

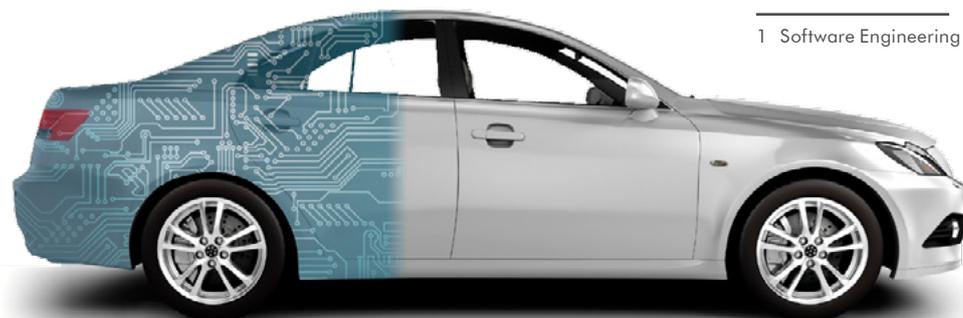
## Integrity, a PTC Product

Enabling organizations to reduce the overwhelming complexity of developing software-intensive products, thereby removing barriers to rapid innovation.

PTC Integrity is the leading software system lifecycle management (SSLM) solution that manages all software system development processes and connects all software engineering artifacts – including requirements, models, code and test – ensuring comprehensive lifecycle traceability. Integrity's open architecture integrates disparate tools into a streamlined software system engineering process, allowing coordination of software change and collaboration across the technology supply chain. With PTC Integrity, development teams improve productivity and quality, streamline compliance and gain complete product visibility coordination – which ultimately drives more innovative products into the market.

### Accelerating Innovation in Software-Intensive Products

The role of software in products is changing. Software is no longer simply another part in the Bill of Materials (BOM). From the operating system of your smart phone to the system that automatically parks your car, today's software often defines a product and drives differentiation. The growth of software in products, however, has created significant complexity for development organizations. PTC Integrity is optimized to solve these software-driven challenges, thereby accelerating development times, lowering costs, streamlining compliance and improving product quality.



Embedded software development as a percentage of development costs will more than double by 2015.

### Software-Driven Challenges

The opportunities to increase product revenue, market share and profitability through software have led to an exponential increase in the amount of software included in today's products. In some industries, engineering organizations report hiring five times more software engineers than hardware engineers, and studies have shown that the reliance on software for innovation in even traditionally hardware-driven industries is well accepted.<sup>1</sup>

However, as companies rely more on software, they face a number of complex challenges that traditional engineering tools cannot solve:

- **Lack of Visibility into Release Readiness** – With software, you cannot visually inspect millions of lines of code for quality, completeness and compliance. Does your organization struggle to release software predictably and to understand the state of release readiness throughout the lifecycle?
- **Inability to Manage the Proliferation of Product Variants** – Many organizations are leveraging software to offer more innovative products and penetrate new markets by creating product variants through software product lines. As the number of product variants grows, however, managing requirements, defects and change across the variants can reduce productivity and product quality. Does your organization have an automated and traceable way to reuse software assets (e.g., requirements linked to test results) and leverage software product lines?

<sup>1</sup> Software Engineering Institute (SAE), Software Development Study 2011

- **High Cost of Compliance** – The level of effort required to ensure compliance is increasing across industries, as new standards such as [ISO 26262](#) and [DO-178C](#) emerge. Software development's rapid rate of change relative to other disciplines can dramatically increase the level of effort required to ensure compliance, driving up product costs and lengthening timelines. Is your organization equipped to deal with these standards without significant impact to product cost and cycle time?
- **Low Product Quality** – As the volume and complexity of software in products increase, so too do the risks associated with product quality. Proven development processes and validated solutions are the key to producing high-quality products. Do your organization's processes and technology consistently deliver high-quality products?
- **Lack of Collaboration Across the Supply Chain** – Today's products are developed through intense collaboration that

transcends traditional corporate boundaries. Suppliers and manufacturers are pressed to exchange requirements and manage the rapid change characteristic of software development. Is your organization able to communicate and collaborate with its suppliers and customers?

### PTC Integrity Key Differentiators

SSLM with PTC Integrity offers organizations a better way to manage the development of software-intensive products. PTC Integrity was purpose-built to solve the challenges of developing software-intensive products and to ensure organizations can drive more innovative products with higher quality to market in less time – thereby increasing market share and profitability.

There are several ways that PTC Integrity is unique in the industry and in its ability to accelerate product innovation (see table below).

Differentiator	Customer Value
<p><b>1. The Only Truly Integral Product Lifecycle Management (PLM) Solution:</b></p> <ul style="list-style-type: none"> <li>• Incorporates all software development processes in a single, purpose-built, open and scalable product</li> <li>• Provides a single source of truth accessible across all of development</li> <li>• Delivers full lifecycle traceability across assets and activities</li> </ul>	<ul style="list-style-type: none"> <li>• Provides direct support for safety-critical product engineering; stitched together "best-of-breed" products are not adequate</li> <li>• Significantly lowers Total Cost of Ownership (TCO) and time-to-value</li> <li>• Reduces overall development costs by improving team productivity and enabling real-time collaboration across disciplines</li> <li>• Reduces time-to-market by eliminating data redundancy and duplication of effort</li> </ul>
<p><b>2. The Only Product Optimized for Software-Intensive Product Engineering:</b></p> <ul style="list-style-type: none"> <li>• Engineered to manage the high velocity of change characteristic of software engineering</li> <li>• Only SSLM product engineered to provide holistic view of PLM</li> <li>• Coordinates software development across the supply chain</li> <li>• Delivers flexible solutions that comply with industry-specific standards and regulations out of the box</li> </ul>	<ul style="list-style-type: none"> <li>• Accelerates time-to-market by reducing cycle time for software-intensive products</li> <li>• Integrates and streamlines compliance with software-relevant standards and regulations, including DO-178B, ISO 26262 and ISO 14971</li> <li>• Reduces overall development cost by eliminating redundancies and rework and reducing unproductive administrative tasks</li> <li>• Improves product quality by simplifying and expediting change management and impact assessment across disciplines</li> </ul>

Differentiator	Customer Value
<p><b>3. The Only SSLM Product with Native Support for Variant Management and Software Product Lines (SPL):</b></p> <ul style="list-style-type: none"> <li>• Provides true reuse of all lifecycle artifacts with traceability, greatly simplifying today's complex product line and product variant scenarios</li> <li>• Supports high-velocity change management across product variants</li> </ul>	<ul style="list-style-type: none"> <li>• Empowers organizations to drive product diversification to penetrate new markets and increase market share</li> <li>• Enables organizations to leverage the potential of SPL to reduce development costs and increase productivity</li> <li>• Improves product quality and customer satisfaction by facilitating defect tracking across product variants</li> <li>• Accelerates product variants' time-to-market by eliminating time spent tracking change and defects across product variants</li> </ul>
<p><b>4. The Only SSLM Product With Real-Time Cross-Discipline Visibility into Product Release Readiness:</b></p> <ul style="list-style-type: none"> <li>• Provides dashboards and reports with real-time metrics aggregated automatically from development activities</li> </ul>	<ul style="list-style-type: none"> <li>• Improves customer and investor satisfaction by improving release predictability</li> <li>• Drives product quality and improves time-to-market by providing the information needed to make key decisions and to correct issues before schedules, quality, or costs are impacted</li> <li>• Number of active requirement change requests, requirement-test coverage, risk coverage, real-time impact assessments, features per iteration, defects per iteration and more available at a mouse-click</li> </ul>

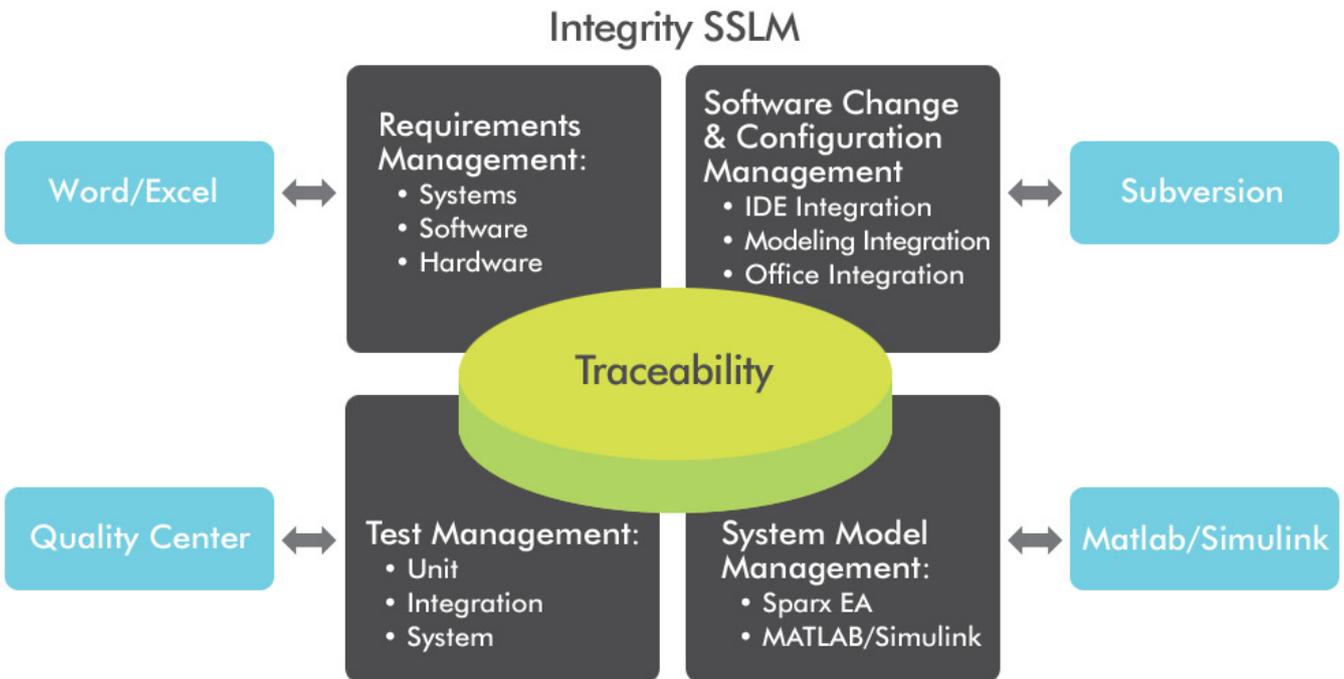


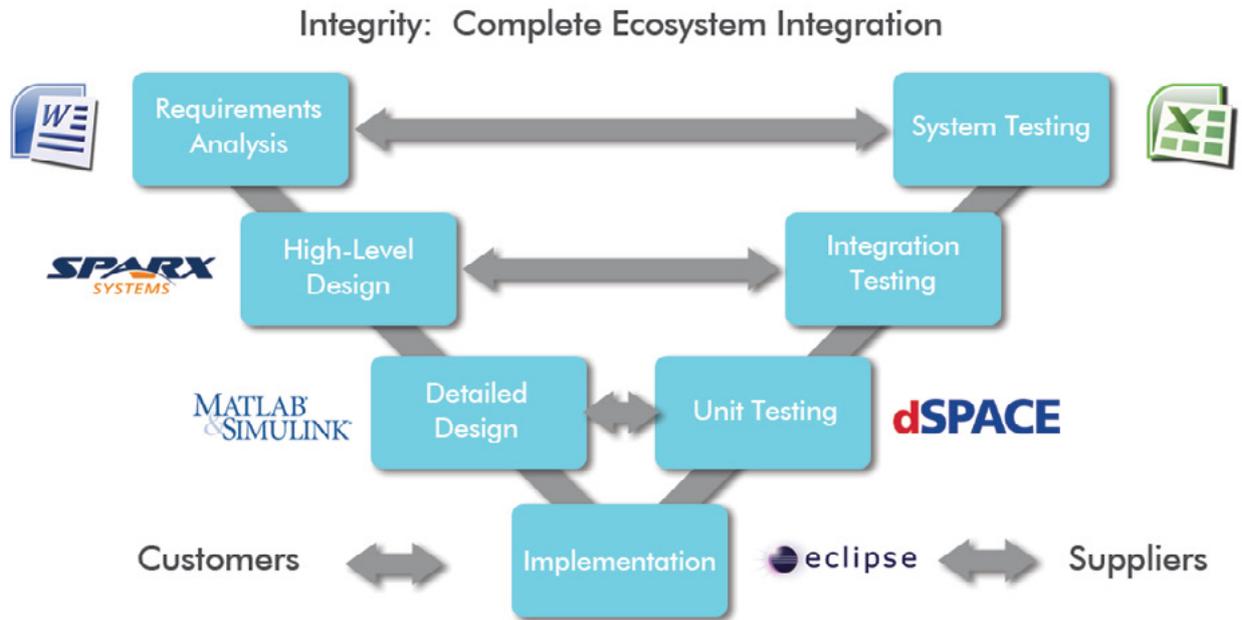
Figure 1: Cost of Embedded Software

**PTC Integrity Capabilities Respond to the Challenges**

There are many tools on the market claiming to address the challenges of software and system engineering. The [Application Lifecycle Management \(ALM\)](#) tools market is saturated with vendors that have a range of offerings from point solutions to complex suites of federated tools. The problem is that developing IT applications is very different from engineering software-intensive products. Only PTC Integrity is built specifically to confront the challenges of software system development.

PTC Integrity Capability	Release Readiness Visibility	Variants Management	Cost of Compliance	Product Quality	Supply Chain Collaboration
<b>Management of all development artifacts</b> <ul style="list-style-type: none"> <li>Incorporates all software development processes in a single, purpose-built, open and scalable product</li> </ul>	✓		✓		
<b>Industry-specific solutions</b> <ul style="list-style-type: none"> <li>Out-of-the-box compliance with standards and regulations such as ISO 26262, DO-178 and ISO 14971</li> <li>Integrates compliance with the development lifecycle</li> </ul>			✓		
<b>Workflow automation</b> <ul style="list-style-type: none"> <li>End-to-end process automation and enforcement, ensuring consistency of process and control of artifacts</li> <li>Configurable workflow that can be adapted to suit specific needs</li> </ul>				✓	
<b>Requirements engineering</b> <ul style="list-style-type: none"> <li>Comprehensive requirements capture and management that reduces late cycle rework due to inaccurate and incomplete requirements</li> </ul>				✓	
<b>Requirements-based test management</b> <ul style="list-style-type: none"> <li>Traceability between requirements, test cases, defects and related development activities. Teams know when requirements change and can assess the impact in real-time</li> </ul>	✓			✓	
<b>Change and configuration management of all artifacts</b> <ul style="list-style-type: none"> <li>Process-driven configuration and change management capabilities deliver traceability and transparency across all activities and artifacts throughout the application lifecycle</li> </ul>	✓		✓	✓	
<b>Automated change history tracking</b> <ul style="list-style-type: none"> <li>The only solution with full lifecycle artifact change tracking and audit history in one place, eliminating the risk of multiple versions of documents</li> </ul>			✓	✓	

PTC Integrity Capability	Release Readiness Visibility	Variants Management	Cost of Compliance	Product Quality	Supply Chain Collaboration
<b>Branch and reuse of all artifacts with trace propagation</b> <ul style="list-style-type: none"> <li>• True reuse of all software artifacts from requirements to test cases and test results</li> <li>• Automated propagation of trace relationships with artifact branching</li> <li>• Automated impact analysis of changes and defects across product variants</li> </ul>	✓	✓	✓	✓	
<b>Bidirectional named relationship model providing lifecycle traceability</b> <ul style="list-style-type: none"> <li>• Comprehensive traceability between all lifecycle artifacts, eliminating the effort wasted on maintaining traceability spreadsheets and enabling compliance reporting to be generated at a mouse click</li> </ul>	✓	✓	✓	✓	
<b>Automated change propagation and instant impact analysis</b> <ul style="list-style-type: none"> <li>• Immediate propagation of changes, both upstream and downstream, ensures that all team members are working from the same specifications</li> </ul>	✓	✓		✓	
<b>Lifecycle integrated model management</b> <ul style="list-style-type: none"> <li>• Models are integrated directly with development artifacts through configuration and change management, ensuring all development assets are easily managed and traceable within the lifecycle</li> </ul>	✓		✓	✓	
<b>Technology supply chain engineering artifact interchange</b> <ul style="list-style-type: none"> <li>• Offers an enterprise integration platform that allows bidirectional integration between PTC Integrity systems and other process management systems, thereby facilitating real-time communication of change between suppliers and customers</li> </ul>	✓				✓
<b>Automated lifecycle metrics collection</b> <ul style="list-style-type: none"> <li>• Automatically collects and rolls up key development metrics in real-time</li> <li>• Provides correlation of metrics across a complete lifecycle relationship model, resulting in immediately useful and actionable information</li> </ul>	✓			✓	
<b>Roll up and visualization of key performance indicators</b> <ul style="list-style-type: none"> <li>• Provides comprehensive, configurable, real-time dashboards out of the box without purchase of additional products</li> <li>• Cross-discipline metrics – such as requirement-test coverage, risk coverage and number of defects per release – that enable the quick identification and resolution of issues</li> </ul>	✓			✓	
<b>Direct support for traditional, iterative and Agile processes</b> <ul style="list-style-type: none"> <li>• Highly configurable for hybrid and mixed processes</li> </ul>			✓	✓	



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