

Infineon Cordless Team Accurately Forecasts Cycle Time and Staffing at Project Start



Infineon is a leading innovator in the semiconductor industry. The company designs, develops, manufacturers, and markets a broad range of semiconductors and complete system solutions targeted at selected industries. Since the launch of its first Digital Enhanced Cordless Telecommunications (DECT) chipset in 1994, Infineon (formerly Siemens Semiconductor) has established itself as a leading global supplier for digital cordless phone chipsets.

The Challenge

The primary market for DECT products has traditionally been the consumer—a very competitive, high-volume, low-margin segment. Infineon made a decision in 2001 to shift its development efforts toward higher-margin market segments. As a result, by 2005, its DECT revenues were in danger of falling off as customers began considering alternative suppliers because Infineon had developed no new DECT product in several years.

Infineon then made a commitment to re-assert itself in the DECT market, which was showing strong global growth. The initial thinking was to develop a highly advanced single-chip DECT solution called COSIC™. Michael Neuhaeuser, director of program management for the DECT product segment within the Communications Business Group at Infineon, was given the responsibility to bring this new chip to market.

Infineon's management favored beginning development of the single chip solution immediately, whereas Neuhaeuser felt a simpler, intermediate solution was more appropriate. *"I thought it was just too risky to go for the single chip first,"* says Neuhaeuser. *"Instead, I was in favor of a two-step approach, because it was critical for us to deliver a working product*

In Brief...

The Challenge

Quantitatively assess whether the project schedule for anew DECT chipset was realistic, given the complexity of the design and the manpower and time budgets.

The Solution

Numetrics' NMX-ERP™ which accurately forecasts cycle times and staffing requirements, quantified the productivity the team had to achieve to meet scheduled targets, and rigorously assessed whether the project schedule the development team proposed was achievable.

The Impact

Achieved 20% higher productivity than other projects.

The Value

Subsequently used NMX-ERP™ on next generation project and not only met plan goals, but also increased productivity.

to market as quickly as possible and regain the trust of our customers."

After making his case, management agreed with Neuhaeuser to develop an intermediate DECT chipset known internally as Step-8, followed by a single chip known as COSIC. But even the interim product carried significant challenges and risks. Although the project team would have some flexibility in the exact feature set to be delivered, the team size was limited by a fixed budget, and the delivery date specified by the primary customer was firm.

And there were further challenges. After four years without any new DECT projects, many of the experienced DECT developers had left Infineon or been reassigned to other areas. In addition, it soon became apparent that the effort would require not one, but four separate project teams scattered around the globe, including Sweden, Germany, China, and India, creating not

only a huge management challenge, but also increasing the project's risk factors. "Obviously, if you have too many risks, you'll never be successful," says Neuhaeuser. "I needed an accurate and absolutely reliable way to quantify my risk of meeting schedule, given the staffing cap that management had approved."

The Solution

Neuhaeuser had worked with Numetrics Management Systems tools and databases in the past to benchmark Infineon's overall IC development performance against the industry. "That was the first time I became aware of a tool to benchmark IC development efforts," says Neuhaeuser. Based on that positive experience, Neuhaeuser decided that the project planning tool in the Numetrics' NMX-ERP™ suite was worth a try for the Step-8 project.

Among the key capabilities of the IC Project Planner is the ability to calculate design complexity of the target chip based on the design's functional and performance specification. In addition, it calculates the team productivity and development throughput that is *implied* in the manager's schedule forecast and staffing plan. With these key pieces of information, the tool enables the manager to assess the likelihood of achieving the project's schedule targets, includ-

ing its tape-out and release-to-production dates. Two x-y scatter charts compare the productivity and throughput implied in the project plan to the industry norm for that type of chip, as well as against the historical productivity achieved by that development team and/or organization. If there is a substantial difference between the figures implied in the manager's plan and either industry norms or the team's historical achievements, then this serves as a risk warning indicator [See Figure below]. The tool displays the numerical difference between the productivity (and throughput) the manager's plan assumes and the industry norms for that particular kind of chip design. This approach to analyzing the feasibility of a project plan is similar to the process project managers go through mentally based on their own experience and intuition. Given the complexity of today's chip projects, that's no longer a viable approach.



"I needed a project planning tool that could give me accurate and reliable estimates of both cycle time and staffing to help me determine quantitatively whether my project schedule and staffing plan was realistic," says Neuhaeuser. *"I needed to accurately measure the schedule risk of my project plan; IC Project Planner was the only tool I knew of that could possibly do that."*

Neuhaeuser brought the Numetrics planning tool into the Step-8 project during the project planning phase. *"Although the Numetrics tool automates the process, nonetheless, it was a new methodology for us, and Numetrics provided support that made the use of the tool straightforward and easy."*

Initially, the Step-8 Project Manager resisted Neuhaeuser's suggestion to use the Numetrics tool. *"He felt that I didn't trust his planning skills,"* says Neuhaeuser. *"But after working with the tool, he became a strong supporter."*

The Numetrics tool allowed the Step-8 project manager to rapidly get an accurate forecast of design cycle time, given the planned staffing level. It took about one day together and another three hours to input the project data into the system. This included a description of the chip, the size of the team, and an estimate of the team's expected productivity, which was based on industry norms and prior benchmarks of the organization's performance.

An initial estimate momentarily put the viability of the project in question. *"At this point, it was very chaotic because the team was not clear about whether the manpower was adequate to meet the cycle-time goal,"* says Neuhaeuser. After performing an analysis of the chip design plan, the Numetrics planning tool provided Neuhaeuser with the answer. The tool enabled the project manager to constrain the project's duration and first tapeout date and observe both the staffing levels and productivity required to meet that target schedule. *"It told us that, to meet our timeline, we had to increase our productivity 30 percent over what our average was for similar*

projects. Getting a quantified productivity target—one that the team believed was achievable—gave us a clear understanding of what we needed to do to achieve our goal and was extremely helpful in motivating the team to hit the target."

The Result

Although Infineon missed its most aggressive target for Step-8, the team was able to achieve 20% higher productivity than the average of previous projects. In every way, the Numetrics tool was extremely valuable. *"In addition to providing accurate estimates of cycle time and manpower required, it allowed us to determine quantitatively whether our challenge was achievable or not,"* says Neuhaeuser. *"It increased our trust in what we were doing and helped us effectively communicate the challenges and risks to top management. It also enabled the Project Manager to quantitatively assess the impact on timelines of reducing design complexity."*

Based on the positive experience with Numetrics on the Step-8 project, Infineon chose to use the Numetrics tool for the next-generation, single-chip DECT project, known as COSIC. A project plan was generated by the Numetrics tool based on a target date specified by the Project Manager. As with the Step-8 project, this plan would require achieving very high productivity. A second "higher confidence" plan was generated with targets based on historic productivity norms, which included statistics from the Step-8 project.

Leveraging the Step-8 project, the COSIC team not only met the higher confidence plan goals, but was also able to demonstrate continuous improvement by increasing productivity over the Step-8 project.