

Making light of networking

How processor manufacturers are allowing networking intelligence to move closer to the consumer.

By **Graham Pitcher**.

Communications technology was one of the driving forces behind internet based commerce. In the late 1990s, sellers were desperate for bandwidth in order to support their web based ventures, whilst users were similarly eager to improve their internet experience.

The dot com crash slammed the brakes on the development of communications technology and the industry went through a relatively quiet period. But today, it's almost like the 'good old days' again. And what's driving communications technology is that networking is moving ever closer to the consumer.

Once the word 'consumer' enters any technological discussion, four things become evident: product developers want devices that are faster, smarter, smaller and – above all – cheaper. And you can add lower power consumption to the list. Recently, two leading suppliers of communications hardware have responded to market needs with upgrades to their communications processors.

Thomas Nindl is Agere Systems' senior marketing manager for telecom products in EMEA. He said network processors were becoming smarter thanks to software. "Our main investment is in software. Hardware is quite straightforward and a board is 10 to 12 layers. That's not a risk, since companies can even outsource their board design. But software is key; you need the intelligence in the software."

Tino Spadaro is director of new product development with Freescale's networking and communications division. He noted: "Intelligence is getting closer to the customer and that's why we've launched QUICC Engine." He believes there will be an 'explosion' in consumer networking starting in 2007. "Companies are now starting their designs and it takes about 18 months to complete the design and do field trials." QUICC Engine will be available in the MPC8360, part of the PowerQUICC II Pro range.

Agere's offering is the APP300 range

which Nendl described as 'significant'. According to Nindl, the APP300 is a fourth generation product. "We started with a hard wired atm, then moved to a programmable device," he claimed. "It's a true line rate device, scalable to Gbit/s data rates. This is important, because our competitors don't achieve line rates. They might have the processing ability, but they can't pass packets at line rates."

Spadaro, however, pointed out that his devices are not only doing layer 2 tasks, but also forwarding at IP layer 3 and looking inside packets at layer 4.

One of the challenges faced by the likes of Agere and Freescale is dealing with the mix of data traffic. Spadaro said: "When we were putting this product together, we looked at the movement towards packet based networks. The bottom line – especially in Japan and Asia – is a move to IP networks. What's important is how multimedia traffic will be carried over these networks. Today, networks are 90% atm, but this will shift over time and our products





will help this happen more quickly.”

Both companies are looking very closely at a range of opportunities and at digital subscriber line access multiplexers – or dslams – in particular, reflecting the migration of intelligence towards the consumer.

“A few years ago,” said Nindl, “these cards were dumb and the intelligence was found on the uplink cards. Today, that’s different and it’s a real challenge to keep these devices cost effective.”

Agere’s APP300 and Freescale’s MPC8360E both support a range of data rates. In the case of the APP300, performance is scalable from 600Mbit/s to 2Gbit/s. Freescale, meanwhile, claims a termination performance of 2Gbit/s and an internetworking performance of 1.2Gbit/s.

Nindl claimed the APP300 range was, essentially, the same device but with the ability to clock differently. The APP310, for example, will handle 600Mbit/s. Moving up the range, the APP340 can accommodate the full 2Gbit/s. “If someone decides to go with the 310,” Nindl continued, “and then wants more throughput, they can move to, say, the 320 without changing their board design because the pin out is identical.”

Both parts are complex devices, integrating a number of functions. Both have serious amounts of on chip processing available. In Agere’s case, it has integrated an ARM926 core, along with a classifier, traffic manager and control processor. Nindl says this is part of Agere’s attempts to reduce the Bill of Materials (BoM) cost. “The ARM core reduces cost,” he claimed, “because it can be used for off chip control work; for example, controlling dsl chips on board.” The

ARM core can be disabled if an external processor is used.

Freescale, meanwhile, has integrated the QUICC Engine. This features dual 32bit risc processors – each running at up to 500MHz – and eight general purpose comms controllers. Spadaro said: “QUICC Engine is a next generation comms processor. It allows customers to use any protocol and speed they want. The only limitation is pin muxing. If you made everything available, it would be a 2000pin package.” He added that the ‘right balance’ was to offer up to eight fast Ethernet ports, along with gigabit Ethernet, Utopia and Packet over Sonet access.

Spadaro noted the MPC8360E featured four main blocks. One of these is the QUICC Engine; another – denoted by the E suffix – is an on board security engine. “This supports AES, DES and so on. It also supports IPSEC; important for intrusion detection and fire-walling.” Alongside, there is an e300 PowerPC core, running at up to 667MHz, plus a systems interface block, handling memory access, amongst other tasks. “We can support a dual memory controller on the device,” said Spadaro. “One can be designated to the cpu, the other to the QUICC Engine. This can increase performance by up to 42%,” he claimed.

Nindl pointed to Agere’s software expertise as one contributory factor to the

APP300’s performance. “The software architecture is efficient and the hardware is optimised. Concise scripts implemented in powerful algorithms can reduce the number of lines of code by a factor of 10 to 15.”

And both companies recognise the value of providing as much software support to the user as possible. Spadaro explained the Code Warrior QUICC Engine Utility. “Our work defining the MPC8360E with customers pointed to the need for tools to help them get going quickly. They wanted a tool that would configure everything.” Amongst its features are automatic protocol conflict notification, common default values, point and click protocol selection and implementation, and access to pertinent documentation via ‘mouse over’ functionality and drop down menus.

Nindl noted that Agere was also offering software packages. “Functional programming interfaces – or FPIs – are ready to go programming interfaces that allow customers to control the device without having to know what the device does.”

The bottom line for both companies is the bottom line for their customers. Spadaro pointed to the need for a cost effective BoM, along with a cost effective product. “We’ve coined the phrase ‘rapidly increasing MIPS/\$,’” he concluded. Nindl, meanwhile, observed: “Everyone is looking for faster, smarter, cheaper networks.”

Illustration: Phil Holmes