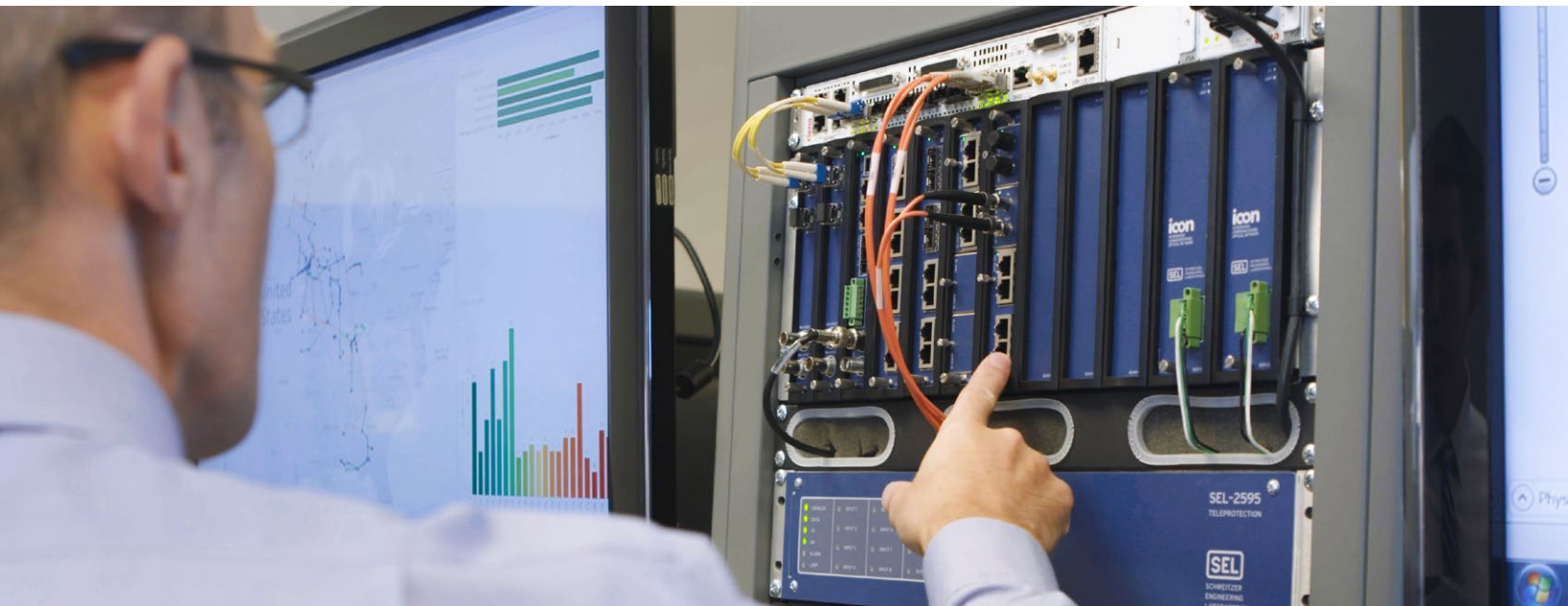


# ICON<sup>®</sup> VSN for Digital Leased Lines



## Transition from analog to digital leased lines and improve protection performance

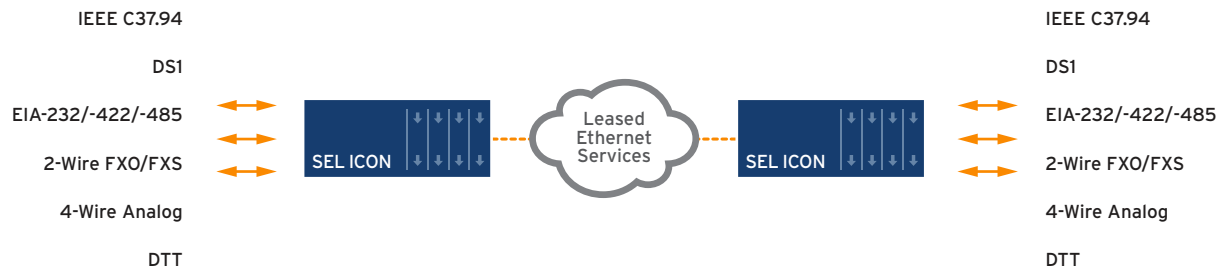
- Deliver <10 ms latency performance for demanding applications like direct transfer trip.
- Retain existing protective relay equipment by adding a cost-effective SEL ICON Integrated Communications Optical Network to each substation.
- Address analog leased line obsolescence concerns.
- Reduce leased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

# Switch to Digital

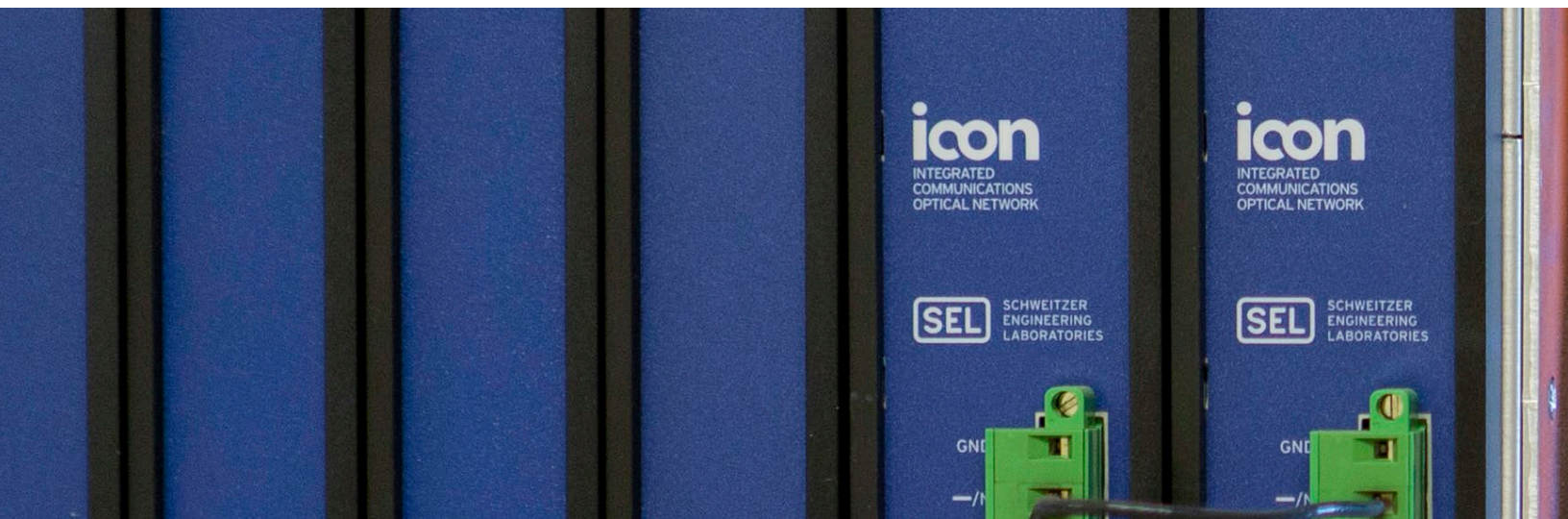
ICON virtual synchronous networking (VSN) makes it easy to migrate from analog to digital leased line services without compromising protection.

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).

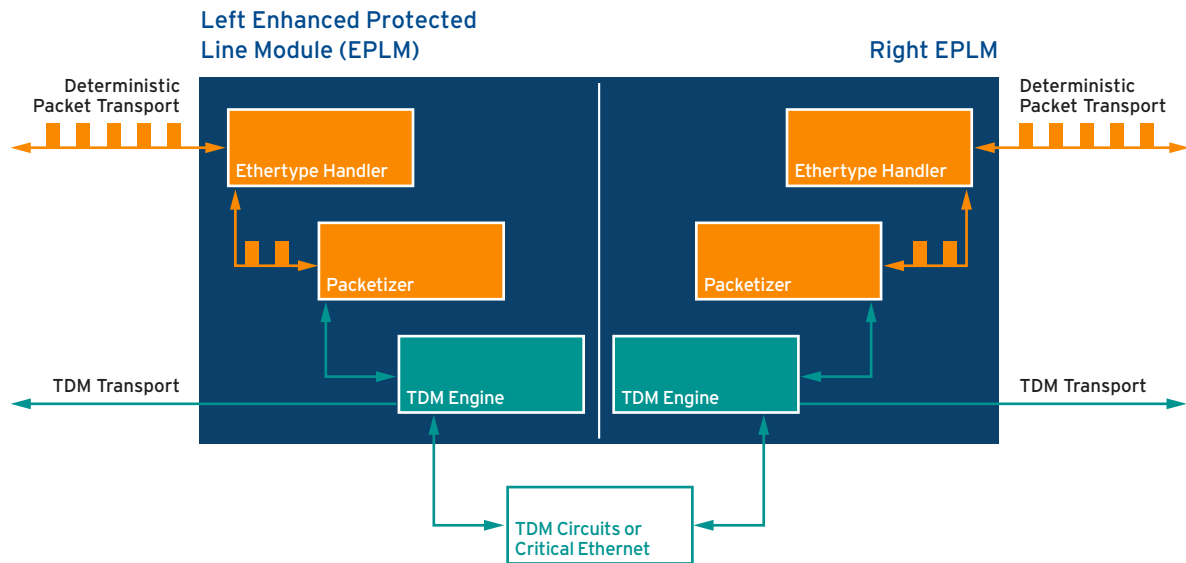


You can combine ICON deterministic transport with dedicated analog drop interfaces, including 2-wire FXO/FXS, 4-wire analog voice frequency, and DTT. These interfaces allow you to preserve existing analog end equipment and create a low-latency circuit through your digital leased line to maintain end-to-end 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.

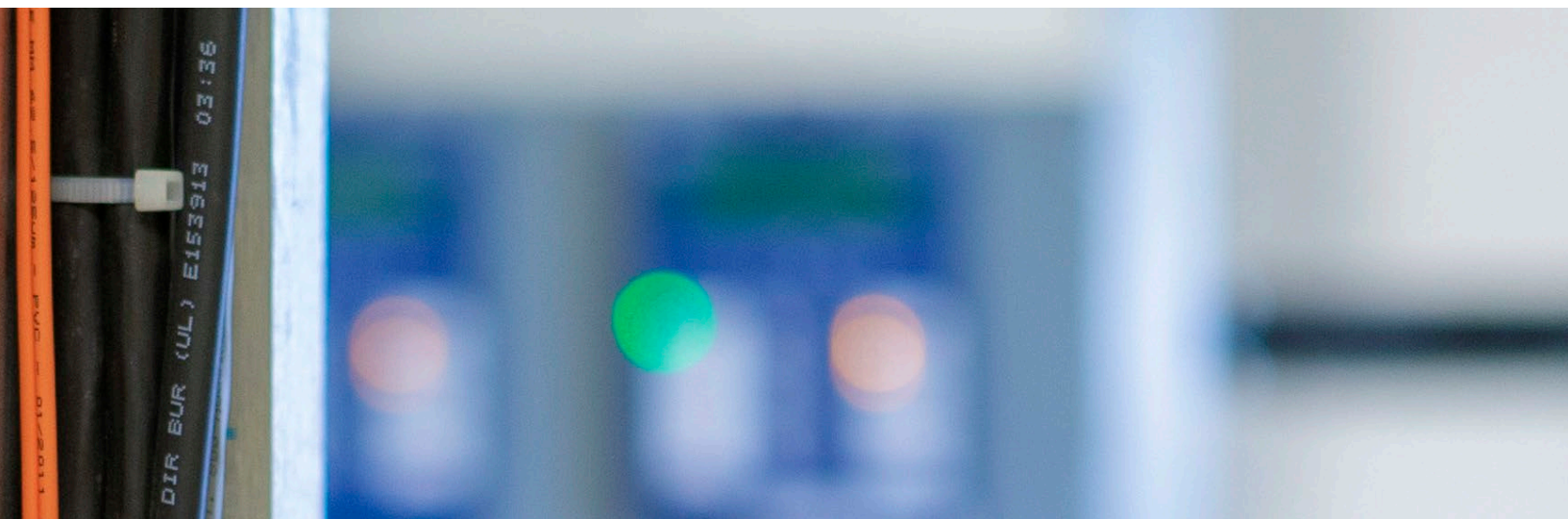


# Performance for Protection Networks

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 Etherbyte 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		
<b>Line Modules</b>	8022-01 Enhanced Protected Line Module	SFP Ports A/B/C/D: 155 Mbps, 622 Mbps, 1 Gbps, or 2.4 Gbps IRIG-B out: 2 BNC
<b>Server Module</b>	8030-01 Server Module	NMS ports: USB, RJ-45 GPS antenna: TNC IRIG-B in: BNC
<b>Chassis and Power Modules</b>	19-Inch Rack Mount Chassis	
	8001-01 Full 19-Inch Chassis	10 available slots
	8011-01 HV AC 120–240 V, IEC C6 Line Cord	Supply voltage: 102–264 Vac
	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: 19–58 Vdc
	Half-Width Cube Chassis	
	8002-01 Half-Width Chassis	
	8010-01 HV AC 120–240 V, IEC C6 Line Cord	Supply voltage: 102–264 Vac, 50/60 Hz
	8010-02 HV AC/DC 120–240 V, Terminal Block	Supply voltage: 102–264 Vac, 50/60 Hz or 88–300 Vdc
	<b>Access Modules</b>	8036-01 Ethernet Bridging Access Module
8036-02 Ethernet Bridging Access Module With PTP		100/1000 Ethernet ports: 4 SFP 10/100/1000 Ethernet ports: 4 RJ-45
8051-11 Nx64F Multimode Submodule		ST ports: 1 Rx, 1 Tx Standard: IEEE C37.94 multimode
8051-12 Nx64F Single-Mode Submodule		ST ports: 1 Rx, 1 Tx Standard: IEEE C37.94 single-mode
8053-11 Data Async Submodule		Ports: 2 RJ-45 Standards: EIA-232, EIA-422, EIA-485
8053-12 Async-CB Submodule		Ports: 2 RJ-45 Standards: EIA-232, EIA-422, EIA-485
8055-01 422 Sync Submodule		Port: 1 RJ-45
8056-01 G.703 Submodule		Port: 1 RJ-48C
8065-11 4-Wire VF Submodule		Ports: 2 RJ-45
8065-12 4-Wire VF Bridging 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
8057-11 DS1 Async Submodule		Ports: 4 RJ-48C
8057-12 DS1 Sync Submodule		Ports: 4 RJ-48C
8057-03 DS1 Psync Submodule		Ports: 4 RJ-48C
<b>System Specifications</b>		Network Topologies
	Path Switching Time	<5 ms
	Convection-Cooled	No fans
	Operating Temperature	–20° to +65°C (–4° to +149°F)
	Mounting	8", 19", or 23" rack or panel mount

## SCHWEITZER ENGINEERING LABORATORIES

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