Persistent

Increasing Engineering Productivity

Integrating ALM & PLM platforms for today's integrated products

Rapidly expanding product complexity, connectivity and compliance needs. Unrelenting pressure deliver new products with the highest possible quality and at the lowest possible development cost.

Software development teams have relied on application lifecycle management (ALM) toolsets for decades to help them meet these goals and more, while hardware development teams have embraced product lifecycle management (PLM) platforms for the same reason.

But something fundamentally changed in the last decade as increasing connectivity has led to exponential increases in software complexity in industries like automotive, aerospace and medical devices.

In 2010, the average car required approximately 10 million lines of software code. Today, there are twice as many lines of code in the typical navigation system alone, and fully autonomous vehicles are expected to require one billion lines of code to function in the near future.

A good example of this concept at work is Volkswagen AG. Currently, the auto manufacturer is responsible for developing just 10% of the software used in its vehicles, but the company is pushing to grow that number to 65% by 2025 through the introduction of its Car.Software initiative.

This independent organization brings together 3,000 VW developers and engineers but company leadership expects it to exceed 10,000 in just five years' time, in an effort to get ahead of the reliance on software that is expected to grow in the automotive industry in years to come.

But this growth in software complexity is accelerating the growth of overall product complexity at a rate three times faster than the productivity improvements needed to support it. So instead of helping engineers and developers be as efficient and productive as they can be, today's parallel ALM and PLM structure is having the opposite effect — **it's forcing teams to waste time, 1 of every 3 hours, according to one study, hunting all over the organization for the right data they need to do their jobs**.

At the same time, this siloed approach creates bottlenecks in end-to-end processes, resulting in unnecessary (and unwanted) friction and limiting the ability for leadership teams to have the end-to-end visibility they need to manage effectively on a daily basis.

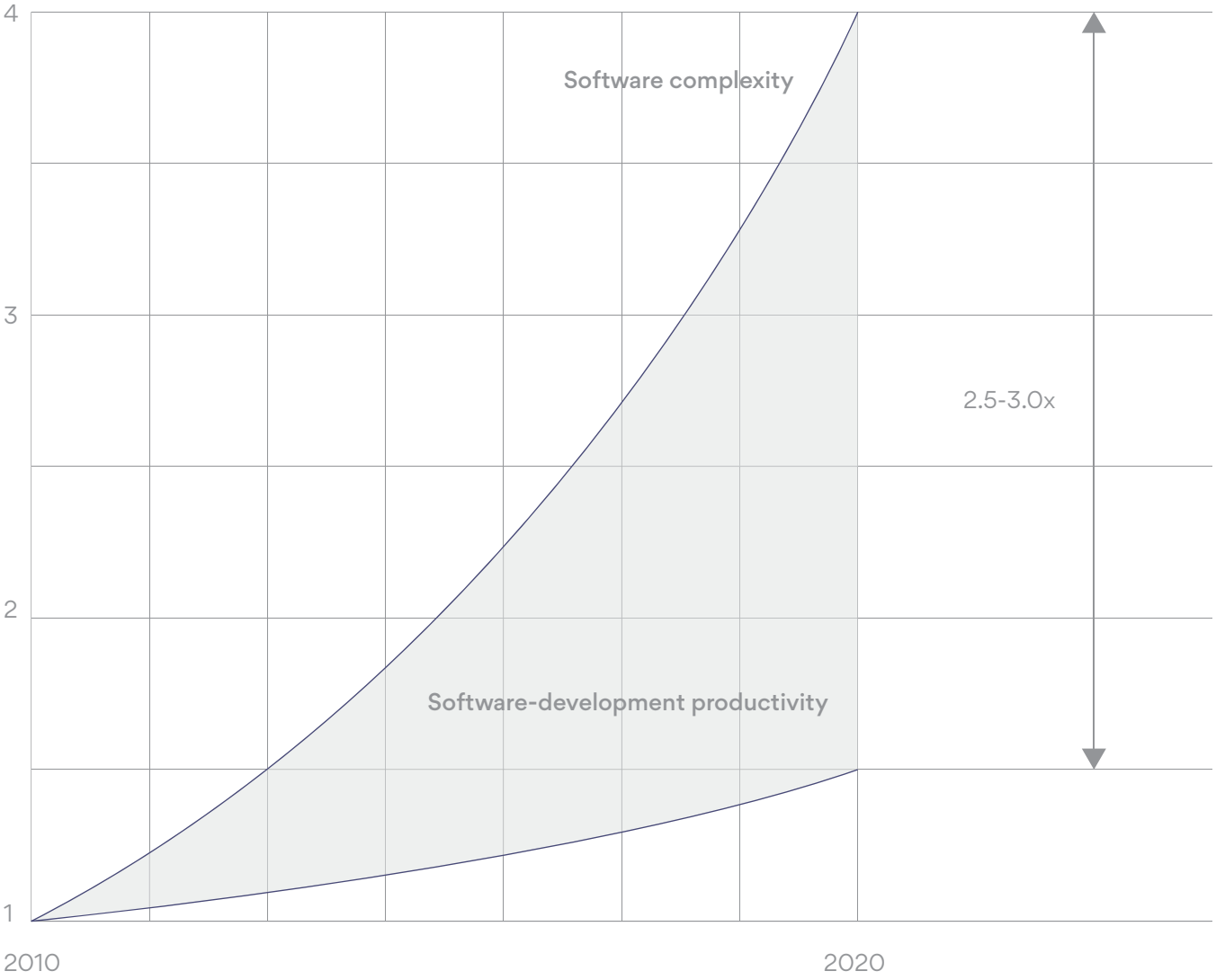
Clearly, the legacy model of siloed ALM and PLM platforms has to evolve if manufacturers of complex products have any hope of unlocking the full potential of their teams, ensuring they can compete in the future.

Pulling the digital thread to unlock up to 33% gains in productivity

Industrial organizations that manufacture complex, connected products need to break down these ALM/PLM silos and deliver "a single version of the truth" across the entire, distributed collaborative enterprise — also known as digital thread.

Product engineers and developers that can immediately use their tool of choice and rely on the organization's digital thread capabilities to deliver the correct, complete, and current data they need can **devote 2 – 3 more hours per day** to value-added activities that otherwise would have been spent locating or creating the right information previously.

This productivity gain strikes at the heart of the main issue software and product developers face today — the chasm between the increasing software complexity and the ability for software development teams to keep pace with it, as depicted below.



Source: Numetrics

McKinsey & Company

© 2020 Persistent Systems Ltd. All rights reserved.

Organizations that have fully integrated their ALM, PLM & related platforms are not only driving sustainable benefits in productivity, process efficiency and visibility, but other critical product development metrics as well, including

Reducing the cost of defects by 60%
ALM platforms like IBM's Enterprise Lifecycle Management (ELM) Version 7.0 — introduced in Spring 2020 — integrates model-based systems engineering (MBSE) capabilities into the ELM toolset, allowing product engineers to conduct millions of simulations across multiple iterations in just weeks.

These comprehensive simulations expose potential issues early in the product development process before physical prototyping begins, avoiding costly systems failures following product release.

Reduce design time by 30%
The collaboration capabilities of PLM platforms like 3DEXPERIENCE® from Dassault Systèmes® have allowed product engineers at 3CON — a global leader in manufacturing equipment for the automotive industry, to collaborate on designs simultaneously from different locations around the world.

This global integration and collaboration capability has cut design time of their complex products by 30% while improving the quality of the designs.

With integrated ALM-PLM platforms, any changes in the requirements for 3CON products — a speed controller, for example, can immediately and automatically notify development teams focused on other affected hardware and software subsystems related to that speed controller, ensuring all involved are using "one version of the truth".

Reducing the cost of manual reviews by 25%
Requirements are the fundamental elements of complex products, and as the number of requirements increases rapidly, so too does the error rate. These errors require manual reviews and corrections that can drag down engineering productivity.

IBM ELM harnesses the power of AI, applying IBM Watson to review requirements changes and additions in real time for completeness, consistency, and accuracy as they are being written to remove ambiguity and avoid costly errors on the spot.

9X increase in early detection rate of design issues
South Korean energy and power component manufacturer Dong Yang E&P collaborates using 3DEXPERIENCE to help drive efficiency, better estimate the cycle time from the early stage of development to manufacturing and increased their early detection rate of design issues from just 5% to 45%.

Reducing development costs by 57%
Just as manufacturers of complex products rely on subsystems to accelerate development and time to market, MBSE allows engineers to reduce development costs using model libraries. These libraries are essentially digital twins of the parts, subassemblies and subsystems already developed for other existing products.

Rather than begin from square one for each new variant or product, engineers can pull proven models "off the shelf" to compress development time and reduce costs dramatically.

Accelerating time to market by 20% and reducing cost of quality by 69%
According to the Project Management Institute, 47% of failed projects are due to poor requirements, and requirement errors are the source of 50% of all project defects. Worse yet, defects identified in a launched product cost up to 200 times more to correct than defects found during requirements and testing, according to the Institution of Electrical Engineers.

By continuously improving the quality of requirements with AI, coupled with IBM ELM's ability to identify defects before production, enables users to deliver much higher quality products in less time for less cost, regardless of the level of product complexity.

© 2020 Persistent Systems Ltd. All rights reserved.

Integrated products demand integrated product development ecosystems

The legacy structure of siloed ALM and PLM platforms is actually robbing product development and engineering teams of their productivity in some industries, as they continually bounce from one data repository or tool to the other in a search for the information they need to do their jobs. It's also hampering the ability of the leadership team to manage these teams, due to the lack of end-to-end process visibility.

Today's complex products are both hardware dependent and software driven, and the technology stacks of leading industrial organizations must reflect and support this permanent shift.

Fully integrating ALM and PLM is an essential step, delivering the digital thread anyone in the organization can follow to quickly find the current, complete, and correct information they need to succeed.

To find out how digital thread can unlock the full potential of your product development teams and deliver breakthrough performance for the metrics that matter most, visit https://www.persistent.com/ibm-engineering-lifecycle-management/jira/

About the Author

Bertrand Raillard
Offering Manager,
Persistent Integration Platform

Bertrand Raillard is responsible for leading the integration products and services offerings at Persistent, enabling customers to create truly end-to-end digital solutions using their preferred engineering platform.

To accomplish this, Bertrand relies on 25 years of experience in the software industry, with the last two decades focused on supporting a variety of industries and manufacturers of everything from blast furnaces and grain silos to jet fighters and chewing gum.

Bertrand holds a bachelor's degree from ISTEC, the Institute of Higher Education in Marketing and Commerce in Paris, France.

About Persistent

Persistent Systems (BSE & NSE: PERSISTENT) builds software that drives our customers' business; enterprises and software product companies with software at the core of their digital transformation.
www.persistent.com

India
Persistent Systems Limited
Bhageerath, 402,
Senapati Bapat Road
Pune 411016.
Tel: +91 (20) 6703 0000
Fax: +91 (20) 6703 0008

USA
Persistent Systems, Inc.
2055 Laurelwood Road, Suite 210
Santa Clara, CA 95054
Tel: +1 (408) 216 7010
Fax: +1 (408) 451 9177
Email: info@persistent.com

Persistent

© 2020 Persistent Systems Ltd. All rights reserved.