

Accelerate Time-to-Value with De-Customization and Standardized Configuration

CIMdata Commentary

Key takeaways:

- *De-customization and standardized configuration of PLM and MES solutions are gaining momentum*
- *Leveraging more than 30 years of enterprise PLM and MES experience, DXC Technology is a global leader in de-customization and standardized configuration of enterprise software solutions*
- *DXC Technology has helped Penske improve the efficiency of its PLM solution while reducing implementation errors and costs, as well as reducing upgrade time*
- *DXC Technology has supported a global automotive OEM, which produces more than 9 million vehicles annually, to achieve competitive leadership through the smart standardization of its MES systems*

Configuration and Customization in the World of Cloud, SaaS, and IoT

CIMdata, along with most of the PLM and MES solution providers and enterprise industry users, has traditionally defined **configuration** as a way to adjust or define the behavior of an enterprise software solution in a manner that the configured capabilities carry forward to the next-released version of the solution without code changes to the base product. Consequently, configurability is a highly desirable attribute of robust PLM and MES solutions. On the other hand, **customization** has traditionally been identified as an undesirable tactic, used mainly to compensate for the inability of the enterprise solution to support the specific needs of the lifecycle rules, data, workflows, and integration with other solutions through straightforward configuration. Customized implementations, reaching beyond the configuration capability of the enterprise solution, necessitate re-implementation of customizations with each subsequent upgrade, and for many companies limit the ability to upgrade their PLM and MES solutions. Upgrading customized solutions is usually a costly and time-consuming effort that CIMdata and almost all PLM and MES solution providers recommend be avoided.

The need for innovation and cost-competitiveness in global engineering and manufacturing businesses accelerates the pace of change many times over what was common in the recent past. Companies that want to remain relevant will need to leverage cloud computing, software-as-a-service (SaaS), internet of things (IoT), and artificial intelligence. In this fast-paced environment, the delays and cost-penalties caused by PLM and MES customizations can be very detrimental. PLM or MES solutions that are not nimble and adaptable to the changing circumstances can make competitiveness and even business survival increasingly difficult. Customized legacy PLM and MES implementations can foster local dependencies within an organization creating significant barriers to upgrading to new functionalities, and in turn hampering the business transformation needed to realize visions such as smart connected product systems and Industry 4.0.

De-Customization and Standardized Configuration

CIMdata recommends that the industry strive for PLM and MES solutions that can largely be implemented out-of-the-box with some configuration while **eliminating** customization. Given

the fact that customizations and the services associated with them could account for 40 to 50% of PLM and MES costs, avoiding customization not only has a significant impact on the agility of future business transformation but also on controlling solution costs. In other words, de-customization (i.e., the systematic elimination of custom code introduced during earlier implementations) of PLM and MES solutions is a crucial element needed for future enterprise infrastructure improvements that will fully leverage the latest technologies for product and process innovations. At the next lower level of criticality, is the operational excellence of global companies across the network of their plants, through greater standardization of the management of their shop-floor systems.

Most large industrial companies use a variety of shop-floor solutions from different providers, as well as custom solutions developed in-house, resulting in an environment in which the individual plants all operate differently. Sharing knowledge, benchmarking operations, performance improvements, and cutting costs across such a disconnected landscape of manufacturing plants becomes very difficult. Standardization of MES configurations, guided by standard processes and solutions across plants, helps attain a more comprehensive solution landscape and achieve better control for making decisions that optimize manufacturing across an organization's plant network. In particular, when it comes time to adapt to changes driven by new technology, new strategy, or the integration of newly acquired plants, the costs and schedules can be better predicted and controlled.

DXC's Deep PLM and MES Expertise with De-Customization and Configuration

DXC has a deeply deserved reputation for its global processes and methods applied to business transformation, value management, technology architecture, change management, and migration of heterogeneous and complex information technology (IT) landscapes supported by governance at the strategic initiative level involving C-level management, as well as program and project governance at the tactical execution level. In over 30 years of implementing, maintaining, managing, operating, and supporting complex and heterogeneous PLM solution landscapes, DXC has developed highly-effective frameworks for standardized introduction of PLM by leveraging its alliances with major PLM solution providers. Certified to provide infrastructure as a service (IaaS) and software as a service (SaaS) cloud PLM environments, including bundling of hardware, applications, and support services, DXC has proved to be an invaluable partner to PLM solution providers in private and virtual private cloud based implementations.

DXC is a global leader for providing services specific to the needs of manufacturing transformation, MES architecture, plant operations, regulatory compliance, manufacturing IT optimization, as well as manufacturing intelligence for decision support. DXC has nearly two decades of experience in modernization and rationalization of manufacturing, in predicting and achieving financial benefits derived from manufacturing process improvements, and in developing manufacturing IT roadmaps that speed up realization of business benefits while optimizing costs. DXC's highly-differentiated Factory as a Service (FaaS) offering provides comprehensive services for the complete Bill of IT needs in the factory while supporting commercial-off-the-shelf (COTS) or custom MES solutions. The most value to manufacturers from DXC's FaaS offering, however, is derived from the standardized MES solution configuration based on plant capability and production requirement categories, mainly due to considerable savings in time and costs during upgrades.

When it comes to configuration and customization covering data models, workflows, enhanced functionality, SOA, database queries, and import/export functionality in PLM and MES, DXC is recognized as a world leader by many businesses in the automotive, aerospace, high-tech, CPG, oil and gas, and energy industrial verticals. DXC has decades of experience in accurately predicting and delivering on the financial benefits of PLM and MES de-customization and standardized configuration, both of which are imperative for the industry to benefit from the latest developments in enterprise software solutions while remaining nimble for adapting to the latest technological changes in the industry.

Case Study: Accelerating Penske's Business Results through De-Customization

DXC helped Penske improve the efficiency of its PLM solution while reducing implementation errors and costs. Additionally, DXC helped Penske reduce the time it took to upgrade its PLM environment, through consolidation and de-customization. All existing customization was progressively eliminated by DXC over the Windchill 10.x incremental upgrades and when it came time to migrate to Windchill 11, it was a purely out-of-the-box upgrade.

DXC has helped Penske reduce engineering time by 30% with 10-20% of time returned to design tasks rather than IT administration and overhead. Previously, 65% of their time was spent moving MS Excel files from one place to another and 35% was spent on other tasks, including designing parts, getting parts to the cars and to the track, and getting the cars to the track. If the team hoped to continue its remarkable record of accomplishment—more than 400 major race wins, 16 Indy 500 wins, and 29 National Championships—they needed to spend less time on management and more time engineering faster cars.

DXC used a transformation experience framework to look systematically at all the relevant areas where Penske needed help, e.g., delivery model transformation, organizational transformation, service management transformation, application transformation, infrastructure transformation, governance, facilities transformation, and program management.

DXC began the de-customization work at Penske, in their NASCAR group, followed by the introduction of the IndyCar data into the PTC Windchill environment. The de-customization work required CAD data cleansing, involving exporting the as-is CAD data, followed by data correction, revising naming and revisioning for each CAD document. All CAD files, all versions, including family table data were exported along with each version's contents in all the products and libraries as-is. Next, the structure information of all assemblies was exported. Finally, all CAD parts were imported back into a new library as the master reference, along with the contents from the folder and the structure information.

The consolidation, streamlining, and de-customization performed by DXC for Penske resulted in reduced costs, improved productivity, and reduced errors in product development, enabling early adoption of PTC Windchill 11 at Penske and a 40% reduction in overall upgrade and migration duration.

Case Study: Smart Standardization for MES Transformation in the Automotive Industry

DXC helped a global automotive Original Equipment Manufacturer (OEM), producing more than 9 million vehicles annually, to maintain leadership through the smart standardization of its MES solutions. The direct result was a significant reduction in the OEM's structural cost,

optimizing its manufacturing footprint and improving its flexibility, which resulted in their ability to balance production capacity to suit regional demands.

The automotive OEM had a complex and varied IT environment with 176 plants in 34 countries, and more than 100 data centers, 10,000 network devices, and 500,000 network nodes. There were more than 3,500 servers and 60,000 clients in the plant offices and on the factory floor. The OEM had more than 200,000 employees building 400 different vehicle systems and components and more than 2,500 IT professionals supporting 8,000 changes each month on more than 500 applications. This complexity was such that the MES transformation necessary to make the company competitive was very difficult. The IT operations were not globally standardized. The aging and inconsistent infrastructure not only posed a risk to manufacturing operations, it also inhibited the mitigation of production issues and the introduction of lean manufacturing.

One of the main issues facing DXC was that the MES solution optimized for component plants could not meet the assembly plants' requirements while the solution optimized for the assembly plants overwhelmed the component plants while still lacking required functionality. Two solution models were used, one for the components plants and the other for the assembly plants but the two models were hierarchical, with the component plant model leveraging the attributes of the assembly plant model wherever needed and practicable.

The MES transformation journey for the OEM involved establishing the MES transformation program, defining the applications and the infrastructure architecture strategy, modeling the business architecture, detailing and optimizing the modernization plans, and finally, modernizing the applications and the infrastructure to achieve the transformed business processes.

The scope of the transformation strategy was very wide, ranging from the IT fundamentals to the capabilities for enabling business processes. Consequently, the strategy not only needed to address what they defined as their critical gaps but also needed to guide the transformation at all levels.

At the lowest level, the IT operating model was targeted for delivering consistent, efficient plant IT operations across the globe. A common approach to plant operations was needed to maximize the effectiveness of leveraging the expertise including knowledge of standards from local "in-country" resources and subject matter experts.

At the next higher level, fixing the plant IT operations was targeted to enable automated software distribution, automated threat and vulnerability management, enterprise network and system management, and standardized work based on global common processes.

Next, fixing the tactical infrastructure was targeted to improve reliability and security of plant IT infrastructure by improving access control, plant floor controls network, improved network and system reliability, and replacing aging hardware to support improved system recovery. Finally, the business transformation accelerated the global management system across all plants with common application architecture, common data architecture, common business processes, and application rationalization.

The transformation enabled unprecedented flexibility in and across regions, reducing sustainment costs, and improving operational uptime. The system was reconfigured without plant disruptions and the launches were accelerated, enabling rapid business process deployment for scaling the systems to accommodate plant volumes.

The transformation improved the availability and increased the production capacity while increasing worker productivity and reducing downtime. It also enabled faster ECO and program launch, faster plant launch and M&A alignment, and quicker adoption of Agile manufacturing.

Summary

Global competition necessitates that businesses involving engineering and manufacturing leverage cloud computing, SaaS, internet of things, and artificial intelligence to remain innovative and cost-competitive. Satisfying changing customer expectations while leveraging quickly evolving technology requires the PLM and MES solutions in the engineering and manufacturing businesses to be easy and time-efficient to configure, implement, and upgrade. CIMdata observes that industrial businesses that have adopted the strategy of de-customization and standardized configuration solution implementation have fared much better in global competition. In fact, most PLM and MES solution providers recommend that customization be **entirely avoided** and that configuration be **minimized** as much as possible.

In CIMdata's observation, DXC with more than 30 years of experience implementing, maintaining, managing, operating, and supporting complex and heterogeneous PLM and MES solutions is an acknowledged leader, with deep real world experiences in de-customization and implementing standardized configurations. DXC has helped OEMs and suppliers in several industry verticals to consolidate, de-customize, automate, and standardize the configuration of their PLM and MES solutions to improve their multi-site multi-region engineering and manufacturing capabilities.

DXC's expertise in de-customization and smart standardization of PLM and MES solution implementations applied to global engineering and manufacturing businesses is invaluable for such organizations to become nimble and modern, to improve their speed of innovation, and balance their production capacity to suit regional demands while reducing structural costs and optimizing their manufacturing footprint.

About CIMdata

CIMdata, an independent worldwide firm, provides strategic management consulting to maximize an enterprise's ability to design and deliver innovative products and services through the application of Product Lifecycle Management (PLM). CIMdata provides world-class knowledge, expertise, and best-practice methods on PLM. CIMdata also offers research, subscription services, publications, and education through international conferences. To learn more about CIMdata's services, visit our website at <http://www.CIMdata.com> or contact CIMdata at: 3909 Research Park Drive, Ann Arbor, MI 48108, USA. Tel: +1 734.668.9922. Fax: +1 734.668.1957; or at Oogststraat 20, 6004 CV Weert, The Netherlands. Tel: +31 (0) 495.533.666.