Be ready for the future: the integration of ALM and PLM

Edoardo Sivera – CNHi
Stefano Rizzo – Polarion Software

Presenter Background

Edoardo Sivera – System Integration TL @ CNHi

- @CNHi → System, SW and Network manager
- @Fiat Auto → developed system and software methodologies
  founded software factory
  managed SPICE and A-SPICE projects
- Electronic Engineer at Politecnico di Torino (during previous life!)

Philosophy and Focus:
Innovation!
Changes are my life!

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Presenter Background

Stefano Rizzo - SVP Strategy and Business Development

- Responsible of long term Vision and Product Strategy. Corporate spokesperson.
- Academic, technical and sales background. First Product Manager in Polarion Software up to 2010.
- Doctor in Computer Science, University of Genoa, Italy

Philosophy:
What's next?

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Why ALM and PLM get together

Automotive

CNET / Google joins with GM, Honda, Audi for Android-powered ...

Google joins with GM, Honda, Audi for Android-powered cars

An expected auto alliance backing Google's OS is unexpectedly broad with the arrival of the world's largest carmaker. The first Android vehicles will arrive this year.

CES 2014: BMW shows off 'drifting' self-drive cars

BMW's promotional video of its latest autonomous driving technology

BMW has shown off self-driving cars that can "drift" around bends and slalom between cones.

CE

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Heavy equipment

Self driving Agricultural Vehicle increasing farm output and efficiency.

From precision farming to autonomous farming: How commodity technologies enable revolutionary impact

by Jeremy H. Brown

Environment&Agriculture | Views | November 11, 2013

The popular conception of farming as low-tech is woefully out of date. Modern farmers are high-tech operators: They use GIS software to plan their fields, GPS to guide field operations, and auto-steer systems to make tractors follow that GPS guidance without human hands. Given this technology foundation, the transition to full autonomy is already in progress, leveraging commodity parts and advanced software to get there more quickly than is possible in many other domains.

This article outlines some of the key technologies that enable autonomous farming, using the Kinze Autonomous Grain Harvesting System as a case study.

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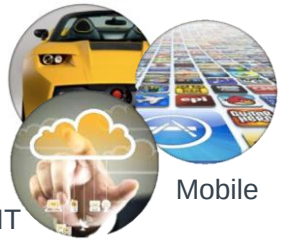
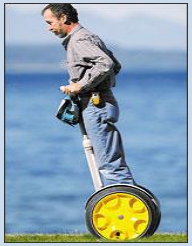
Every Business Is A Software Business…

Another manufacturer recalled 160,000 cars with hybrid engines due to a failure of its engine control software.

--McKinsey, The Detroit News

One Japanese manufacturer recalls 81,000 sedans due to a sensor failure causing the air bag system to default to the fully deployed position, regardless of seat position – ***CNN***





Segway is recalling all of its high-tech electric scooters because a SW glitch has caused riders to fall off and break teeth and wrists. The problem is fixed by a 15 minute software upgrade…

– USA TODAY

"Software is eating the world"

Marc Andreessen, Aug 2011

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Internet of Things

New Markets for Software (wearable, connected)

Product Differentiation through Intelligent Features

Compliance with Evolving Regulations

Mass Customization

Continuous Innovation

Wishes

- **Avoid putting faulty products on the market**
- **Global corp. need to optimize their processes and tools**
- **Reduction of the cost of new product introduction**
- **Comply to regulations (i.e. 26262)**

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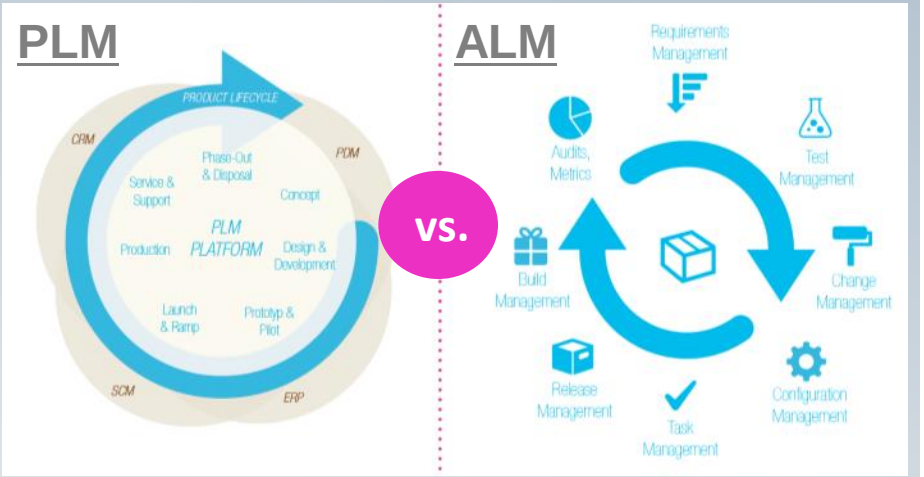
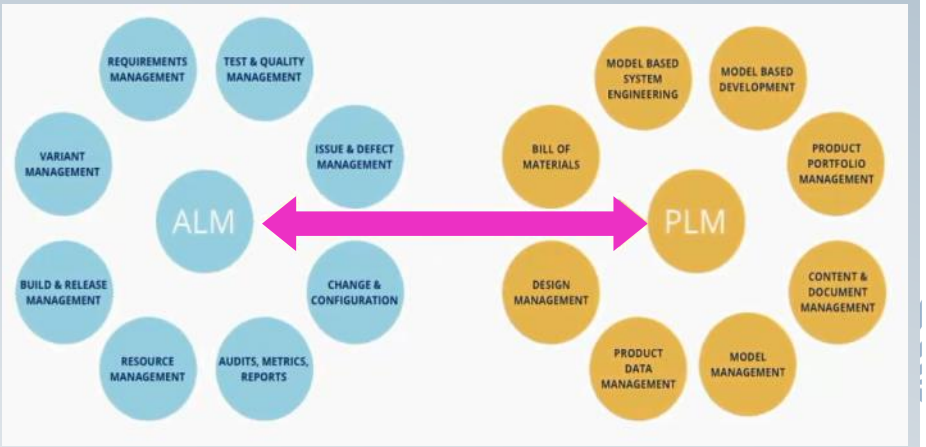
TODAY

- In the past ALM and PLM have been operating in isolation
- This has compromised product quality and delivery



FUTURE

- We believe PLM and ALM must work in unison to address today's product development demands



Business benefits of ALM-PLM integration

- Visibility across all assets
  - Improve search and locate information
  - Comply to regulations (ISO 26262)
- Accurately link firmware with hardware
  - Avoid errors, avoid damage costs, avoid reputation risk
- Traceability of assets for engineers in all lifecycle phases
  - Enable effective collaboration across globally distributed units
- Support maintenance, repair, & operations (MRO):
  - Quickly locate parts and manage defect fixes
  - Reduce inoperative time of broken products

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Vehicle and Electronic System development processes in CNHi

CNH Industrial

Our Products

Trucks

Buses

Firefighting and
Emergency Equipment

Crawler
Excavators

Skid Steer Loaders

Combines

Tractors

Engines
and Transmissions

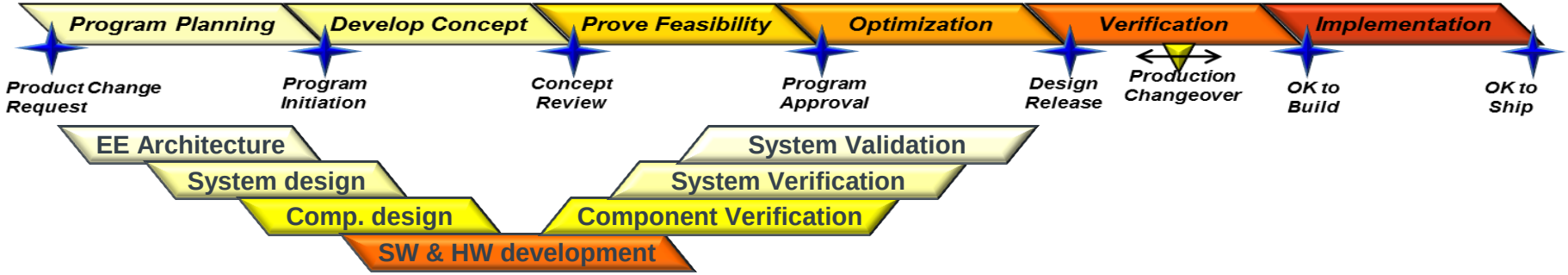
CNHI – Vehicle Development Process

GPD 2.0 Process Framework

- GPD is the process used across CNHI to **develop new vehicles**
- It is a **core** CNH Business Process.
- The GPD Process consists of a set of development **phases** (), which are initiated and completed by **milestone** reviews ().
- Each phase has a set of **deliverables**, which are expected to be completed by the end of that phase, before moving onto the next phase.
- The GPD phases, with their deliverables, help **guide the Platform Team** through the complex steps of a development program.
- GPD 2.0 also incorporates **Lessons Learned** into all Milestones from Program Initiation to OK to Ship

CNHI – Vehicle & Electronic System Development Process

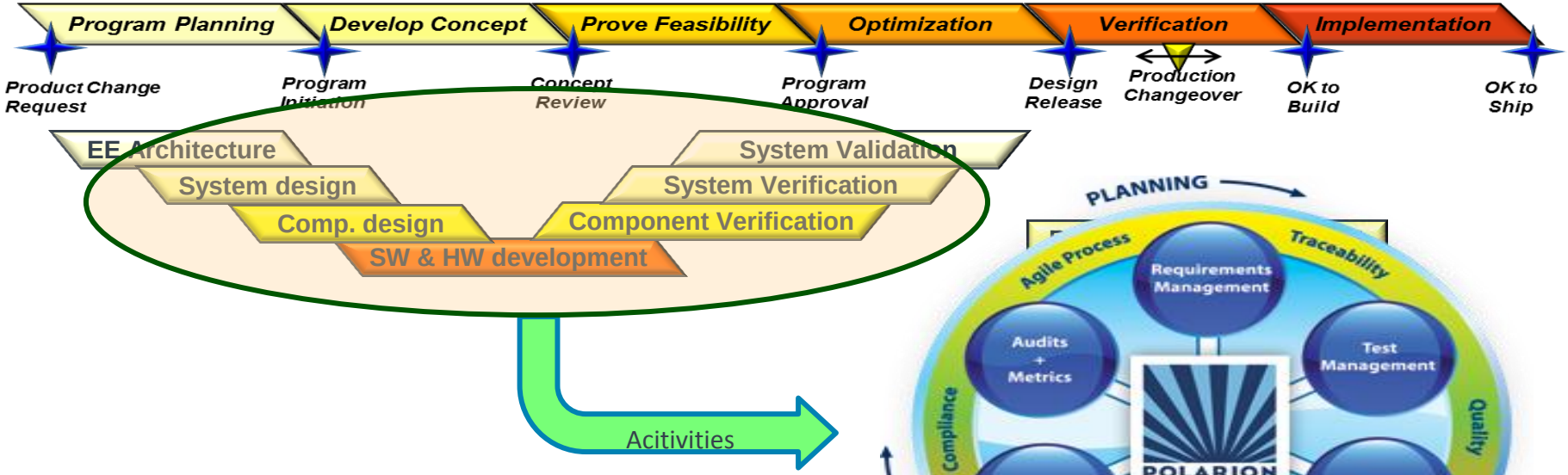
GPD 2.0 Process Framework



- The responsibility for following the GPD Process belongs to the **Product Platform Team**.
- The responsability of technical activities and deliverables belongs to the **Functional Areas** (see next slide).
- The GPD 2.0 and Electronic System development processes have to be integrated:
  - Different responsable teams (platform and functional areas)
  - Different deliverables (magerials and technicals)
  - Different process scheduling
  - … but… **same milestones**!

Two processes to be integrated

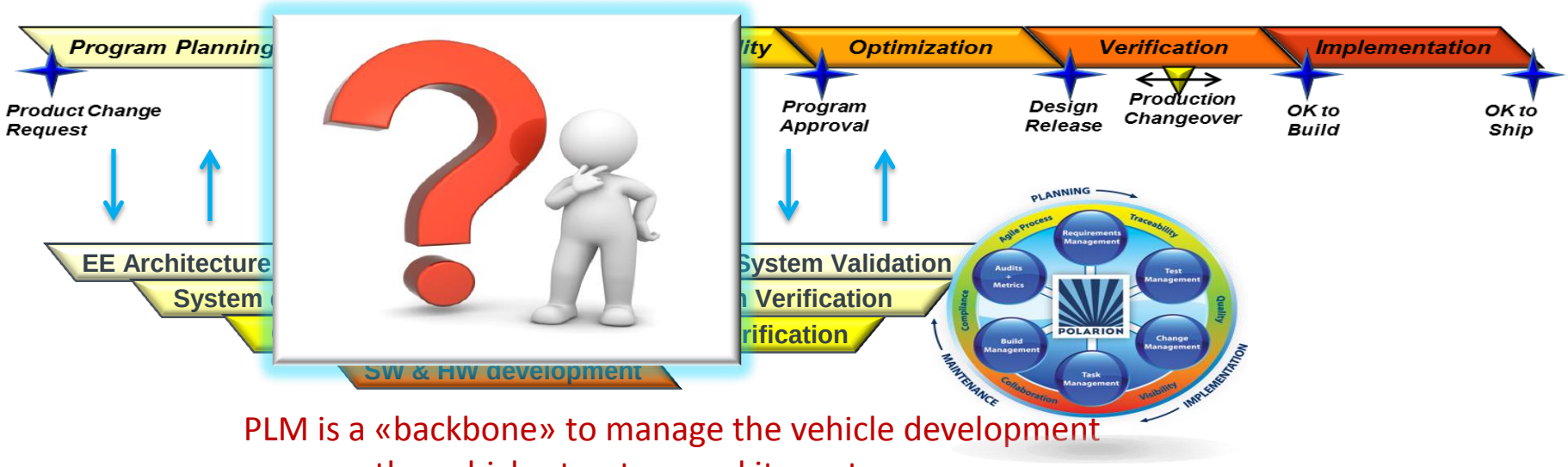
Electronic Systems and Vehicle development processes



PLM → Vehicle Development Process

ALM → Software and Electronic System Development Process

Two processes to be integrated



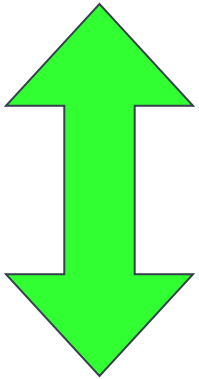
PLM is a «backbone» to manage the vehicle development process, the vehicle structure and its parts.

ALM help to manage vehicle functions, logics, network, diagnostic, software, etc. development

→ → → How to integrate them? ← ← ←

Two processes to be integrated

Current situation



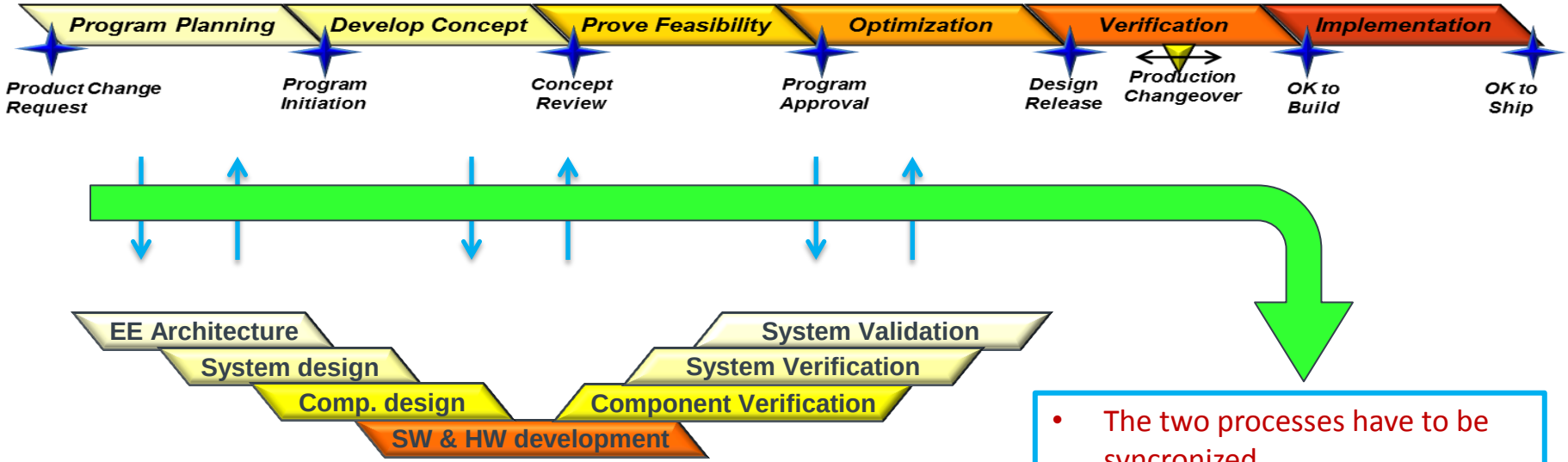
Currently, the link between these process **is not well managed**!
Only **not structured and unformal** link are defined:

- Emails
- Phone calls
- Meetings

The information is often **duplicated**!
The **information retrieval is difficult** (various queries in different environments!!)
No sincronization, No collaboration, No unique workflow!

Two processes to be integrated

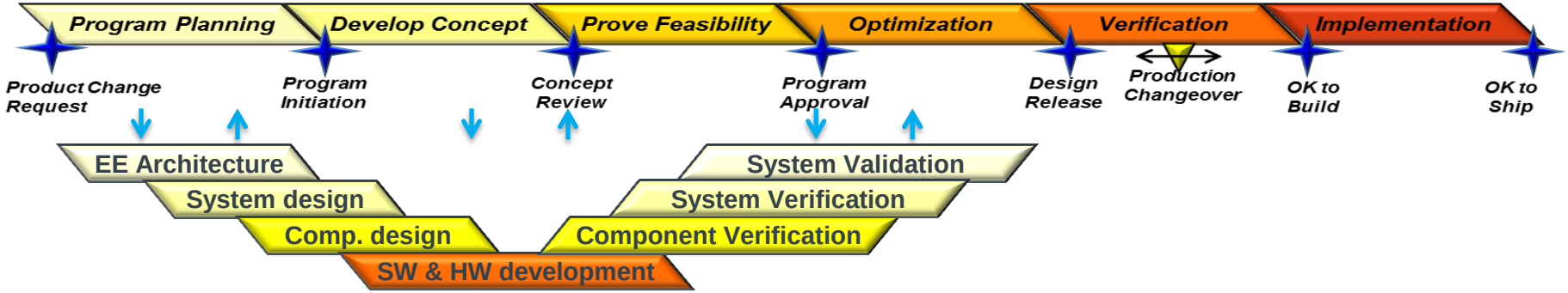
Main requirements



- The two processes have to be syncronized
- The two processes have to refer data (no data duplication!)
- The releases of ALM process have to «published» to PLM process

Two processes to be integrated

Needs /1



- **Link between vehicle and electronic system development processes**, in order to implement
  - *Impact analysis*
  - *Tracebility*
- **Change management** cross these two processes
- **Baseline** in ALM have to linked to specific **product part number** managed in PLM.
  - It is necessary to define a policy how to manage «part number» in PLM, linked to workproducts managed in ALM.

Integration: when?

CNH next steps

Today:

- PLM solution is in place
- ALM «pilot projects» (ie: Agile SW Development, Task management) are already in place
- No integration between ALM and PLM

Within 2014 / 2015:

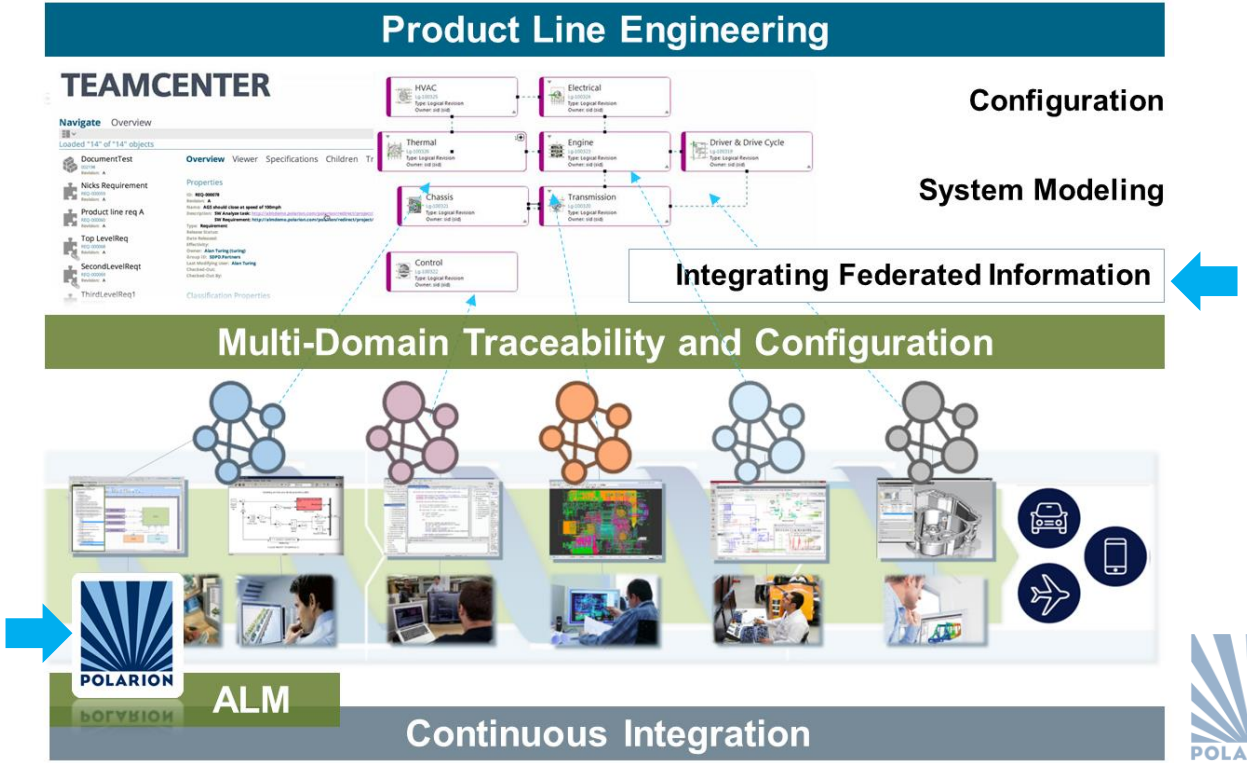
- ALM (Polarion) is completely in place since June 2014, in order to manage all new electronic systems / component projects
- ALM (Polarion) will manage functional safety information (January 2015)
- ALM (Polarion) will manage system, component and software test process (March – June 2015)
- Integration between ALM and PLM →
  - Reqs for first application (September 2014)
  - Vision, strategy, feasibility and plan (February 2015)
  - Implementation (within 2015)

Polarion & Siemens

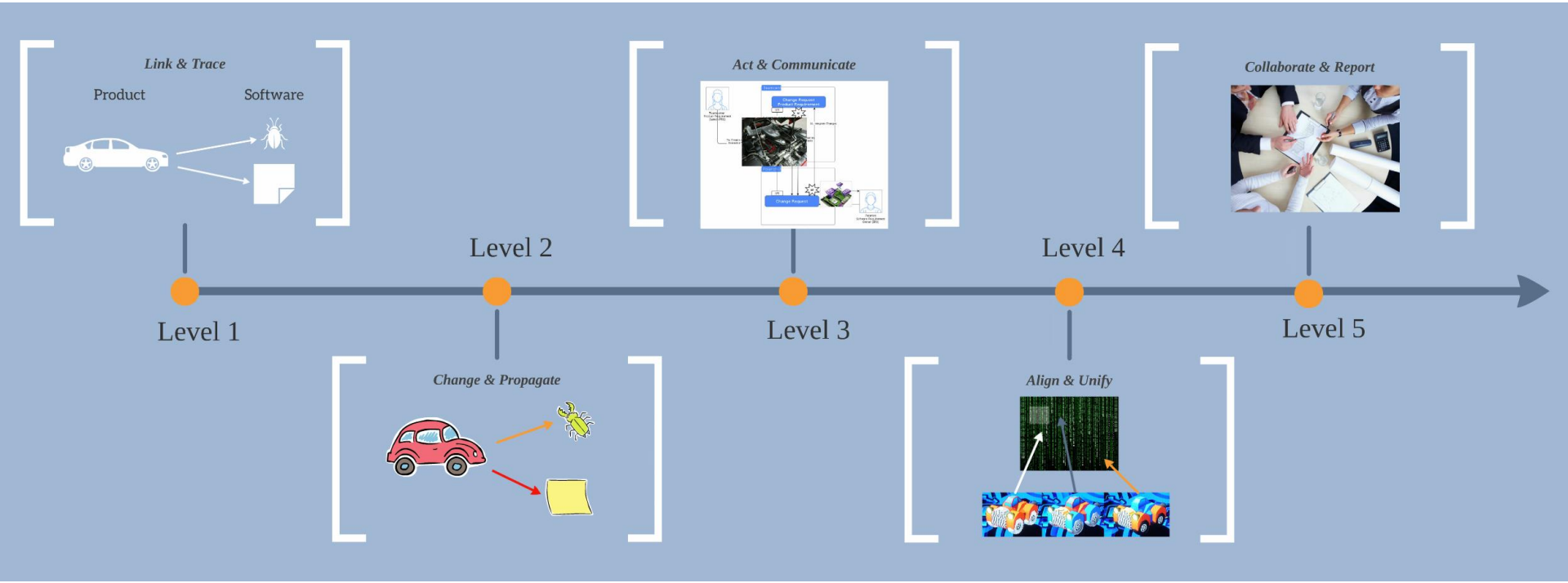
ALM within Systems Driven Product Development

MULTI-DOMAIN:

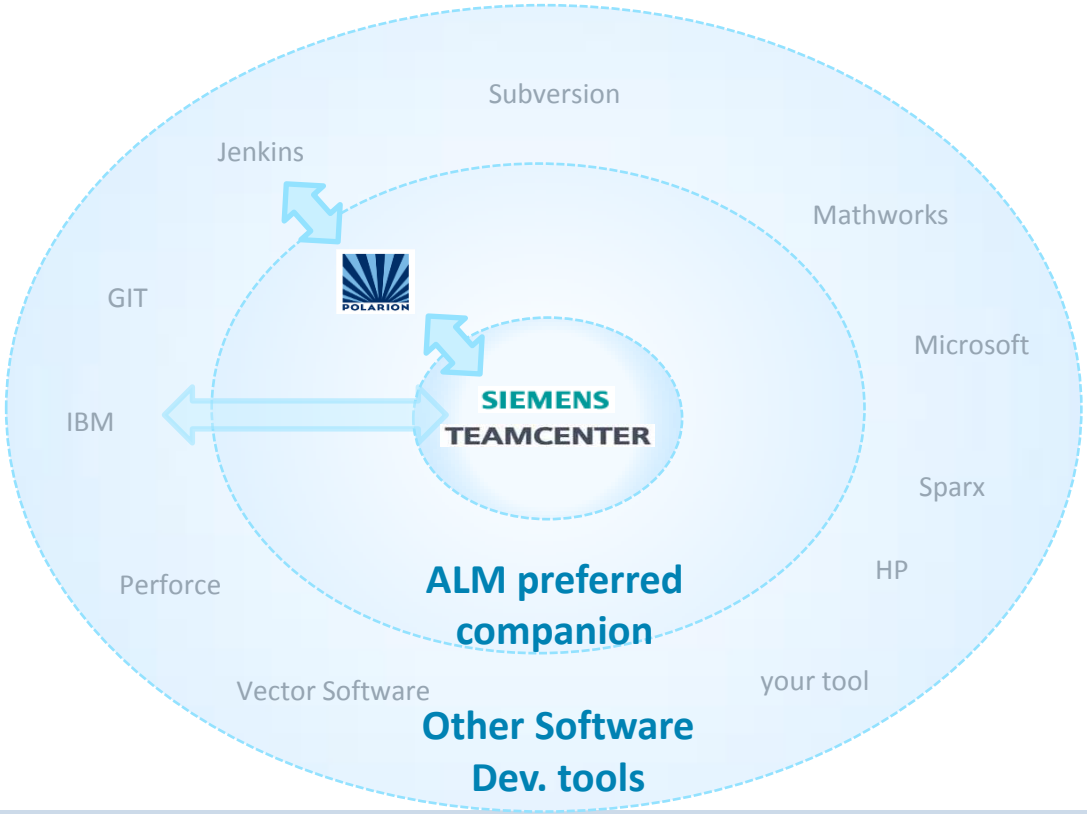
- Governance guided by valid product configurations
- Change Management
- Decision making
- Continuous integration
- Closed-loop validation



Levels of integration



A complete ecosystem
Addressing any software development need



What Market Analysts Think

OVUM

"Polarion has a first-class ALM solution… In the near future we expect Siemens to be able to offer an **integrated ALM–PLM** solution **to address the current needs of software engineers**, and the choice of Polarion is a good one"

Michael Azoff, Principal Analyst, Ovum

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What Market Analysts Think

CIMdata

"Product complexity is increasing in all industries and manufacturers are striving to optimize processes and tools. To gain true efficiencies in product design, **one integrated flow is needed that weaves together the mechanical, electronic and software development processes**. The Polarion-Siemens partnership is bringing two of the process lanes together into **an integrated solution** within Teamcenter to facilitate these much needed efficiency gains."

- Laila Hirr, CIMdata High Tech Electronics Practice Manager

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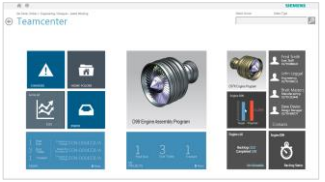
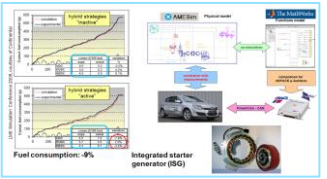
Benefits

Productivity	Software development closed-loop with Product Lifecycle Management from Inception to EOL
Quality	Part of MBSE for continuous software validation Leverage modeling & simulation capability
Cost	Right first time software deliveries and reuse Optimize software design decisions in context of overall products
Scalability	Proven Enterprise infrastructure Very minimal changes in your organizations





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What Customers Think

"This is great news **that we've been hoping** for ever since we started using both Teamcenter and Polarion. The integration of software and product development processes will allow us to achieve a much better use of our tools and resources and **help our teams bring innovative products to market at a much faster pace**."

Edoardo Sivera, System Integration Team Leader, CNHi

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Questions?

Thank you.

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