SIEMENS
Ingenuity for life

Polarion

Facilitating agility, traceability and regulatory compliance

Today's product-line engineering demands that you compete and capitalize on opportunities; you must be able to innovate at unprecedented speeds while improving quality and managing a complex lifecycle of compliance and regulatory standards. In other words, you must be agile. You simply cannot expect your systems-engineering teams to perform at this level using just any point solution. This paper introduces you to Polarion software and discusses how it can help make your organization more agile.

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Executive summary

Products are getting smarter and more connected. Smart innovations are emerging in every industry. The Internet of Things (IoT), 3D printing, the Cloud, mobile internet, advanced robotics and knowledge automation are just some of the strong drivers behind these innovations. Software for applications and embedded systems are playing a key role. Expeditiously creating and delivering these innovations is becoming essential to achieving business success.

To compete at this accelerated speed you need to innovate quickly and adapt to changes without sacrificing quality: In other words, you must be nimble.

In the past, the development of software was inspired by the lean principles of manufacturing. It enabled users to create the agile practices that are so critical to delivering better software faster. Now it is software that is driving corporate agility.

Studies have shown companies that follow this formula usually perform better. As much as we agree that using agile methodologies is better, in this paper we won't focus on a specific methodology. By agility we are referring to the ability to deliver high-quality and compliant results quickly.

The key to success

The right tool

The project management triangle shows the three opposing factors that constrain the quality level of a project: scope, time and cost. Usually companies have to sacrifice one of them in order to deliver the project.

- Scope is increasing: you need to innovate in order to be competitive
- Schedule/time is shrinking: you are forced to deliver at an accelerated pace
- Cost: It's the only one that you control

People create the products. Bring more people, even an infinite number of people, and your problem is solved! We wish it could be that simple. We know that good people are perhaps the scarcest resource of all. Your only choice is to help your existing people do their jobs better and faster. This is possible when you give them the right tool; a software solution that will do most of the job for them so that they can focus on what really matters: innovation.

The 10 commandments of the right tool

There are many tools out there, and unfortunately, many companies are stuck with inappropriate tools. Your competitors are using tools, too. To outperform them, it is critical to choose the right tool; a modern one that is capable of helping you meet modern challenges.

Here are the key capabilities that the modern tool must possess:

1. As easy to use as Word

What is the application that you use when you have to write something? Most likely it is Microsoft® Word or Excel® spreadsheet software. Why is that? Because we are all used to it, it feels natural and we can focus on our writing without worrying about the tool. This is the reason why Word and Excel documents are so widespread throughout organizations.

To keep track of this information, you need to move it into a management tool. These tools use rich text. Well, rich text is not Word. So you become frustrated and waste time copying and pasting parts of documents to recreate the tables that are not imported correctly, or to reformat the lists and bullet points.

Then how about those documents that someone forgets to import?

For these reasons it is critical to have a tool that has the required functionality and is as easy to use as Word. You will not need to write intermediary documents, but will write directly in the tool. And when you write documents you will still need to have a method in the tool for performing a smooth import.

2. Collaboration in the Cloud

These days we use lots of devices: computers, tablets and phones. It is much easier to do our work if we can have access to the data anytime, anywhere.

Current collaboration techniques also require us to be able to work in parallel on the same document, and to review, approve and electronically sign them. We must also be able to discuss and record these discussions, or to receive alerts on the preferred channel.

Putting all of this in one phrase, your tool must support effective internal and external collaboration.

3. Traceability and versioning

You need to know at any time who made a change, what it was, when it was it done and why.

4. Re-use and variants

Lots of time is spent on writing requirements. Too often new requirements are just a small change from old ones, or are even the same, but in a different context. Why waste time writing them many times, and then make it difficult to update them in case they change? Your tool must give you the option to re-use them easily and to manage those variants.

5. Support any workflow or methodology

Every company has their own version of processes, or uses different methodologies. It is critical to have flexible, customizable workflows that can easily adapt to your methods and norms.

6. Release predictability

It is not enough to have good requirements; they have to be executed. The tool must allow you to plan your project and resources, spot potential bottlenecks before they occur with audits and quantitative metrics and perform change impact analysis.

7. Test management

Test management is as important as software requirements management. It is easier when you can specify, manage and execute test cases on a single platform together with the requirements that are used to generate them. This is because delegating test management to another application, even when integrated, makes it more difficult to achieve full traceability and receive live reports on the status.

8. Compliance

There is usually a lot of work to prove compliance. You reduce a tremendous amount of work when the tool offers you out-of-the-box templates to manage and prove compliance for organizations and standards such as the International Organization for Standardization (ISO), United States Food and Drug Administration (FDA), Federal Aviation Administration (FAA), Automotive SPICE® Process Assessment Model, Capability Maturity Model Integration (CMMI) and Sarbanes-Oxley (SOX). The wider the spectrum of industry standards, the better.

9. Integration and extensibility

Software people like to use a lot of tools to ease their work developing, building and releasing products. You need to have a tool that can be integrated with these applications while serving as a single source of truth. It is important for this tool to have application programming interfaces (APIs) to extend the solution.

10. Low total cost of ownership

As we are talking about reducing the costs, you should look at all direct and indirect costs: installation, configuration, administration, annual maintenance, hardware and infrastructure management, as well as training your people to use the solution.

As you can see, agility requires not only optimizing the way requirements are managed, but managing the entire application lifecycle. A simple software requirements management tool is not enough. We believe that agility can only be achieved with a unified application lifecycle management (ALM) solution.

We'll discuss why in the next sections.

Overcoming obstacles to achieving agility

Not all ALM is created equal. Some will hinder your agility due to:

- Poor collaboration tools

- A desktop client that prevents accessing data anytime, from any device

- Lack of traceability to all lifecycle artifacts

- Featuring rich text editors instead of easy-to-use functionality that leads to overreliance on email in lieu of workflow and documented audit trails

- The fact only limited data is exposed in the Cloud

- Not being designed for system engineers and lacking maturity

- Poor customer support for nonpremium users

- No support for agile methodologies

- An old interface with poor usability

- Point solutions that are integrated, not unified, which makes traceability and reporting difficult

- Lacking Word/Excel/requirements interchange format (ReqIF) round trip

- Poor support for history and baseline comparison

- No electronic signatures

- No integration with product lifecycle management (PLM)

- Huge operational expenses

Providing a proven solution

We believe that Polarion provides the best answer to these challenges.

Polarion is a proven solution for global organizations in a wide range of industries, from automotive to medical device and aerospace; companies that create products that people trust and have achieved agility, traceability and compliance for their complex products.

Our customers use Polarion because:

- It has a unified platform for requirements, quality and ALM. Collaboration, traceability and workflow are core competencies in Polarion. There is a big difference between integrated and unified. Integrated means that the data resides in different systems; it makes it difficult if not impossible to give access to all data, and it is difficult to create reports and operational costs are high

- A unified solution has easy access to all data. Do you need project transparency? You get aggregated management information in real time. Everyone is aligned with what is being built and why it is being built to drive advancement while protecting integrity and compliance. This helps teams respond faster and with better quality to new business opportunities and customer demands

- It is completely browser based. This is important because wherever you are, regardless of what system you are on, you have the ability to connect to Polarion, whether you have a Mac® computer, a Windows® operating system, tablet or smartphone. There is no installable client with Polarion. You don't have to manage that machine in order to use it with Polarion. This is important for the growing global enterprise that our customers have to navigate because often times we no longer have a development enclave, but rather a global collaboration through suppliers or customers that are outside the traditional boundaries. Alternatively, they are able to work with interior departments of a single corporation throughout the world

- We provide product maturity: Polarion provides traceability for large cross-functional teams and regulated complex environments and a track record that is 10 years long

"I have worked in automotive electronic development for more than 20 years. With Polarion, it is the first time that the entire spectrum of development activities is covered by one tool. This improves the product quality and saves time and money."

Rainer Kirchner
ASK Industries

Prioritizing migration

It is important to consider migration when switching tools. It is not only about migration of data; it makes little sense to migrate the data if the same operational and use cases that have become important to usability in past years are not at least brought forward into the new product. Finding the right product is certainly important.

Migration to other products is complex and painful. Data has a different structure, and items need to be mapped and transformed. The ReqIF in other products lacks the usability, and it struggles to recognize data that has been previously imported.

People who use Polarion have long experience with ReqIF. Our customers use it to exchange data with their suppliers or original equipment manufacturers (OEMs). Over time we implemented functionalities that have helped them verify the integrity of the data and easily identify the changes:

- User interface for visual mapping of attributes, no coding required
- Create templates for re-using the configuration of the modules with similar data model
- Import tables and object linking and embedding (OLE) objects
- See the number of items created and synchronized before starting ReqIF import
- Find the items updated since the last time the ReqIF import was performed

In addition to migrating data, much of the functionality that is available in other tools with special scripting language is done directly from the Polarion user interface. For example, it is easy to see the history of a document and compare versions. A special feature called time machine allows you to browse, search and report on any historical state of your project just like you do with the current state.

At the same time Polarion is extensible with Polarion API.

Understanding how Polarion stacks up

Let's look back to the 10 commandments of agility to see how Polarion complies with them.

1. As easy-to-use as Word functionality

Polarion has user-driven capabilities, with a focus on the specific needs of diverse stakeholders within the software development lifecycle, including team leads, engineers, developers and testers:

Polarion import wizard
- Using Polarion enables document-centric team members to easily import and leverage existing assets using the rule-based import wizard, which recognizes artifacts such as requirements, test cases, defects, etc., contained in Word or Excel, and enables them to be quickly imported to our browser-based platform

Polarion LiveDocs
- Enjoy simple functionality and real-time collaboration online. It essentially delivers the usability of Word and Excel without the limitation

- Work Items are uniquely identifiable, traceable and controlled by the workflow

Polarion RoundTrip
- Share content externally while maintaining traceability

User interface options
- Document view for analysts

- Table view for developers and testers

Diagram creation in the browser
- Unified modeling language (UML), flowcharting, business process modeling notation (BPMN) and more

Embedded knowledge
- Guide users with workflows in the wiki to perform tasks step-by-step.

"In comparison to other systems, working with Polarion ALM is a walk in the park."

Phillippe Meuli
Swisslog AG

2. Collaboration In the Cloud

Collaboration is not an afterthought with Polarion. It is a key guiding principal in everything we build.

Cross-team information exchange online
- Threaded discussions, wikis, polling, alerts and more in real time

Status change signatures
- Streamline and accelerate formal processes

Electronic signoff
- Approval center for formal approval processes

- Enable Code of Federal Regulations (CFR) 21 Part 11 compliant e-signatures

Version history
- Track how decisions were made

My Polarion dashboard
- Push important information to each user

"Polarion drastically improved the collaboration of stakeholders by tearing down the walls between organizational units."

Jörn Tiedjen
LMT Lammers Medical Technology

3. Traceability and versioning

You need to know at any time who made a change, what was it, when was it done and why.

Comprehensive linking and automated audit trails
- Ensure full traceability across projects and lifecycles
- MATLAB® environment and Simulink® environment models
- Enterprise Architect UML
- GIT/SVN/Perforce

Impact analysis
- Assess impact on requirements, timelines, resources
- Visual differential: Compare with changes highlighted
- Time machine: Browse, search and report any state

"The designed-in traceability support of Polarion saves significant time. Before, the company invested 20 to 25 percent of project time just managing the process with Excel and Word. With Polarion, traceability is achieved by pressing a button and the time invested is reduced to 5 or 10 percent."

Uli Markert
Supervisor, Software Services
Spansion

4. Re-use and variants

Synchronized re-use
- Share and synchronize across projects
- Great for regulatory requirements
- Browse, search and report on any historical baseline state via Polarion time machine
- Visual differential: Compare documents via change highlights

Polarion variants
Unified ALM for product-line engineering
- Effectively manage the commonalities, variations and inter-dependencies of your product family
- Save time on managing isolated copies
- Increase innovation and reduce maintenance effort

"The biggest benefit for WaveLight is the ease of re-use of artifacts such as require-ments across different projects."

Werner Motzet
WaveLight

5. Support any workflow or methodology

Controlled, automated processes
- Reduce routine manual work

- Get started quickly with out-of-the-box templates

- Customize for hybrid, agile, waterfall, etc.

- Use wiki guides for step-by-step directions

- Ensure no steps are missed or bypassed

Governed change management
- Set up change management automation

- Propagate changes instantly or on demand

"Thanks to Polarion, we can rely on a single platform to collect our data, exchange documents, collaborate, keep traceability and control our workflow."

Andreas Deuter
PHOENIX CONTACT Electronics

6. Release predictability

Intuitive plan creation
- Assign tasks and estimates to milestones, including time-boxed release, iteration and sub plans

Improved release predictability
- Get project status based on task completion

- Review organization-wide and cross-project practices

- Compare progress in real time against team capacity and ideal progress metrics

Real-time Information
- Access for any stakeholder online

- Run reports across multiple projects to help coordinate activities amongst different teams

- Asynchronous data loading to boost performance

Online report designer
- Easily create your own reports

- What you see is what you get (WYSIWYG) report editor

Wide range of reports
- Use any of the reporting extensions available on the Polarion extensions portal

- Deploy your own custom widgets

- Full access to open API with script widget

"With Polarion we can plan and communicate the status of requirements, project tasks and tests across projects and companies."

Justyna Niewiadomski
Phonak

7. Test management

Easy test case import, creation and linking
- Import/create test cases from HP Quality Center and other tools

- Link test cases to requirements, change requests, etc.

Integrated test automation
- Run builds automatically, import any file format

Bi-directional synching and traceability
- Import all test results to ensure complete traceability

Automated reporting and assignment
- View issue and task reports based on test failures

- Workflow rules enable automated issue assignment

Specify, execute and track testing in one tool
- Create/import test cases from third party apps

- Synch between Excel as well as HP Quality Center and Polarion

- Link related work items multi-directionally for full traceability

- Automate testing, reporting and task creation via workflow triggers

- Manage everything from any browser-enabled device

Accelerate quality assurance
- Plan for quality, catch issues and analyze change much earlier and faster in the development process

"We leverage the ALM solution of Polarion across our complete development lifecycle for requirements, central test management and full traceability meeting ISO 26262."

Maria Eugenia Zuniga
Quantum Technologies

8. Compliance

Certified tool with standards templates
- Only ALM tool certified for International Electro-technical Commission (IEC) 61508/ISO 26262

- Templates for CMMI, FAA, FDA, IEC, ISO, SPICE etc.

Risk assessment
- Use built-in preconfigured project templates

- Leverage failure modes and effects analysis (FMEA) work-sheets with real-time analytics

Automated verification and validation processes
- Verification of standards compliance: comprehensive traceability, automated forensic-level accountability and real-time reporting

- Validation of intended use via requirements review with electronic signatures and uninterrupted traceability starting early in the design phase

"We're just thrilled about the Polarion tool qualification for ISO 26262. This saves us a lot of time and money in our own qualification process."

Maria Eugenia Zuniga
Quantum Technologies

9. Integration and extensibility

Out-of-the-box integration and open APIs to extend functionality

• Quickly expand functionality via the Polarion extension portal

• Build your own extensions with Open Java and web service APIs

• Connect with almost any external solution in collaboration with Siemens PLM Software professional services

Certified integration with popular third-party solutions including:

• HP Quality Center (software testing and test management)

• Atlassian® JIRA® software (defect tracking and Agile project management)

• Simulink (hardware design and modeling)

• Enterprise Architect (UML modeling, model-driven design)

Cooperative extensions with a growing list of strategic partners including

• Klocwork (source code analysis)

• Loadster (load and performance testing)

• OpenMake (DevOps)

ALM-PLM integration with Teamcenter

10. Low total cost of ownership

We concentrate on cross-platform enterprise applications that are easy to implement and customize, enabling more effective software requirements management, quality and test management, as well as unified ALM across a broad range of industries, including aerospace, automotive, medical device and systems engineering.

Our unified, complete solutions can be implemented expeditiously, allowing our customers to avoid wasting time and budgets on costly point solutions and consultants to make them work together.

Conclusion

Agility is the ability to deliver quickly with high quality while complying with regulatory standards. You need the right tool to help your people work efficiently and focus on the tasks that matter the most.

Using Polarion provides a modern and proven ability to help you innovate at unprecedented speeds while improving quality and managing a complex lifecycle of compliance and regulatory standards.

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About Siemens PLM Software
Siemens PLM Software, a business unit of the Siemens Digital Factory Division, is a leading global provider of product lifecycle management (PLM) and manufacturing operations management (MOM) software, systems and services with over 15 million licensed seats and more than 140,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with its customers to provide industry software solutions that help companies everywhere achieve a sustainable competitive advantage by making real the innovations that matter. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

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