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Understanding

CONFIGURATION MANAGEMENT

in Windchill

ptc

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Why Configuration Management Matters

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Product configuration is the process by which parts and components are selected and arranged within a bill-of-material (BOM), so that the final product meets a given set of requirements. Configuration management provides tools that simplify the configuration process and a means to govern what configurations are possible in a given context. It also ensures that all configuration-specific derivative documentation is accessible in the form required by each enterprise function, including engineering, manufacturing, sales and marketing, or service.

CHALLENGES

Manufacturers that lack robust configuration management capabilities struggle when it comes to handling ever increasing product complexity. With increased product complexity there is an exponential increase in process complexity. Lack of governance, traceability, and poor downstream communication of product configuration information impedes the efficiency and impacts the quality of work done by every stakeholder in the enterprise. Stakeholders end up working on different versions of the product, operating off of outdated information, and duplicating administrative activities.

CONSEQUENCES

Higher Cost of Poor Quality – Poorly governed configuration constraints, lack of validation tools, manual handovers of configuration data, and manual creation of downstream derivative documents lead to more errors during physical production.

Missed Revenue Opportunity – Inability to efficiently configuring products to meet customers' needs constrains businesses from taking full advantage of various go-to-market strategies (ex: assemble-to-stock, assemble-to-order, configure-to-order, and engineer-to-order).

Diminished Productivity – Lack of reuse combined with configuration workflows that lack traceability and provide poor visibility put a heavy administrative burden on stakeholders and delays value-added actives.

Delayed Time-to-Market – Inefficient product development due to lack of configuration tools, serial development between engineering and manufacturing, and lack of reuse across products leads to slower product development and delivery.

Benefits of Configuration Management

Configuration Management in Windchill provides the foundation to manage your product's configurable platform, configure variants using predefined business rules and logic, validate all the design configurations across a range of requirements, and share that information across the enterprise. Built into every step, Windchill provides governance, traceability, associativity, and collaboration tools to ensure every stakeholder is working towards the same end-goal with the same source of truth.

BETTER DESIGN REUSE

Engineers can reduce duplicative work, minimize product portfolio complexity, and accelerate product delivery by leveraging options and choices, as well as parts classification for design reuse.

GOVERNANCE AND TRACEABILITY

Reduce risk and efficiently manage like products all under one overloaded BOM. Track quality, compliance, and make changes across a family of product configurations more easily.

SWIFT PRICING

The cost of manufacturing a given configuration is derived more quickly based on new inputs and existing data so critical pricing information is available to the customer sooner, and orders can close faster.

ACCURATE ORDERS

With effective and well-integrated product configuration systems in place, order accuracy is reinforced, eliminating costly errors.

ENGINEERING EFFICIENCY

Make the best use of engineering resources by leveraging current product engineering data while incorporating new or changed product configuration requirements. Variability is optimized and costly rework is eliminated.

CUSTOMER SATISFACTION

Reducing error rates, offering superior quality, providing reliable pricing information, and delivering to market faster improves customer satisfaction and brand reputation.

Key Configuration Management Capabilities in Windchill

The following list of key configuration management capabilities in Windchill is not exhaustive. Both the list and definitions are intended to provide a brief overview of the tools that are among the most valuable to the typical configuration management user.

BOM Management/Product Structure

Users build product structures within Windchill by creating parts and defining part relationships. With a top-down approach, the product structure is created in the design process before creation of ECAD/MCAD models. Alternatively, if the product structure is first defined in a CAD application, a bottom-up design method can be used to automatically create the part structure in Windchill. In either approach, using this data model, users can build complete and accurate mechatronic BOMs, composed of multi-discipline parts, all associated with relevant CAD files and documentation for global access to a single, synchronized source of the holistic product definition.

Options and Choices

Windchill allows you to define a list of fixed options and choices to describe discrete configurations within a product family. An option describes a particular feature or facet of the product. Each option presents several choices that are applicable to specific variations of the product. Choices are assigned to parts and define the context in which the part shows up as a valid selection for a specific configuration. These definitions can be reused across multiple product families. This methodology accelerates product configuration and allows option managers to create and govern what configurations are possible under specific circumstances and within certain product lines.

Key Configuration Management Capabilities in Windchill

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Configuration Logic

For some configure-to-order and engineer-to-order strategies, a more sophisticated selection logic is needed to generate products that meet parameterized requirements. Configuration logic is used to define such parameters (for example, a length dimension or cooling capacity of the product), the variable constraints on those parameters, and the corresponding lookup tables for parts selection. Logic can scale from simple assignments to sophisticated rules and calculation-based scenarios that cover many different platform strategies.

Dynamic Visualization (Dynamic Mock-Up)

Windchill can dynamically build visualization content based on the as-configured product structure. This enables users to see and interact with configured product variants including multi-CAD structures assembled from different authoring applications, all within the PLM environment. Windchill provides simple yet powerful digital mockup (DMU) tools like Quick View to dramatically improve the performance and load times for viewing large and complex product structures. These capabilities are used for interference checking, color coded search and visual compare, and to generate viewables for downstream process plans, work instructions, catalogs, etc.

Baseline Management

Baselines are static snapshots of products and/or project data objects that are captured to denote a very specific point in a products maturity or a particular milestone in its development. With baselines in Windchill you can show the progress of a product structure over time as a way to manage projects or as historical reference. Baselines can be used, for example, to capture all data submitted for a client review at a particular milestone, to evaluate progress against deliverables during product development, or to easily compare the differences between two versions of a product as part of a quality investigation.

Key Configuration Management Capabilities in Windchill

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Effectivity

Effectivity is the planned date, lot, or serial number at which old versions of the object are replaced with new versions in production. It is used to determine when a specific part revision is planned for use in production. This capability enables the definition and management of configurations and associated feature/rule effectivity (i.e., when a specific feature will be offered within a specific market). By extension, this capability enables the definition and communication of part effectivity to other enterprise systems that require it, such as ERP, to ensure all stakeholders are aligned on the timing of critical changes.

BOM Transformation

BOM transformation in Windchill provides fully associative BOMs that ensure changes in the engineering BOM (eBOM) are accurately transferred to the manufacturing BOM (mBOM) and service BOM (sBOM) without omission or transcription errors. As with eBOMs, the items in these derivative BOMs are linked to the associated CAD files, relevant documentation, and replacement parts so that maintenance and navigation of complete product data is simple, intuitive, and presented in the proper format for downstream use. With associative BOMs, users in any part of the organization can have the confidence that they are looking at reliable, up-to-date product configurations.

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Expert Insights

JEFF ZEMSKY
VP, Windchill Digital Thread
PTC

"Windchill provides the foundation to manage your product's configurable platform, validate all the design configurations, and share that information across the enterprise."

There are many go-to-market strategies, and most rely on configuration management to be effective. The strategy, or mix of strategies, that your company goes to market with should dictate how your products are designed, tested, validated, manufactured, and serviced. If implemented according to best practices and with the right tools, configuration management can ensure the activities in each of these phases is informed, efficient, and in accordance with your business needs.

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Customer Perspective

ERIC HORN
IT PLM Solution Architect
MicroVention, Inc.

"It's not just making an impact as far as managing the designs up front, but if you do it right, it can also have huge ramifications on the deliverables that push into manufacturing and beyond."

MicroVention, owned by Terumo, is a leader in aneurysm treatment. They are dedicated to enhancing patients' lives through cutting-edge neuroendovascular solutions. As a medical device company, they are challenged to develop innovative products while meeting strict regional regulations. Leveraging Windchill, MicroVention is on a transformative journey to meet these goals, while remaining cost-effective and delivering accessible healthcare.

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Realized Benefits Case Study

NIDEC GLOBAL APPLIANCE

Nidec Global Appliance manufactures compressors and motors for cooling solutions including HVAC systems and household appliances, with over 14,000 employees and 11 factories across four continents.

CHALLENGE

Nidec Global Appliance started to use PTC's Windchill in 2015 to manage their CAD data, otherwise leaving product-related information in siloed systems. With disconnected systems and processes, there were inevitable product delays with low first-pass yields, internal and customer line failures, rework, and field failures. Nidec knew that uniting and streamlining product development globally was critical to improving time to market and reducing the cost of quality issues.

SOLUTION:

To handle product complexity and increased regulations with speed and efficiency, Nidec consolidated from many disparate local data management tools to a single global Windchill environment. With all product data governed under one single source of truth, Nidec implemented and standardized a host of PLM capabilities including component management and configuration management. Learn More

284% Increase in number of large projects

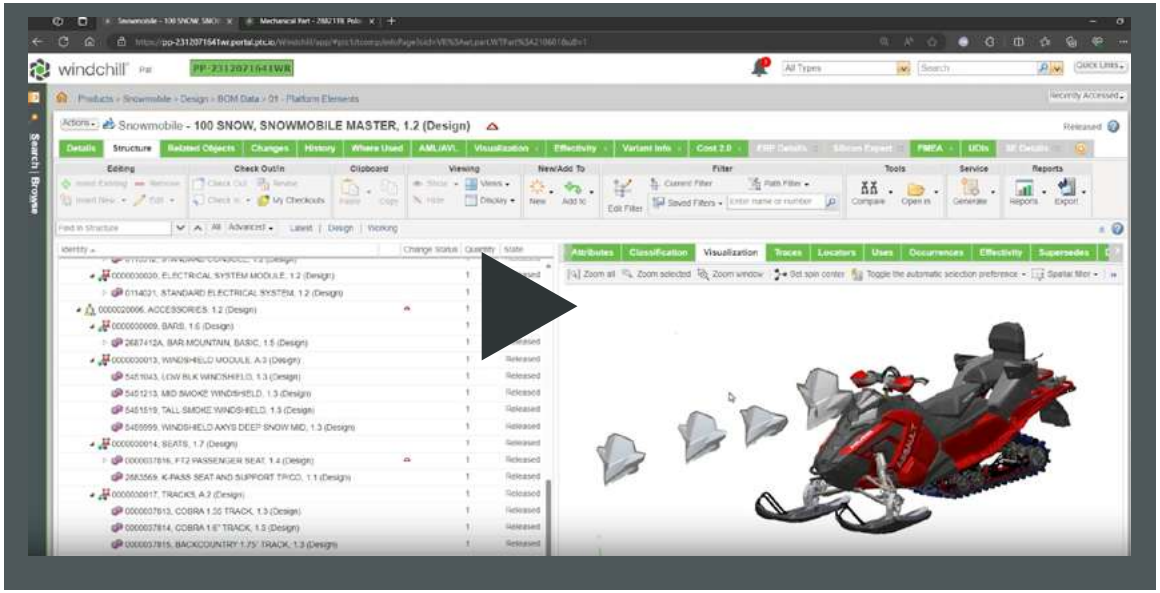
48% Decrease in time-to-market

22% Decrease in project resource needs

40% Reduction in cost of non-quality

See Configuration Management at Work

This demonstration shows a brief glimpse of the power of configuration management in Windchill. Starting with an overloaded BOM, the demo walks through the creation of a new Polaris snowmobile variant, including the use of options and choices and dynamic visualization to easily make and identify all configuration decisions along the way. It emphasizes the efficiency and precision with which a new configuration can be generated and delivered to downstream stakeholders.



- OVERLOADED BOM
- DYNAMIC VISUALIZATION
- PART-CENTRIC DEFINITION
- REPLACEMENT PARTS
- OPTIONS AND CHOICES
- VARIANT CREATION
- BOM COMPARISON
- BOM REPORTING

Configuration Management Solutions: What to Consider

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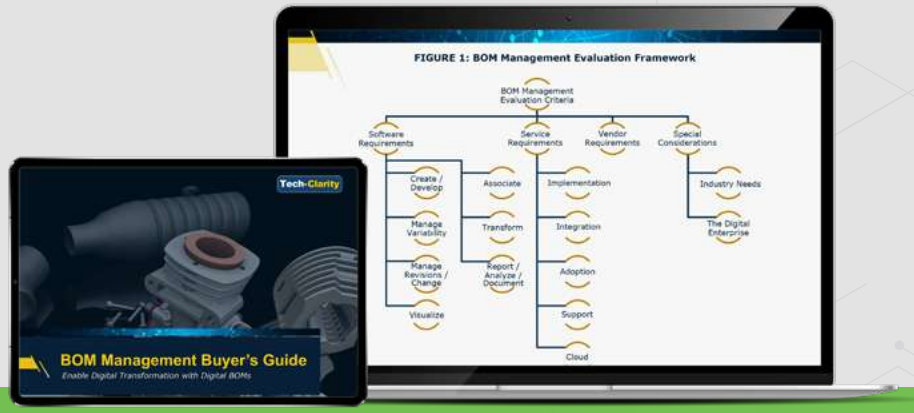
Configuration Management Requires a Strong PLM Foundation

A strong change management is inextricable from a strong PLM foundation. However, too many companies operate with immature BOM management processes, often based on drawings, that lead to delayed time to market, quality problems, poor productivity, excess cost, and damaged customer relationships.

Improving the maturity of change management by implementing a digital BOM not only helps with things like complexity, product personalization, efficiency, and collaboration but also plays a crucial role in supporting organization wide digital transformation efforts.



Use this Tech-Clarity Buyer's Guide as a reference tool as you investigate systems to improve the maturity of your own PDM or PLM practices.

Learn More >

This Buyer's Guide covers:

- The benefits of digitizing BOM management and making it the foundation of the digital thread and digital twin.
- The functionalities, service options, and vendor requirements you should be considering when looking at BOM management solutions.
- Why you should look beyond your current needs so you can support the digital future.

Learn More

Click here to explore more of these topics

BOM Management

Collaborative Product Development

Engineering Change Management

Manufacturing Process Management

Model-Based Systems Engineering

Parts Classification

Product Configuration Management

Product Data Management

Product Variability Management

Quality Management

Requirements and Test Management

Service Process Management

Supply Chain Collaboration

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