BOSCH

seerene

serenity in software production

Measuring and Improving Software Production

Enabling Strategic Steering and Management of Large-Scale Software Development Organizations

Joined talk of

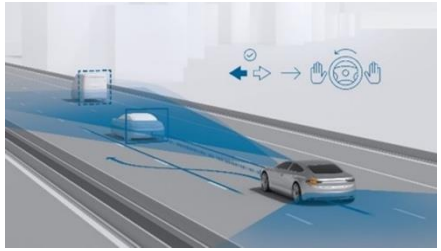
- Dr. Matthias Burger, Director Cross-Domain Computing Solutions Bosch
- Dr. Zora Slavik, Senior Project Manager Bosch
- Dr. Johannes Bohnet, Founder & CEO of Seerene

Conference: Beyond the Engine – Unleashing the Potential of Automotive Software
November 7th, 2024
Microsoft Atrium Berlin

Cross-Domain Computing Solutions

Assisted & Automated Driving

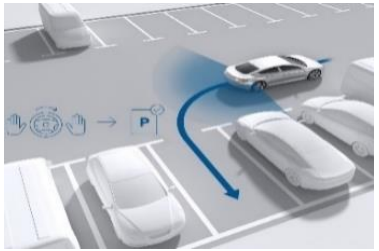
DRIVING



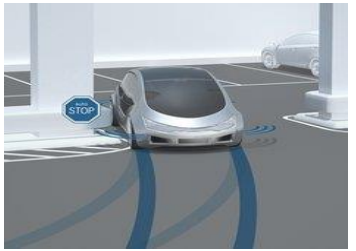
Bosch driving assist family (L2)

Emergency braking

PARKING



Park steering control



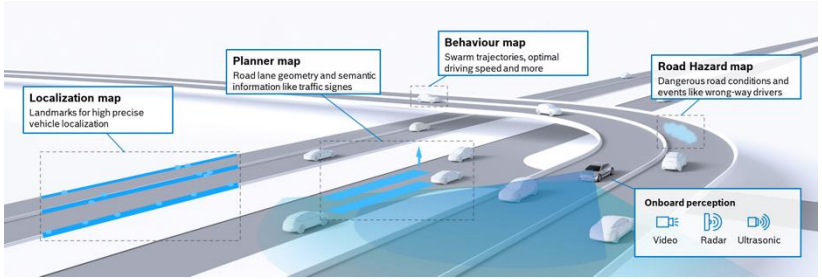
Maneuver emergency braking

VIDEO

Near Range Camera System

Multi Purpose Camera

SERVICES



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Software Factory

Large-Scale Program

Driving
Product Line

Parking
Product Line

Video
Product Line

Software Deployment

Software Deployment

Driving
Software Building Block

Parking
Software Building Block

CUSTOMER
Complete Software

CUSTOMER
Software Deliveries

CUSTOMER
Third Party Software

RTA-VRTE (ETAS)

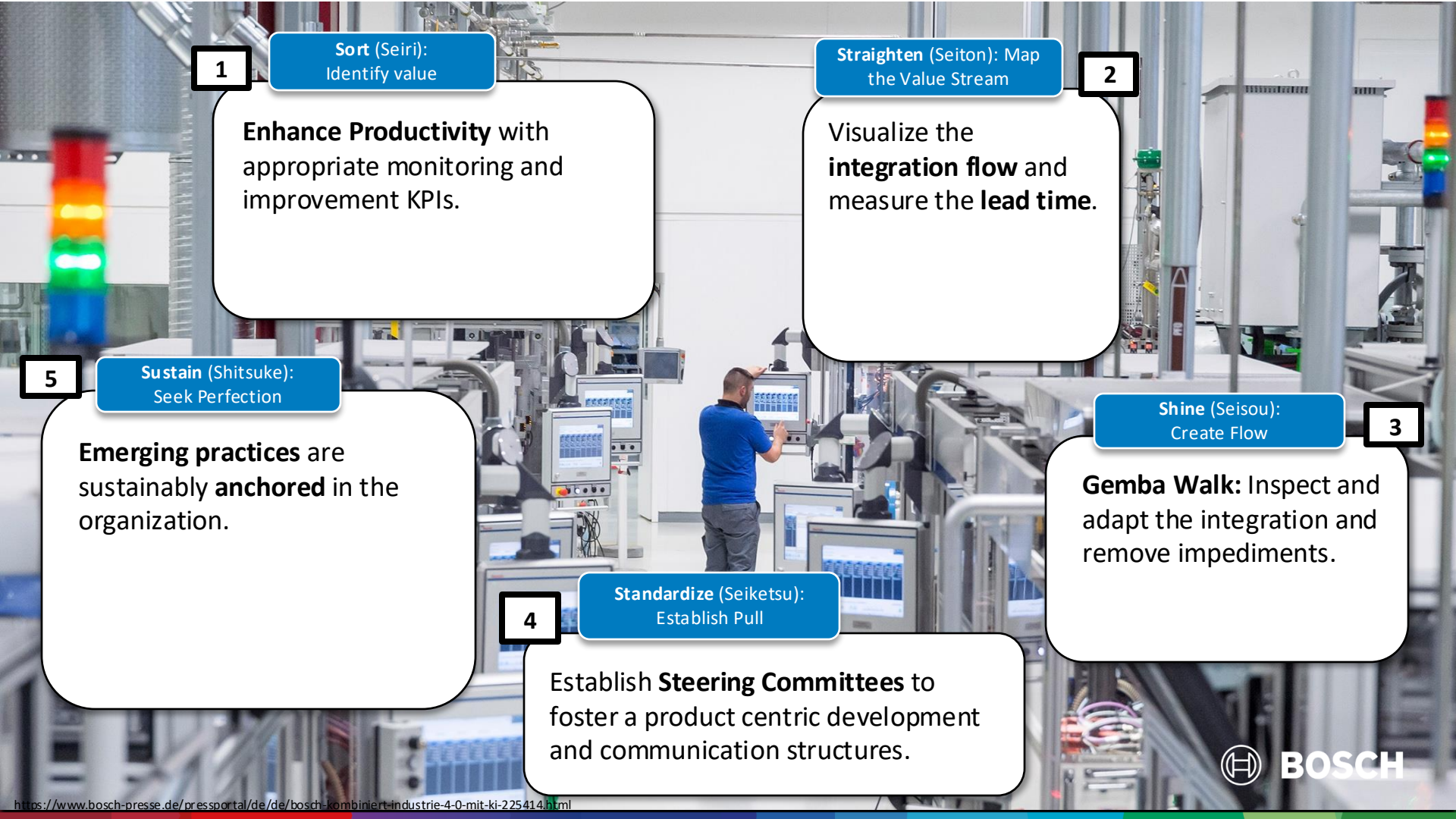
BSW Gateway

RTA-CAR (ETAS)

METRON

ETAS
- RTA-CAR — Autosar Classic
- RTA-VRTE — Autosar Adaptive
- AOS — Automotive Operating System

BOSCH



1 **Sort** (Seiri): Identify value

Enhance Productivity with appropriate monitoring and improvement KPIs.

2 **Straighten** (Seiton): Map the Value Stream

Visualize the **integration flow** and measure the **lead time**.

3 **Shine** (Seisou): Create Flow

Gemba Walk: Inspect and adapt the integration and remove impediments.

4 **Standardize** (Seiketsu): Establish Pull

Establish **Steering Committees** to foster a product centric development and communication structures.

5 **Sustain** (Shitsuke): Seek Perfection

Emerging practices are sustainably **anchored** in the organization.

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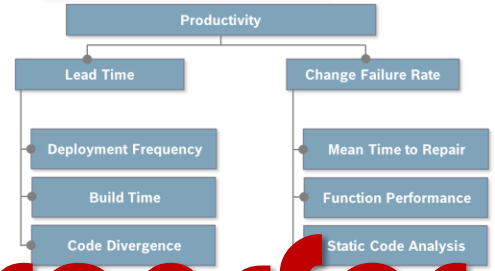
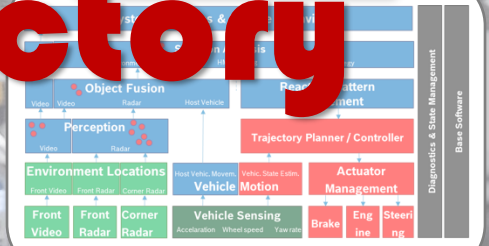
Transfer the Concept to a Software Factory

1 **Sort** (Seiri): Identify value



2 **Straighten** (Seiton): Map the Value Stream

3 **Shine** (Seisou): Create Flow



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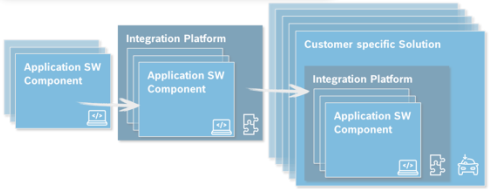

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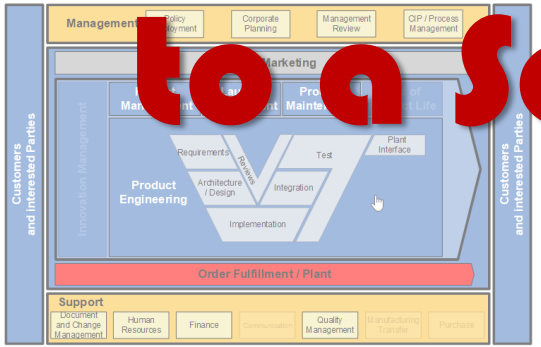

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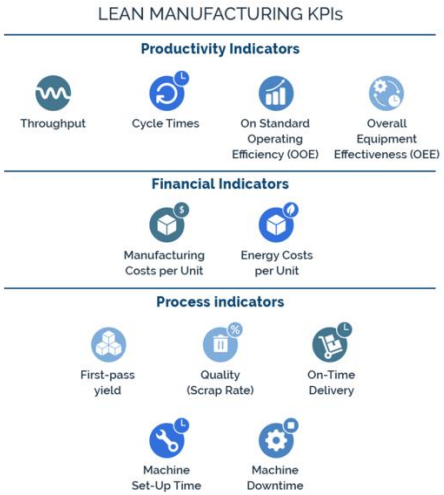
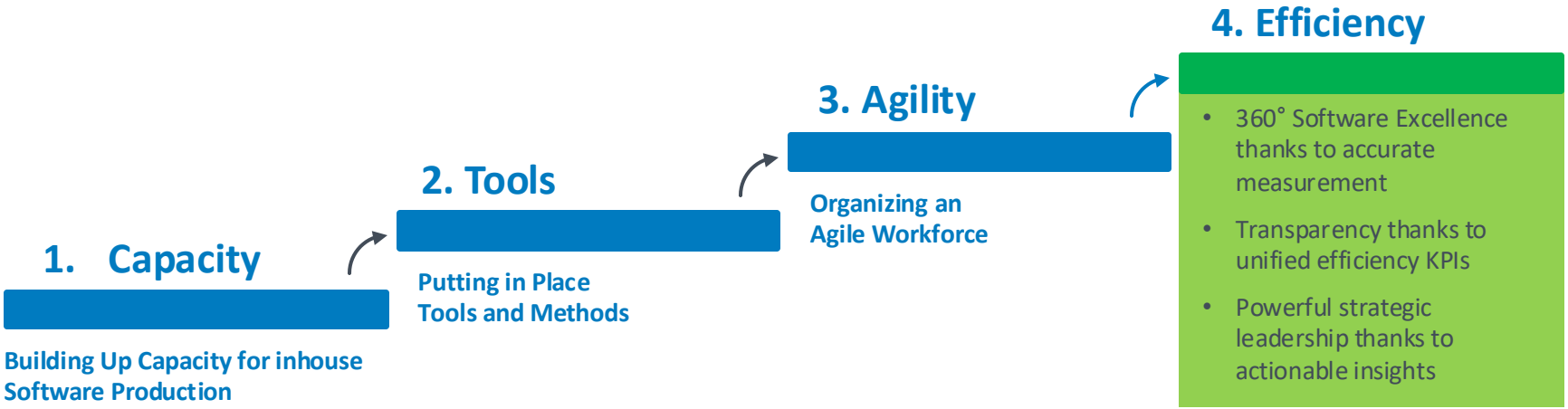
Software Production is where Hardware Production was in 1980s

…when factories started measuring to systematically become better and better



Inefficiency in Software Production Threatens Competitiveness

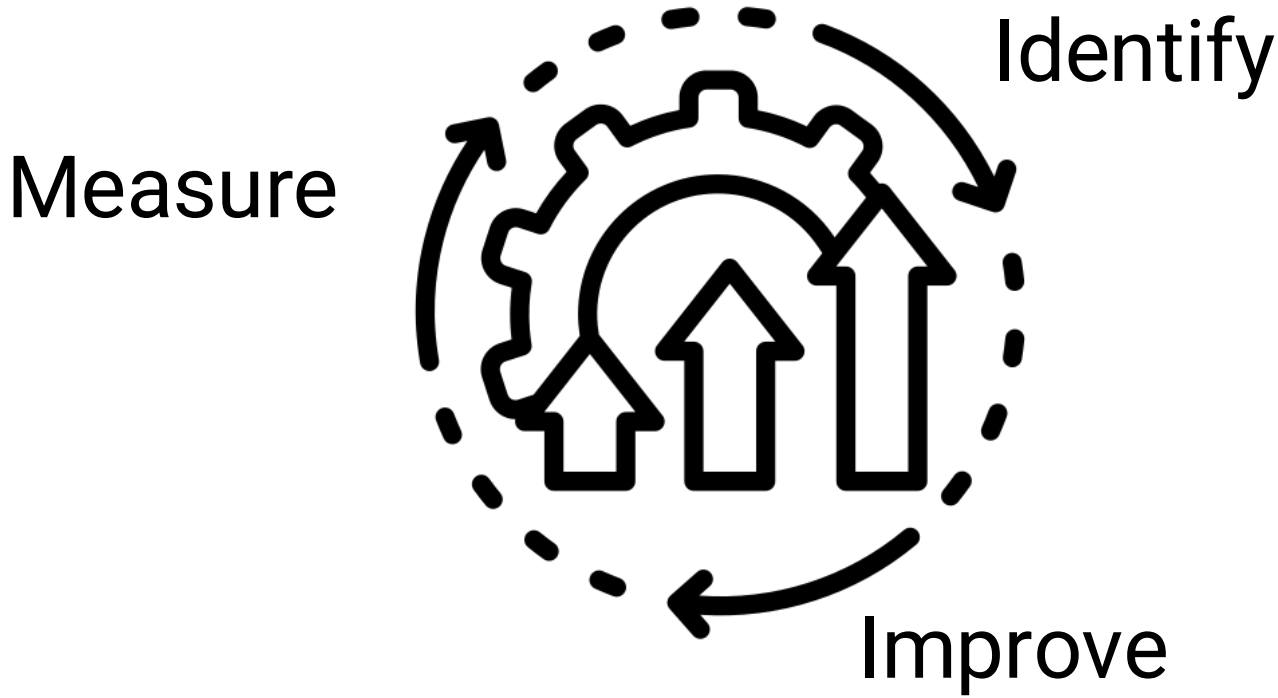
Organization-wide transparency is the core requisite of efficiency



- All corporate CIO/CTOs have 1-3 more or less in the pocket.
  The crucial success factor will be the ability to handle operational excellence in the increasingly volatile field of software production (4).

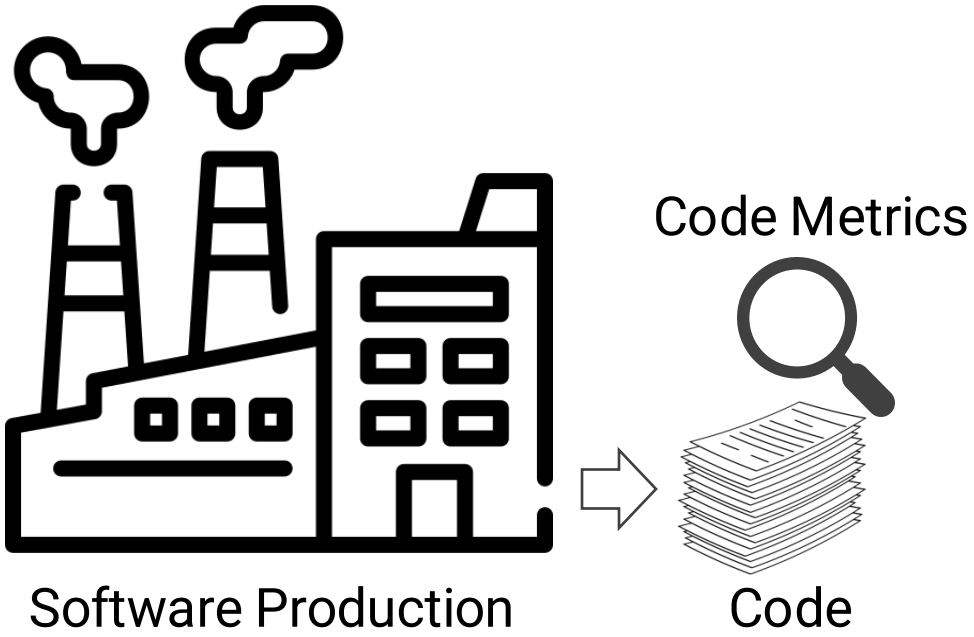
Establishing a Continuous Improvement Process → A MUST HAVE

Excellence of software production must be measured and continuously improved



State-of-the-Art Measuring Approaches (1)

The measurement of software production is still in its conceptual infancy

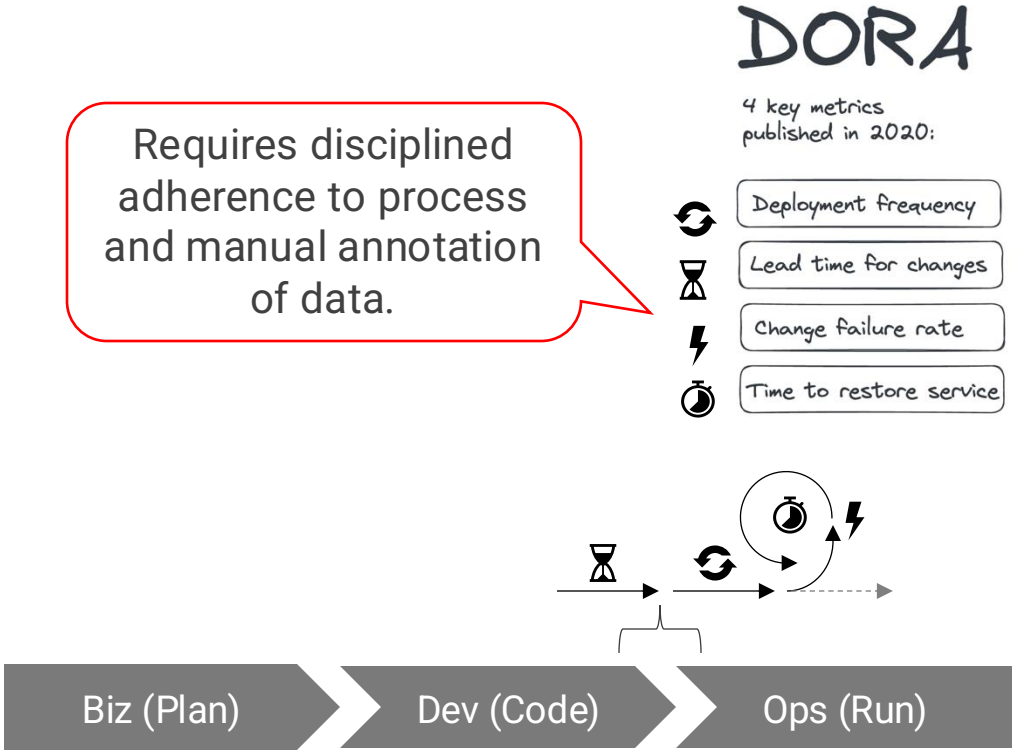


Limitations:

→ Measures only “the produced material”
→ No insight into the software production itself
→ Is not comparable across programming languages and different types of software

State-of-the-Art Measuring Approaches (2)

The measurement of software production is still in its conceptual infancy



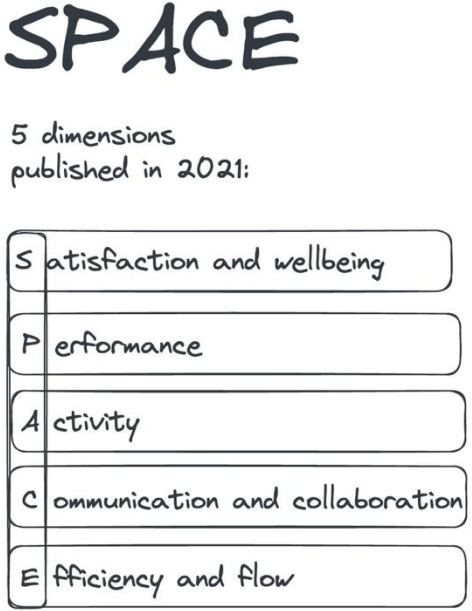
Limitations:

→ Only insights about the gap between Dev and Ops

→ Not easily scalable due to specific data preparations and process adherence by teams

State-of-the-Art Measuring Approaches (3)

The measurement of software production is still in its conceptual infancy



Purely based on surveys

Developer, “how do you feel about… ?”

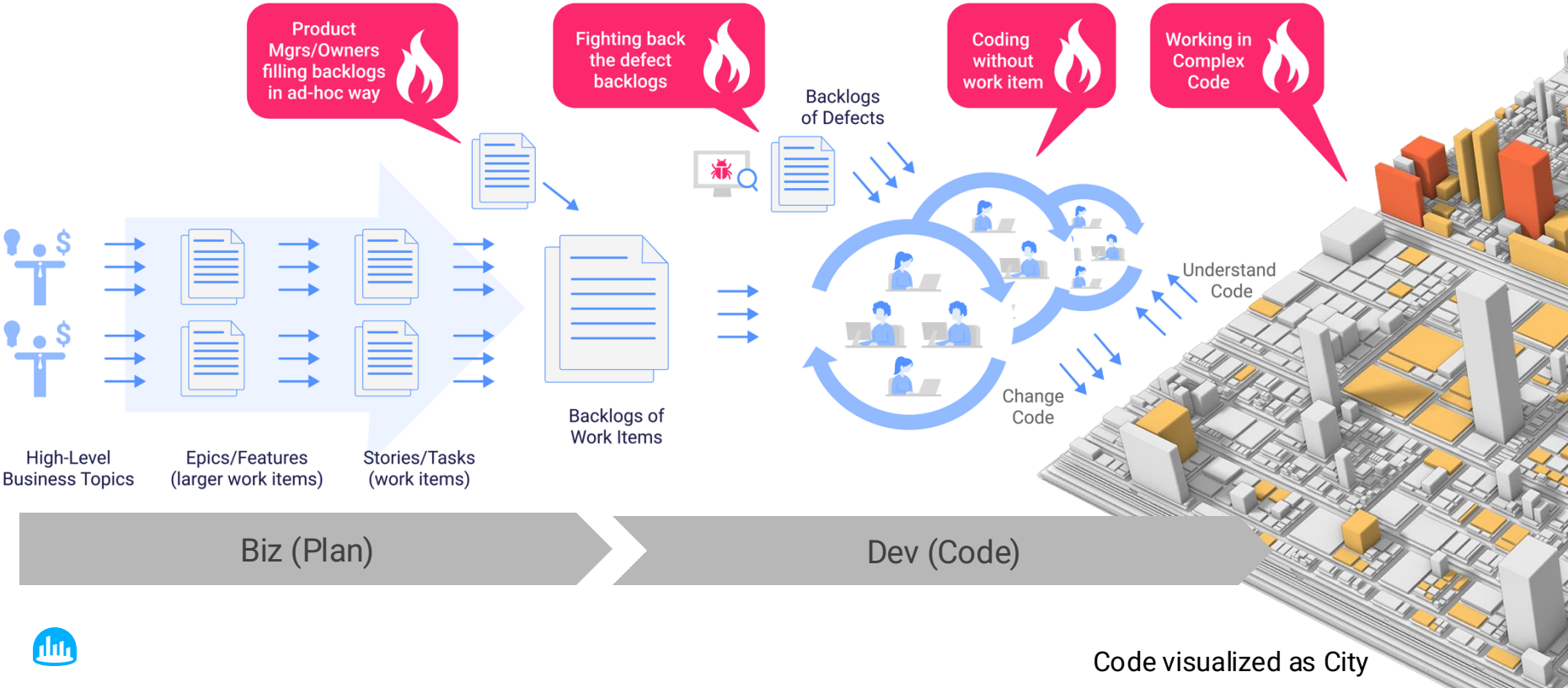
Limitations:

→ Effort for participants to fill out surveys

→ Cannot be repeated often, due to manual effort (~once per year max)

The Scarcest Resource in Software Production is Developer Time

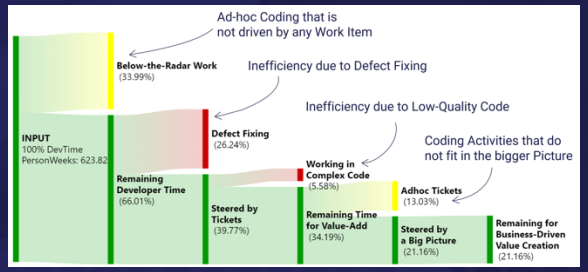
Measuring various sources of inefficiencies/frustration for developers



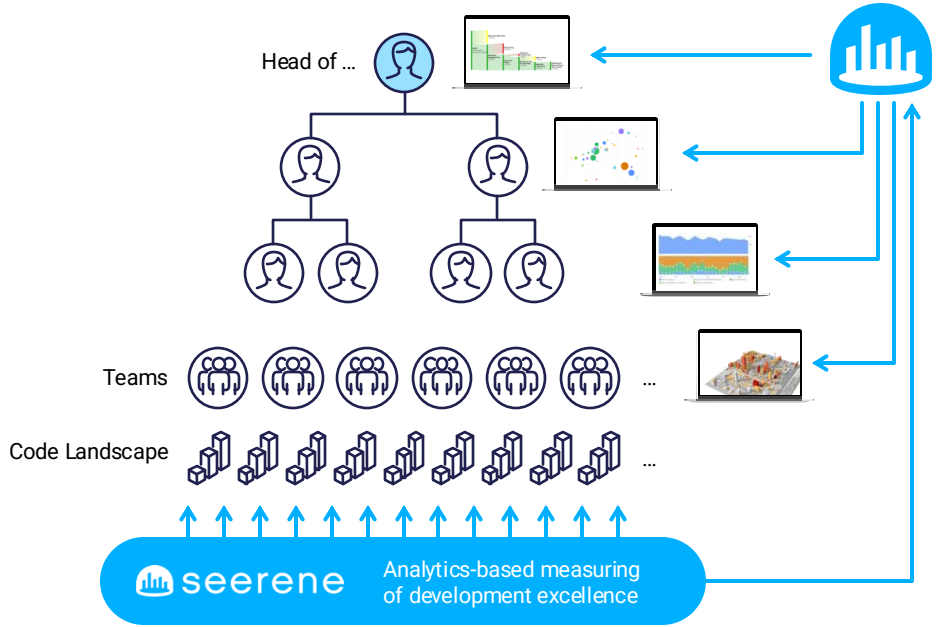
Code visualized as City

Ingredients for Success

1. KPIs that matter both for business as well as for teams → inefficiencies/frustrations
2. KPIs that can be compared across teams
3. KPIs that are agnostic to technology stack and types of software systems



Establishing a Data-Driven Improvement Process is a Strategic Long-Term Endeavor



Transfer the Concept to a Software Factory

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Visualize the **integration flow** and measure the **lead time**.

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Continuously inspect and adapt the integration and remove impediments.

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Establish **Steering Committees** to foster a product centric development and communication structures.

5

Sustain (Shitsuke): Seek Perfection

Emerging practices are sustained by **anchoring** in the organization.

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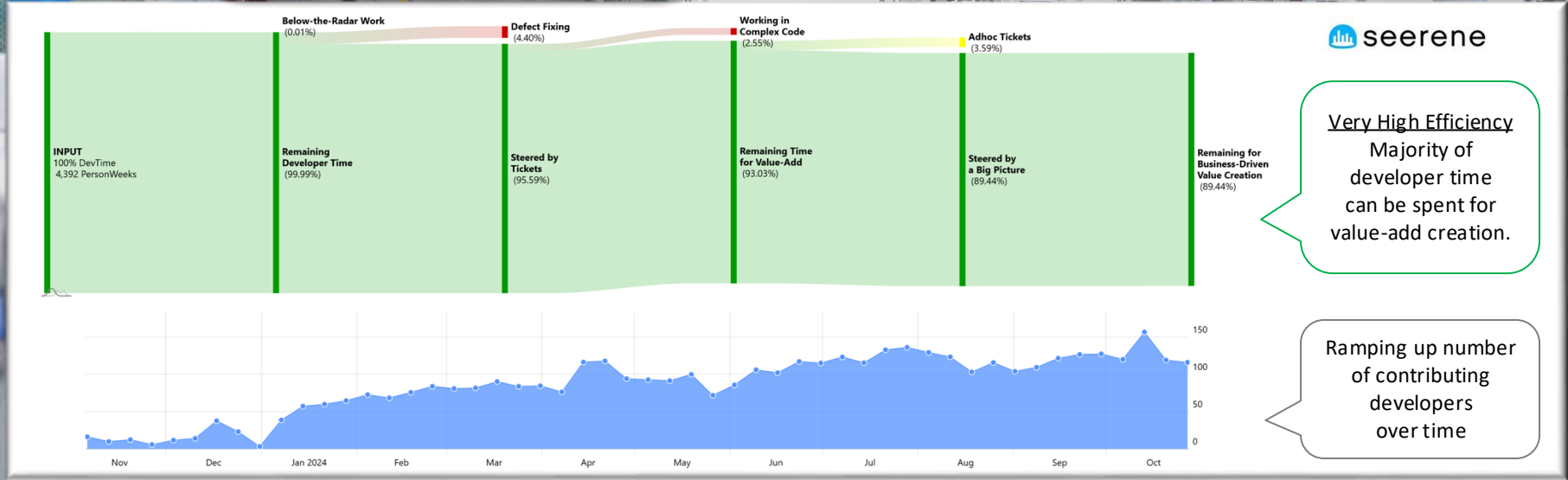

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Very High Efficiency
Majority of developer time can be spent for value-add creation.

Ramping up number of contributing developers over time

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Straighten (Seiton): Map the Value Stream

2

Visualize the **integration flow** and measure the **lead time**.

Driving
Product Line

2 days

8 days
Software Deployment

10 days

5 days

8 days
Driving
Software Building Block

30 days

10 days

10 days

CUSTOMER
Complete Software

22 days
Parking
Product Line

2 days

22 days
Software Deployment

9 days

0 days

22 days
Parking
Software Building Block

30 days

16 days

16 days

8 days
Video
Product Line

23 days

CUSTOMER
Software Development

30 days

CUSTOMER
Third Party Software

30 days

eTAS
RTA-CAR Autosar Classic
RTA-VRTE Autosar Adaptive
AUTOSAR Automotive Operating System

RTA-VRTE
eTAS

18 days

8 days
BSW Gateway

18 days

12 days

RTA-CAR
eTAS

3 days

METRON

Integration Lead Time
Time from finishing implementation of a changeset until downstream integration.

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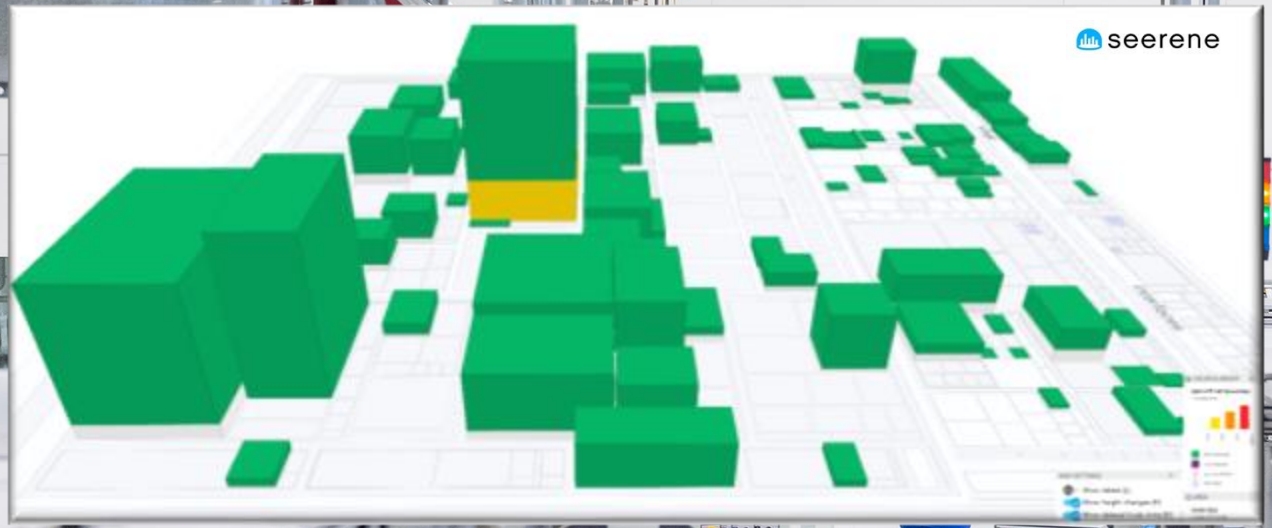

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Business:
Align the product roadmap with strategic business goals. Prioritize features by business value.

Program Steering Committee

Architecture:
Maintain a future-proof robust and scalable system architecture with well-defined interfaces. Ensure architectural integrity through frequent integration testing.

Architectural Review Board

CIP Process:
Regularly inspect and adapt the integration flow for maximum efficiency. Continuously optimize the development pipeline for speed and efficiency.

Lead Time Improvement Board

Organization:
Manage SW changes. Assess interdependencies on the entire SW stack. Evaluate benefits against effort and optimize towards customer needs.

Change Control Board

4

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Establish Pull

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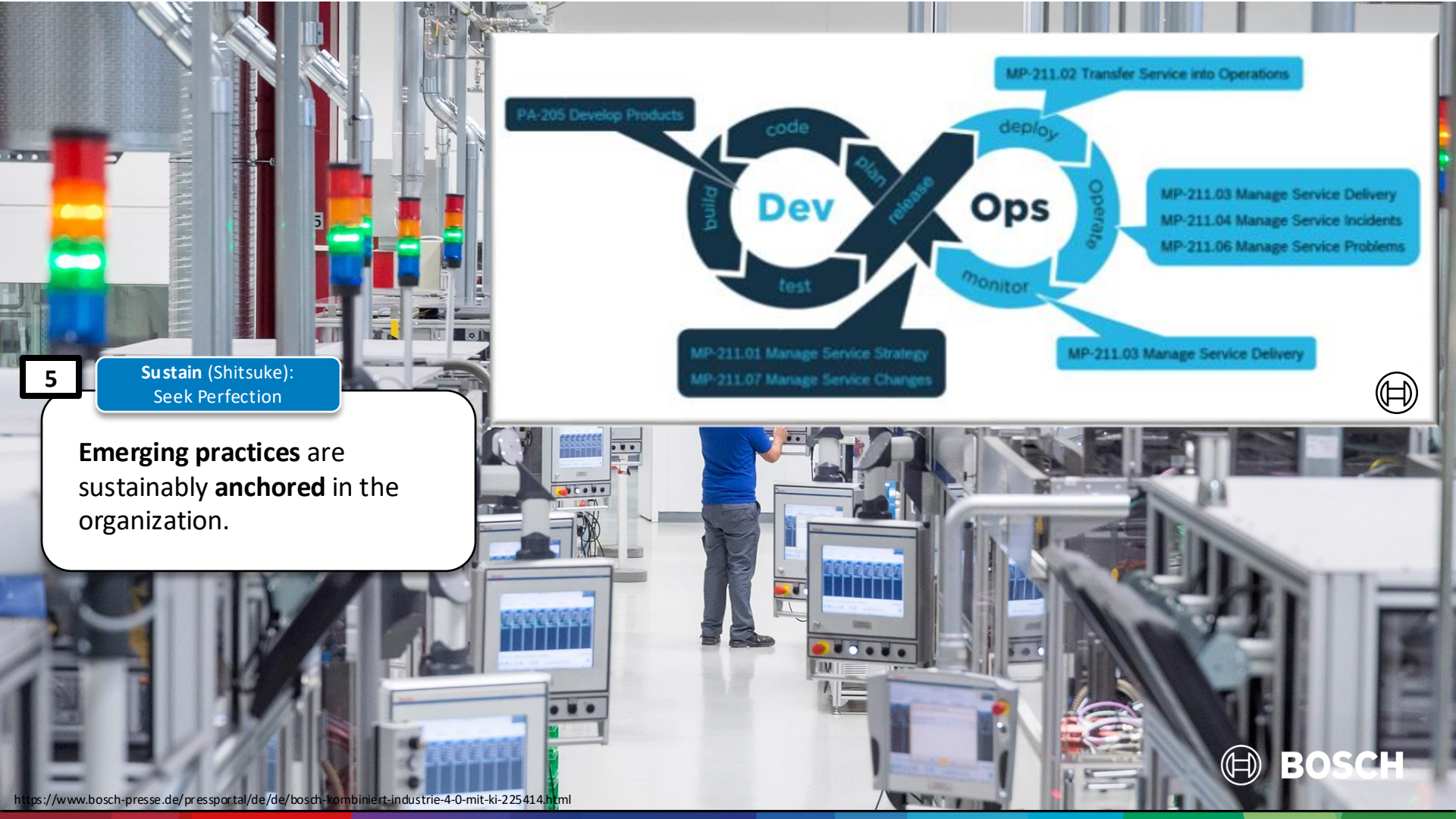

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Driving Business Forward.

Focus on code that counts. Software is the asset that delivers value.

Build for Scale. Maintain the Flow.

Unleash productivity. Measure the integration stream.

The Gemba Walk – Code in Motion.

Go where it happens. Use appropriate tooling for Design Reviews.

Driven by Value. Designed to Deliver. Built to Last.

Master the value stream. Implement an efficient collaboration model.

Data-Driven CIP is a Must-Have in today's Software Production

To keep up with business competitors you must systematically measure and improve software production

Thank You for Your Attention

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