



The race to reinvent the process for developing connected and autonomous vehicles

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Agenda

- Aras at a Glance
- Automotive Industry Context
- Digital Tools & Processes Challenges
- Aras Approach
- Conclusion

Aras at a glance



Aras Company Overview

Enterprise Product Lifecycle Management

Fastest growing worldwide

Global Operations | Veteran PLM Team

North America, Europe and Asia

**Focus on markets with
complex products & processes**

Automotive & Industrial

Aerospace & Defense

High Tech Electronics

Consumer Goods

Life Sciences

Energy

46%

3 year compounded annual growth

450+

employees and hiring

300+

Subscribers Worldwide

1,000+

Companies running **Aras Open**

Sample Customers



HITACHI
Inspire the Next



GE Aviation



INSITU
A Boeing Company

AIRBUS



RENAULT
Passion for life



SICK

Sensor Intelligence.

 **Microsoft**

 **Carestream**



SAAB

 **Kawasaki**

 **Huntington
Ingalls
Industries**

BAE SYSTEMS

 **LEAR**
CORPORATION

 **DeLaval**

 **DONGFENG**
DONGFENG MOTOR CORPORATION

 **LEONARDO**

 **MAGNA**



HONDA

SCHAEFFLER

Automotive Industry Context



Growing number of assistance features

Parking assistant

Lane assistent

Jam assistance

Emergency Break assistent

Distance Warning

Predictive efficiency assistent

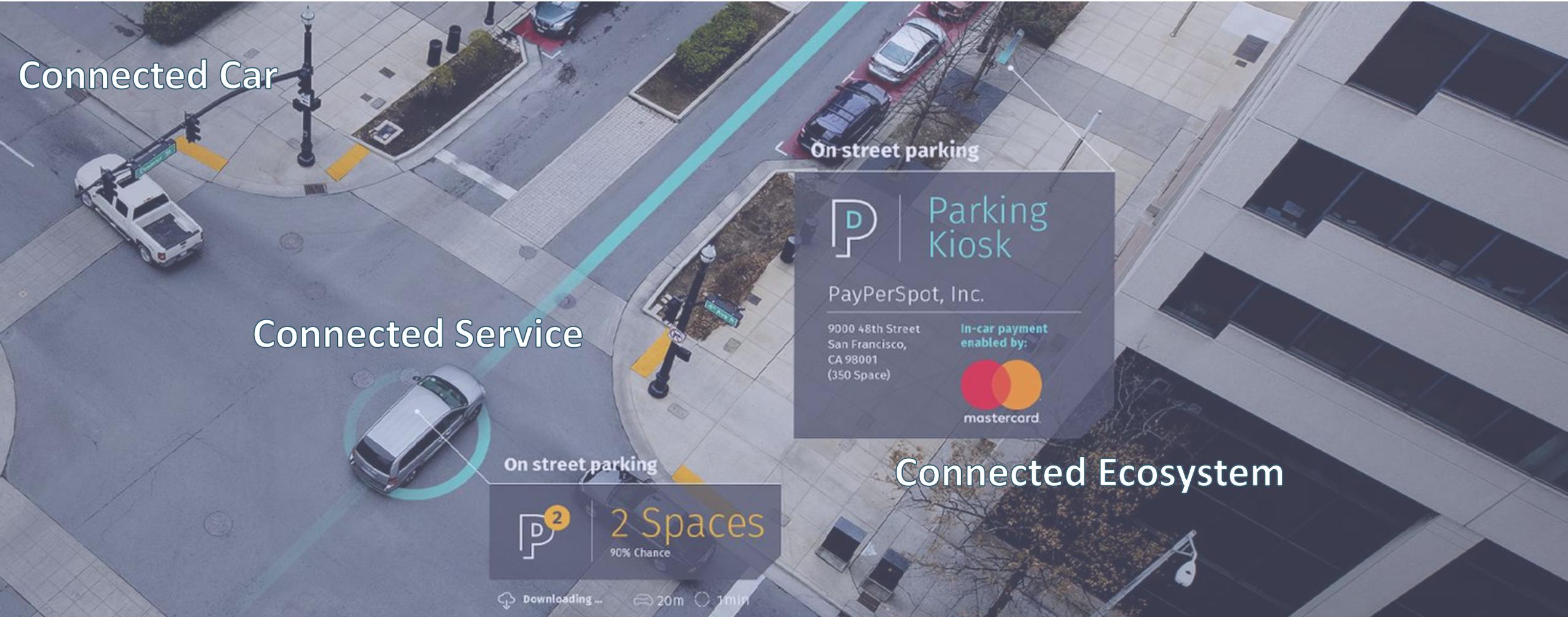
Traffic sign assistent

Connected Navigation/Realtime Traffic

Sourround view



From car manufacturer.... to part of an ecosystem



Connected Car

Connected Service

On street parking

On street parking

Connected Ecosystem

P | Parking Kiosk
PayPerSpot, Inc.
9000 48th Street
San Francisco, CA 98001
(350 Space)
In-car payment enabled by:

mastercard

P² | 2 Spaces
90% Chance
Downloading ... 20m 1min

Maintaining In-Service Products

Interpreting IoT data and managing updates in the field



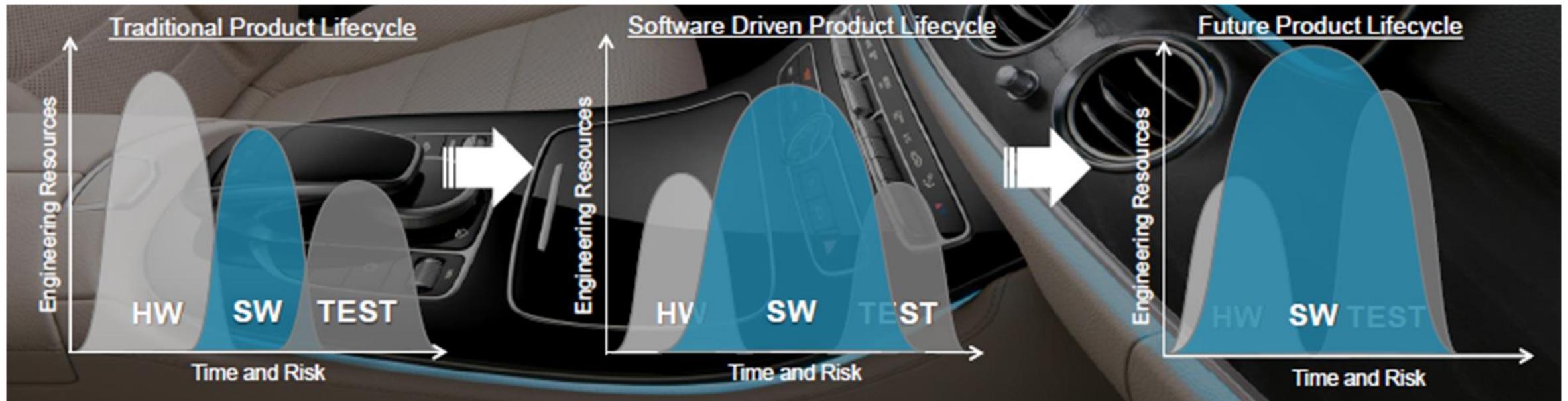
Over The Air Updates (OTA)

OTA software updates will not only affect your infotainment system but also power train and vehicle safety systems

Coordinating Cross-Discipline Development

“80% of product innovation and differentiation is now electrical, electronics and software. Not mechanics.”

- Siegmur Haasis, R&D, CIO, Daimler



Managing Outsourced Activities

Now suppliers control critical technologies



Global Suppliers to 2013 Ford Fusion

Suppliers to the all-new Fusion play a critical role in Ford's strategy to increase parts commonality across global platforms. Below is a profile of Fusion's global supply base, as well as examples of suppliers that provide key components to the vehicle. Fusion is built off Ford's global CD4 platform and will be sold as the Mondeo in Europe and China.



234
SUPPLIERS

32
COUNTRIES



5
CONTINENTS

70%
ALIGNED
BUSINESS
FRAMEWORK
SOURCING

80%
GLOBAL PARTS
COMMONALITY

Built:
FLAT ROCK ASSEMBLY PLANT
Flat Rock, Michigan, USA

HERMOSILLO STAMPING AND ASSEMBLY
Hermosillo, Sonora, Mexico

<ul style="list-style-type: none"> ● AUTOLIV Airbags (front, rear, curtain, passenger) ● AUTONEUM Floor carpet, trunk trim, insulation ● BOSCH Powertrain control unit, restraint control module ● BREMBO Rotors ● BROSE Window regulator ● CONTINENTAL Brake components, ABS, body control module, powertrain control unit, instrument clusters ● DELPHI EDS, evaporative emission canister 	<ul style="list-style-type: none"> ● DENSO A/C compressor, HVAC unit, fuel delivery module, instrument clusters, alternators ● DMI Knuckles, rear lower control arm ● FAURECIA Exhaust system ● FLEX-N-GATE Body molding, hinges, door check arms, stampings ● GKN Power transfer unit, halfshafts ● GRUPO ANTOLIN Headliner ● IAC-INTERNATIONAL AUTOMOTIVE COMPONENTS Instrument panel, floor console, door trim, hard trim 	<ul style="list-style-type: none"> ● INALFA Sunroof/moonroof ● JCI Batteries ● KAUTEX Fuel tank ● KEY SAFETY SYSTEMS Seat belts ● LEAR Seat modules ● MAGNA Radiator support, exterior functional moldings (plastic), stampings, FEM ● MANN+HUMMEL Air induction system ● MARTINREA Subframes, suspension link, fuel lines, hoses, filler pipes 	<ul style="list-style-type: none"> ● PANASONIC Audio ● TAKATA Steering wheel and driver airbag ● THYSEN KRUPP Steering column ● TOYODA GOSEI Dynamic sealing ● TRELLEBORG Engine and transmission mounts ● TRW Switches, knee airbags ● ZF Electric power-assisted steering gear, control arm
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Delivering systems & services globally

Legal Requirements

Connectivity

Security

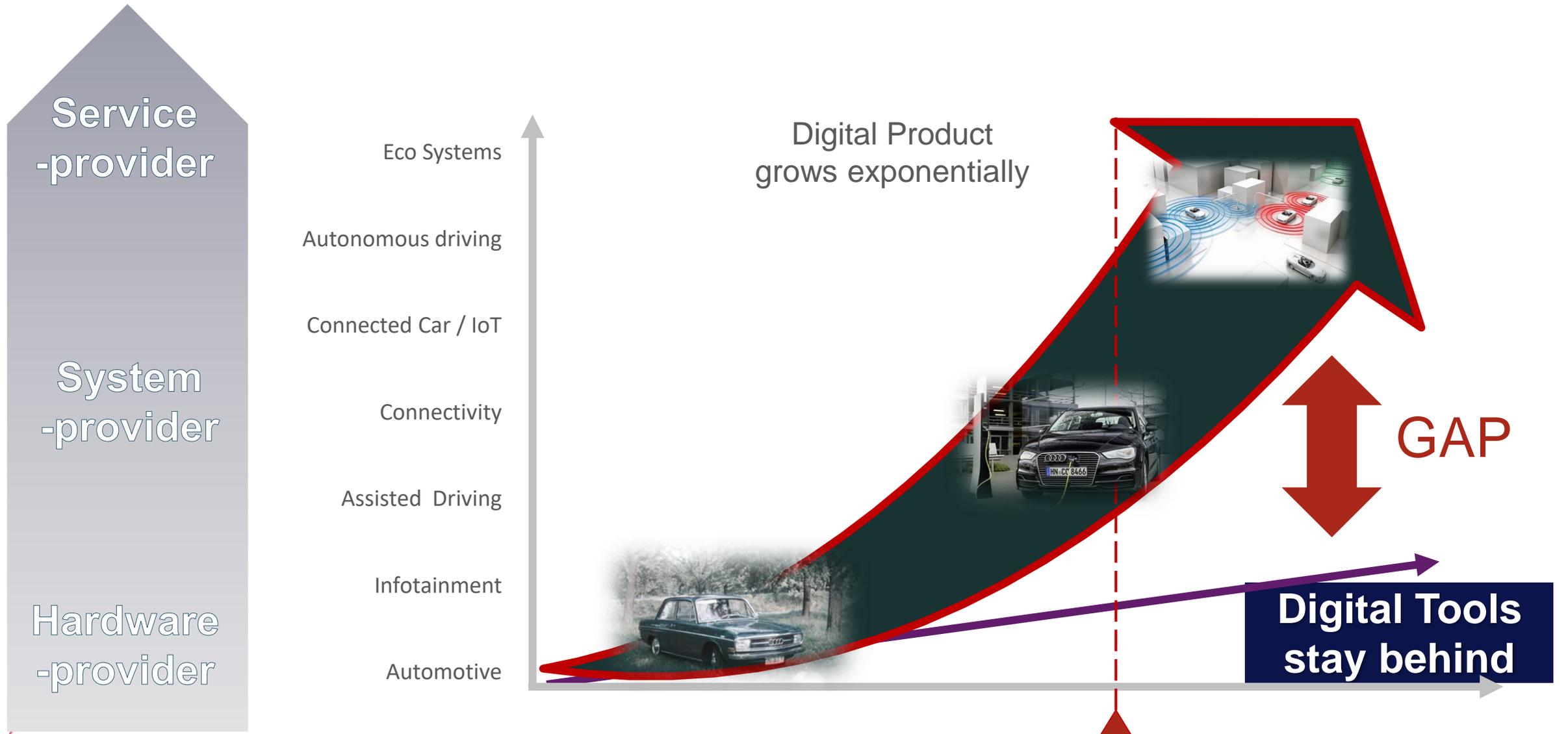
Cultural Expectations

**Content/Service
Providers**

Infrastructure

Data Privacy

Growing degree in digitalization of product



Digital Tools & Processes Challenges



Main Challenges for Digital Tools and Processes

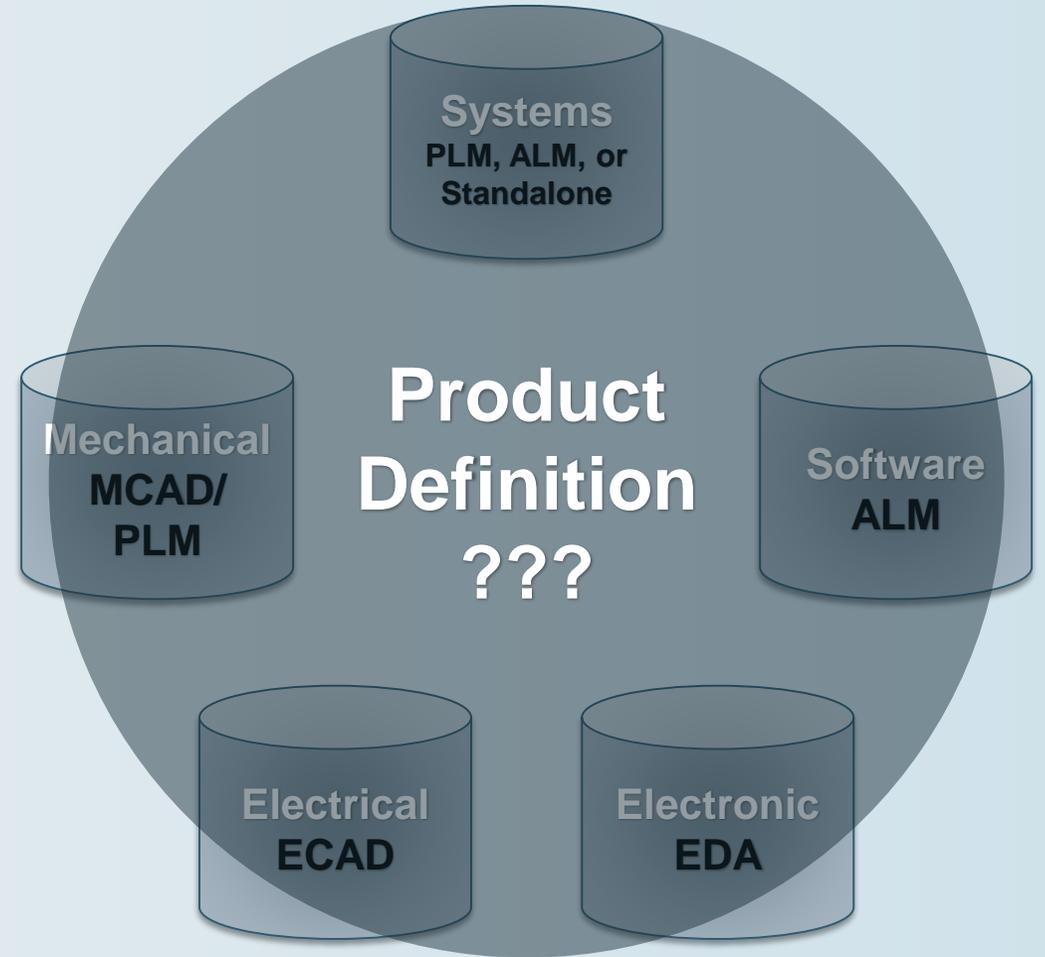


Aras Approach and Beliefs



No Single Product Definition

- Without a single, integral product definition managed by a single, integral product configuration, how do you enable...
 - MBSE?
 - Multi-domain modeling and simulation?
 - Product lines, options, variants?
 - Configuration and change management?
 - Verification and validation?
 - Connected products / IoT?
 - Digital thread?
 - Digital twin?
 - Digital transformation?



Platform Overlay Approach



Concept

Development

Manufacturing

Service

Platform Applications

Platform Services

MBSE

Simulation

ALM

ECAD
PDM

MCAD
PDM

ERP

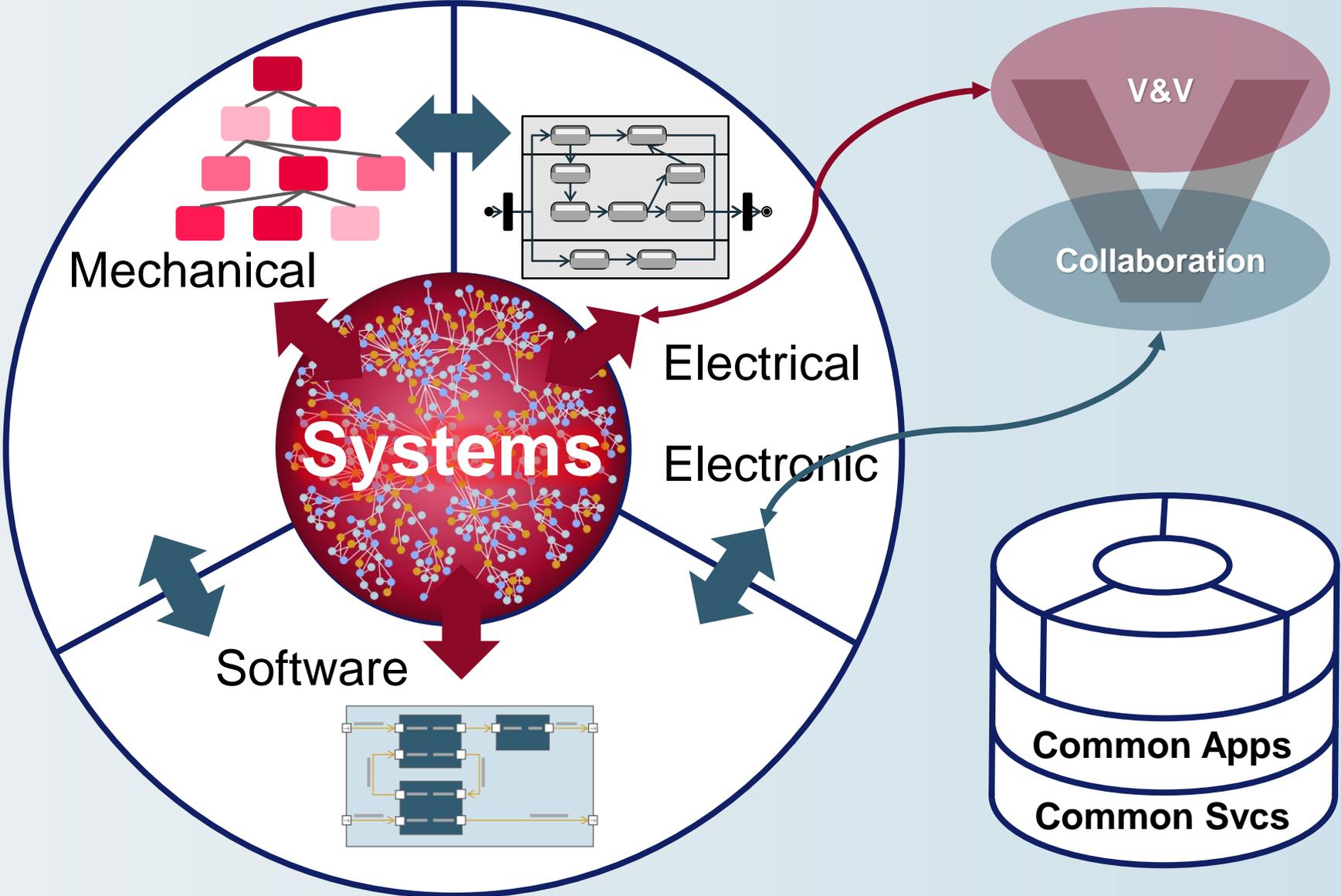
MES

Maint. Mgt.

Depots &
Shipyards

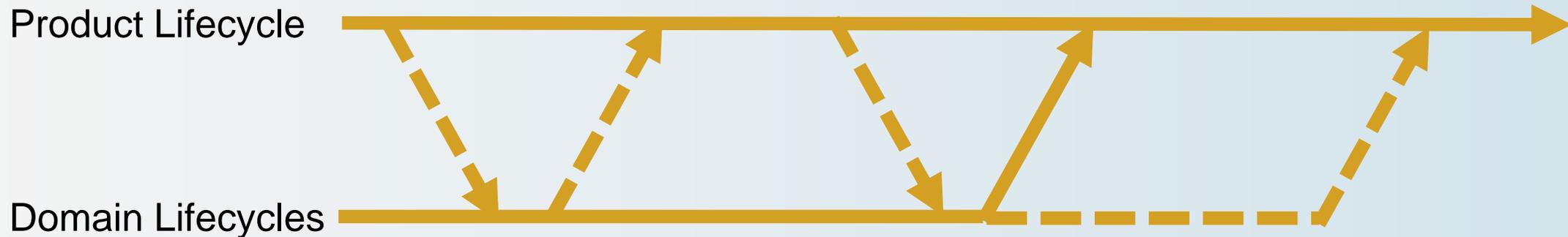
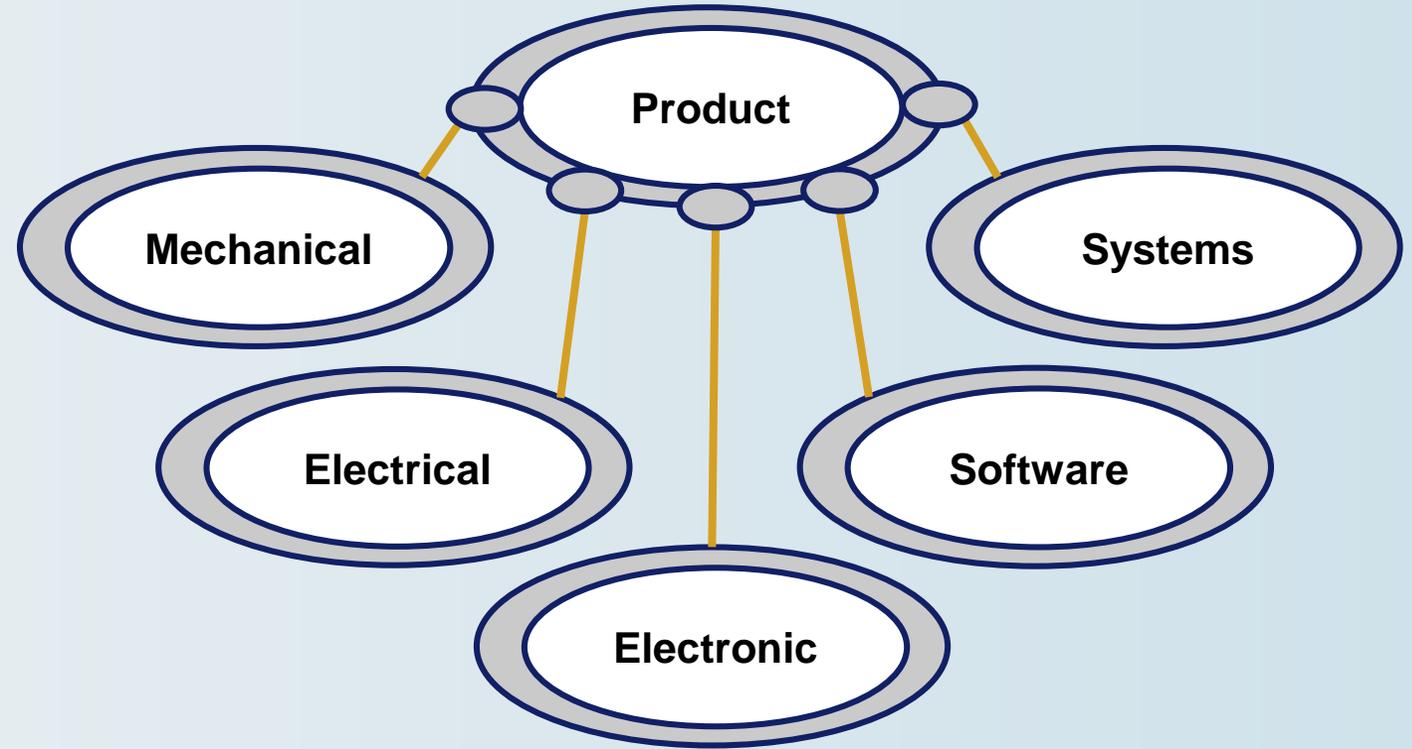
A Single Platform for Product Definition

- Common Applications
 - Quality
 - V&V
 - Collaboration
- Common Services
 - Permissions
 - Role-based contexts & views
 - Etc.
- Common Processes
 - Config/Change
 - Variants
 - PLE

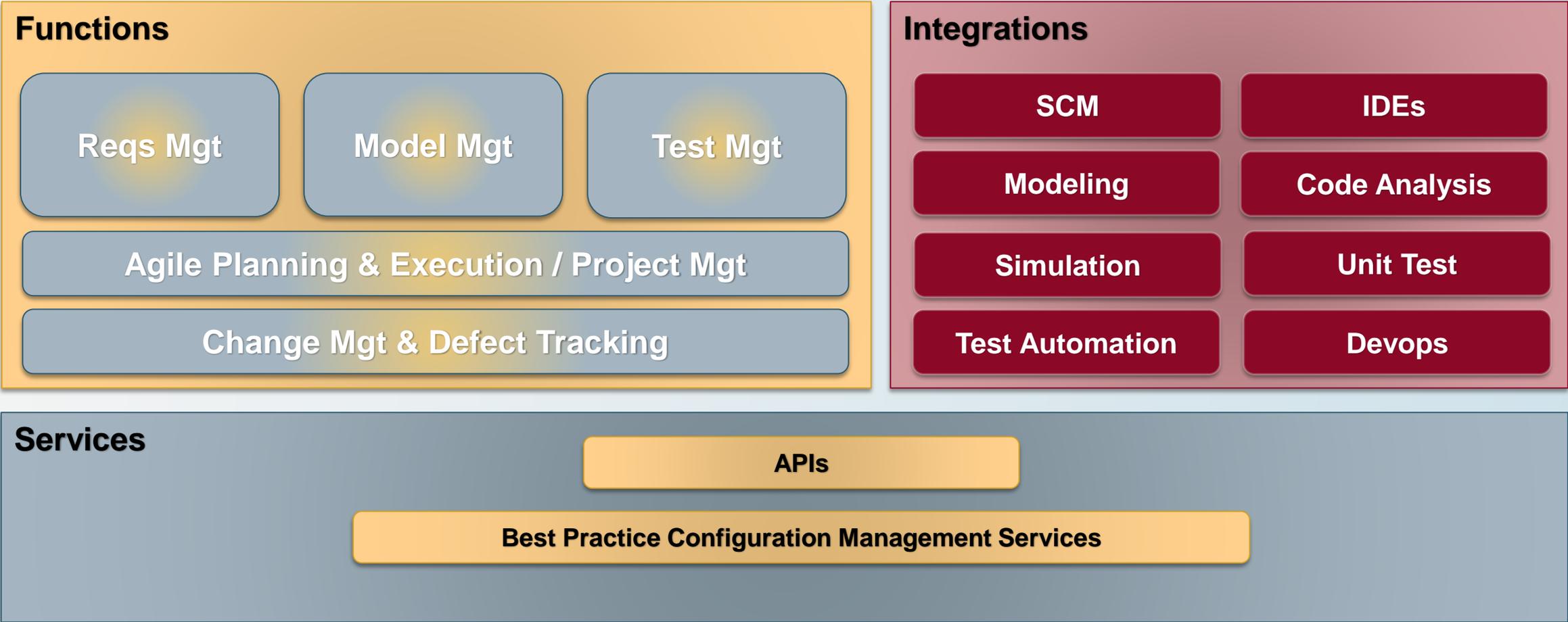


Reconciling CM Models

- The optimal way to solve the challenge...
 - Create CM meta-models for each domain
 - Reconcile differences in domain-specific CM models through the meta-models



Adding ALM Capabilities to PLM – Integrate or Replace?



Thank you for your attention



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