Enterprise PLM Solutions
Advanced PLM Platform

The Aras Innovator Model-based SOA for Enterprise PLM

Advantages of combining the Model-based Approach with a Service-Oriented Architecture

Updated Edition

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Contents

Aras Innovator ® enterprise PLM
is running in production at
Fortune 500 companies such as
GE, GETRAG, Hitachi, Honda,
Motorola, Textron and XEROX.

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Executive Summary

Evolving business environment needs a different approach to enterprise PLM

Aras® provides advanced enterprise Product Lifecycle Management (PLM) software solutions. The Aras product, Aras Innovator®, delivers comprehensive, full-featured enterprise capabilities that are optimized for global deployments.

This paper does not cover the functional details of specific Aras solutions, and instead concentrates on the underlying technology innovation developed by Aras for creating and running these solutions.

Aras is based on a simple premise. Large-scale enterprise applications must be capable of quickly adapting to dynamic and unpredictable business requirements AND heavy customization must not impede upgradability. In a word, enterprise applications must be "Resilient".

Aras Innovator was designed to provide highly scalable, flexible solutions that adapt quickly while upgrading easily regardless of the level of customization. The entire purpose is to support continual evolution in a company's mission-critical business processes.

Aras Innovator has a run-time Web application framework that is a set of loosely coupled / federated services that are optimized for performance and scalability and which form a service-oriented architecture (SOA). Then, we use meta-data templates to describe everything; application functionality, business logic, data schema, screens, workflows, etc, etc, etc... literally everything. We call it a "model-based SOA". Model-based SOA is our unique innovation. It is also what makes our enterprise software so powerful.

Our framework is built on standard commercial technologies and proven infrastructure to ensure the platform is secure, robust and reliable. We use open Internet standards to ensure compatibility and interoperability across the diverse & heterogeneous technologies that exist in large companies.

What we have done dramatically reduces the time, cost, and effort to customize & deploy enterprise applications, adapt them to changing business conditions, and upgrade them to new technology versions. We've made enterprise applications resilient.

The result of our innovation is unmatched business agility… and a dramatically lower Total Cost of Ownership (TCO).

Conventional Approach Creates Problems

Enterprise applications have contributed significant value to businesses over the last few decades. Unfortunately, businesses have paid a high price for these achievements, most often in the form of multi-million dollar system implementations and upgrades due the technology limitations of hard coded schema and business logic.

Gartner Research estimates that over a five year period more than 50% of the TCO for an enterprise application is spent on consultants and internal resources necessary to implement, maintain, and update the system. Years later many companies are still unsure if they have achieved an actual Return On Investment (ROI).

Conventional enterprise system vendors mask the rigid nature of their software by convincing customers to deploy "best practice" solutions. However, you will inevitably be confronted with situations where the vendor's "best practices" do not exactly match your company's specific competitive practices. At this point you must pick one of two unattractive options:

Do not change the system – If you opt not to customize the system's "best practices" your competitive position is 'at risk' because you will face the loss of competitive advantage by forcing your business to fit the system.

Customize the system – If you opt to customize the system then complex recoding and schema changes will typically be required. As most companies know first-hand, these customizations are complicated, time consuming and very expensive. And in less than a year the market conditions will change and your company will be stuck without the ability to adapt, to innovate, to improve, to compete.

Both of these options are unacceptable today given the volatile nature of the global economy. So, what can you do?

The Need for Greater Flexibility

The business environment is rapidly evolving. Product complexity is increasing as software and the Internet changes products in all industries. Globalization is creating opportunities and disrupting the status quo resulting in extended global supply chains and design partnerships, new competitors and mergers and acquisitions. And business needs are changing, driven by new business models and changing regulations.

Businesses need flexible enterprise applications that can be quickly tailored to support company-specific competitive processes and easily changed to adapt to the business environment. In order to meet this challenge a new level of enterprise application flexibility is required.

Improved software adaptability means that your company can support new and unique processes that deliver:

- Differentiated products and service offerings that excite customers

- Shorter process cycle times that improve responsiveness to customers
- Better profit margins that ultimately increase shareholder value

In addition to the strategic benefits that greater enterprise software flexibility provides your company will realize a significant reduction in the amount of time and IT resources necessary to deploy and maintain applications translating into significant cost savings.
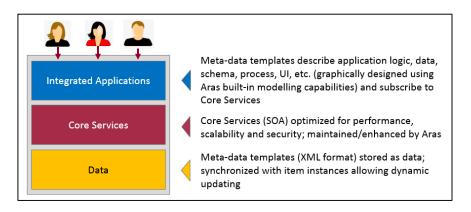
Introducing Aras Innovator

A different approach to enterprise PLM architecture

From the outset Aras has taken a fundamentally different approach to create the Aras Innovator® enterprise application framework.

Instead of defining an object model which is hard coded into the services, we chose to separate the two. The result is a run-time web application framework consisting of loosely coupled / federated web services optimized for performance and scalability which form a service-oriented architecture (SOA).

Then we use meta-data templates to describe everything: application functionality, business logic, data schema, screens, workflows, etc, etc, etc... literally everything. The meta-data templates define the objects in the system and those objects then "subscribe" to the services that they need. We call it a "model-based SOA" and it's the basis for creating resilient applications.

For those architects looking for a generic description, Aras Innovator is a Web-based, n-tier, service-oriented architecture composed of web clients, application server(s), database(s) and file server(s) and is based entirely on standard Internet protocols including HTTP / HTTPS, XML and SOAP (Simple Object Access Protocol).

For dynamic access the meta-data templates (which are defined entirely in XML) are normalized into tables and columns within the database along with the end user instance data. At start-up the schema is cached to optimize system performance.

The use of XML templates to describe the models that define the business objects, workflows, and screens is significant for several reasons. Working

with XML is widely understood and XML files are easy to manipulate at the text level as well as with graphical editors such as those in Aras Innovator, and most notably, XML files are portable.

Portability is of specific importance because the sharing of enterprise applications is made fast and easy. All that is required to move an application between two different Aras Innovator systems is simply export the XML templates from one system and import them into the other. This capability is useful for a number of situations such as:

- Migrating customized business logic for an upgrade to a new release of the underlying Aras Innovator SOA technology

- Moving new features from a development environment to a production environment

- Creating a new application and moving it to an existing system instance

- Sharing a business process between two different divisions of a business

The portability of Aras Innovator applications is significant because even extensively tailored applications can be moved from one environment to another quickly and with minimal effort. In contrast conventional enterprise applications require months and sometimes years of complex and costly work to move which creates significant issues for upgrade.

Delivering Unmatched Flexibility

The advantage of the Aras model-based approach is considerable. Changes to enterprise applications in Aras Innovator can be made quickly as opposed to weeks or months using conventional compiled code-based systems. Benefits of the Aras approach include:

- Real-time changes to business rules, forms, workflows, lifecycles, and the data model without complex programming

- Graphical drag & drop solution development with dynamic schema modification for fast and easy application creation and extension

- Separation of business logic and services simplifies upgrades and enables solution portability

- No proprietary languages to learn

Because Aras Innovator is delivered by a common framework, applications inherently interoperate. Every application developed with Aras Innovator shares a consistent feature set and look & feel.

Ensuring Scalability

Because of their separation from the customized model and the resultant standardization, the Aras Core PLM Services can be optimized for performance, scalability and security. This is reinforced by the single stack architecture which also maximizes performance and scalability and additionally simplifies maintenance.

Aras scalability was validated during a recent independent benchmark conducted by independent consultants Logic 20/20 on behalf of an Aras client. During the benchmark Aras was shown to scale linearly to 250,000 concurrent users.

And to offer organizations the maximum deployment flexibility Aras can be deployed in the cloud, on premise or both.

Making Upgrades Easy

Regardless of the amount of tailoring an Aras Innovator enterprise application has undergone, upgrades are straightforward and easy.

The entire system definition is described in the model's XML template. The SOA web services which define the behaviors and actions available to the model is compiled code. The combination of the model-based approach with the SOA results in a complete separation of system description and underlying technology. Upgrades to new releases of the underlying Aras Innovator SOA technology are straightforward. In fact Aras performs upgrades for subscribers at no additional cost. No other PLM vendor can make this promise.

Maximizing Customer Value

Aras approach unleashes competitive advantage
Aras Innovator enables previously unattainable business process innovation and dramatically accelerates continuous improvement. By enabling progressive business practices a company can attack competitors in new ways to capture market share.

Customers also benefit from the ability to consolidate and rationalize legacy and point applications into a single, modern solution environment. The ability to quickly create powerful, new enterprise solutions that seamlessly interoperate and easily integrate with mission-critical applications provides a cost-effective way to retire legacy systems.

Closing Summary

Today successful companies are seeking new advantages in the marketplace through business processes and technologies to outmaneuver the competition. However, many are struggling to achieve the level of agility required to execute quickly because of the rigid and cumbersome nature of their conventional enterprise applications and the excessive costs to change and support the systems.

Aras believes that to meet the challenges of the future, enterprise solutions must serve as an agent of change, as opposed to an obstacle. Aras Innovator combines proven, secure and scalable technologies using an innovative approach that delivers the first truly resilient enterprise applications resulting in a dramatically lower ownership cost.

About Aras

Aras provides advanced enterprise Product Lifecycle Management (PLM) software solutions to companies with complex products and processes. Customers include GE, GETRAG, Hitachi, Honda, Motorola, Textron and XEROX.

Aras' model-based SOA architecture and SaaS subscription model deliver PLM solutions that adapt to your business, remove unnecessary barriers to collaboration and change the economics of PLM in your favor. A full set of applications provide complete functionality for companies of all sizes.

Aras can be utilized as an end-to-end PLM system or can complement existing ERP, PLM, and PDM legacy systems through open integrations to leverage previous investments and avoid further license expenses.

Aras
300 Brickstone Square
Suite 904
Andover, MA 01810
(978) 691-8900 Phone
(978) 794-9826 Fax
info@aras.com
www.aras.com