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DSX Fundamentals

Connecting with Your Network



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Cross-connection encourages seamless expansion, simple rerouting and quick restoration for today's evolving networks

Reduce costs; increase revenues; satisfy customers—the tenets of service providers as they balance today's tenuous financial climate with the promise of next-generation products and services. And as networks migrate and expand to include more complex services, reliability and flexibility become even more vital to their success. That is why digital system cross-connect (DSX) solutions remain the best option for connecting network elements.

The deployment of DSX platforms eases network expansion; allows circuit access for nonintrusive testing, monitoring, and patching; and establishes a central termination point for efficient circuit rearrangements. It allows operators to add a migration of technological platforms and bring advanced services closer to customers while preserving integrity at the network's core.



Make the Connection

Telecommunications networks must be designed to seamlessly absorb new growth, accommodate wiring changes, and restore failed circuits quickly. In its journey from source to destination, a signal travels through a gamut of telecommunications equipment that transforms, grooms, multiplexes, switches, demultiplexes, and routes the signal. Operators have three accepted methods of routing this signal: direct connect, interconnect, and cross-connect via a DSX. Direct connection and interconnection suffer from significant limitations, but the DSX remains fully capable of providing optimal flexibility, reliability, and access to the network.

DSX, coupled with a robust connectivity infrastructure, enhances several work operations:

- Faster service provisioning with greater capacity
- Increased service reliability and protection of electronic equipment and network elements
- Fundamental maintenance including physical layer access
- Quicker service recovery
- Simple, uncomplicated rollovers in future network migration planning
- Non-intrusive network element replacement and testing

Connectivity typically accounts for 1% to 10% of the upfront costs of network deployment. A small investment to simplify procedures, reduce errors, and minimise outages. Many network performance problems stem from restricted access for maintenance, cable congestion, rerouting or monitoring capabilities. And each problem is a high-maintenance proposition characterised by longer service interruptions, operational inefficiency, and frustrated customers that can be easily averted with a DSX solution.

But there is more to connecting a network than simply running cables between network elements.

Network design plays a crucial role in determining whether a network will generate revenue or lose profitability through excess labor costs and missed service opportunities.

Network design is evaluated against three criteria:

- Flexibility
- Central termination point
- Circuit access

Flexibility

Change is inevitable. In today's dynamic, evolving networks, it isn't a matter of if things will change—it's a matter of how much. Today's communications networks demand a migration platform equipped with the cable management and physical rearrangement flexibility to accommodate new services and network elements. Today's networks demand the flexibility of DSX.

Unlike a direct connect solution, where network elements are directly connected to one another in a dedicated, pre-assigned method, a DSX solution serves as the demarcation point. This limits faults to individual circuits only, allowing changes to be performed with minimal recabling and labor costs.

Direct connection forces operators to locate cables and then pull them to new locations, resulting in an extensive, intrusive reengineering process that demands a great deal of time and money recabling each network element. In contrast, a DSX allows operators to simply remove and replace a small wire on its cross-connect field to reroute circuits. This quick resolution is critical for maintaining service even during massive redesigns. It's foolish to add new services if existing services are taken down to do so.

Easier reconfiguration allows operators to manage the subsequent traffic flow when access to the physical network layer is required. Technicians can simply patch into the corresponding circuits with a patch cord for reconfiguration or monitoring purposes.

Central Termination Point

During network element rearrangements, a DSX can manage all rerouting, terminating, and maintenance functions from a centralised location. Without this centralised termination point, as in direct connection, cables must be pulled from each network element and subsequently rerouted to new destinations. Cables soon litter the central office; tracing becomes difficult; and labor costs soar. Mining for the physical facilities on the backplane of a network element is cramped and time-consuming. This method of hardwiring jeopardises reliability and often results in interrupted service because damage isn't limited to individual circuits but effects can quickly spread to all circuits within a shared component like a common electronic backplane. For instance, a

dropped wrench could knock out an entire network element, inducing havoc throughout the network.

DSX and interconnect systems allow operators to do all maintenance and rerouting from one location. These robust devices protect other, more delicate equipment from inadvertent damage during the circuit rearrangement process. And with easy circuit identification centralised, wiring on network elements' backplanes remains undisturbed and unharmed.

Circuit Access

A network's success often depends on how quickly it adapts to change and the simplicity of its maintenance capabilities. Networks require physical access points on every circuit for monitoring, patching, and testing purposes. The ability to tap into and read the signal on any circuit—and not interrupt service to customers—is invaluable in today's market. By incorporating jacks, DSX is the only solution that can localise a fault by allowing operators complete access to any circuit, anytime.

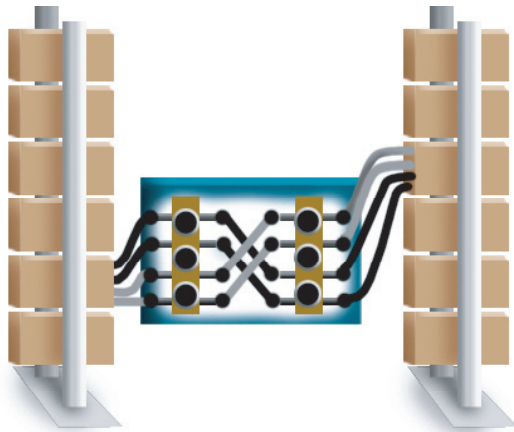
Passing a signal through a jack creates a "window" into the circuit. Through this window the signal can be monitored or pulled out, or a new signal can be introduced, by placing a temporary patch cord into the corresponding ports. By inserting one end of the patch cord into a monitor port on the DSX, and the other end into a test unit or other device, operators can monitor a signal without interrupting service.

When intrusive testing is required, operators simply plug the patch cord into the IN/OUT port on the cross-connect field of the DSX. The signal flow to the cross-connect field is interrupted and a new connection between the jack and patch can be made. The signal can then be sent to a testing device to check for transmission errors or to another network element to temporarily reroute the signal.

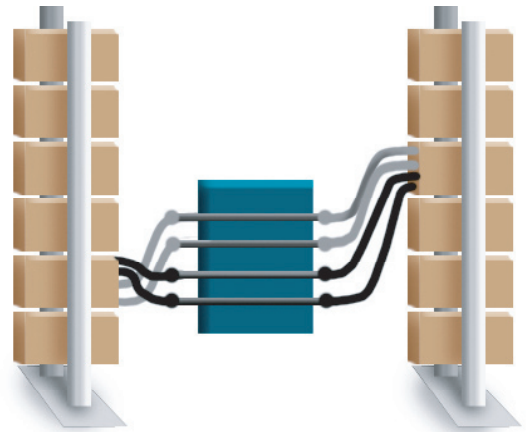
The integration of a DSX into the network allows operators to patch around faulty circuits quickly and easily. And operators are given time to restore the primary circuit without fear of service outages for customers.

Passing the Test of Time

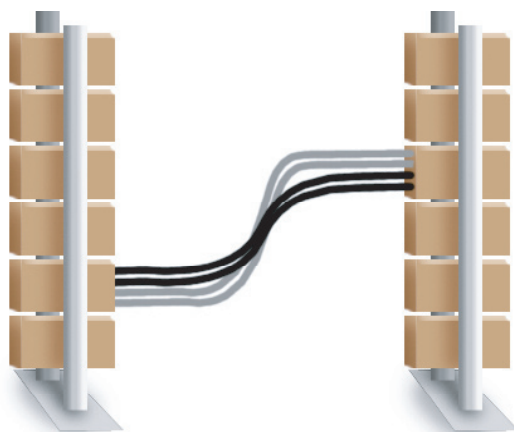
Networks evolve over time as technology changes and advanced services are adopted. Equipment obsolescence and the necessary incorporation of new technologies present carriers with on-going challenges. When the customers and the market are ready, the carrier must move quickly or risk missing revenue opportunity. A DSX cross-connect point allows deferment of property/plant and equipment expenses and allows upgrades to new technologies with the least disruption to current services. A physical plant with optimal cable management capabilities encourages quick reconfigurations, upgrades, and diverse alternate routing. And only through the cross-connection of network elements will service providers be able to meet the changing needs of their networks.



Cross-Connect Using a DSX Panel: permanently terminates equipment cables to a DSX panel via jacks. Cross-Connection offers optimal flexibility and rerouting options and enables intrusive or nonintrusive access for testing, monitoring, and patching.



Interconnect: terminates all equipment cables to connectors on a passive termination block. Central termination point is established, offering some flexibility for rerouting. The lack of circuit access negates testing, monitoring, and patching.



Direct Connect: elements are directly cabled to each other without going through an intermediate termination point—negating flexibility, testing, and rerouting capabilities

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