



Distant

The business of transforming register transfer level (RTL) descriptions of chips into finished designs could become commoditised, according to speakers at a recent panel on outsourcing design. Some panelists said they believe the chip industry could be on the verge of spawning a chip-implementation services business that will parallel the development of wafer foundries.

The panel, at the Globalpress Electronics Summit in Monterey, California, was moderated by Bryan Lewis, research vice-president and chief analyst for Gartner Research. He opened by drawing a distinction between outsourcing and offshoring, pointing out that companies

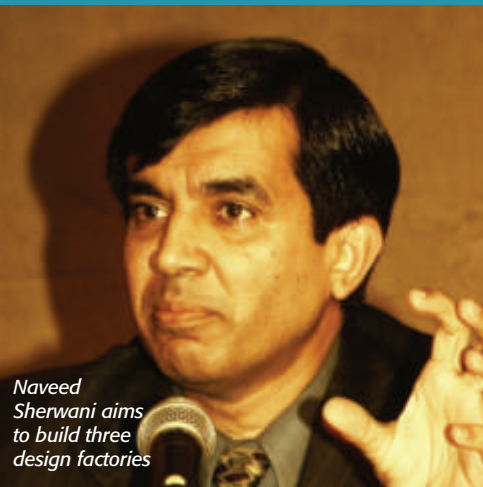
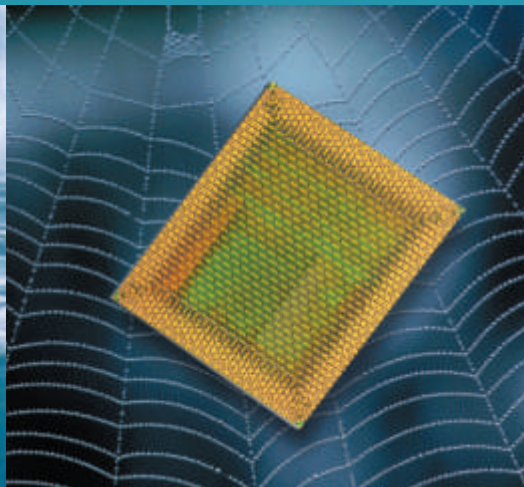
such as Texas Instruments and Intel send work offshore to overseas subsidiaries while IBM and Xilinx offer outsourced design services within the US. True offshore outsourcing operations were represented on the panel by Indian companies Wipro and OpenSilicon.

Offshoring is nowhere near as common as outsourcing, although offshoring is widely feared. A recent US survey found that four-fifths of respondents were outsourcing work within the US. The survey, which allowed multiple responses, found the next most popular place to send work was China and Taiwan, closely followed by India, Western Europe and Canada.

Logic verification is the most popular task to outsource,

shores

**Outsourcing chip design
could soon turn into a
commodity process if some
companies get their way**
by Luke Collins



*Naveed
Sherwani aims
to build three
design factories*

with 62% of survey respondents sending such work offshore because of its regimented and repeatable nature. Far fewer people (37%) outsource architectural design, while defining system requirements was only outsourced by 15% of respondents. Lewis said: "Nobody wants to outsource that because it's the crown jewels of the company."

Outsourcing complex design work can be difficult. Two-thirds of those surveyed found outsourced work took longer to complete than expected, while three-fifths found communicating with their outsourcing partners a problem. Almost half had higher costs than expected and almost a third questioned the management skills of partners.

So why outsource, if doing so brings such apparently

marginal benefits? Mohamad Ali, vice-president of engineering and technology services at IBM, said the top two reasons for outsourcing among IBM's customer base of larger Fortune 500 companies were time to market and innovation. Cost was only their fourth most important concern.

"Lots of clients are looking to innovate very quickly and to create an excellent user experience. So that's where we start out, looking at the user experience they're trying to create and then determining what assets we can bring," Ali said. "One of the things we have to bring to the table is a very large base of intellectual property, plus deep engineering and manufacturing expertise and industrial →

design expertise, because what they're looking for at the end of the day isn't just a chip but a whole solution."

Dave De Marinis, senior director and general manager of design services for Xilinx Design Services, said the oldest reason for outsourcing is high barriers to entry to using certain kinds of technology, such as physical chip design tools. Now companies outsource to cut risks and costs, increase performance or a combination of all three.

Naveed Sherwani, president and CEO of Indian design-services company Open-Silicon, said it's a matter of companies knowing how they should spend their time: "Each customer must decide what is their core competency and focus on that. If you're going to do two or three designs a year, your chances of success will be less than someone doing 20 or 40 a year."

Satish Premanathan, practice head in North America for chip and system design at Wipro, another Indian outsourcing supplier, agreed:

"It's not a question of throwing a design out the door and expecting it to be completed and given back to you. The company that outsources has to determine what is core and what is not, what is time critical and what is not, and identify those areas where these outsourcing organisations have specific domain experience.

"People look for help to fill a gap in their experience, to help take them to the market fast," he added. "Then slowly you can transition the product back into your own design organisation." The other time companies want to outsource work is when they have created a working design and are being asked for variants, which they don't have the capacity to develop in-house. "People outsource to manage the ramp-up and ramp-down of resources," he said.

If you outsource design to cut costs or get to market more quickly, you had better be sure your partner can meet your goals. "You need to figure out what is to be outsourced, then figure out whether the organisation you want to outsource to has the necessary processes and capability to do the design," said Premanathan. "Can they scale up the manpower and the tools to handle the IC design? And does this organisation have the necessary domain skills to do it?"

Mobashar Yazdani is manager of the ASIC programme at HP, where he oversees the implementation of between 30 and 50 ASIC designs a year. "The biggest problem [in outsourcing] is unrealistic expectations," he said. "You really don't know who you are outsourcing to and what their capability is. One internal division may want to save

“We’ve had people tell us they have IP and then advertise for people to design those IPs”

30% and another may want to save 70% and there are two totally different ways of dealing with this."

One of HP's biggest concerns in using outsourced services is auditing the companies to understand their capabilities.

"We've had people tell us they have IP and then advertise for people to design those IPs," Yazdani said. He has also had difficulties paying small companies, because of the myriad ways in which they handle their budgets and accounting. Such companies make unrealistic promises about cost savings in order to get the job "and later on come back and say, we didn't put down the tools costs".

COST FACTORS

"One of the main factors is not reducing cost, because the productivity could be twice as much over here so there's no real benefit," Yazdani added. "The benefit comes where you have some resource that you might not otherwise have, such as a broader IP portfolio. What causes us problems is evaluating that. It takes a month or two to look at a company and see if they have the right stuff. It can take so long that eventually people say, we know so much about them we might as well go with them and put another guy of our own to work with them."

If companies are going to outsource design work successfully to third parties they need an agreed way to hand off the work from one to the other. Some ascribe the emergence of the foundry business to the establishment of the GDS-II layout file format as a standard.

"We don't even want to go to RTL necessarily," said Yazdani, "we want to work at the architectural level designing all the blocks and figuring out what features to put in and what the product is going to be. Then there's going to be a lot of IP involved, so you want standards around IP quality, IP maintenance and so on. Then we work at that level and basically outsource everything 'down there', so someone else designs it and puts it together.

"What's causing a problem is that there are no standards 'down there'. VSIA, Spirit and all those companies have been working on this for some time but there's nothing out there

Sourcing		
On or offshore?	Inside company	Outsourced from company
Off	Intel Texas Instruments	Wipro Open-Silicon
On	Most companies	IBM Services Xilinx Design Services



now. The other limitation is the tools around that. So we need a lot of investment in tools that will enable that to happen.”

Sherwani said: “Architectural level outsourcing is very difficult. We are not yet ready to say that we can do that sort of outsourcing in a factory sort of way.”

What Sherwani does believe is that chip design can go the same way as chip manufacture, splitting into a hierarchy of companies offering differing levels of added value: “I believe it is possible to create a fab, like a silicon fab, to create designs.”

Sherwani, who helped set up and run Intel’s foray into the ASIC business, said that, for medium-complexity chips, the design process from RTL descriptions to silicon is “essentially a commodity”. His definition of medium-complexity chips includes designs of up to 10 million gates, in processes with dimensions down to 130nm.

“The front end of the design is specifying product and taking it to RTL,” he said. “That is something a company that knows a design does very well. But if you look at it from RTL onwards that is essentially a commodity, but one that needs expensive tools and built-in expertise.

He argued that companies will move to doing without their own back-end design teams and operations. “We have customers today that just have the front end, that is product marketing people, product definition people and people who write RTL and no-one else. People will take chips to RTL and then outsource to companies that can very effectively work their designs into silicon realities and then deliver the silicon to them in a cost-effective manner.”

Sherwani is developing what he called a ‘design factory’ approach. Each design factory has about 50 staff and handles eight designs in parallel, finishing 20 designs a year. Each member of staff does a fixed task in a flow like a production line. Sherwani does not allow design teams to form, to avoid the ‘fiefdoms’ he saw emerge at Intel. The first design factory is already established in Bangalore, India, and a second is being set up at the moment. The third will be in Pudong, China.

He said he believes he can control costs by using lower-cost labour, buying tools more carefully, making his staff more effective by ensuring they build up skills through repetition and by keeping them busy.

The design factory approach has been tried before, most notably with Cadence’s Tality venture, which failed despite

the investment of hundreds of millions of dollars. So why will Open-Silicon be any different?

Sherwani said: “What happened with Tality was it had a very high cost base because of being in North America and its high-end approach meant that the non-utilisation of human resources was very high, perhaps 40% or 50%. At Open-Silicon our ratios are north of 75% and that is how we can maintain a profitable design services business. It would not be possible if we were doing very complex designs.”

Yazdani said: “Cadence’s problem was a clash of interests. They were selling tools and coming after your chips also so you didn’t want to engage with them.”

DEMAND FOR SCALE

Ali added: “Tality was probably not a value play at the end, it was a cost play and they had North American resources so that model was broken. Plus they didn’t have the scale to bring a proper value play. You’re going to need scale to bring those value propositions”

Ali’s argument is that outsourcing design in this way is just a logical next step for an IT industry that has been dismantling its vertically integrated structure for the past 20 years or so. “We believe that R&D and design outsourcing will be very big and that’s why we launched this business,” he said. “Twenty years ago manufacturing outsourcing began on the base of cost savings. In the late 1980s there was a move to IT outsourcing, which now makes up half of IBM’s annual \$90bn revenues.

“Today we see that the larger companies we focus on that are solving more complex problems – in terms of bringing an innovative solution to their marketplace – are crying out for this kind of relationship between [themselves] and companies with tremendous assets that can very quickly create innovative solutions.

“I really believe a big driver for outsourcing is innovation. We have a client in China that has outsourced to us. What this company is trying to do is to create something that will change the face of China. They’re trying to create a box that will be deployed to hundreds of millions of people and this box will have certain characteristics that they don’t feel anyone else has the wherewithal to create.” ■

Luke Collins is a freelance technology journalist