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BLOG

Active Electrical Cables (AEC) Becoming an Important Part of Data Center Architectures

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Cloud providers are rapidly evolving their network topology architectures as they move towards 400 Gbps and beyond. One trend resonating across the industry is the move towards CLOS switch rack or Distributed Disaggregated Chassis (DDC) topologies and the use of copper above the server access layer. Both Service Provider and Data Center networks will take advantage of the power density provided by 25.6Tbps switch silicon to deploy dense in-rack CLOS architectures. Active Electrical Cables (AEC) such as HiWire™ AEC are a key enabling technology for DDC architectures.

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the use of copper above the server access layer. However, the distances DAC can serve continue to shrink with each increase in speed, and fiber remains costly.

DDC will ramp in 2H20. Both Service Provider and Data Center networks will take advantage of the power density provided by 25.6Tbps switch silicon to deploy dense in-rack CLOS architectures. Active Electrical Cables (AEC) such as HiWire™ AEC are a key enabling technology for DDC architectures.

In many ways, DDC CLOS architectures use copper cables as a replacement for the traditional modular chassis backplane. As we look towards this architecture change, we see three unique form factors of cable emerging to replace DAC and AOC.

Active Optical Cable (AOC) Replacement

Products like **Credo HiWire™ SPAN AEC** will begin to replace AOC. A fully populated rack of AOC can often have the same power as the switches themselves, and the current supply chain does not have consistent high-volume availability. AOC also has a high relative cost of a fiber solution. This type of copper solution will have longer distances and will potentially move into use cases around the middle of row connectivity.

Gear Shifting Splitter Cables

Products like **Credo HiWire™ SHIFT AEC** will gearbox between SERDES speeds. While today, the most common option is splitting a 56 Gbps SERDES into two 25 Gbps ports, we expect this type of cable to become more popular when 112 Gbps SERDES begin to ship. For example, a purpose-built 48-port 100 Gbps switch with 112 Gbps SERDES could become multipurpose and split down to 25/50 Gbps ports for server access or switch-to-switch connectivity.

Low Cost, Short-Reach Cables

Products like **Credo HiWire™ CLOS AEC** will begin to enter the market for short distances within the rack. Today DAC comes in one type of solution; however, with DDCs becoming more popular, a new type of purpose-built and short-reach cable should emerge to connect switches within a rack. By purpose-building for this use case, the cable should be cheaper, thinner and lower power, which is attractive when trying to pack so many cables into a single rack.

We expect that newer copper technologies will also benefit from improved process geometries over the next 12-18 months. Moving from 28nm to 12nm and below will help drive down cost in the interconnect part of the market in a very similar way of the moving from 28nm to 16nm to 7nm had huge cost savings in the switch ASIC itself.

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