



# Create Flow in Software Engineering

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Cross Domain Computing Solutions (XC)  
Robert Bosch GmbH



# XC | What we have with us

## Product portfolio



**Assisted & automated driving**



**Software and services**



**Modern E/E architectures**



**Cockpit solutions**

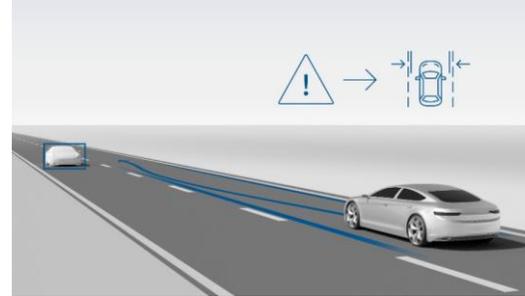
# XC | What we have with us

## Assisted & Automated Driving – Driving Portfolio

### Safe and performant features ...

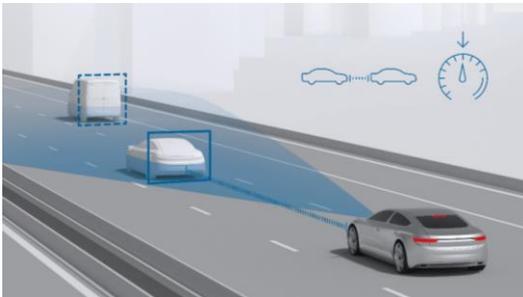


**Emergency braking** – e.g., AEB crossing, AEB pedestrian

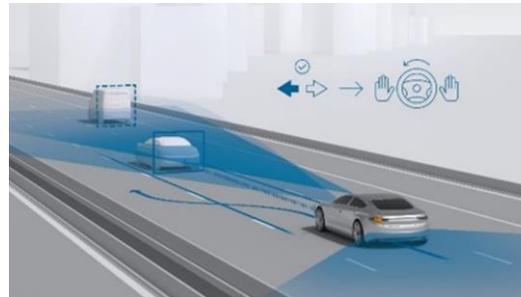


**Emergency steering** – e.g., Emergency lane keeping, Evasive steering support

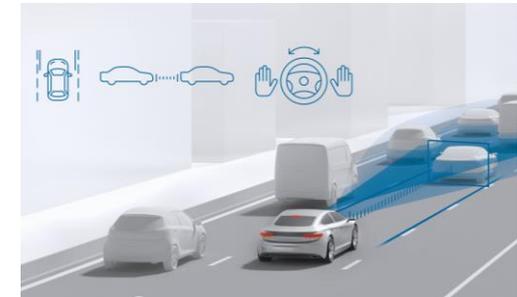
### with outstanding driving experience ...



**Comfort (L1)** – e.g., Adaptive cruise control, Lane centering assist



**Bosch driving assist family (L2)** – From Bosch driving assist base up to Bosch driving assist premium

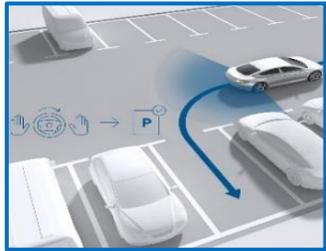


**Conditional Automation (L3)** – e.g., Bosch driving pilot

# XC | What we have with us

## Assisted & Automated Driving – Parking Portfolio

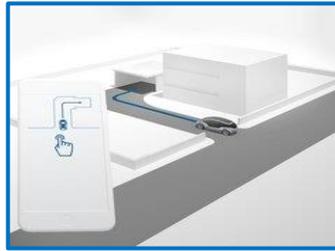
Strong **automated features** in different situations...



Park steering control



Remote park assist



Homezone park assist

with **predictive safety features** while low speed maneuvering ...



Maneuver emergency braking



Mis start prevention



AEB-reverse pedestrian

with **superior 3D visualization** ...



Virtual flight



Transparent hood



Rim protection

**We offer tailored  
solutions**

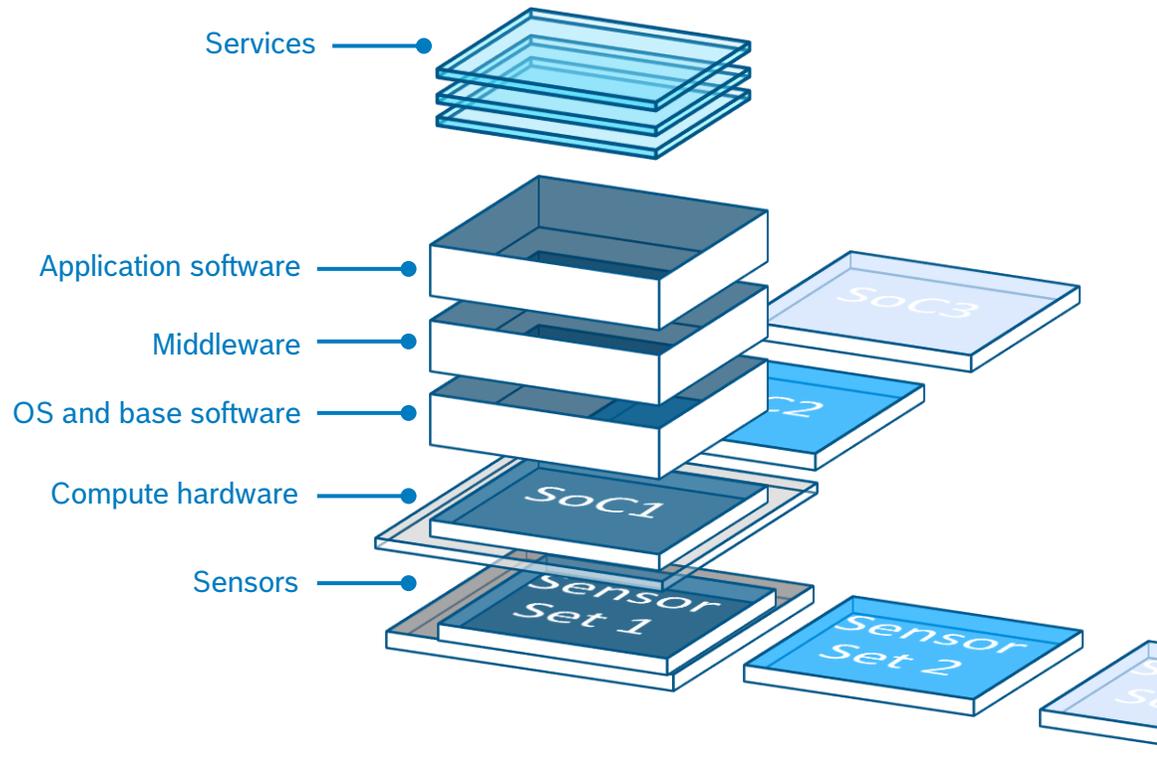
**Flexible configuration  
meets customer specific  
requirements**



# XC | What makes us stand out

## Flexible Compute Solutions

XC is the home for the **Assisted & Automated Driving** and infotainment domain as well as the **compute layer**. Offering solutions both in the verticals and horizontal layers of **hardware, software** and **services**.



We create services for the mobility of tomorrow



We deliver best in class Assisted & Automated Driving features in driving and parking



We drive the transformation of E/E architectures



# XC | What makes us stand out

## Software defining the vehicle

“

Drivers across the globe want to **seamlessly integrate** their vehicles into their digital world. After all, we have gotten used to **constant updates** and **new features** on our smartphones. Now, we are applying this to cars as well.

**Markus Heyn**, chairman of the  
Bosch Mobility sector board

### Two outstanding advantages of software-defined vehicles:



**Speed of development**

Instead of years, **implementing new functions** in existing systems will be **just a matter of days** in the future.

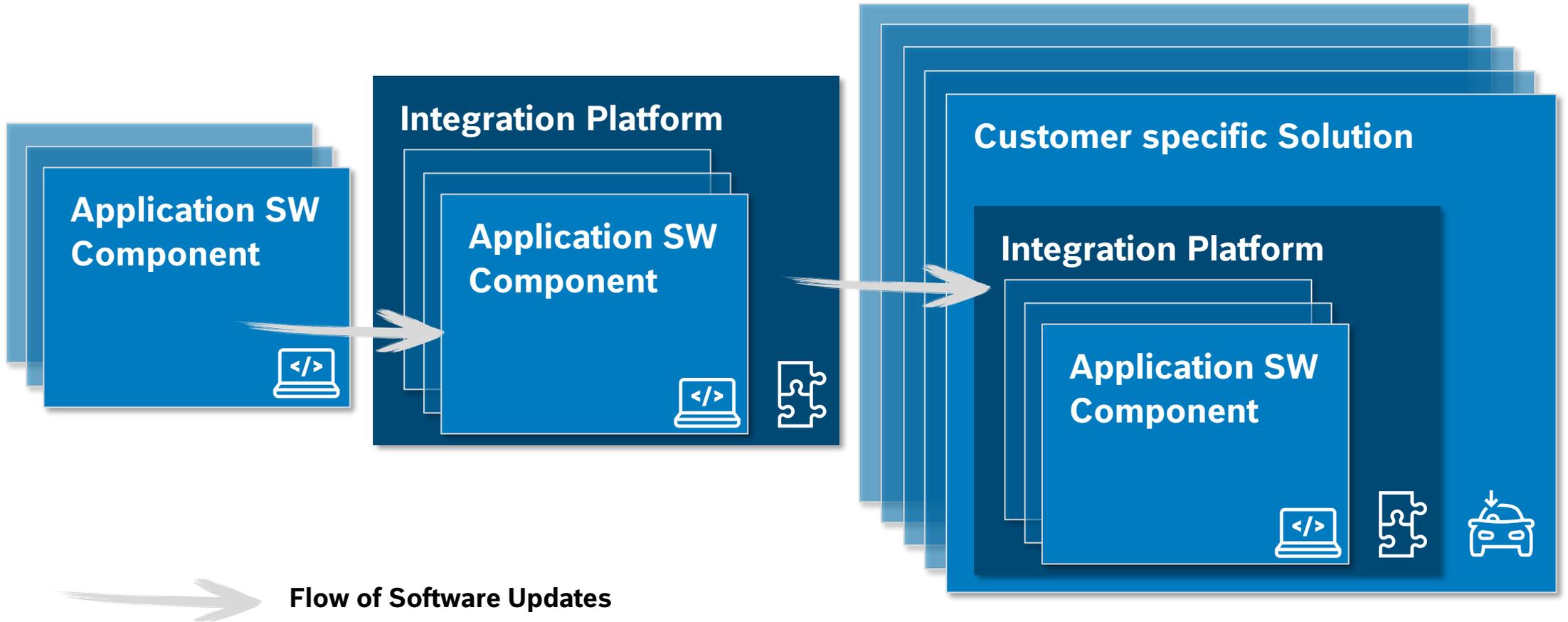


**Decoupling of SW and HW development**

Cars will feel “like new“ for longer thanks to **software updates and upgrades** adding new features via cloud-connection.

# XC | What makes us stand out

## Configurable Software Platform Solutions



**Create Flow**

**W 190**

MIM Prägen/...  
MLV

**Continuously improve  
productivity with real-time  
KPIs.**



# Create Flow in Software Engineering

## Building Customer Specific Solutions

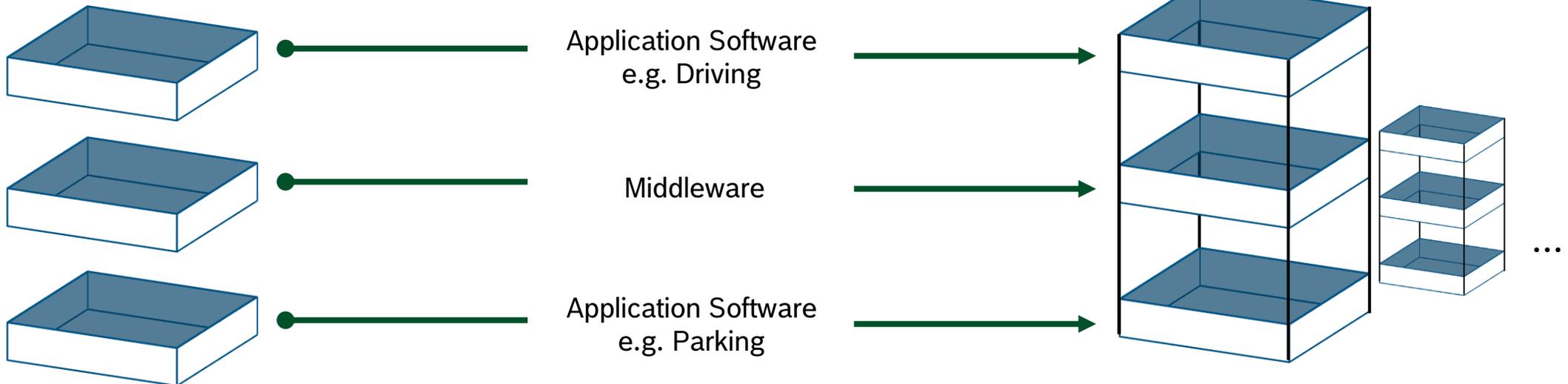
### Horizontals:

Continuous development  
of components



### Verticals:

Integrated and Customer  
Specific Solutions



# Create Flow in Software Engineering

## Metrics for Flow

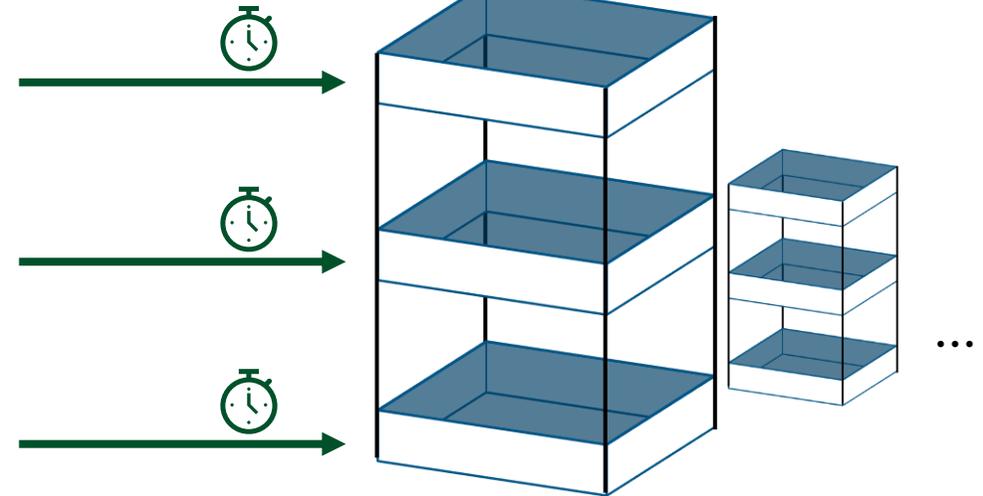
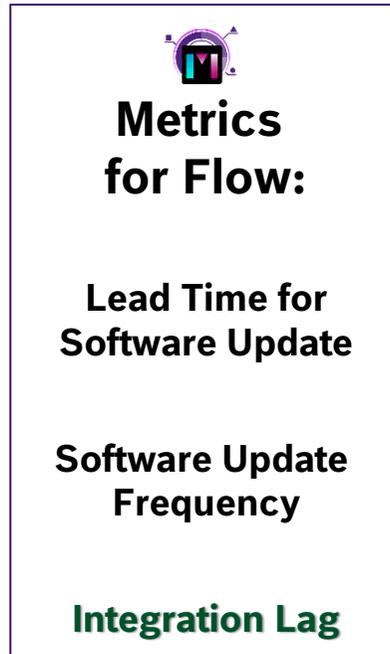
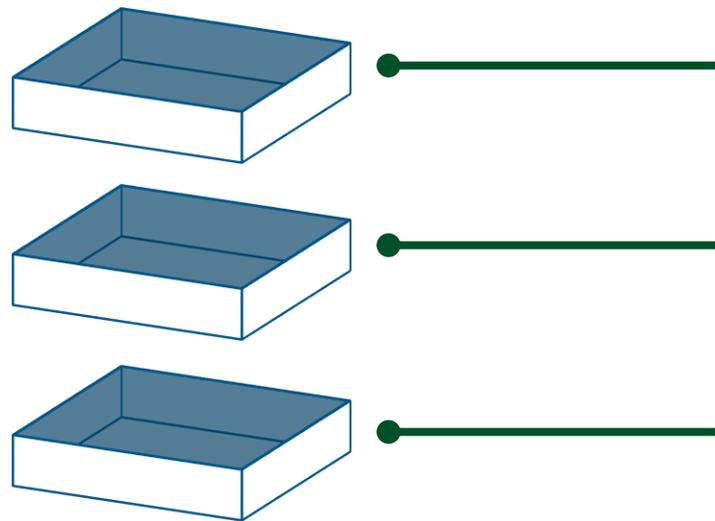
### Horizontals:

Continuous development  
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### Verticals:

Integrated and Customer  
Specific Solutions

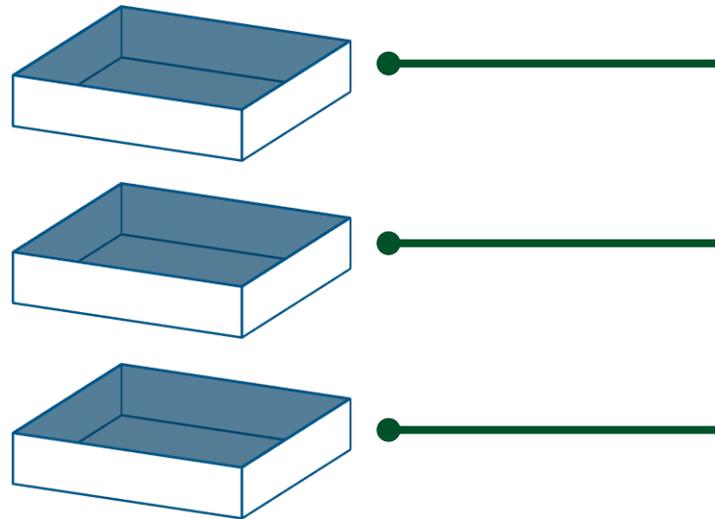


# Create Flow in Software Engineering

## Metrics for Flow

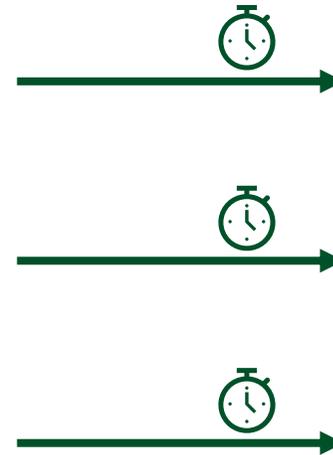
### Horizontals:

Continuous development  
of components



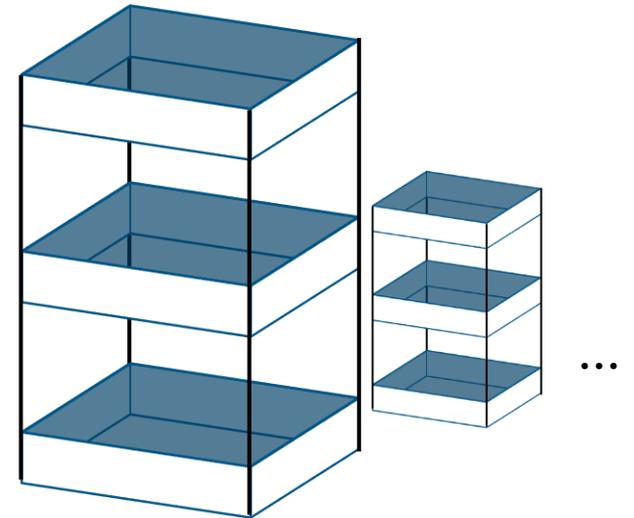
### Integration Lag:

Age of the oldest,  
non-integrated  
feature. Waiting time  
w/o value add and  
w/o feedback



### Verticals:

Integrated and Customer  
Specific Solutions



# Create Flow in Software Engineering

## Bosch Monitoring and Analytics Service

Services

### Dashboard as a Service



Build Pipeline Statistics

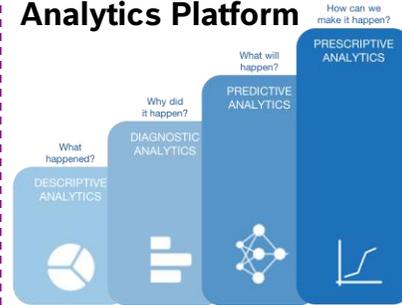


Source Code Mgmt. Statistics

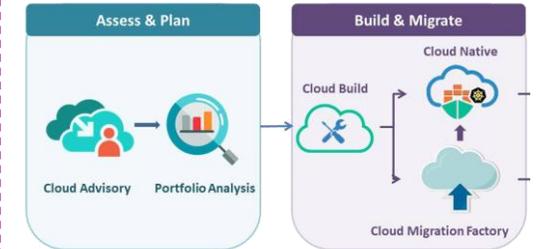


Accelerate KPIs, Integration Lag

### Analytics Platform



### Consultation & Customer Support



Platform

Identity and Access Management

Reusable Python-based Framework

Monitoring and Operation

Security

Provider

### Supported Tools for Data Provisioning



 Bitbucket



Azure Repos



webhooks



JFrog ARTIFACTORY



GitHub



Azure Pipelines



Azure Boards



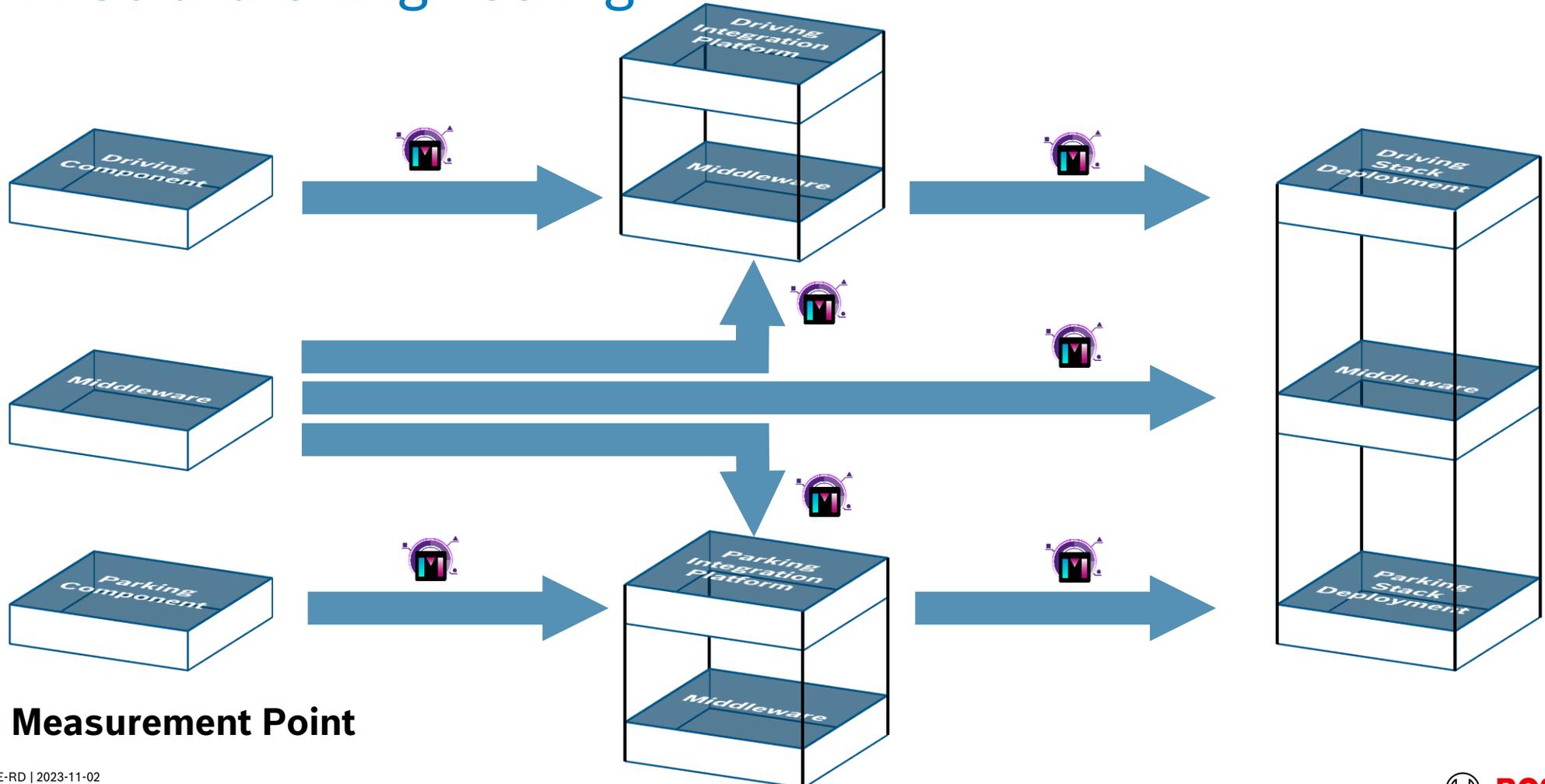
Jira



CONAN

# Create Flow in Software Engineering

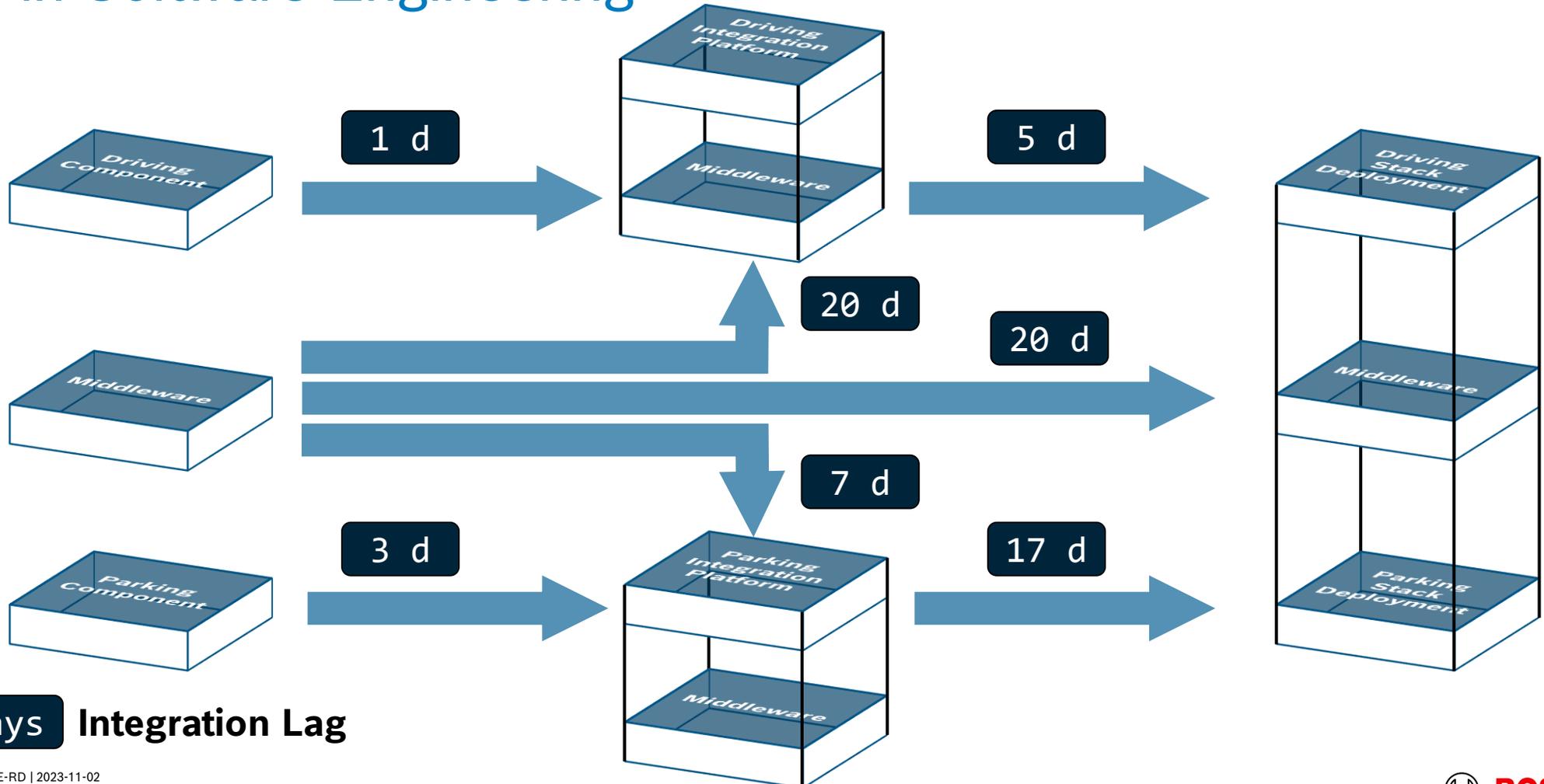
## Flow in Software Engineering



**Measurement Point**

# Create Flow in Software Engineering

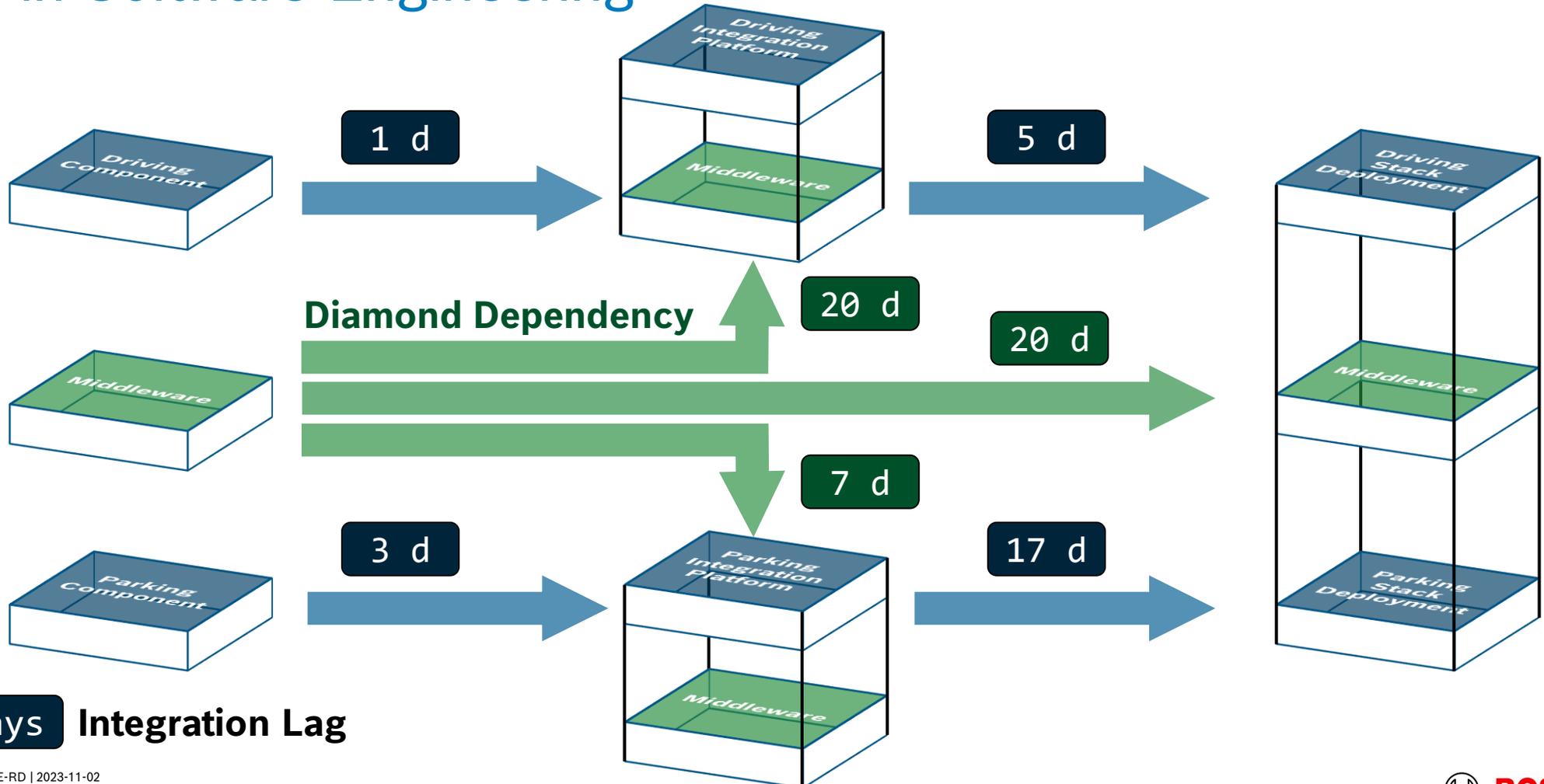
## Flow in Software Engineering



**days** Integration Lag

# Create Flow in Software Engineering

## Flow in Software Engineering



## Inspect and Adapt

Identify the root cause by forensic use cases (Gemba Walk)



# Create Flow in Software Engineering

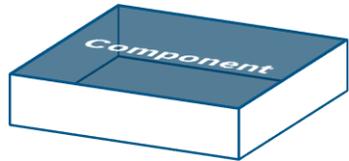
## Inspect and Adapt



Lines of code added / deleted:  
~ **100.000**



Branch



Lines of code added / deleted:  
~**1.000.000**



seerene

Main dev branch

# Create Flow in Software Engineering

## Key take-away

- ▶ **Attractiveness of vehicles is determined by their software-based functionalities**
- ▶ **Configurable architecture enables customized solutions**
- ▶ **Quantifying Flow provides transparency for optimizing Software-defined Value Streams**
- ▶ **Creating Flow across all contributing parties is key for productivity**