

MicroTCA User Interview with Richard Norman, Hyperchip (Hyperchip makes network routers)

By Lance A. Leventhal, ATCA Newsletter Technical Editor

1. Why did you decide to go with MicroTCA?

Hyperchip needed a compact standard chassis for the H40G, an extremely dense high-bandwidth routing product. MicroTCA offered a ready-made 1U chassis with off-the-shelf AMC-based interface cards at 10 Gb/s and even 20 Gb/s, allowing us to pack a 40 Gb/s router (60 Gb/s for Ethernet) into a MicroTCA chassis only 1U high and 8.3 inches deep.

2. What platform were you using previously and why did you decide to change?

We were using a proprietary platform previously. We switched to MicroTCA and an AMC because, instead of building all parts of a system to get one product, we can now just build a single AMC and get a complete product family. The family includes a network processor AMC, a complete 40/60 Gb/s data plane AMC, a routing hub, a 1U MicroTCA router, and a full AdvancedTCA system, all at 40 Gb/s for SONET/SDH and 60 Gb/s for Ethernet (and going to 100 Gb/s). And all hardware is off the shelf except that one PCB!

3. Are you using a vendor-supplied platform or developing one in-house? Why did you make this choice? If you are using a vendor-supplied platform, whose is it?

Vendor supplied - why reinvent the wheel? The H40G can work with a variety of chassis – Hyperchip is currently using a MicroBlade 1U MicroTCA chassis from VRose Microsystems.

4. Did you face cooling and power distribution problems?

The chassis can supply and cool up to 340 Watts. The H40G is very power efficient, so the entire router uses only a fraction of the available power even though it provides massive route tables, extensive ACLs, and carrier-grade QoS for 100 million packets per second (40-60 Gb/s of full-duplex bandwidth).

5. Have you implemented shelf management? If so, what software did you use?

The H40G uses an off-the-shelf CorEdge shelf manager for tongue 1 of the MicroTCA hub, and sandwiches it with an AMC that holds the entire 40/60 Gb/s router data plane and uses tongues 2 and 3. The whole sandwich fits in the MCH slot with tongue 4 free for added features.

6. How do you interconnect your MicroTCA boards?

The H40G AMC is the switch fabric as well as the network processor and traffic manager for the whole chassis, so it interconnects all the interface cards. The H40G is FPGA-based, so it can adapt to whatever protocol the off-the-shelf interface cards use. XAUI is the most popular for 10 Gb/s, but Interlaken should come in for 20 Gb/s and 40 Gb/s interface cards. However, the H40G can even speak PCIe, Fibre Channel, or Serial RapidIO if an interface card needs it. And the next FPGAs will support 10G signaling, allowing Hyperchip to pack 100 Gb/s of full-duplex bandwidth in the same AMC form factor.

7. How did you debug and test your MicroTCA system?

Hyperchip uses everything from oscilloscopes and protocol analyzers to make sure that the interface cards behave properly, to router testers for the applications software.

8. Did you find any interoperability issues?

The cards at up to 10 Gb/s are all generally compatible. Beyond 10 Gb/s per AMC and beyond four SerDes channels, more standardization is needed on which channels get used for the extra bandwidth.

9. How large is your system and how much throughput does it provide?

Even the tiny H40G 1U MicroTCA chassis provides a massive 40 Gb/s for SONET/SDH, and up to 60 Gb/s for Ethernet. In AdvancedTCA, Hyperchip's H40G can provide up to 240 Gb/s of routing per slot, and that's real full duplex bandwidth, too (what some folks would call 480 Gb/s).

10. Are you using middleware? Is it Service Availability Forum-compliant?

Hyperchip used its proven scalable middleware for the H40G. It should be SAF compliant, but hasn't been through formal testing. The H40G AMC itself is middleware agnostic, so it can also be used in systems with off-the-shelf or proprietary middleware.

11. Do you use AdvancedTCA also, or are you planning to use it?

The H40G AMC has been built to work in AdvancedTCA as well as MicroTCA. Hyperchip has concentrating on MicroTCA first because that lets the entire trade-show 'booth' fit in a laptop bag. AdvancedTCA will provide scalability, but even the 5-slot chassis will have to be checked luggage, whereas the 1U MicroTCA chassis is carry-on for maximum convenience.

12. What is your opinion of MicroTCA? Will you use it in other products?

MicroTCA is great! Hyperchip only needed to build 20 square inches of PCB for the H40G, and got an entire leading-edge product family out of it!

13. How has MicroTCA worked out in terms of effort and return on investment?

Compared to the old proprietary products, MicroTCA dramatically slashes the effort and the investment, and gives more in return, too.

14. What is the single most importance piece of advice you would go to those planning similar projects?

Don't reinvent the wheel – leverage the AdvancedTCA/MicroTCA/AMC ecosystem instead, and deliver a world-leading product in a fraction of the time!

Richard Norman is the President of Hyperchip. You can reach him at morman@hyperchip.com.