PRODUCT DEVELOPMENT AS A COMPETITIVE ADVANTAGE

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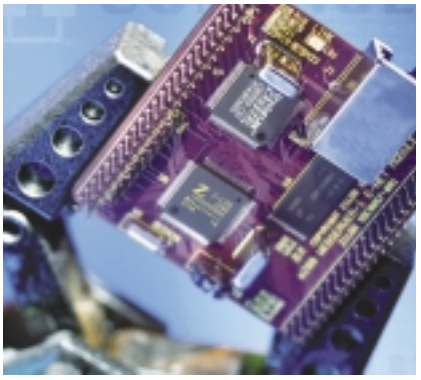
DISCUSS THE DEVELOPMENT AND EVOLUTION OF A CORE PROCESS FOR PRODUCT DEVELOPMENT THAT HAS ENABLED ZILOG TO RELEASE NEW PRODUCTS IN A CONSISTENT AND PREDICTABLE WAY

Corporations are bounded by a number of constraints. At the highest level of abstraction, a corporation's ability to be superior at only a few key core processes is a major limiting factor. At ZiLOG, the worldwide supplier of semiconductor products, the four highest-level core processes are strategy development, product development, demand creation, and value delivery.

Back in early 2002, ZiLOG's product development resources were spread geographically across Europe, the Americas, and India, with multiple business units each having resources at each of the seven design facilities on these three continents. Some functions were centralised (e.g., the design of development tools and the development of silicon testing operations), and others were the responsibility of specific business units. Weak project management, ad hoc team organisation, and the lack of a defined product development process typified projects. Individual learning was taking place but was not captured into a process. There were no process targets, and time-to-

market and product development productivity were not measured or managed. Firefighting was often more highly regarded than consistent development cycles. Because of this reactionary method of problem solving, resources would flow to whatever issue caught management attention. Technology development was interspersed with product development activities, making project schedules unachievable and reuse of the technology intermittent or impossible. These situations defined the baseline, or most primitive stage of evolution, of ZiLOG's product development process.



ZiLOG's first challenge was to define a practical process framework that would be readily accepted by the product development groups. Refining, challenging, and inventing new ways of working would ultimately follow.

CHANGING THE ORGANISATIONAL DESIGN

There are a variety of concepts for improving an organisation's product development process. At ZiLOG, four concepts were selected and integrated to provide what ZiLOG felt would be an exceptional design. These concepts are described below.

Organisations are perfectly designed to get the results that they get. If an organisation wants different results, then it must change its organisational design. Once the decision to change the organisation is made, the most difficult challenge is to align its new organisation with its strategy. Then it must ensure that all design choices must be aligned with this same strategy. These design choices can include the organisation's mission, guiding principles, goals and objectives, technical systems (business processes, technologies, and physical arrangements), decision-making and information systems, people systems (selection, assimilation, training, certification, performance management, etc.), reward systems, and renewal systems.

Business processes. All organisations are composed of business systems that can include core processes such as strategy, product development, demand generation, supply chain or order fulfillment; or enabling processes including information technology, human resource development, information collection, technology development and reporting, finance, etc. These processes must be identified and mapped at levels that are most useful to the organisation. One of the critical steps of this mapping process is determining when one process ends and another starts. This mapping activity provides extremely valuable data that aids in identifying skill sets and capabilities, deliverables, categories for goals and objectives, key decision-making areas for responsibilities and participation.

Categorisation of work. Not all work is created equal. Left unabated, an organisation's business-essential and compliance work will always consume its competitive work. Work can be classified into four categories: 1) Competitive work is work that creates a distinction for which customers are willing to pay more, or create a significant cost advantage. 2) Competitive enabling work is work that directly enhances the competitive work. By itself, competitive enabling work does not create distinction. However, when connected to the competitive work, it is enhanced, adding to its distinctiveness. 3) Business essential work is work that is essential to compete. An organisation's performance must conform to industry standards or experience drawbacks. 4) Compliance work is work that manages legal risk. Just as with business essential work, an organisation must operate at industry standard performance levels or suffer a competitive disadvantage.

Knowledge management. At the intersection of different knowledge domains, new knowledge is created, and significant advantage can be achieved. Once an organisation's competitive work is identified, one must consider the organisational performance levels that will create distinction. Once these performance levels are determined, an organisation must identify the organisational knowledge (know what and know how) that is essential to fulfill that previously identified level. This knowledge must be categorised as either tacit or codifiable knowledge. Once this knowledge is understood, different organisational designs can be implemented to support learning activities.

An organisation thrives and grows according to how effectively its core processes and enabling processes are designed and used.

DESIGNING THE PROCESS FRAMEWORK

Requirements

The product development core process is one of ZiLOG's most critical, or 'competitive', business processes. In the product development process, new product ideas are converted into marketable products.

Kyle Smith

Norman Sheridan

Paul Gustavson

In May 2002, Norman Sheridan, Sr. Vice President of System Development, visited with Paul Gustavson and Kyle Smith of Organisation Plan and Design Inc. (OPD). Together, they outlined requirements for defining the foundation of the Product Development process. Mr Sheridan stated, 'I want to design a process that is easily understood, can take us to the next level of performance, and can actually be used by our marketing and engineering design teams.'

PROCESS FRAMEWORK

To meet Norman Sheridan's requirements, OPD consultants designed an approach to define four critical components of the process:

1. clarify results for both the overall process and each phase of the process
2. define the work to be performed to achieve the desired results – both process definition and process flow
3. describe each of the key deliverables for each phase of the process
4. clarify roles and responsibilities for participants in the process and for each key deliverable.

Over a three-month time frame, more than 50 individual interviews were conducted, more than 15 focus groups were facilitated, and past work efforts documented in order to meet ZiLOG's requirements. A core process design team was formed from the various knowledge disciplines, including silicon, software, tools, product marketing, and technical publications. This design team validated each step of the process.

The first phase of this validation required the clarification of the desired project results. After confirming the project scope and reviewing past work efforts, the design team's subject matter experts began to complete a high-level definition of the process. This phase documented the business processes and clarified how ZiLOG chooses to compete. In addition, knowledge requirements were gathered within the product development process and organised to provide ease of access. This phase supported the broader requirement of ongoing improvement and knowledge transfer within the process. To culminate the project, training documentation was developed to integrate the knowledge of business processes, the competitive work of the organisation, and the critical knowledge and skills required by the process.

NEW PROCESS DESIGN CHOICES

The results of the process design included the development of a framework that addressed each of the following organisational design choices.

Desired results. Define the desired results of the overall product development process and each of its phases. Defining these results included clarifying how a product changes state as it progresses from phase to phase.

Process definition. The process defines the work that must be performed to achieve the desired results. The process is defined in terms of inputs, critical activities, key deliverables, starting points, and ending points.

Process flow. The process illustrates the flow, noting critical upstream and downstream dependencies.

Critical deliverables. Each critical deliverable is described noting key components, templates, and best practice examples.

Organisation structure. An organisational design includes the development of core teams. These teams co-ordinate, communicate, make decisions, and perform necessary activities within the product development process. Core team members are the people that possess the skills and knowledge from each department involved in a particular development activity. Different points of view, skills, and backgrounds provide synergy for ideas and decision-making in the core teams. At the hub is the core team leader, who is responsible and accountable for ensuring that the product meets its goals for time-to-market, quality, development expense, and product cost.

Decision making. This choice formally defines the roles and responsibilities of team members, core team leads, peer reviews process ownership, and senior management. The responsibility matrix identifies four key decision-making roles:

- who has responsibility to recommend
- who has approval/veto responsibility
- whose input or support should be sought prior to making a decision
- who is informed after the decision is made

The success of any implementation is based on a strong case for change, finding the critical change leverage points, providing performance feedback, and creating a culture for change. Management was clearly frustrated with performance results and the case for improvement was clear and well understood by all members of the process.

CRITICAL LEVERAGE POINTS

Once the subject matter experts had validated the design component, four implementation elements were introduced. The first element identified the role of a product development process owner, who would be responsible for managing the overall process, resources, and the reduction of cycle time. The second element formalised the responsibility of crucial work stream leaders such as silicon design, tools development, technical publications, software development and product marketing. These leaders would be responsible for improving on each individual work stream managing constraints and reducing process variances. The third component included the formalisation of a core project team lead. This lead would be responsible for the integration of each work stream activity, manage the individual product development process, and deliver the project results. The final element included the creation of a product development community of practice to manage the knowledge within the process.

TRACKING PERFORMANCE

To reinforce the focus on performance, a project tracking system was developed that collected cycle time, cost, resources and current project status. Management reports were standardised to provide a share understanding of expectations regarding cycle time and project issues.

Desired behaviour attributes were identified and linked to individual, team, and department performance goals. Development work that focused on clear, professional conversation was reinforced.

MANAGEMENT WAS CLEARLY FRUSTRATED WITH PERFORMANCE RESULTS AND THE CASE FOR IMPROVEMENT WAS CLEAR

ACHIEVING RESULTS

Making effective process choices has allowed ZiLOG to deliver two families of Flash-based microcontroller devices with the launch of the eZ80Acclaim! product family and the highly successful Z8 Encore! product family.

While corporations must manage constraints, they also have opportunities to make different and more effective choices. ZiLOG has chosen to make different decisions, and is today achieving different results. The initial benefits are visible and tangible. In the first year of implementation, cycle time has been reduced by 40%, consistency is becoming the norm rather than the exception, schedules are better managed, and the product development process is slowly improving. The organisation is better aligned and focused, business processes are defined, competitive work is highlighted, and knowledge is being discovered and diffused.

The most primitive stage of ZiLOG's product development evolution is past, but the evolution continues. Management has targeted another 40% cycle time improvement in 2003 – a target that ZiLOG's product development teams feel is more easily attainable with a solid product development process in place. Of course, reaching this target means ZiLOG must continually challenge and refine the process in anticipation of inventing new ways of working in the near future.

Dr Norman Sheridan is the Senior Vice President of ZiLOG's Systems Development Group. Paul W. Gustavson is President, Founder and Owner of consultants Organisation Planning & Design, Inc. (OPD). Kyle Smith joined OPD in 1999.