A Product Innovation Platform and Its Impact on Successful PLM Deployments

CIMdata Commentary

Key takeaways:

- *Product innovation platforms are the foundation upon which functional capabilities, data, and processes are enabled—leading to the potential for much more innovation*
- *Few PLM implementations, especially those based on monolithic solutions, achieve their goals and often end up as "instant" legacy PDM solutions that are not sustainable*
- *A strong product innovation platform dramatically eases the burden of integrations with an enterprise's broad range of PLM-enabling solutions*
- *Aras Innovator provides an open and extensible product innovation platform that can be employed to provide an enterprise with a PLM solution that can grow into the future*

Product complexity continues to accelerate as electronics and software have become critical elements in almost every type of product and the demands on products to connect to the Internet of Things becomes a compelling reality. As manufacturers strive to bring new products to market, they are realizing that processes designed for a simpler era are being stretched. More than three decades ago, major manufacturers began implementing product data management (PDM) systems to address product complexity. As the complexity of products and business processes increased, so too has the vision of how to support and foster product and process innovation from a lifecycle perspective.

Many of today's product lifecycle management (PLM) architectures have evolved from PDM solutions that were designed 30 or more years ago. While today's architectures are greatly improved from what was available back then, the way they are applied in most PLM-enabling solutions still does not support easy integration with other enterprise platforms or solutions nor do they have the flexible capabilities needed for assimilating data, organization structures, and working processes to support the product lifecycle. The outcome is that companies must customize core data structures and solution processes to meet their particular business needs. As business needs change, future adaptations of the solutions become even more difficult, and upgrades, sometimes impossible.

In recent years, platforms have become an important element for enabling business activities. Today, companies want to drive their product lifecycles based on the use of platforms that streamline operations, reduce the costs of doing business, and simplify integration of data and processes across the enterprise and throughout the entire lifecycle. A PLM solution enabled by a product innovation platform is structured to solve many of the difficulties inherent in having to drive innovation with a heterogeneous solutions suite. Such a platform uses modern software and information technology (IT) constructs (well defined layering, modeling, services, native internet support, standards, etc.) to support key elements of sustainable solutions including maintainability, adaptability, upgradability, integration in heterogeneous environments, and others.

Platformization is real and not just an opportunistic mash-up of tools and capabilities. It requires a new approach to architecting PLM-enabling solutions so they become much more

flexible, adaptable, and capable of working with other solutions that typically comprise a company's enterprise application environment. Product innovation platforms can help companies more effectively realize product and process innovation and end-to-end lifecycle management in a stable environment, both today and well into the future. A product innovation platform is a foundation upon which functional capabilities, data, and processes are enabled and executed.

Well aware of the challenges presented by innovation and other initiatives, a number of PLM solution providers are proposing a platform approach, either purpose-built or transformed from existing offerings, and wherever necessary extending capabilities by licensing, partnering, or acquiring technologies.

The Product Innovation Platform

While the initial implementation of traditional PLM-enabling systems, such as PDM, remains very important, it can be rapidly overshadowed by the cost and disruption from continuing upgrades and deployment to new areas, projects, and programs, as well as by partnerships and acquisitions that bring new, unanticipated mixes of tools and processes to bear. Under these circumstances monolithic enterprise IT applications (e.g., many legacy PDM solutions) are no longer sustainable and robust enough to provide a viable solution. They are difficult to maintain, particularly when an enterprise wants to tightly integrate its product data with its product lifecycle processes and tools. A product innovation platform approach can help mitigate these problems.

Product innovation platforms support extended enterprise data and process integration and enablement—well beyond departmental, typically monolithic implementations. This vastly increases the value of processes, and the information they operate on, to the business.

Additional benefits of enabling PLM through a product innovation platform include:

- Reduced cost and resources required to support upgrades and the addition of new capabilities—all companies are faced with technology integration issues, and a product innovation platform greatly reduces these, or eliminates them altogether
- Increased flexibility in managing intellectual assets and processes throughout the entire lifecycle
- Support for diverse business domains throughout an extended enterprise
- Easier assimilation of acquisitions which bring different processes, PLM-enabling tools, and data requirements

Because of its central role in tying together critical product lifecycle management capabilities and data with the people who use these resources, the product innovation platform should natively support:

- Data longevity: Data from a wide variety of authoring applications needs to be captured as it is created. As the tools and tool versions change, the platform needs to manage the variety of data, and easily integrate that data with all the tools that use the data.
- Extensibility: Platforms must be flexible, adaptable, and extensible over a long lifespan. As new requirements and innovative capabilities become available the platform needs to support updates and additions to its capabilities in a

structured, maintainable way, while not losing essential flexibility and breadth of capability.

- Collaboration to support innovation: Collaboration is a critical aspect of the innovation process. For people to collaborate, they need access to the information on which they want to collaborate, but they need this in the context of their work processes—this implies that the tools that support those processes must be connected through a product innovation platform to support process consistency and to provide the information in the proper context needed to run each process.
- Systems engineering modeling and simulation: As can be seen in Figure 1, the potential impacts across the systems engineering domain are both broad and deep. Systems engineering relies on the concept that there is support for collaboration to allow rapid iterations in modeling, validation, and verification. The product innovation platform needs to support all disciplines involved in a system's definition (mechanical, electrical, electronic, and software) throughout these crucial processes.

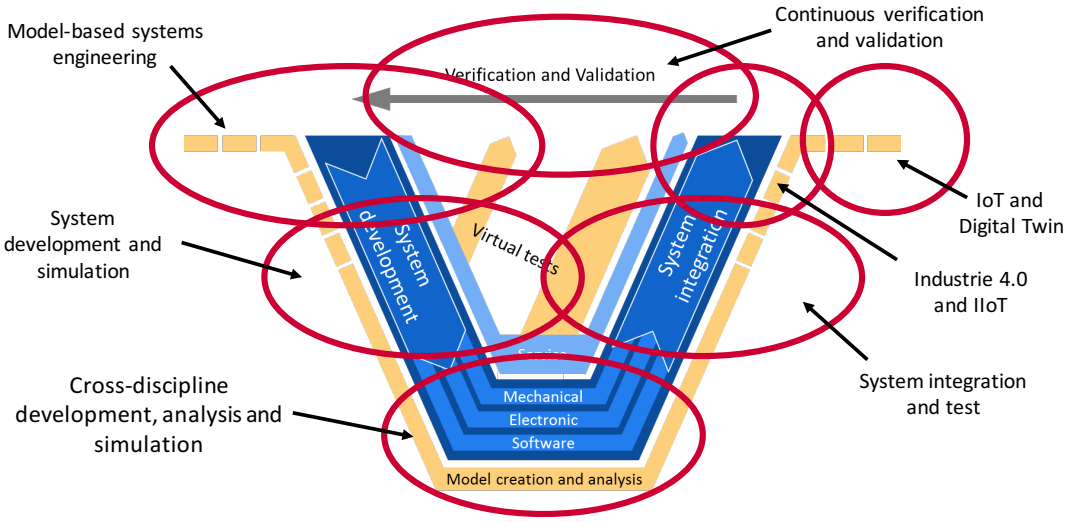

Figure 1—Potential Impacts of the Platform on Systems Engineering
(*Source: VPE TU Kaiserslautern, Aras*)

- Through-life configuration management: Product developers need tools to easily create configurations and assess alternatives. Downstream users need to be able to verify the configuration of the product, including change and effectivity, and ensure it is managed at all lifecycle stages from requirements through design, manufacture, and support.
- Data analytics: One of the major issues companies face is massive data related to new and existing products that should be reused as much as possible to increase its value. Data analytics is necessary to reveal the valuable data that can help promote innovation that leads to business success.
- Visualization: People can't work with data they can't see, so in the world of complex CAD models, drawings, schematics, photos, documents, and many other data formats, having a flexible, multi-format data viewing capability becomes a critical asset that, when supported within the platform, provides data visibility across PLM-enabling tools and databases.

- Digital thread: The digital thread is not just the assets themselves, it includes the connections between them. The digital thread should allow any authorized downstream user, for example, to select a part on the engine shown in Figure 2 from the service manual and learn about its manufacturing history, its change history, its CAD model, and the simulation tests that were performed, or trace all the way back to its requirements. Implementing a digital thread is not easy, but it's a problem that a product innovation platform approach can help solve.

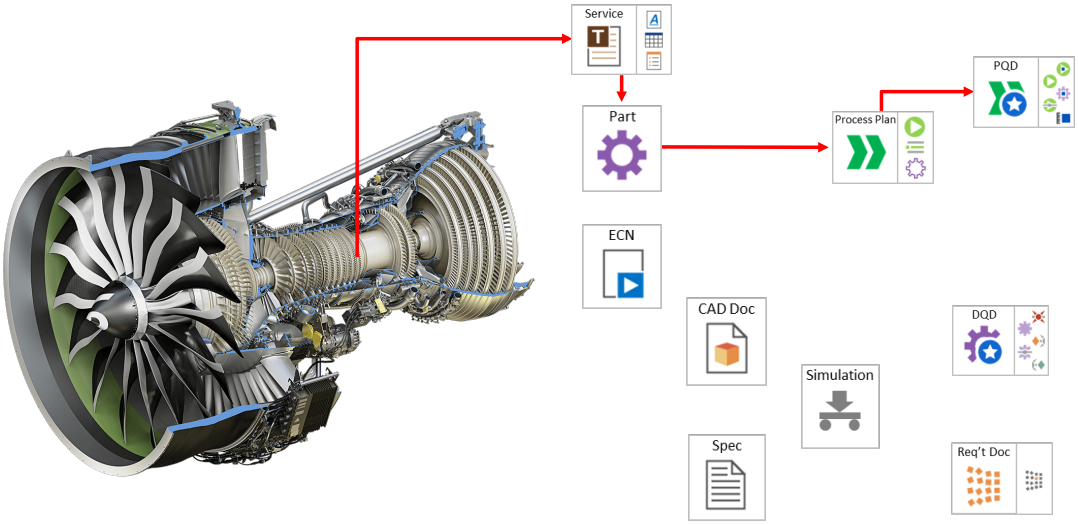

Figure 2—Digital Thread
(*Courtesy of Aras*)

- Closed-loop decision making: Examination of Figure 1 reveals that the product innovation process is very iterative in nature. In this environment, people need to be able to rapidly determine what is going on with respect to their data and other contributors to their processes. To create the trust necessary to support rapid innovation, a product innovation platform must provide the workflow capabilities required to model and execute closed-loop processes that lead to informed and defensible decisions.
- Intellectual property management and protection: The IP of an enterprise is its lifeblood—without trusted, connected sources of information, organizations cannot hope to be innovative. The product innovation platform connects the information (IP) in a common backbone that becomes the single source of truth for the organization. It also provides security mechanisms to assure that data is not intentionally or accidentally damaged or compromised.

The Aras Innovator Platform

Aras Innovator was architected by industry veterans to support an open, flexible, model-based approach to PLM—one that naturally lends itself to supporting the product innovation platform approach. The Aras team designed a set of web services that perform common tasks such as item management, relationship management, security, workflow, vaulting, etc. To solve their business problems, customers create applications which access these services using the integrated modelling engine, making them quick to build and modify just like the catalog of out-of-the-box applications from Aras, see Figure 3.

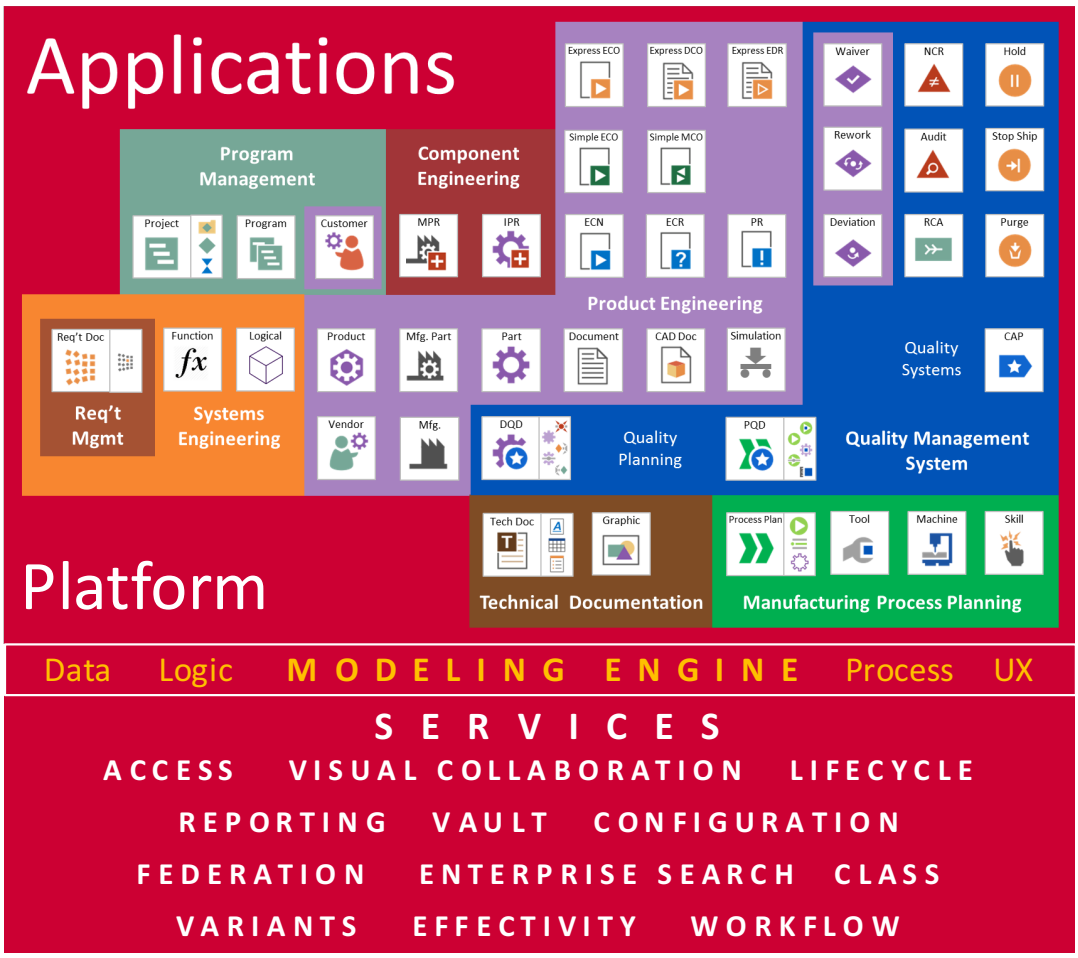

Figure 3—The Aras Innovator Platform Approach
(Courtesy of Aras)

This flexibility is a critical capability for a PLM platform. As business needs evolve the process and data models that describe the business also need to evolve. Just being able to add additional attributes to objects is not enough. Objects that describe aspects of the business will need to be combined in unanticipated ways to support new products, processes and business models. Aras Innovator was designed to support this dynamic data modeling.

A key difference in Aras' approach is that it is an open platform. Not only is the solution available for open download and use, making it easy for organizations to install and evaluate, but Aras' PLM platform integrates to a long list of authoring tools and enterprise solutions. Connectors and Integrations for ALM, MCAD, ECAD, PDM, ERP, and many other desktop and enterprise solutions are available from Aras and their partners. This increases end-user adoption and lowers implementation risk. Aras also provides out-of-the-box integrations to Microsoft Office, LDAP, and Multi-CAD 3D PDF viewing and even advanced PDF artwork capabilities. Aras partners that CIMdata talks to generally comment on how easy it is to develop integrations to Aras Innovator.

Aras customer Airbus has recently been talking about their Greenhouse strategy. Rather than going through a traditional top down, monolithic PLM project, the Aras Innovator Center of Excellence allows any group within Airbus to propose a business requirement that needs a solution. If appropriate, the Center of Excellence creates Aras-based applications that can

leverage data that already exists within Airbus' Aras platform (without extracting it or making a copy), solve the immediate business issue, and potentially provide new data, process, and even solutions that can be leveraged and reused elsewhere in the enterprise. CIMdata plans to do more research on this alternative approach to enabling PLM.

At CIMdata we have seen many Aras Innovator implementations. They all look very different, and are tailored to the business processes the specific client needs to support to be successful within their business environment. We see the Aras architecture as a competitive differentiator.[1] Due to its architecture Aras, can offer database upgrades for free to subscribers no matter how the solution was configured. They have many customers that have brought highly tailored solutions forward through many releases of the Aras Innovator Platform over a decade or more demonstrating the sustainability of the solution.

Conclusions

Many product development companies believe that a single monolithic enterprise IT application is neither sustainable nor robust enough to serve all their business functions. The complexity of extended enterprise processes, organizational elements, partnerships, acquisitions, and data requirements are difficult, perhaps impossible, for any single solution provider to address, no matter how large. Also, many companies cannot realistically migrate to a single tool. The value proposition or return on investment (ROI) does not work considering the cost of changing tools, data migration, and cultural change. If alternative platforms are sustainable, then federating through integration on a product innovation platform may provide a better ROI than migration and consolidation.

The new business platform paradigm is one in which solutions from multiple providers can be seamlessly deployed using an architecture that is resilient and can withstand rapid changes in business activities. This isn't about departmental process enablement, or even enterprise capability, but rather support for extended enterprise processes; supporting role-based needs yet crossing traditional organizational and system boundaries to support processes that span multiple organizations and roles.

CIMdata believes that for end-to-end processes to work effectively, companies need a clear roadmap for a PLM-enabling product innovation platform that supports system-centric product development and end-to-end lifecycle management. Companies need to take a strategic view of their product innovation platform so it can leverage their enterprise IT architecture that clarifies the relationships between enterprise solutions and platforms like ERP and SCM. Working at the platform level to define and implement connections should help reduce costs by shifting integration efforts towards the enterprise solution providers, including PLM providers rather than using historic, unsustainable one-to-one integration technologies.

Solution providers are taking differing approaches to developing product innovation platforms and companies should take time to understand the key characteristics of each. Aras' platform strategy and technology provide an open, flexible, scalable way to manage business process and data complexity and change, supporting the multi-faceted business environments faced by many companies today. The underlying web service platform provides support for many key product innovation platform characteristics including the extension and even replacement of core capabilities. This contrasts with those legacy PLM solutions, especially monolithic

[1] See: http://www.cimdata.com/en/resources/complimentary-reports-research/commentaries/item/551-aras-innovator-redefining-customization-upgrades-commentary

solutions, that struggle to adapt. CIMdata sees this situation too often in consulting engagements with industrial companies.

In support of these assertions, the Aras platform has been recognized by PLM veterans, such as Airbus and Microsoft to support innovation.

CIMdata observes that Aras Innovator's underlying web service platform provides support for many key product innovation platform characteristics including the extension and even replacement of core PLM-enabling capabilities. Companies looking to upgrade or overhaul their PLM environment should look at the platform approach and how Aras Innovator supports it.

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.