11
	8041-01, -04 Transfer Trip Module	Commands: 4
	8057-01 DS1 Async Submodule	Ports: 4 RJ-48C
	8057-02 DS1 Sync Submodule	Ports: 4 RJ-48C
	8057-03 DS1 Psync Submodule	Ports: 4 RJ-48C
Other	**8029-01 Crypto Module**	Ports: 4 SFP, 2.4 Gbps
System Specifications	**Network Topologies**	Linear and multiple rings with single or dual interconnected nodes, plus linear spur and subtended ring topologies
	Path Switching Time	<5 ms
	Cooling	Convection-cooled; no fans
	Operating Temperature	–20° to +65°C (–4° to +149°F)
	Mounting	8", 19", or 23" rack or panel mount

SEL SCHWEITZER ENGINEERING LABORATORIES

Making Electric Power Safer, More Reliable, and More Economical
+1.509.332.1890 | info@selinc.com | selinc.com

PF00634 • 20181005

WORLDWIDE 10 years WARRANTY