



Incremental Migration:

Deploying 10G, 40G, and 100G in the Same Network

As demand grows for 40G and 100G networks, it is imperative that data center and IT managers consider cabling and connectivity that can handle multiple tech refreshes, emerging technologies, and the latest standards. This type of migration strategy will maximize their return on infrastructure investment.

While shipments of 40G and 100G transceivers are on the rise, the large majority of data center networks don't undergo a wholesale migration from 10G channels to native 40G or 100G in one fell swoop. Instead, many typically move in stages: upgrading to 40G or 100G at switches in the core or aggregation layers, with the goal of updating servers or top-of-rack switches during a future tech refresh. Organizations who make these incremental changes need to plan carefully, as the right strategy will avoid costly upgrades that require ripping out cabling and starting over with a new network architecture.

Choose a Flexible, Scalable Cabling Infrastructure

Regardless of the switch or port type for 10G, 40G, or 100G fiber, a 24-fiber MPO/MTP[®] cabling system is the most flexible and scalable solution. In 2010, when IEEE 802.3ba was ratified, it required 24-fiber MTP connections for 100GBASE-SR10. Within months, Leviton became the first manufacturer to offer an end-to-end 24-fiber MTP system. In the following years, more manufacturers followed suit,

and in 2012 Leviton introduced lower loss 24-fiber MTP solutions, allowing more connections in a 40G/100G channel. Today we have reached the point where the latest active equipment for 40G and 100G can support multiple ports using the 24-fiber interface.

The following topologies are common scenarios that show ways to utilize your existing cabling infrastructure with OM3 and OM4 short-reach optics. These use 24-fiber and 8-fiber MTP connectivity, but many of these scenarios can also use existing 12-fiber legacy trunks with minimal to no modification.

QSFP+ 40G to 10G

Figure 1 shows an architecture with an upgraded 40G switch that is networked to existing 10G servers. A 24-fiber MTP® trunk connects a switch and server cabinet. At the switch, a cassette combines three 40G ports (QSFP 8-fiber) on the 24-fiber trunk. In the server cabinet, each 40G port is segregated into 10G LC connections to support server connectivity.

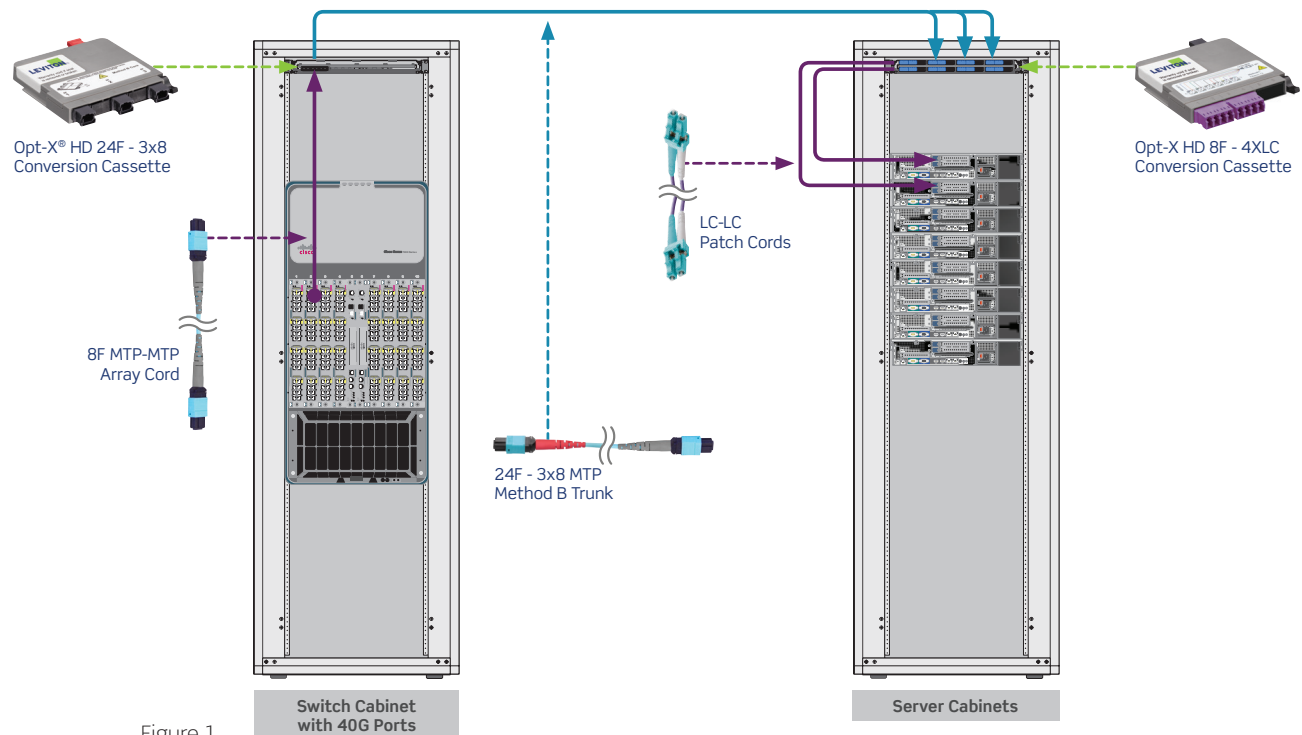


Figure 1

It is important to note that you do not necessarily require a new 24-fiber MTP trunk. If you have existing 12-fiber MTP trunks in place, you can use a cassette with two 12-fiber MTP inputs that will break out into 3 x 8 fibers. However, when one moves to more dense and more complex applications, the 24-fiber MTP solution makes for an easier migration.

Top of Rack 40G to 10G Conversion with 24-Fiber Trunks

Figure 2 shows a scenario that uses existing servers and a Top-of-Rack (ToR) switch with 10G ports. The switch then integrates and communicates with the core switch via a 40G uplink port. The scenario uses common elements seen in the previous examples, but uses an 8-fiber MTP® array cord to feed into the 10G ToR switch.

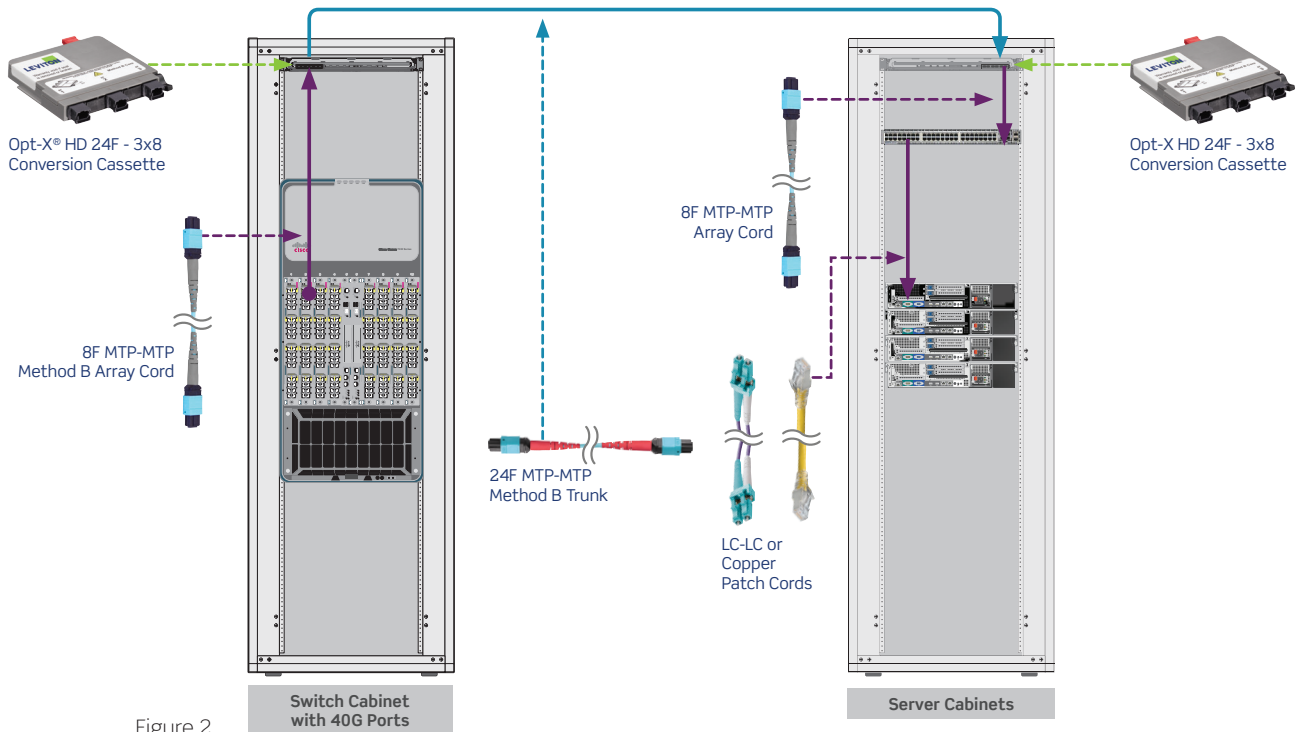


Figure 2

The polarity in this type of channel is somewhat unique — it does not follow TIA Method A, B, or C standard polarities. On the four 10G ports at the ToR switch, you must integrate each transmit and receive to land properly at the 40G port (QSFP). So polarity of the array cord and cassette are a key piece of this channel design. The cassettes and array cords control the fiber mapping and provide transitions from 10G to 40G. The cassettes in particular are very flexible components that can be utilized in many other existing network architectures, making the migration from 10G to 100G easier to install and configure.

New Installation for a 40/100G Deployment

Figure 3 shows an example of a completely new installation, using 40/100G right out of the box without any 10G switches in the channel. This method has 40G or 100G ports on the core switches, and 40G uplinks at the ToR switches. The patch panels at the top of each rack use MTP® bulkheads, with all 8-fiber cords from one QSFP port to the next.

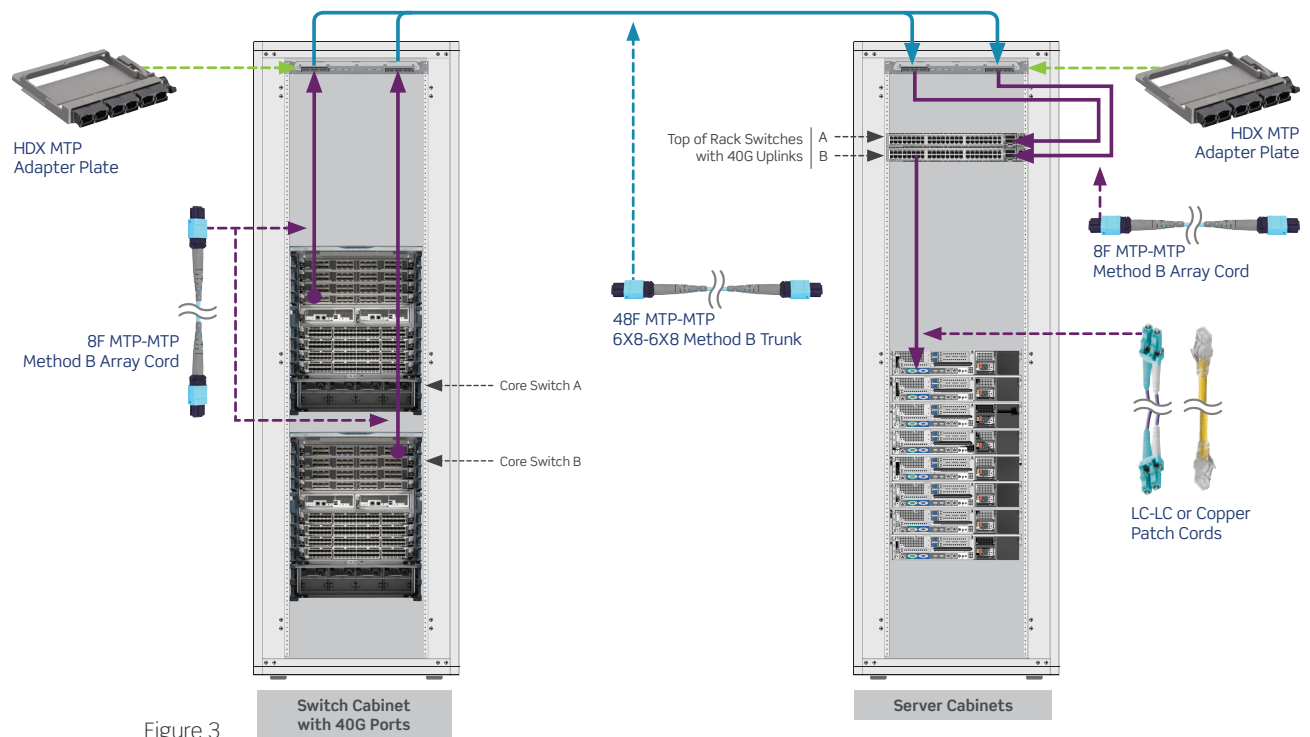


Figure 3

This scenario can use 24-fiber trunks that break out into 40G ports, similar to the topology in **Figure 2**. Another option is to create trunks with 8-fiber strands on every leg, with 8 fibers per 40G or 100G port, as shown in the diagram above. However, density can become a challenge with 8-fiber legs: A 1RU panel or enclosure can support up to 288 fibers, but supporting that density with 8-fiber connections would mean 36 legs from a 288-fiber trunk. This means cable management challenges will need to be addressed around the 1RU panel, on the front and rear sides.

This topology is not ideal for use with existing 12-fiber infrastructure. Integrating existing 12-fiber trunks with 8-fiber connectivity on the patch cord creates dark fibers — a poor way to utilize fiber in the structured cabling.

For data center managers, it will be critical to maintain their investment in cabling infrastructure while having the flexibility to support these new applications. The Leviton Opt-X® Unity System is a proven system that will not only meet current bandwidth requirements, but will also provide the flexibility needed to meet any future network demands, including 100G, 400G, and beyond. And with 100 percent fiber utilization at a higher density, the Opt-X Unity system facilitates easier cable management, reduced pathway requirements, and improved airflow to provide greater return on infrastructure investment.

You can see more topologies and learn more options for upgrading your network while utilizing existing infrastructure by downloading the [complete white paper](#).