

Integrate the SEL ICON™ With Legacy SONET Networks Using Mid-Span Meet

Ken Fodero and Tom Dahlin

INTRODUCTION

The SEL ICON™ synchronous optical network (SONET) multiplexer is ideal for mid-span meet with existing SONET networks, allowing for the gradual replacement of older SONET systems. The ICON has the ability to manipulate its use of the SONET overhead bytes, which allows it to be transparently placed into existing OC-48, OC-12, and OC-3 networks. This feature enables the gradual upgrade of older existing SONET systems while avoiding a disruptive large-scale upgrade of the entire network.

The interconnected ICON node is provisioned to pass through the SONET payload from the existing network. The ICON inserts its payload into preselected unused bandwidth in the existing network. The existing network passes the ICON traffic transparently as well.

SEL SOLUTION

SEL ICON nodes can be placed in between non-SEL SONET nodes in an existing SONET network, as shown in Figure 1. ICON DS0 traffic is passed between ICON nodes via unused bandwidth on the existing SONET network. The example shown in Figure 1 depicts ICON nodes inserted into an existing Nortel 6110 OC-3 SONET network.

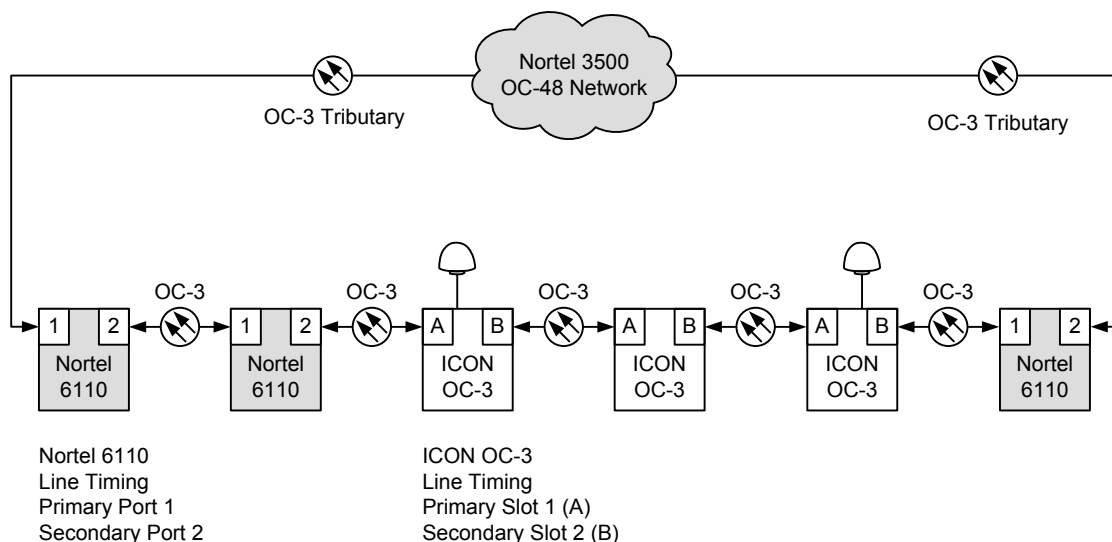


Figure 1 Mid-Span Meet Example: SEL ICON and Nortel 6110 OC-3 System

The following are the SONET transport overhead (TOH) byte settings required at the ICON nodes to prevent each system from interfering with the overhead of the other system in the mid-span meet:

1. All ICON nodes must be line-timed to the incoming Stratum 1 synchronization status messaging (SSM) value from the Nortel equipment. If an ICON loses timing from both directions around the ring, the SSM timing must be set up to fall back to its internal Stratum 3 clock.
2. The ICON Network Management System (NMS) channel must be removed (unassigned) from the first set of TOH data communications channel (DCC) bytes and placed in an unused VT payload.
3. The global link monitor must be removed (unassigned) from the second and third set of TOH DCC bytes and use an in-band Epipe link monitor to ring-protect Ethernet traffic. Settings 2 and 3 allow the DCC bytes from the Nortel equipment to flow through the ICON nodes untouched.
4. The time stamp must be removed (unassigned) from the TOH E1 byte. For IRIG-B time distribution and time stamping for sequence of events, Global Positioning System (GPS) antennas are located at each end of the interconnected nodes and the E1 byte is used only between those ICON nodes. Because two ICON sites have GPS antennas that are capable of providing a Stratum 1 synchronization timing source, the ICON fallback timing must be programmed to force an output quality value of 4, which represents a Stratum 3 using the first generation SSM settings. The ICON Stratum 1 source should not conflict with the current timing sources used by the Nortel equipment.

The ICON is capable of a mid-span meet with most existing SONET systems, allowing for the gradual replacement or the continued expansion of existing networks while avoiding the expense and disruption of a complete system upgrade.

