ENOVIA PRODUCT CONFIGURATION MANAGEMENT

Increase Profits — Deliver the Right Products at the Right Time
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Executive Summary

21st century innovation and fulfillment is experiencing unprecedented global growth. Coupled with a continuing technology evolution, this growth makes products more complex and more difficult to deliver to customer and market expectations. Companies eager to take advantage of this trend are facing a dilemma.

Unlike their counterparts in the last century, consumers today have more say in designing a product. Social networking sites provide a global stage for consumers to review and comment instantaneously about a product’s performance.

Manufacturers feel compelled to provide consumers with feature laden products that meet each niche — creating an environment of complex products with costly mechanical, electrical and software capabilities that customers are demanding to fulfill their unique needs. Manufacturers are seeking answers on how to:
- Increase product diversity and variability while keeping costs low
- Meet customer expectations for more personalized products
- Deliver products consistent with the market demand

This whitepaper examines the advantages of the ENOVIA® Product Configuration Management solution. The ENOVIA solution enables companies to define conceptual product definitions that can be reused across a multiple series of products, satisfy market specifications, and provide many possible optional capabilities.

These conceptual product definitions serve as a common framework for defining desired configured products and driving the generation of design bills-of-material (BOMs). As a result, companies can expedite the design process and lower costs while still meeting customer demands.

The ENOVIA Product Configuration Management solution helps companies accelerate their time-to-market challenges by:
- Bridging the gap between market requirements and engineering
- Increasing the reuse of parts and components across multiple products
- Delivering the right products to market as quickly and efficiently as possible
Product Variability + Containing Costs = Challenging

Global manufacturers are facing a double-edged sword—meeting customer demands for highly variable configurations that include costly mechanical, electrical, and software capabilities; and building those products at the lowest possible cost.

Product variability is so entrenched in the manufacturing process today that the old saying ‘one size fits all’ is no longer valid. Today consumers customize their automobiles online—before even stepping onto the showroom floor. Social networking communities have the power to sway a product’s design. And retailers stock shelves with a variety of the same product—all in hopes of capturing a portion of the consumer’s wallet.

Let’s take as an example the 3D Handled Scanner OptiNum from Noomeo. The 3D scanning world is highly active at the moment with a steady stream of new products coming on-line. Among them, portable system like the one from Noomeo, based on structured light, is of great interest.

Handheld 3D scanners are becoming increasingly popular, for their ability to perform 3D measurement in a fraction of the time and for their ease of use in constrained environments.

From frame, to camera in different resolutions, to color, to connection, the 3D Scanner can have a multitude of options to satisfy the consumer, which can increase sales for manufacturers who offer such a variety (see Figures 1 and 2) but also cause manufacturing and profitability headaches.
Figure 1

Colors of the Encasing

Frame Alu
Frame Carbon

Option for the Frame

Option for the Trigger

Option for Connections

Configuration 1
Standard
3DS scanner
Color: Black
Frame: Carbon
Camera: 1024*768
Connection: USB

Configuration 2
Wifi 3DS scanner
Color: Red
Frame: Alu
Camera: 1024*768
Connection: Wifi

Configuration 3
Advanced
3DS scanner
Color: grey
Frame: Alu
Camera: 1600*1200
Connection: Wifi

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ENOVIA Product Configuration Management
The Importance of Delighting Customers
The business impact of unsuccessfully capturing consumer requirements accurately and efficiently is obvious. Companies lose their competitive edge, revenues drop, the wrong products go to market and the downward spiral begins.

Consumers lose faith in the company brand because the products do not meet their expectations. The inadequate products end up creating inventory that has reduced sales value. Warranty costs increase as consumers return the products. Engineering is frustrated, orders shrivel up angering sales, and senior management must confront shareholders with poor financial results.

Recuperating from lost business is difficult, expensive, and challenging.

Inefficient Business Processes; Outdated Technology
Unfortunately, many manufacturers lack the internal business processes and technology necessary for designing quality products at competitive cost points and deal with the burgeoning market variations and technical specifications.

Without a product configuration management solution or with rudimentary solutions like excel spreadsheets, BOM generation for the configurations is extremely manual and error prone. It is hard to ensure that all the compatibility rules between various feature options are respected. Also it becomes difficult to reuse common parts between various configurations resulting in higher costs.

Let’s look at how an effective product configuration management strategy dissolves these challenges.
The Business Case for Product Configuration Management

From Concept to Design using Effective Business Processes

Manufacturers interested in producing low cost, high quality products that meet customer requirements must transition away from traditional design processes. Instead, manufacturers should choose an approach that is driven by market and consumer requirements for highly variable configurations.

Involving system engineering and product marketing upfront in the New Product Introduction (NPI) process is only the beginning. Implementing a standard product structure that drives new product offerings to market faster and enables the re-use of parts across product variations is the broader solution (Figure 3).

Equally as important is the ability to plan a product’s evolution that matches customer demands for new options or state of the art technologies. Also, an effective product configuration management approach must support Build to Order (BTO), Configure to Order (CTO) and Engineer to Order (ETO) business models.

**Bottom line:** Instituting a product configuration management solution enables manufacturers to hone costs sharper while ensuring that designs meet the market and technical requirements. Quality and cost are huge competitive advantages in a global manufacturing economy where razor thin profit margins abound.

*Figure 3*
Desired Products + Lower Costs = Happy Customers

ENOVIA® V6 helps customers satisfy evolving market demand by defining and tracking complex products from concept to design. The ENOVIA V6 Product Configuration Management strategy is based on a product centric approach allowing one common product definition to drive the introduction of new configurations using the product configuration techniques.

Figure 4 illustrates the complete solution principle that enables the various roles to manage the product starting from the capturing the customer requirements to generating a BOM that satisfies those requirements.

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Figure 4
An Effective and Adaptive Solution
The ENOVIA strategy divides the product configuration solution into the following pragmatic phases and provides the flexibility to enable the varying business processes customers employ.

1. Requirements Capture (Requirements Manager)
The Requirements Manager captures customer or market needs easily from source documents such as Microsoft (MS) Word or Microsoft (MS) Excel or from an external application, reducing any duplicated data entry and manually-generated errors. Requirements can also be created natively from within ENOVIA V6. Requirements drive the product features or capabilities.

This approach allows for traceability throughout the entire development process, ensuring that market goals are met.

2. Product Portfolio (Portfolio Planner)
The Portfolio Planner organizes and manages the product portfolio using product lines and model hierarchies. Products/models give insight into product planning activities in terms of projects and major product launches that are delivered within the enterprise. Portfolio Managers can monitor product launch schedules and the status of product release.

3. Marketing Options (Product Planner)
The Product Planner provides the marketing view of the product structure by defining the new product features/options or reusing the existing ones from the Enterprise Feature Dictionary. The Marketing features are the options presented in the product configurator while making the selections for a specific customer order or specifying a sellable product to be offered in the market.

4. Technical Systems/Modules (System Architect/Engineer)
The System Architect/Engineer defines the technical features which describe the framework that generates the BOM. The technical features describe the technical components or modules of the product that comprise a standard product structure with all possible variations used as a framework to define configured products and eventually the resolved BOMs.

The Systems Architect/Engineer defines the rules that drive the selection of appropriate technical features upon the selection of the marketing options for a specific configuration. Parts representing the design solution are associated to the technical features which are consumed in the BOM.

5. Product Configurator (Product Manager)
The Product Manager creates the configurations for satisfying a customer order for an ETO/CTO model or for the sellable products to be offered in the market for a BTO model by selecting the desired marketing options. During this process, the system does a real-time validation of configuration rules to enforce the selection of valid options. A flat list of parts is generated for a valid configuration. This action allows stakeholders a real-time view of which parts are needed to manufacture the configuration.

6. EBOM Generation (Product Manager)
Prior to the generation of the BOM, stakeholders preview the BOM structure, reviewing, analyzing, and checking for any missing parts. The Product Manager generates the resolved EBOM for the configuration for Engineering/Manufacturing purposes and for order fulfillment in the ERP system.

The Services Oriented Architecture (SOA ) of the open ENOVIA V6 platform enables retrieving part related information from Enterprise Resource Planning (ERP) and other legacy applications into the master EBOM within ENOVIA V6.
**ENOVIA Product Configuration Solution Benefits**

By empowering the key players as described above, manufacturers can:
- Connect market and consumer requirements with product development thereby delivering products in demand
- Increase profits by delivering the right product at the right time Increase product diversity and variability while keeping costs low
- Ensure product compatibility with market innovation
- Maximize part reuse across multiple products by leveraging feature modularization approach

**The Technology with Answers**

Here is a synopsis of the ENOVIA products that enable customers to implement a product configuration management solution successfully.

**ENOVIA® Requirements Central™** enables organizations to improve their overall global requirement management process by capturing the ‘voice of the customer’ and translating it into user requirements that define new products. The software creates a central repository of customer needs and the product requirements that satisfy them.

When used with other ENOVIA products for defining the functional and logical aspects of a product, ENOVIA Requirements Central enables traceability throughout the entire development process to ensure products are developed that meet market goals.

**ENOVIA® Engineering Central™** addresses key global product development challenges by eliminating the significant process and data communication barriers that exist between mechanical, electronics, and software engineering disciplines within the enterprise and the product supply chain. With ENOVIA Engineering Central, companies can aggregate input from all design disciplines into a single enterprise-wide definition of the engineering bill-of-materials (EBOMs). All functions throughout the company access the same EBOM information resulting in improved innovation, decision making, quality, and process throughput.

**ENOVIA® Variant Configuration Central™** tackles product diversity during the ‘idea’ or concept phase of the product development process. A conceptual feature definition of the product is used as a framework for a diverse but modular platform. This approach to the product definition helps companies get ideas to market faster, streamline the engineering processes, and reduce design diversity.

**ENOVIA® Variant Configuration Experience** helps product engineers decrease design diversity by leveraging the functional product definition. Engineers then can:
- Evaluate the design feasibility of new product configurations
- Leverage the functional product structure definition to drive the generation of physical solutions (EBOMs) with parts previously designed to fulfill marketing requirements
- Ensure reuse for future product concepts by identifying parts that satisfy new feature capabilities
Conclusion

Successful manufacturers understand that bridging the gap between the ‘voice of the customer’ and engineering is critical. Consumers have more influence today on product design than ever before. Manufacturers that respect consumer input will reap the financial benefits.

The ENOVIA Product Configuration Management solution delivers the business processes and technology that enables manufacturers to bridge that gap and meet the needs of both sides. Consumers will have access to the products they crave; engineering will have the strategies and platform to capture consumer requirements and execute product development —on time, on budget and within the market specifications.

Also, the solution helps companies define the conceptual product definitions for reuse across a multiple series of products while satisfying market demands and cost controls. Systems engineering standards throughout the product development process allows companies to improve part reuse and minimize feature proliferation with modular product definitions.

Product definition stakeholders (system engineers, product managers, and portfolio managers) can access different views of the product based on their specific objectives (marketing, engineering, and physical). Utilizing common modules across multiple products is the most efficient and cost-effective formula for delivering the right products.

Noomeo OptiNum is an handheld 3D scanner designed with the help of the Design Studio of Dassault Systèmes. The illustrations of the 3D scanner OptiNum has been provided by Noomeo http://www.noomeo.eu and are not contractual.
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Dassault Systèmes, the 3D Experience Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes’ collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 150,000 customers of all sizes in all industries in more than 80 countries. For more information, visit www.3ds.com.

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