How to
Increase Engineering Productivity

Free up time for innovation and increase productivity by eliminating manual handover processes

Configit®

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Executive Summary

Increasing customization and personalization demands are leading to more complex product portfolios. Millions of potential product options and combinations need to be managed across a portfolio of products with shorter and shorter lifespans.

While Product Lifecycle Management (PLM) systems are becoming more sophisticated with advanced variant management features, the queries of valid product options across multiple products in a portfolio is becoming more challenging. Providing non-engineering personnel with access to this information can also be a challenge, as the format of information presented by the PLM system might be difficult to understand and not aligned with the format of information presented in the commercial and ERP systems.

That is where Configuration Lifecycle Management (CLM) solutions come into play. Designed to manage all potential product configurations across a product portfolio, CLM Solutions create a common "language" and database across the enterprise and systems.

Unlike variant management in PLM systems, Configuration Lifecycle Management solutions are designed for fast response to queries, no matter how many product options and combinations are available. In a format that can be understood by all departments, this information can be targeted to specific users or groups. This provides engineering departments with a powerful means of managing the increasing complexity of product variants, features and options that are necessary to meet growing customer demands.

Integrating PLM and Configuration Lifecycle Management makes it possible to address both the challenge of managing increasing complexity as well as enabling a fast and reliable "single-source-of-truth" on all valid product configuration information across the portfolio that can be effectively shared with all departments.

What is Configuration Lifecycle Management (CLM)?

Configuration Lifecycle Management solutions are focused on providing a "single-source-of-truth" for product configuration information designed to be used by any employee across the enterprise. Using easy to understand concepts in a language that is familiar and translatable to various domains, Configuration Lifecycle Management supports all departments involved in the product design, development, sales and delivery process.

At the heart of every Configuration Lifecycle Management solution lies the product model. The product model contains all product configuration options, or 'features,' that can be combined to create different product variants. Features are linked together using "rules," which can be simple (such as options to include or not include a feature in a product variant), or more advanced (such as logical expressions that enable features to be included if certain criteria are met).

These concepts of product "variants," "features" and "rules" can be applied to different domains and contexts, and this provides a common language enabling each department to define and query product configuration combinations and variants in a language that make sense to them. This, in turn, enables various "perspectives" on how features can be combined.

For example, an "engineering perspective" will focus on defining the product variants that should be made available, based on rules for which engineering options should be included and under which circumstances. A "sales perspective" will add additional rules that focus on commercial options, while a "manufacturing perspective" will add logistics and planning options and so on.

The common Configuration Lifecycle Management concepts and language allows product configuration data to be shared, but also adapted to meet specific functional needs.

Business impact of Configuration Lifecycle Management for Engineering

Driving Revenue

✓ Accelerate innovation

✓ Shorten time to market

✓ Modularize products

✓ Optimize product portfolio

Reducing Costs

✓ Scale product management capacity

✓ Eliminate maintenance of unsold products

✓ Reduce instances of Engineer-To-Order

✓ Improve internal efficiency

Mitigating Risks

✓ Eliminate configuration quality defects

✓ Mitigate supply chain instability

✓ Reduce errors in Bill-of-Material

✓ Eliminate non-compliant products

Implementing CLM for Engineering

How Configuration Lifecycle Management solutions are integrated with PLM systems is determined by where the features, rules and configurable BOMs are created and managed.
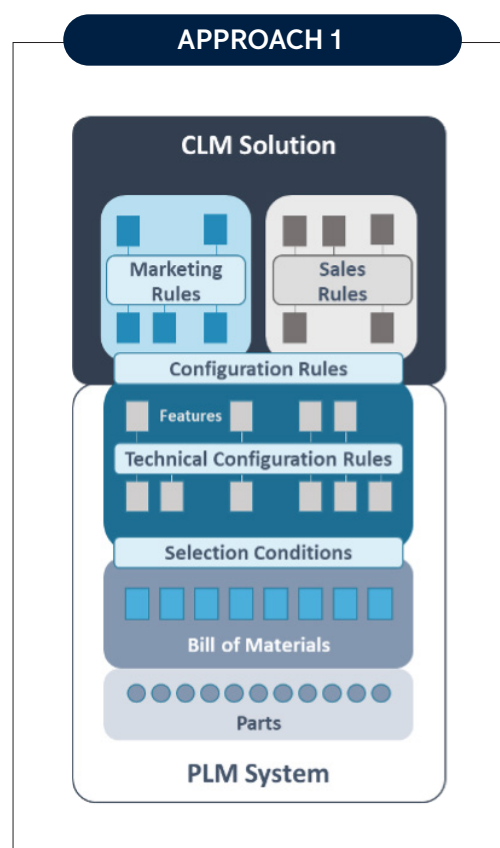
PLM as master

In this first approach, all technical features and rules are defined in the PLM system, while product configuration rules are defined in the Configuration Lifecycle Management solution.

This means that the PLM system provides information on parts (or other materials needed to manufacture the product), technical features and technical configuration rules for how features are combined to provide different variants. The selection conditions are also defined in the PLM system and are used, in this case, to create configurable BOMs.

These features and rules are imported into the Configuration Lifecycle Management solution and regularly synchronized to ensure that the information provided by the Configuration Lifecycle Management solution is reliable and up-to-date.

The benefit of this approach is very little disruption to engineering activities, while still allowing product configuration information to be efficiently shared with other departments. It also allows additional perspectives for manufacturing, marketing, sales and service to be managed in the Configuration Lifecycle Management solution without the need to accommodate these additional rules and features in the PLM.
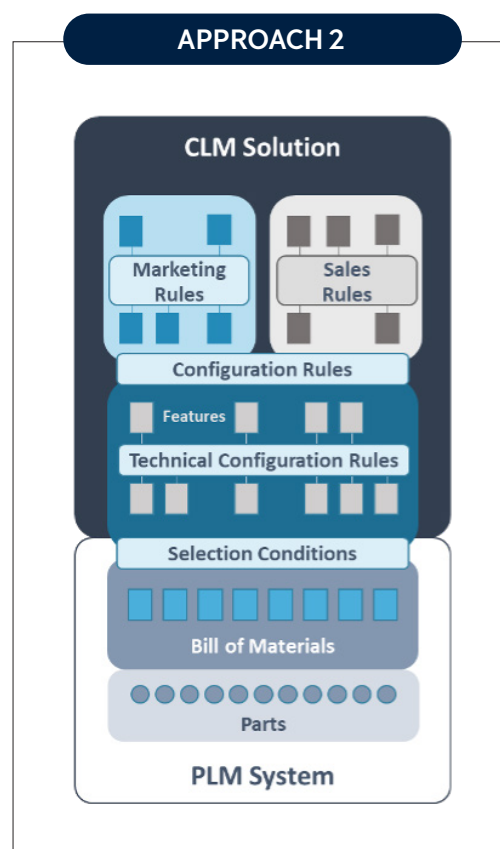
APPROACH 1

CLM Solution

Marketing Rules

Sales Rules

Configuration Rules

Features

Technical Configuration Rules

Selection Conditions

Bill of Materials

Parts

PLM System

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Approach 2

PLM manages configurable BOM

Using this approach, technical features and configuration rules are defined in the Configuration Lifecycle Management solution and are synchronized with the PLM system, which is then responsible for creating the configurable BOM.

The benefit of this approach is that all features and rules are defined and managed in the Configuration Lifecycle Management solution, allowing Engineering to quickly access and query product configuration information across the entire product portfolio. For PLM systems with a close integration to Manufacturing Engineering Systems (MES) and Enterprise Resource Planning (ERP) systems, it can be an advantage to allow the PLM system to manage configurable BOMs and synchronize with these systems over existing Application Programming Interfaces (APIs) that can be difficult to replace.

See Page 9 for details on how ABB used this approach to implement their Configuration Lifecycle Management solution.
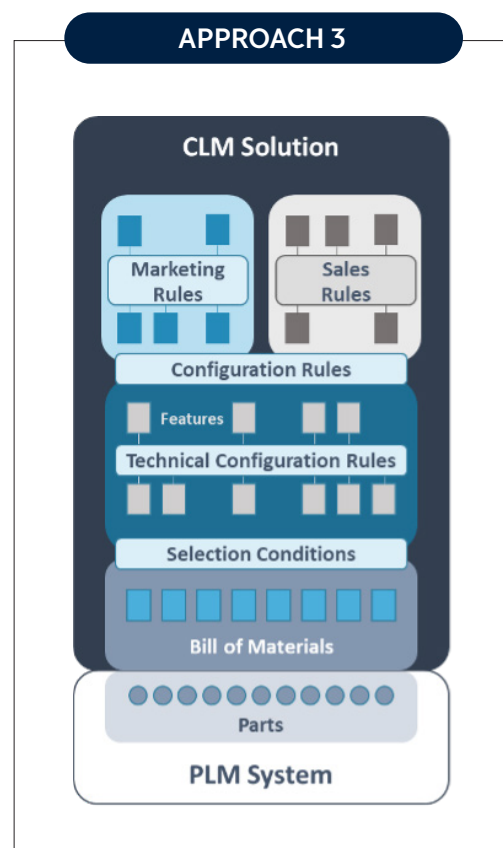

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Approach 3

CLM as master

In this approach, the Configuration Lifecycle Management solution takes responsibility for managing features, rules and the creation of configurable BOMs. Top-level parts numbers, and other parts information, are imported from the PLM system to the Configuration Lifecycle Management solution, forming the basis for the product model features and rules that define product variants.

This approach is advantageous for PLM systems that have limited variant management features or capacity constraints by offloading product modeling and configurable BOM tasks from the PLM to the Configuration Lifecycle Management solution and avoiding any synchronization discrepancies that might occur.

As the Configuration Lifecycle Management solution only needs access to the list of parts and assemblies that could be combined to form a valid product variant, this approach requires very little integration. This can be provided as a static file import at the start of the process without the need for further synchronization.

APPROACH 3

CLM Solution

Marketing Rules

Sales Rules

Configuration Rules

Features

Technical Configuration Rules

Selection Conditions

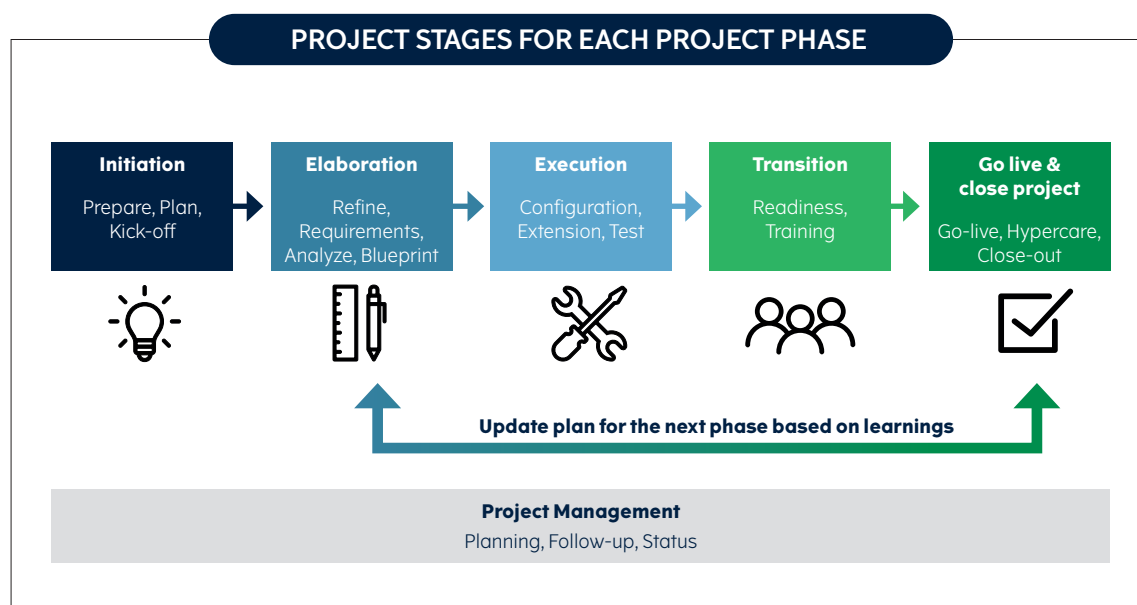Bill of Materials

Parts

PLM System

The Configit integration method

System integration projects can be daunting, but with proper planning and built-in flexibility, challenges can be addressed efficiently. The key to success is avoiding a "big-bang" integration by breaking the effort into multiple phases that individually bring value and provide learnings that drive subsequent project phases. This agile approach enables assumptions to be tested during each phase and adjustments to be made that will ensure the success of the integration project.

Each phase of a project is driven by an elaboration stage. In this stage, it is vital to gather all relevant stakeholders around the table to ensure that no crucial knowledge and insights are lacking, and any potential issues can be identified in advance. The focus is ensuring any changes made do not have repercussions for the rest of the product design, development and delivery process.

The elaboration phase provides the details for the subsequent stages, as well as a high-level plan for subsequent phases, which are updated, refined and detailed during the next elaboration process based on feedback and learnings from the current phase.

With this proven process, many potential risks that other integration projects encounter can be avoided or mitigated in a timely manner.

PROJECT STAGES FOR EACH PROJECT PHASE

Initiation	**Elaboration**	**Execution**	**Transition**	**Go live & close project**
Prepare, Plan, Kick-off	Refine, Requirements, Analyze, Blueprint	Configuration, Extension, Test	Readiness, Training	Go-live, Hypercare, Close-out

Update plan for the next phase based on learnings

Project Management
Planning, Follow-up, Status

Customer Case: From 4 weeks to 8 days – The Power of CLM

ABB NEMA wanted to reduce their order-to-delivery time. However, to do this required better integration between the PLM and ERP systems as well as integration with e-Commerce platforms.

Configit worked with ABB NEMA on providing a Configuration Lifecycle Management solution based on Configit Ace®. The integration project focused on the PLM system first, followed by ERP and eCommerce systems to support both internal and external users.

ABB Power and productivity for a better world™

CLM + PLM INTEGRATION
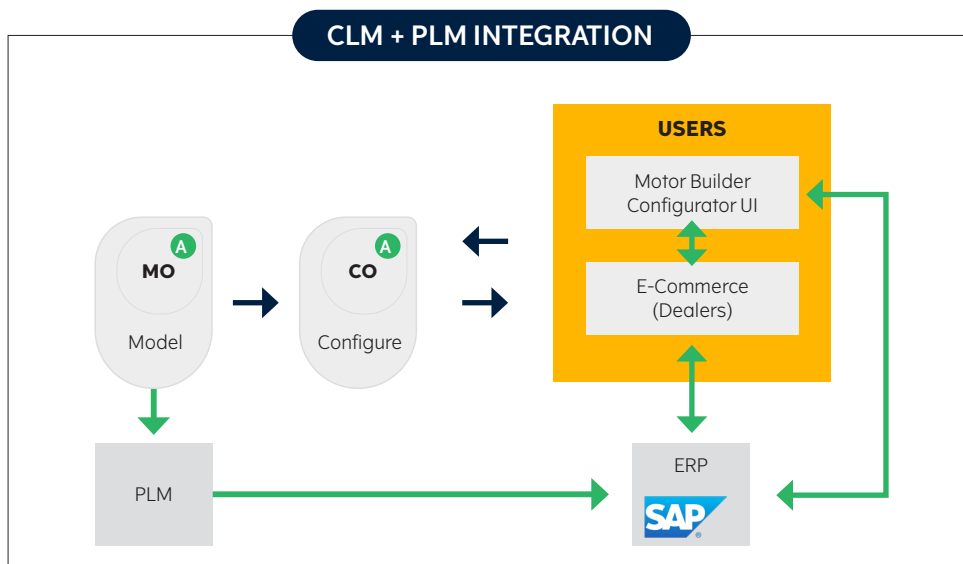
The Configit Ace® Model module, used for product modeling, was integrated with the PLM system according to Approach 2. This enabled all product configuration information to be managed in Configit Ace®, while the PLM creates the configurable BOM required by the ERP system.

The Configit Ace® Configure component enables users to interact with the solution space to select the right product configuration. This enabled the ERP and e-Commerce platforms to validate product configurations in real time based on up-to-date information synchronized with the PLM and ERP systems.

This solution enabled ABB NEMA to implement a Configure-to-Order solution that reduced order-to-delivery time from 4 weeks to just 8 days.

Choosing the right approach

The choice of approach depends on the current environment and maturity of existing solutions, as well as the impact on established work processes.

Approach 1 has the least impact on ongoing work processes and procedures, but limits the benefits that can be accrued. Approaches 1 and 2 are ideal for organizations with a tight integration between the PLM system and MES/ERP systems over an API that is difficult to replace. Approach 3 provides the easiest path from an integration point of view, as there is little need for synchronization, but it has the greatest impact on existing work processes.

One can also progress from Approach 1 to Approach 3, where the benefits of CLM can be accrued over time. This flexibility allows organizations to choose the approach that is best suited to their corporate goals and current organizational situation, while continuously reaping the benefits of CLM.

Benefits of CLM integration

Once the integration of the Configuration Lifecycle Management solution and PLM system is complete, it is now possible to share product configuration information with other departments. Engineering can share the product model and product configuration information to other users via the Configuration Lifecycle Management solution, which also allows these users to add product configuration information to support their specific perspectives without impacting the information in the PLM system itself or engineering workflows and processes.

The API also allows new features and rules to be added, enabling non-engineering users to add their own product configuration options as part of their perspective. For example, sales users can add commercial options and rules to the product model that manage the commercial availability of product variants and options in different markets and customer segments.

In addition, configurable BOMs, GA and layout drawings and parameterized CAD models can be created and updated automatically, enabling a faster response, more thorough analysis, and immediate downstream propagation of all the necessary information to enable manufacturing, marketing, sales and service organizations to do their jobs.

Benefits our customers have achieved using CLM for Engineering

More products, same resources
90 % less effort

Availability of standard product and features
from months to weeks

95 % reduction inproduct modeling time

Find out how Configit can help you implement CLM for Engineering

As a leading provider of Configuration Lifecycle Management solutions, Configit has proven experience in delivering Configuration Lifecycle Management solutions for engineering teams. Our proven project approach ensures a low-risk implementation with continuous value delivery.

Contact us to find out more at **sales@configit.com**

At Configit, we help our customers globally to master the challenges of getting configurable products to market faster, with higher quality and engineered at lower costs. As a pioneer of Configuration Lifecycle Management (CLM), we have been instrumental in driving the adoption of CLM solutions globally. The Configit CLM solution is the first of its kind to connect and enable collaboration across functions – from engineering and sales to manufacturing and service - by ensuring the entire organization is operating from the same data. We call it a single source of truth, which provides companies with comprehensive, accurate and easily accessible data of all their configurable products.

Trusted by the world's largest manufacturing companies for their mission-critical digital transformation projects, our advanced configuration platform built on patented Virtual Tabulation® technology handles the most complex products on the market.

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