



Scaling Agile and Experiences from Volvo Cars
Darko Durisic

Vision at Volvo Cars -

©Volvo Cars

Freedom to move in a personal, sustainable and safe way.



Who am I?

- Doctor of Philosophy in Technology University of Gothenburg [2017]
- Volvo Cars [2011-ongoing]
 - Program Manager – Architecture and System Design [2023-ongoing]
 - Product Manager - System Architecture [2021-2023]
 - Product Owner - System Architecture [2020-2021]
 - Senior System Architect [2019-2020]
 - Release Train Engineer [2018-2019]
 - Agile Transformation Leader [2017-2018]
 - (Senior) System Engineer [2011-2017]
- Lecturer [2016-ongoing]
 - Kristiania University College [2021-ongoing]
 - Chalmers | University of Gothenburg [2016-ongoing]



Required knowledge for this course

- Agile principles and practices
- Agile methods (XP, Scrum, Lean, Kanban)
- Basics of TDD and CI/CD
- Basics of agile leadership

Traditional

- **Future is Predictable**
- **Nothing will substantially change**

Therefore...

← **“Predict and Plan”**

- **We make most decisions ahead of time**
- **If we build according to spec, we'll get what we expect**

Agile

- **Change is to be expected**
- **We can't know everything ahead of time**

Therefore...

← **“Sense and Respond”**

- **We plan as we go**
- **We make decisions based on what we learn**

Ad-hoc

- **Prediction is meaningless**
- **Everything is constantly changing**

Therefore...

← **“Just do something”**

- **The plan is - what to do next**
- **We act (react) on problems**

Moving Towards an Acceptance where 'change happens faster than we can predict.

Change happens faster than we can predict

**“... the pace of change has never been this fast —
yet it will never be this slow again.”**

Justin Trudeau, World Economic Forum in Davos, January 2018

New reality in the automotive domain

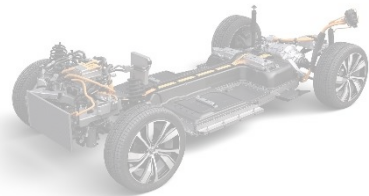
Technology



Autonomy



Connectivity



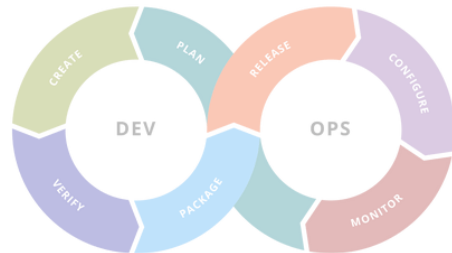
Electrification



New players



New customer expectations

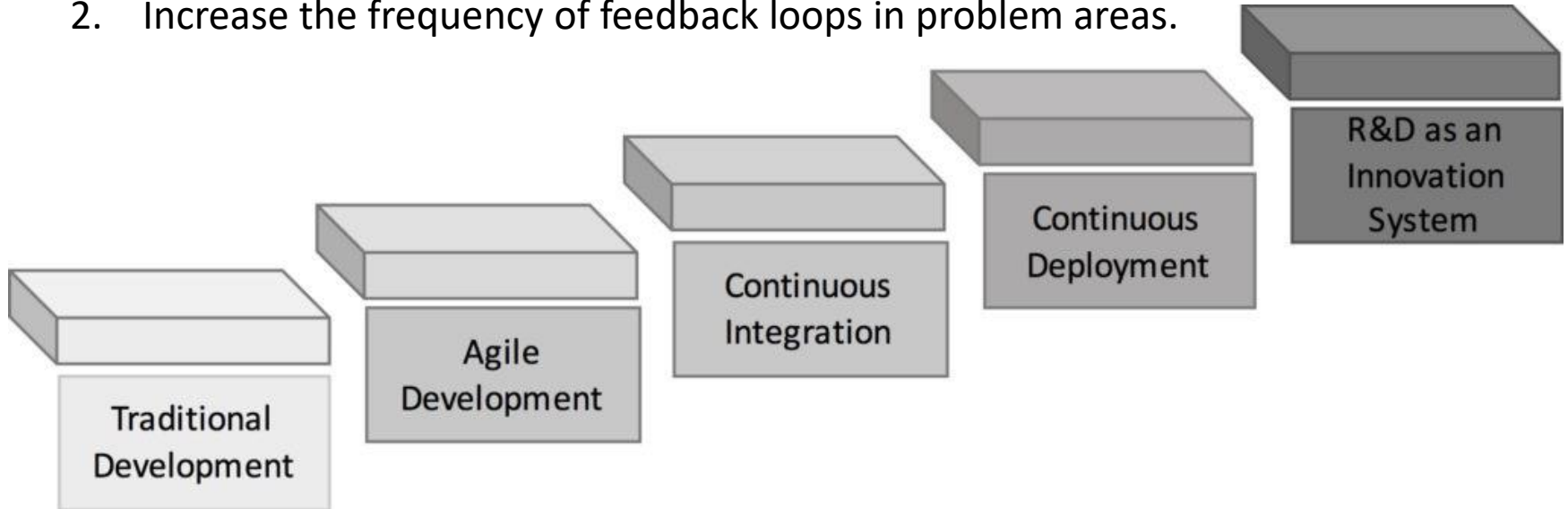


Continuous X₇

Stairway to heaven [Jan Bosch]

If a problem develops:

1. Make sure that all feedback loops are in place.
2. Increase the frequency of feedback loops in problem areas.



Levels of authority

Experiences from a submarine captain: [link](#)



1. **Tell:** make decision as a leader

2. **Sell:** convince people about decision

3. **Consult:** get input from the team before decision

4. **Join:** make decision together with the team

5. **Advise:** influence decision made by the team

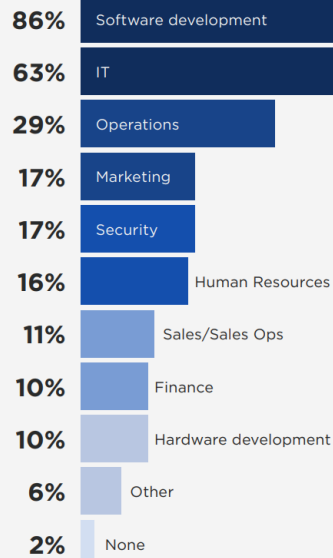
6. **Confirm:** check decision by the team

7. **Delegate:** no influence, let the team work it out

Agile transformation - Industry view

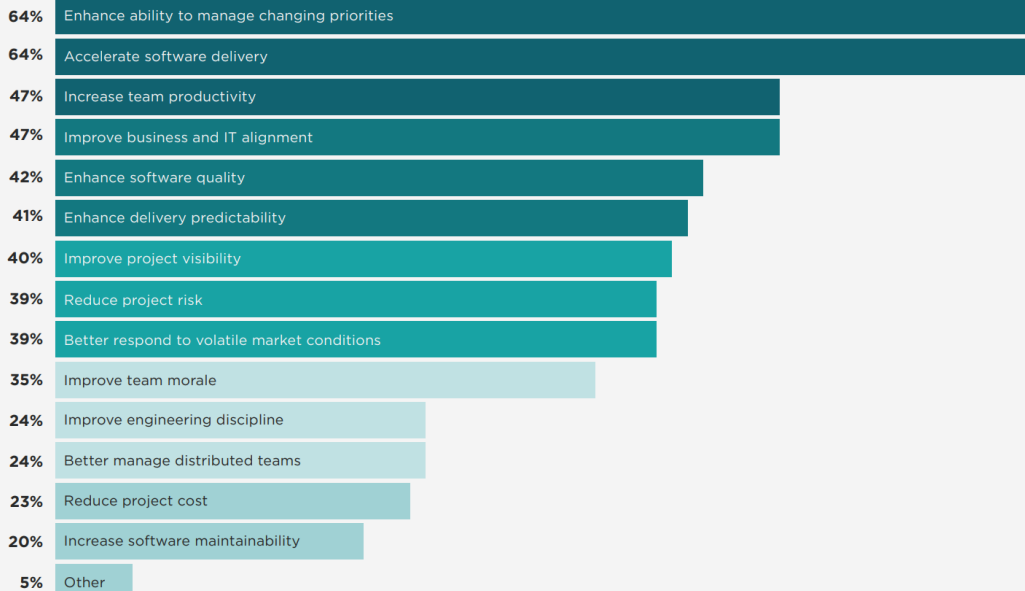
Which areas of your organization have adopted Agile principles and practices?

**Respondents were able to select multiple responses to this question.*

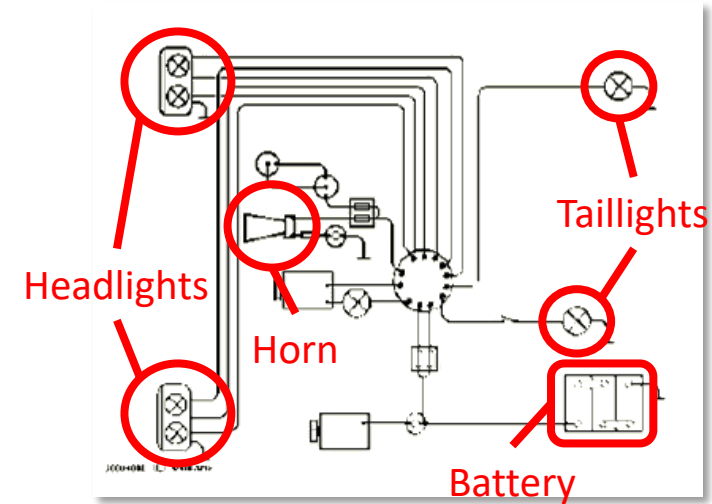


What were the most important reasons for adopting Agile within your team or organization?

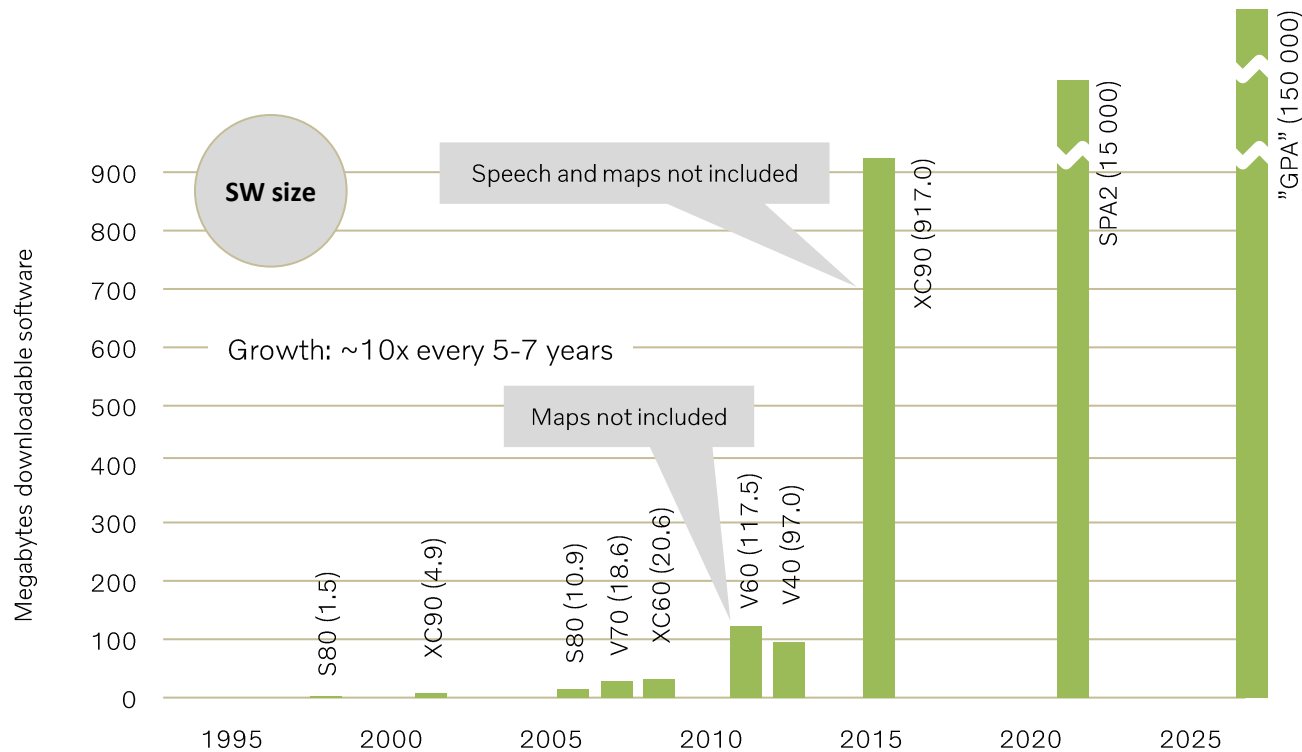
**Respondents were able to select multiple responses to this question.*



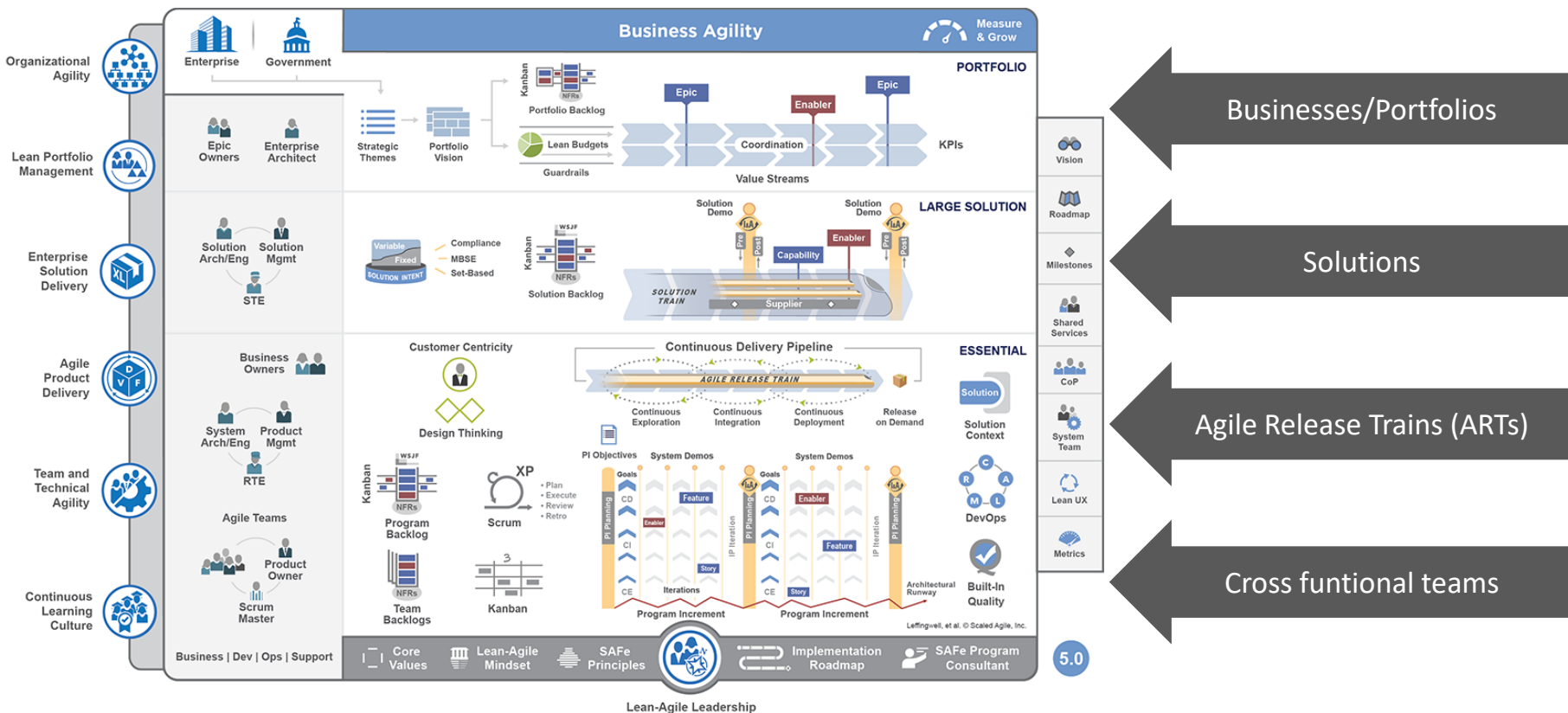
First E/E architecture at Volvo Cars (1927)



E/E architecture evolution at Volvo Cars



Full SAFe framework



Mindset behind development methods and frameworks

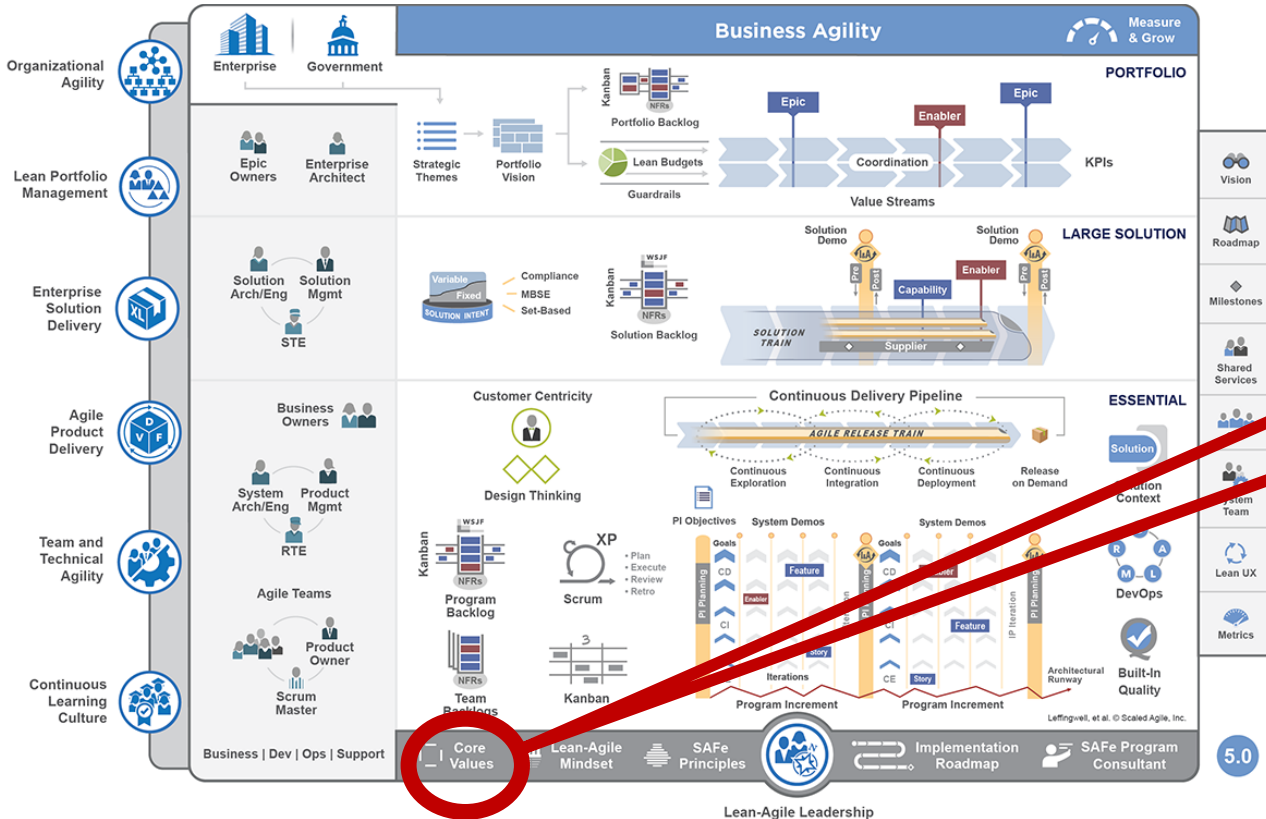
- In traditional development, you get what you .
- In agile development, you get what you .
- In SAFe, you get what you .

test

specify

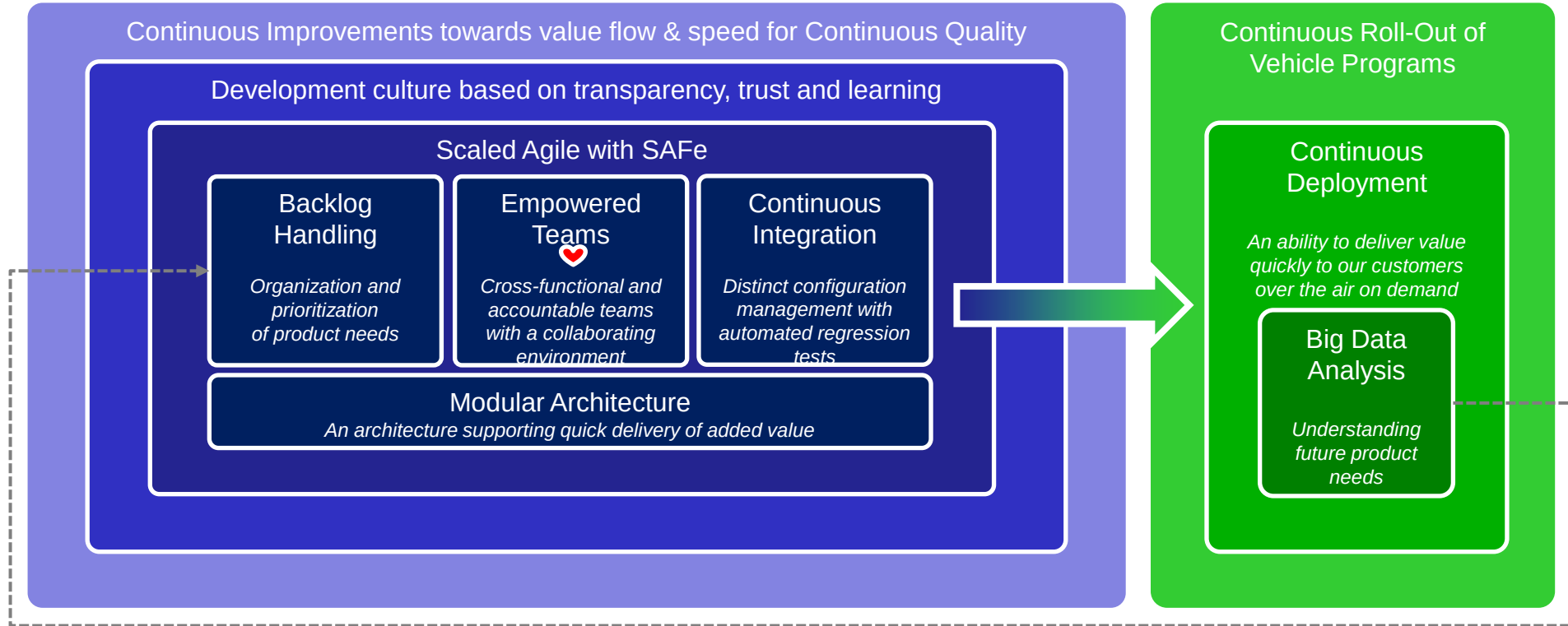
synchronize

Core values

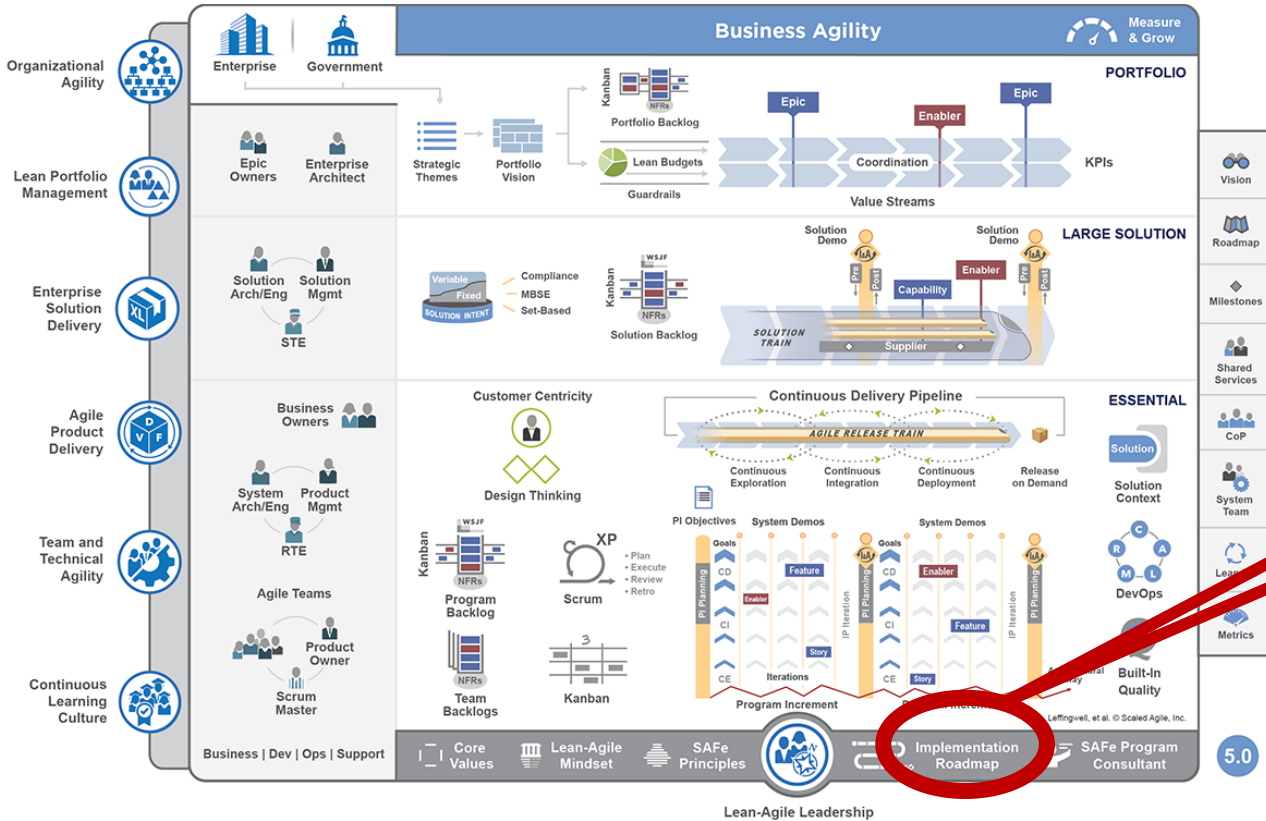


SAFe is based on three bodies of knowledge:
Agile Development,
Lean Product
Development and
Systems Thinking

Core ingredients



Implementation Roadmap



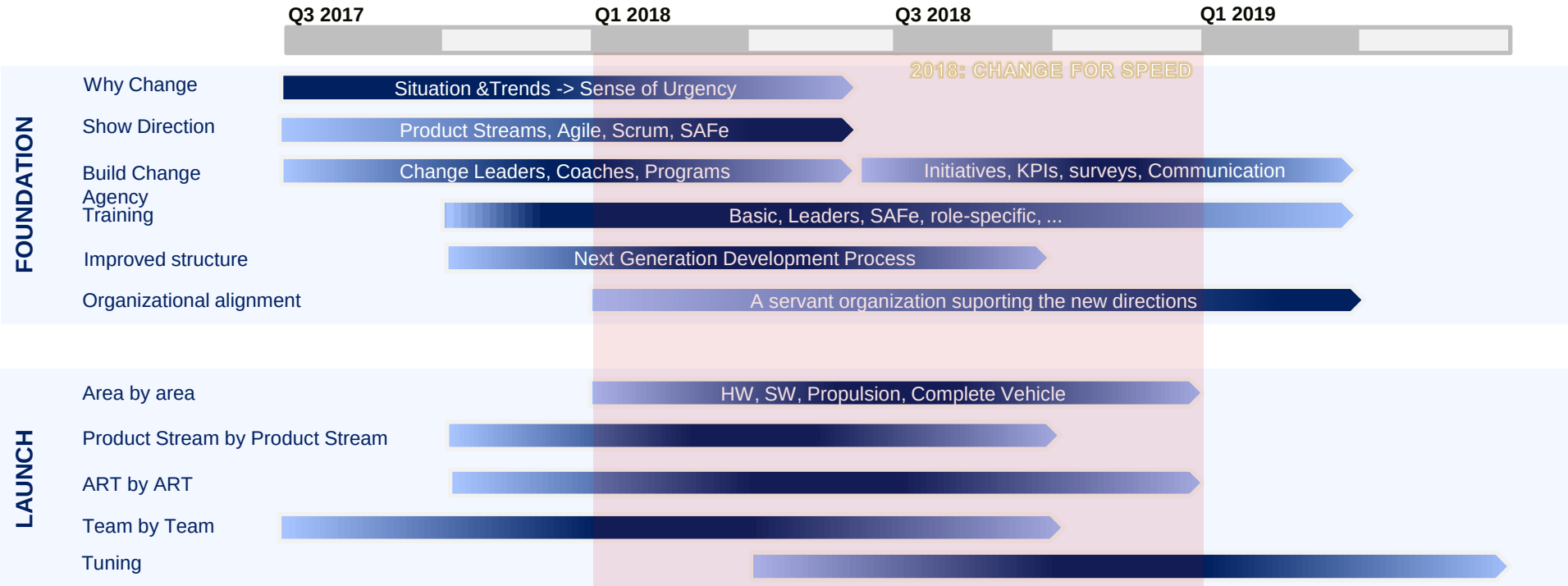
High level steps for the agile transformation of companies according to the framework of SAFe.

Decision, Fall 2017



Full speed towards full agile - Volvo cars large scale agile transformation

High level transformation plan





Volvo Cars Agile Trainings

VOLVO

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Updated 21w39

Find new opportunities to learn and develop your skills

VPDS introduction, Online

2021-11-05 09:00 – 11:30 Eng
2021-12-07 14:00 – 16:30 Eng
2,5 hours [ENG00640](#)



Train the Trainer, Online

2021-10-05-06 + 12 08:30 – 12:00 Eng
2021-10-19-20 + 26 08:30 – 12:00 Swe

1,5 days via Teams [PED00724](#)



CI Basics Training

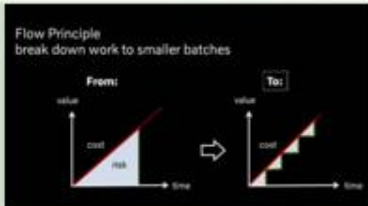
2021-10-28 12:00 - 15:00
2021-11-25 9:00 - 12:00
2021-12-02 12:00 - 15:00

3 hours [ENG00738](#)



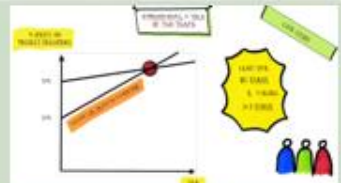
Agile Scrum & SAFe for PO, PM, RTE and Scrum Masters

2021-10-05 — 06 8:30 – 16:30
2021-11-29 – 12-01 8:30 – 16:30
2021-12-14 — 15 8:30 – 16:30
2 days [ENG00754](#)



Agile Introduction

2021-10-05 – 07 08:30 – 16:30
2021-10-11 – 13 08:30 – 16:30
2021-11-10 – 12 08:30 – 16:30
2 days training [ENG00865](#)



Value Flow Basics

2021-10-19 08:00-10:00
2021-11-17 13:00-15:00
Also available on demand for 20+ persons
2 hours – via Teams [ENG00792](#)



The Developer, Engineering

2021-10-06 — 07 09:00 – 15:30
2021-10-27 — 28 09:00 – 15:30
2021-11-24 — 25 09:00 – 15:30

2 days via Teams [ENG00234](#)

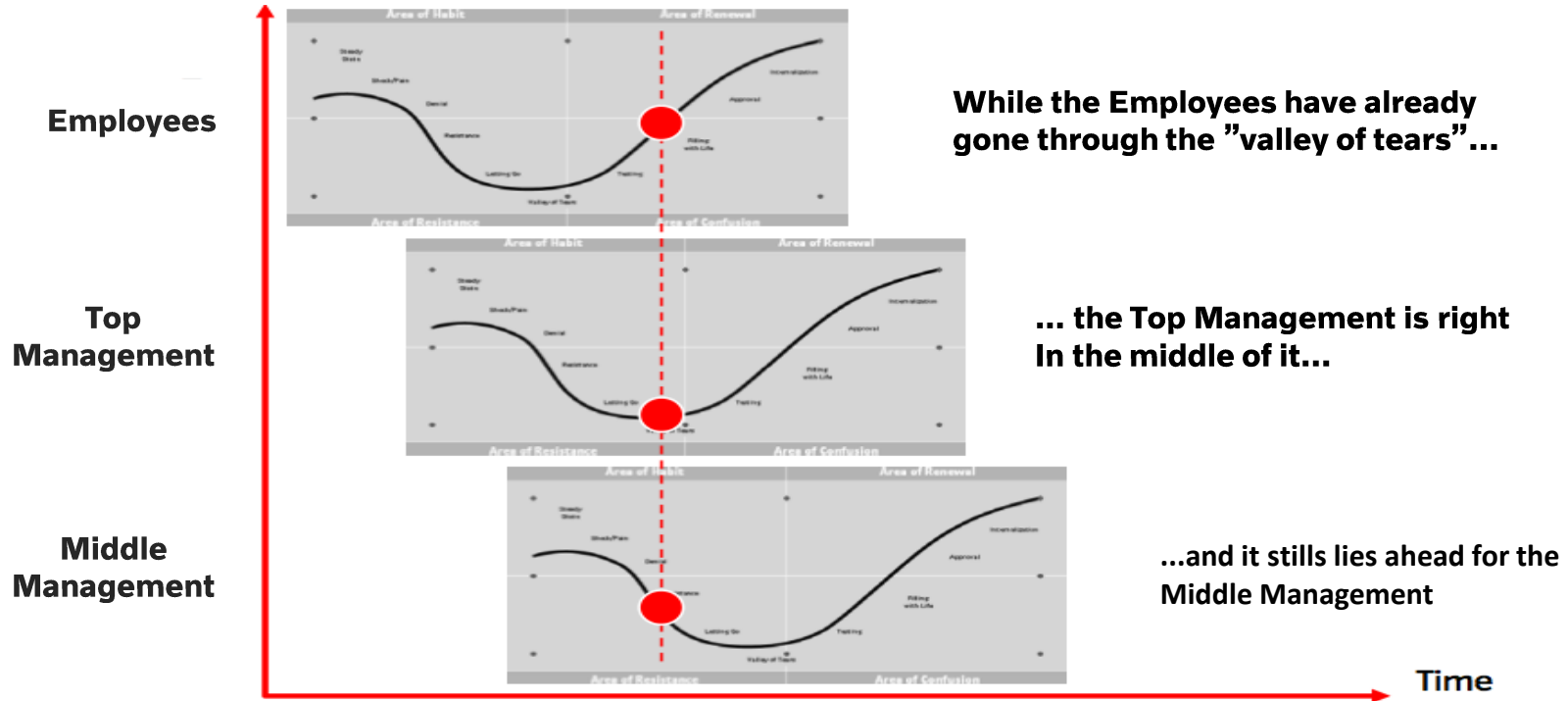


Introduction to VCAF

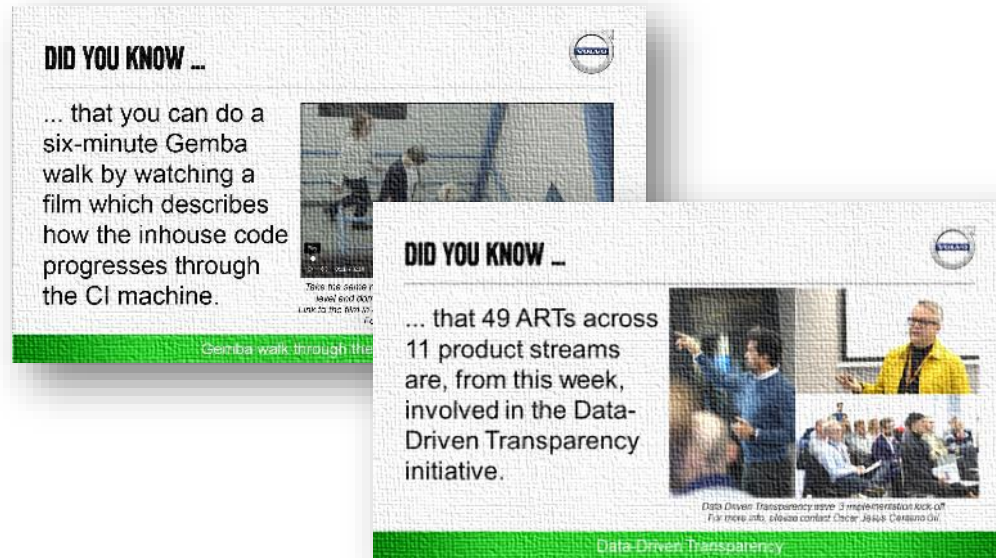
2021-10-01 08:30 – 10:00 Eng
2021-10-08 08:30 – 10:00 Swe
2021-10-29 08:30 – 10:00 Eng
1.5 hours [ENG00822](#)



Different people are in different stages

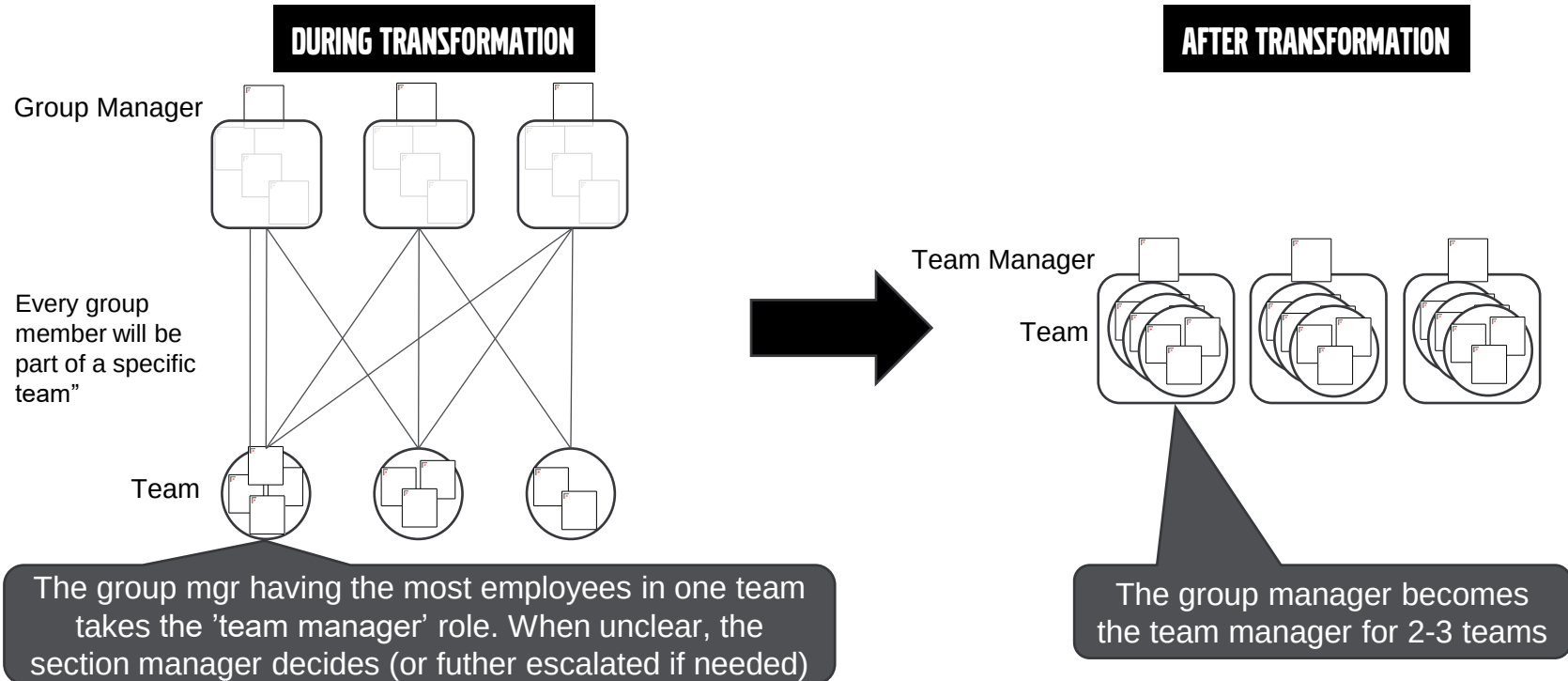


What to do?

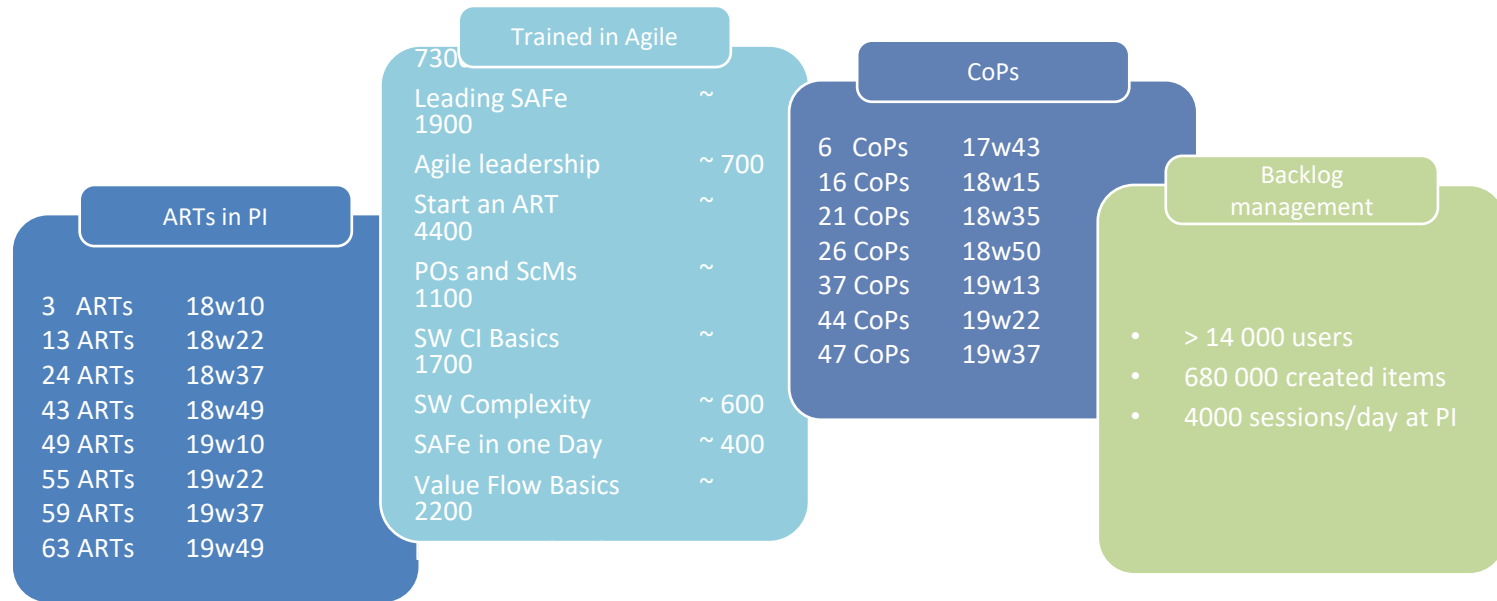


Make it simple to communicate good stuff!

Group managers vs. team managers

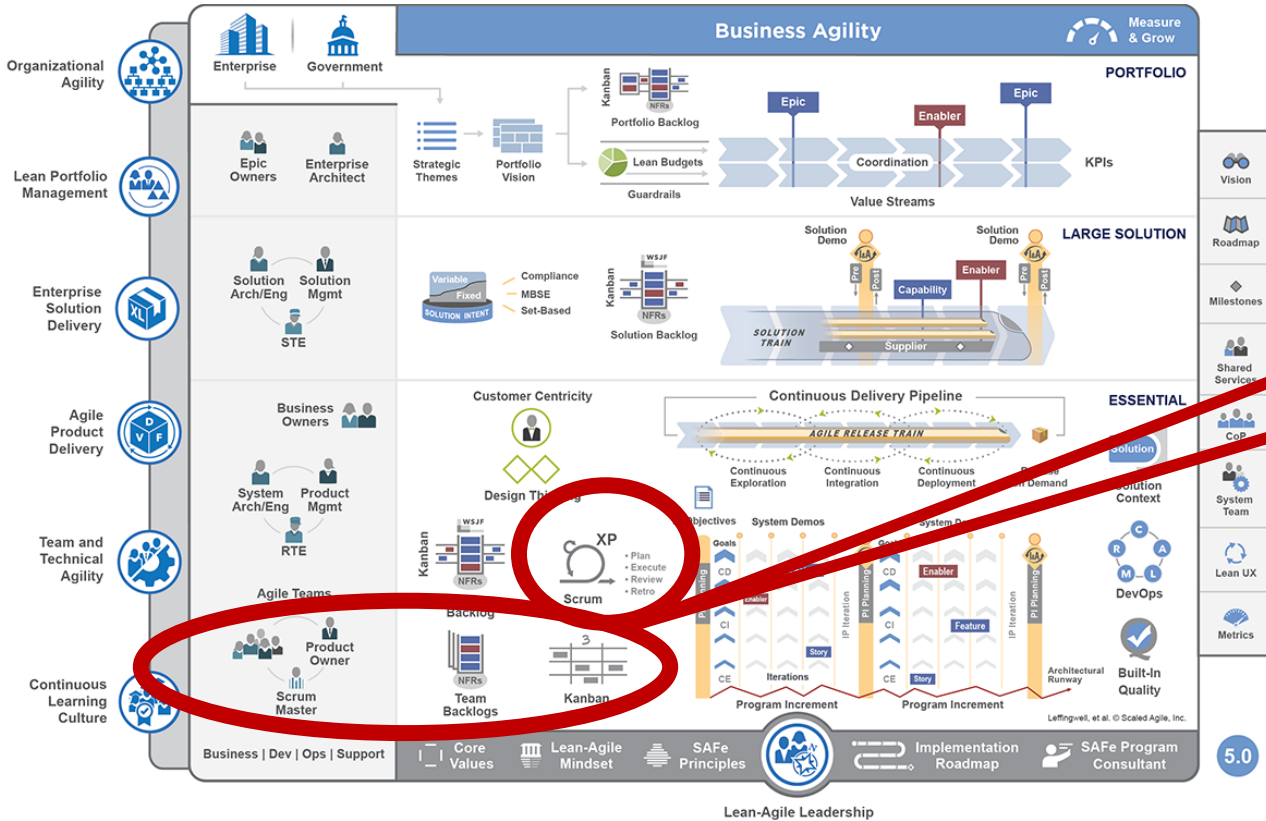


What to do? Status after 2 years.



By end 2019, we were probably so agile that we understand we are not!

Empowered teams



The foundation of SAFe is built on the belief that nothing beats an agile team

The cross functional teams

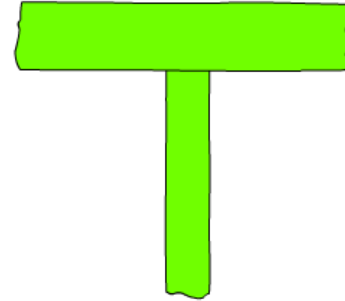
Agile empowered teams



"I-shaped"
Expert at one thing



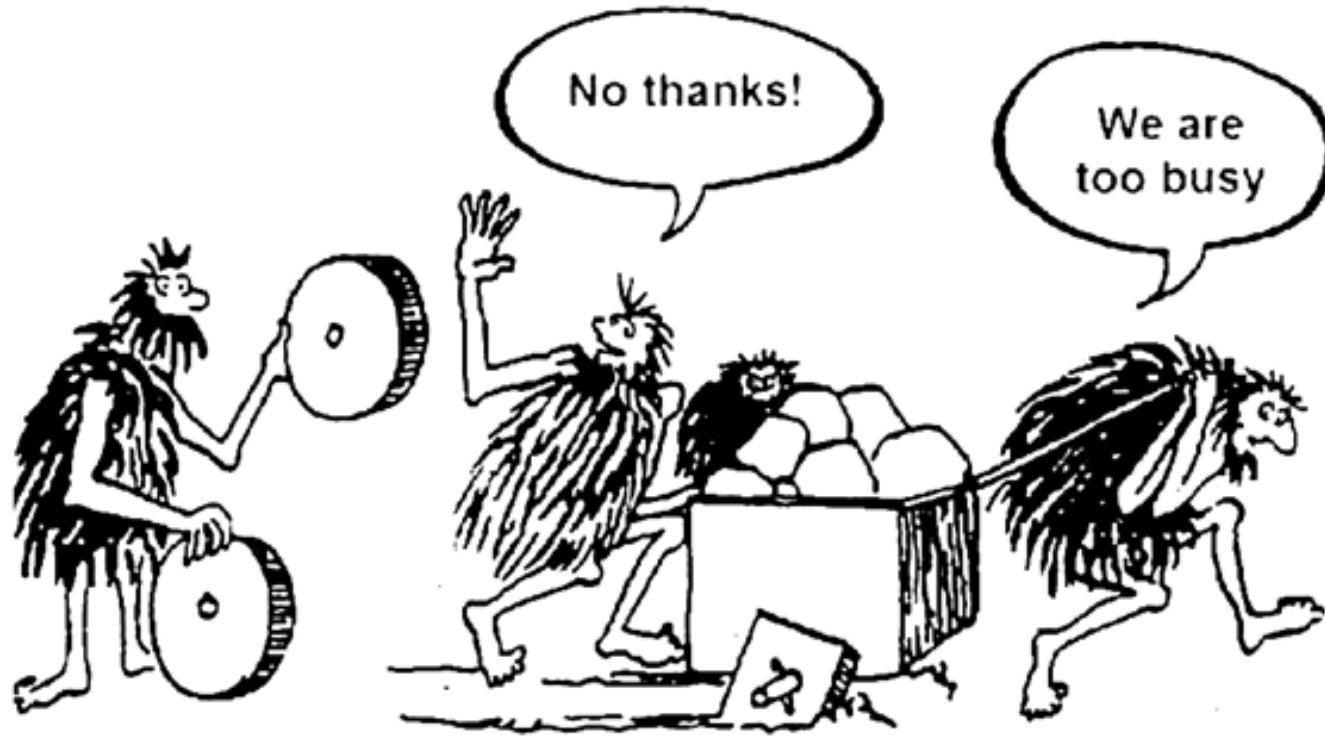
Generalist
Capable in a lot of things
but not expert in any



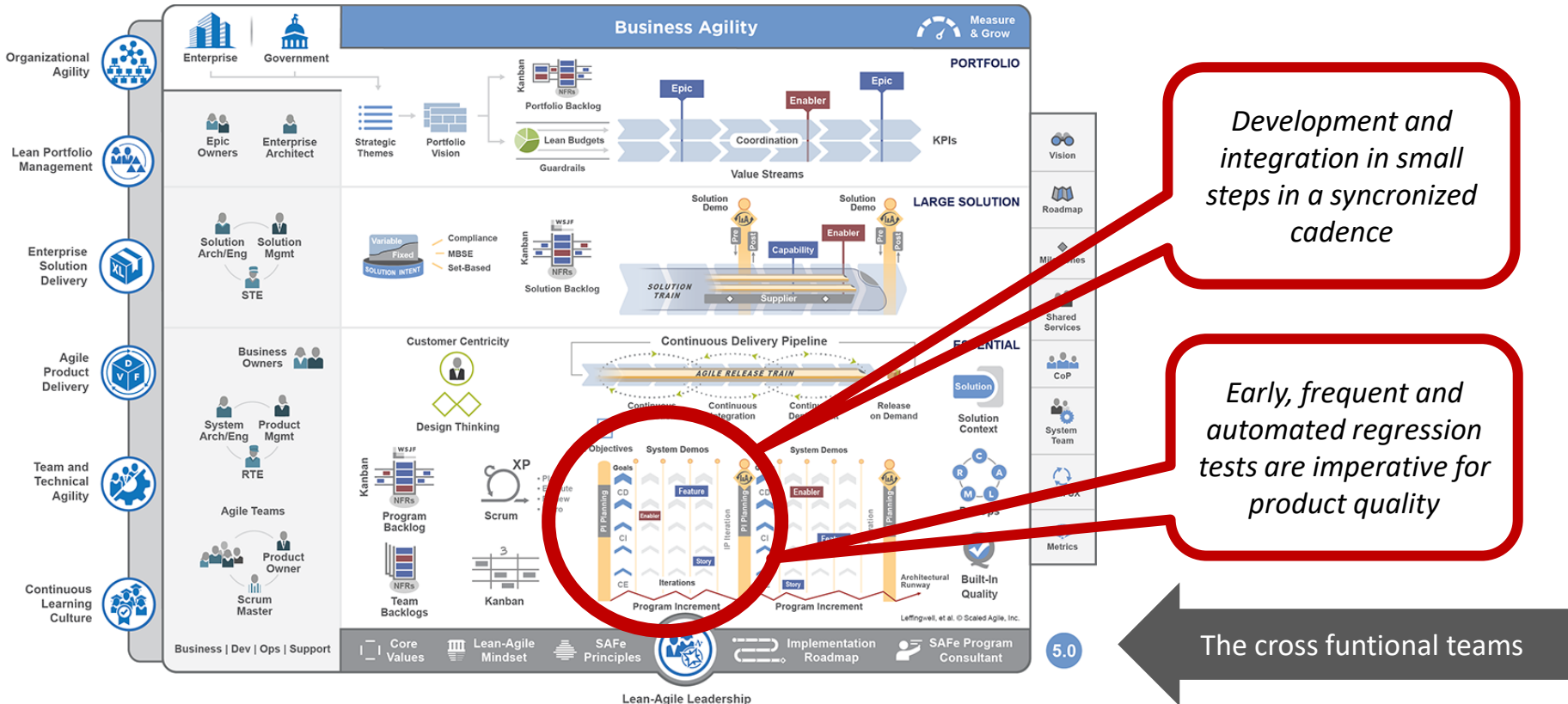
"T-shaped"
Capable in a lot of things
and expert in one of them

<https://medium.com/@jchyip/why-t-shaped-people-e8706198e437>

Improvement is an investment for the future!

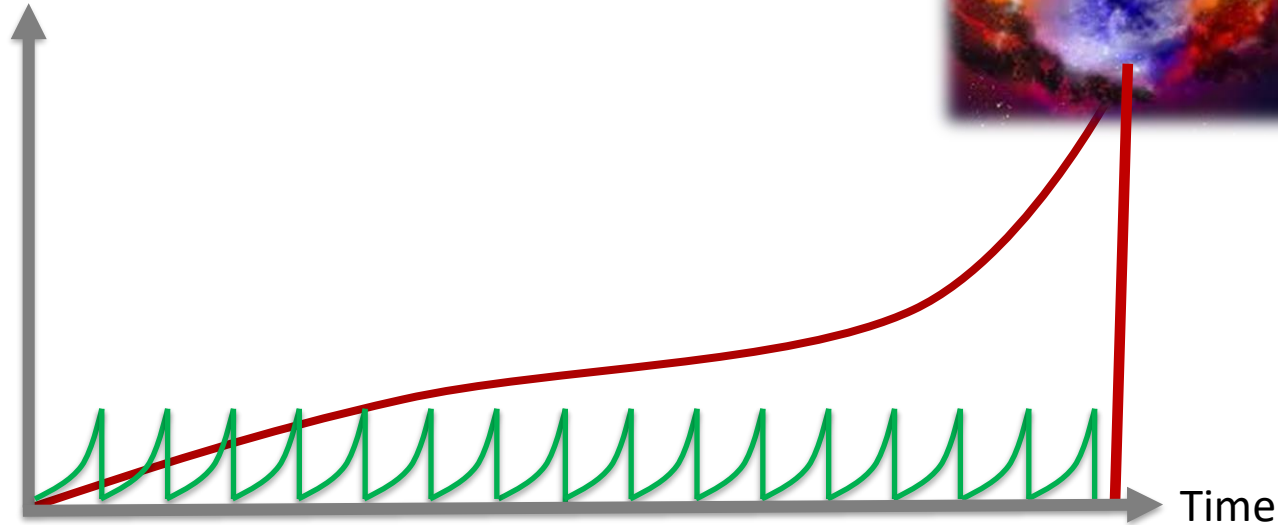


Continuous development and integration



Miandset change

Technical debt
Risk/Change

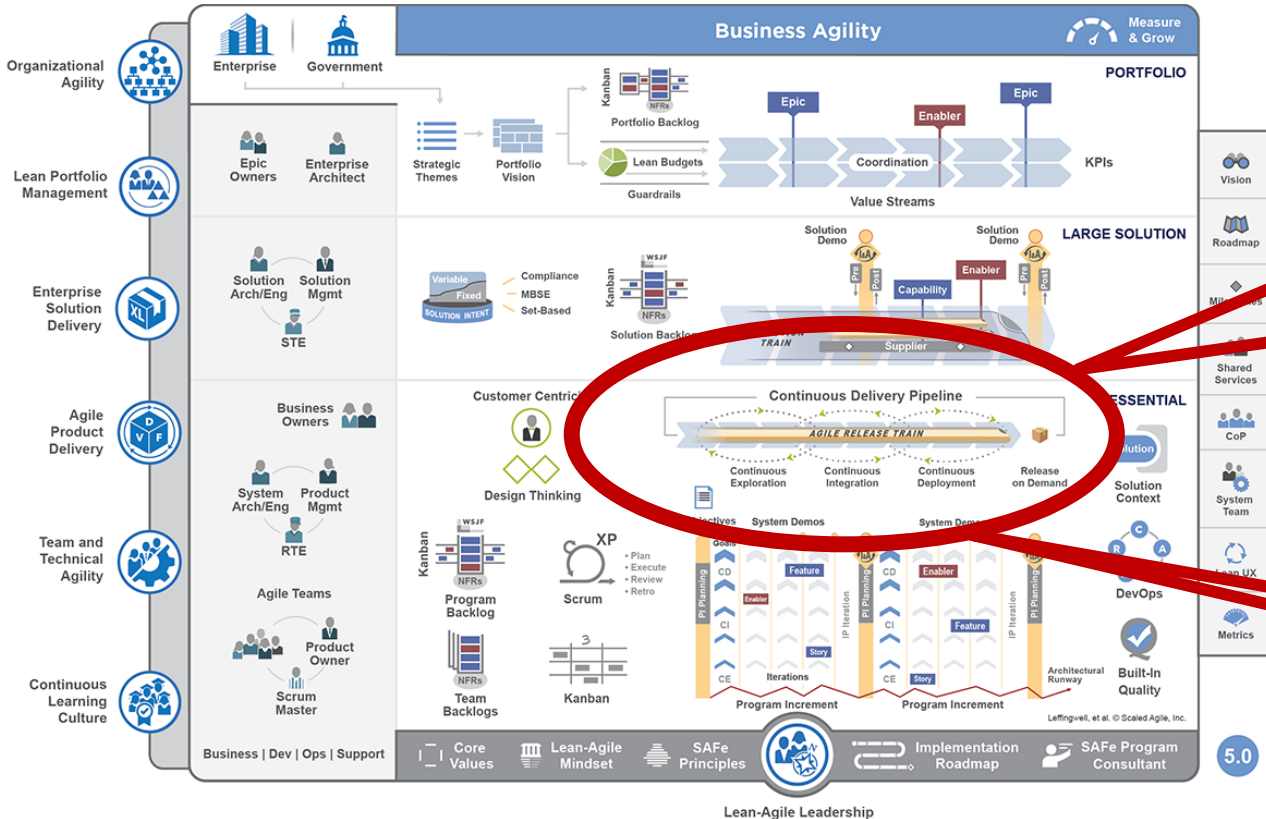


“Big bang” or
“Integration hell”

Rigs



Agile Release Train (ART)

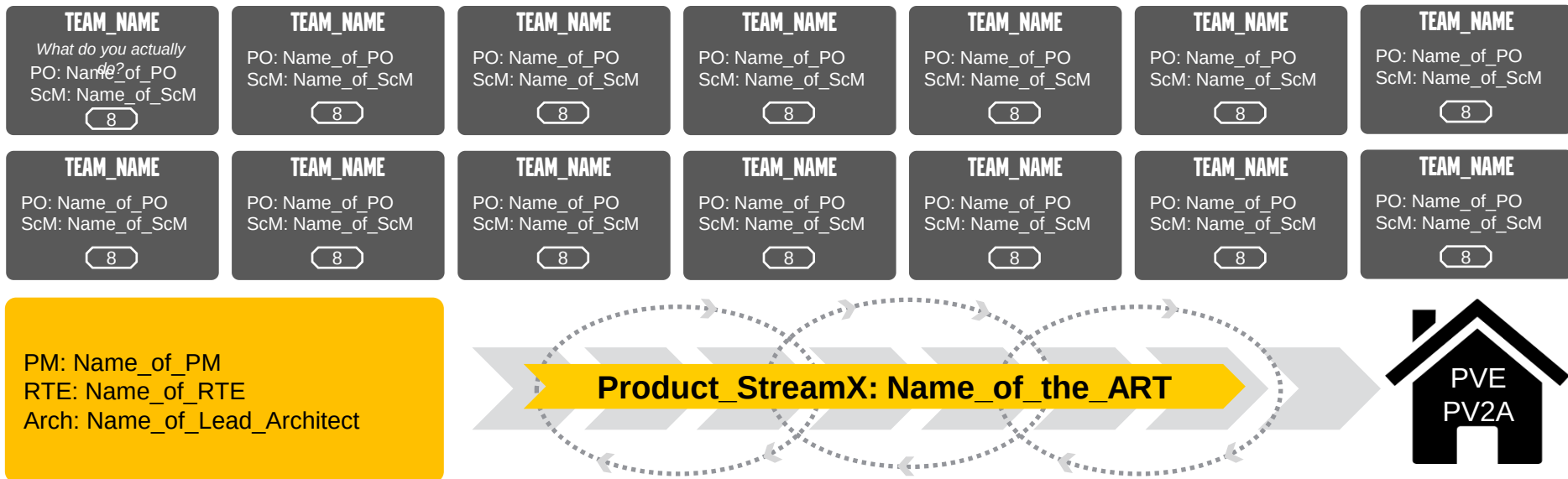


The ART is a cluster of team that delivers a continuous flow of customer value. It has all needed capabilities and is formed to be as independent as possible

The Agile Release Trains

Aligning 50-125 practitioners to a common mission in a synchronized cadence of 10-12 weeks

ART description template



VISION STATEMENT

Here you write a few sentences about the ART's reason for existence and how it will contribute to our future excellent vehicles.

SCOPE OF THE ART

Here you write a few sentences about the main scope (what you develop) in the ART. You can also mention what is out of scope if you suspect this might be unclear

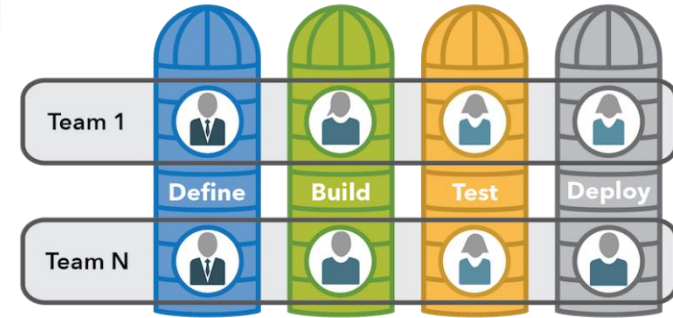
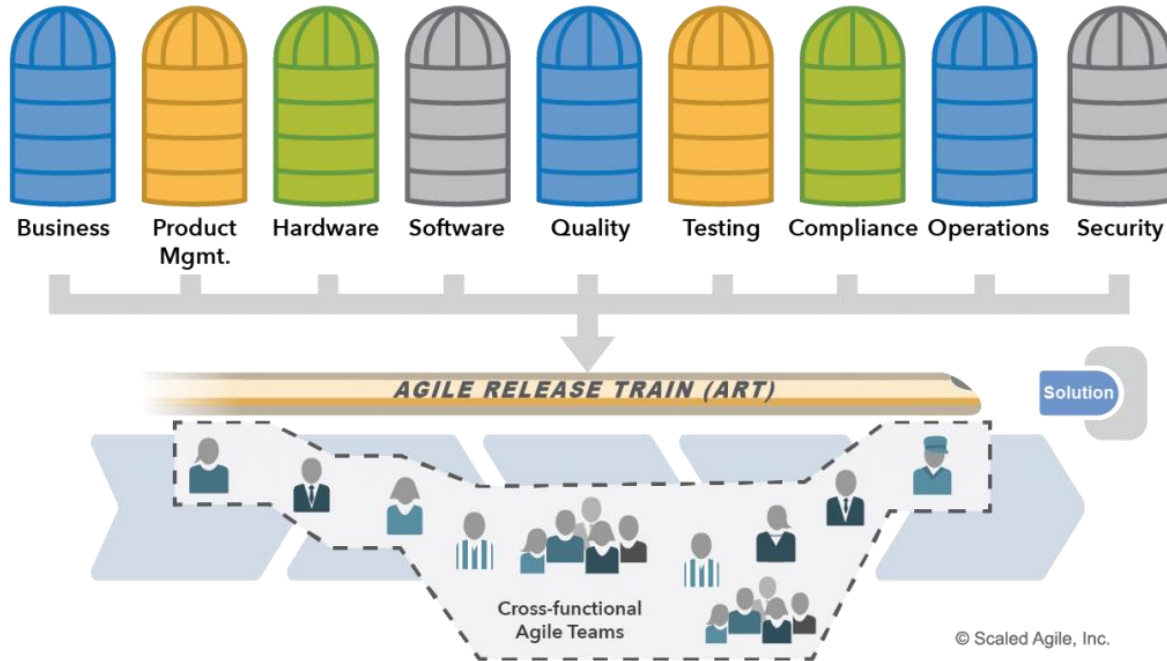
MAIN DEPENDENCIES

Here you write a few sentences about the main dependencies towards key stakeholders (internal as well as external)

SHARED SERVICES

Here you write which shared services or other key roles that contribute heavily to the ART.

ARTs and teams are fully cross-functional



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The PI planning/Big Room Event is a meeting where all stakeholders meet face-to-face to set the high-level plan for all teams in the upcoming increment

The Agile Release Trains

Develop on Cadence. Release on Demand

Synchronized development cadence

PI Planning w.10



PI Planning w.22



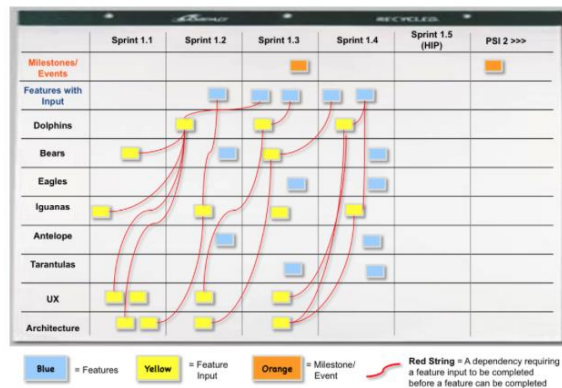
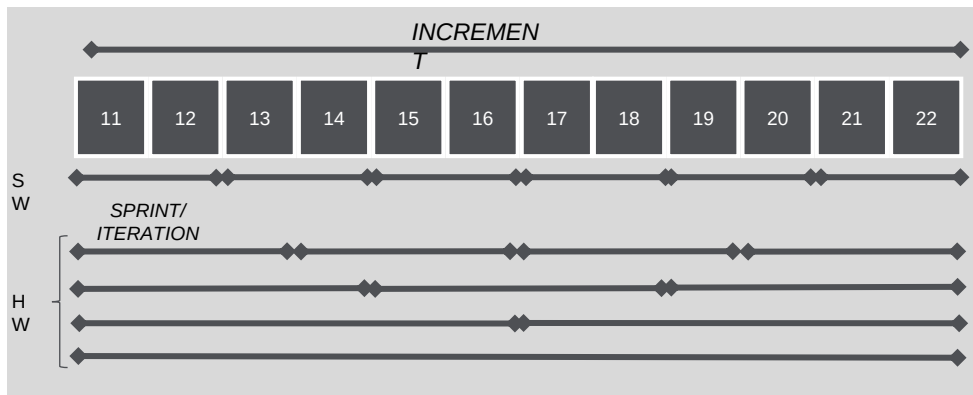
PI Planning w.37



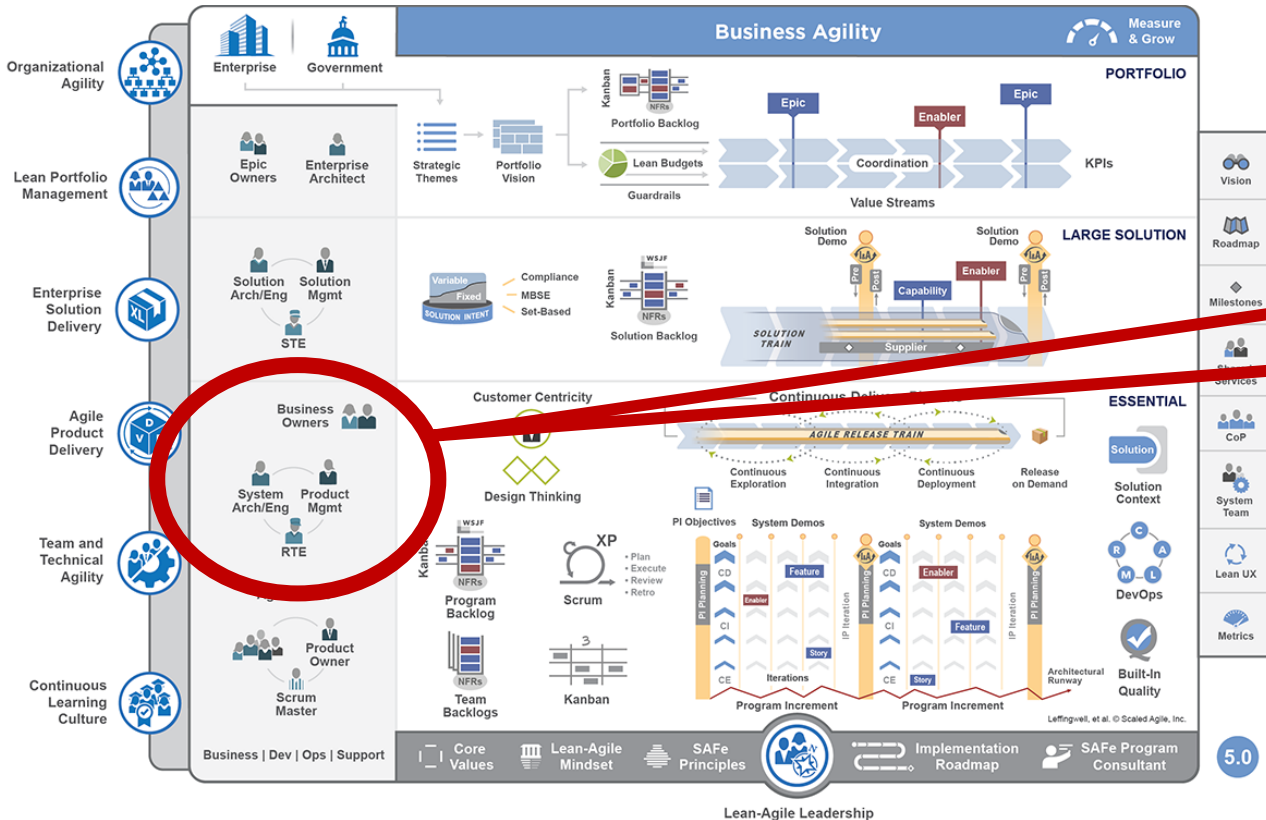
PI Planning w.49



WEEK



ART lead roles



ARTs need roles to facilitate synchronization and continuous flow efficiency

The Agile Release Trains

Product Manager (PM) Role Profile

MY PURPOSE

Maximize value added work by owning and deciding upon priorities in the Program Backlog from a business perspective as well as developing the program Vision and Roadmap.

WHAT DO I DO

- I own the Program backlog
- I work with stakeholders, customers, other Agile Release Trains and the Solution Train to understand needs, split Capabilities and Epics to define and prioritize Features and Program Enablers.
- I am the only person who can approve features as done at the Program Demo. This includes validation that the feature meets acceptance criteria according to the Definition of Done and has the appropriate, persistent acceptance tests.
- I understand and support portfolio artifacts like Budgets, Strategic Themes and Business Cases.
- I collaborate with Solution and System Architects to define both functional and non-functional requirements
- I work with release management to define releases and solution increments.
- I work with System Architect/Engineering to understand and prioritize Enabler work on a program level
- I assess metrics, including evaluation of business value achieved versus plan.
- I take responsibility for product safety, by ensuring planning and fulfillment of safety activities according to the development process and approve my Products for release when sufficient product documentation is available.
- I ensure fulfillment of legal requirements (automotive specific) and certification for my Products.
- I participate in the Pre- and Post-PI Planning to define the inputs, milestones, and high-level objectives.
- I demonstrate contributions of my ART at the Solution Demo
- I build an effective Product Manager/Product Owner team
- I work with Suppliers, making sure the requirements for supplier-delivered capabilities are understood and assisting with the conceptual integration of these concerns.

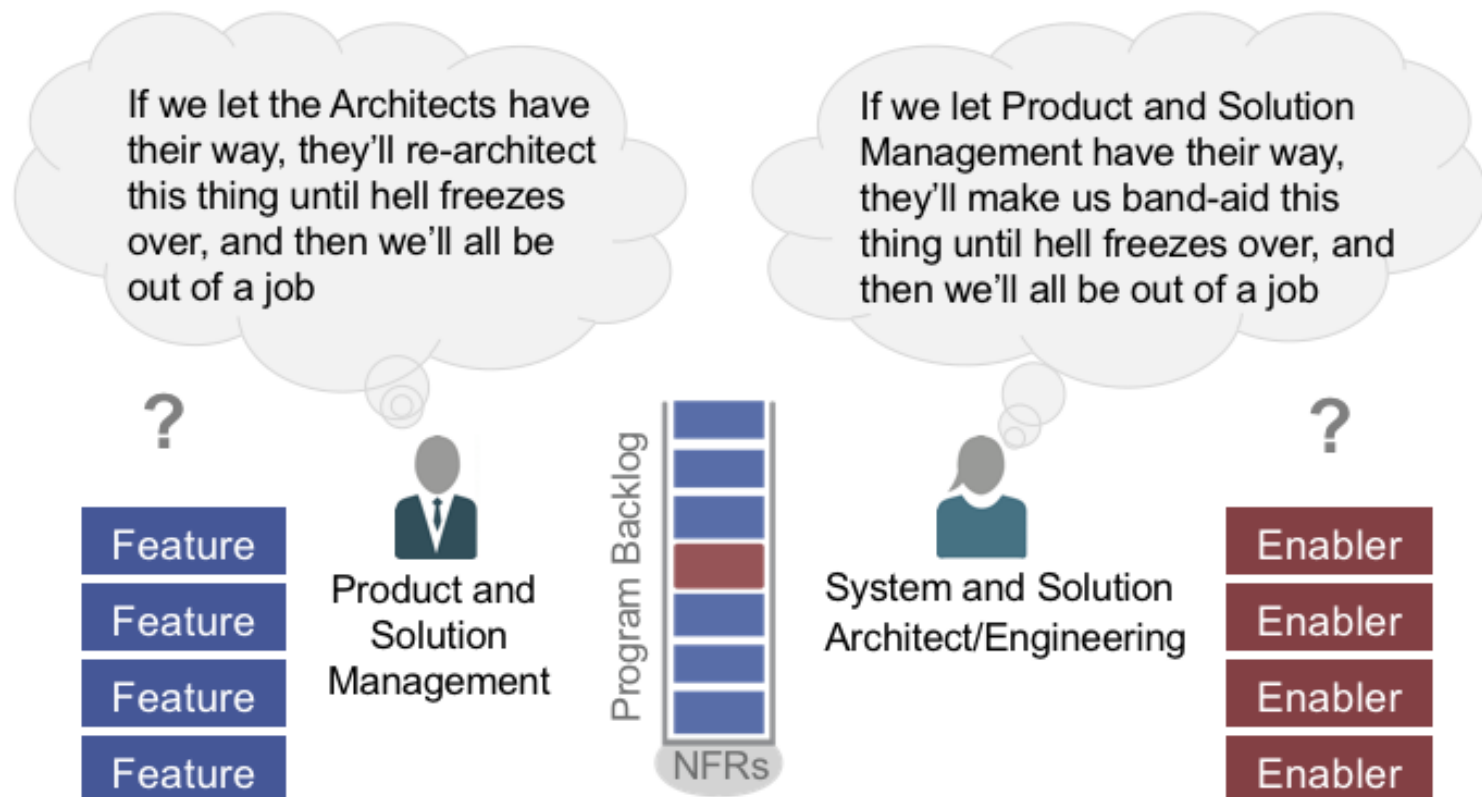


100% PM for one ART
(might be more than one)

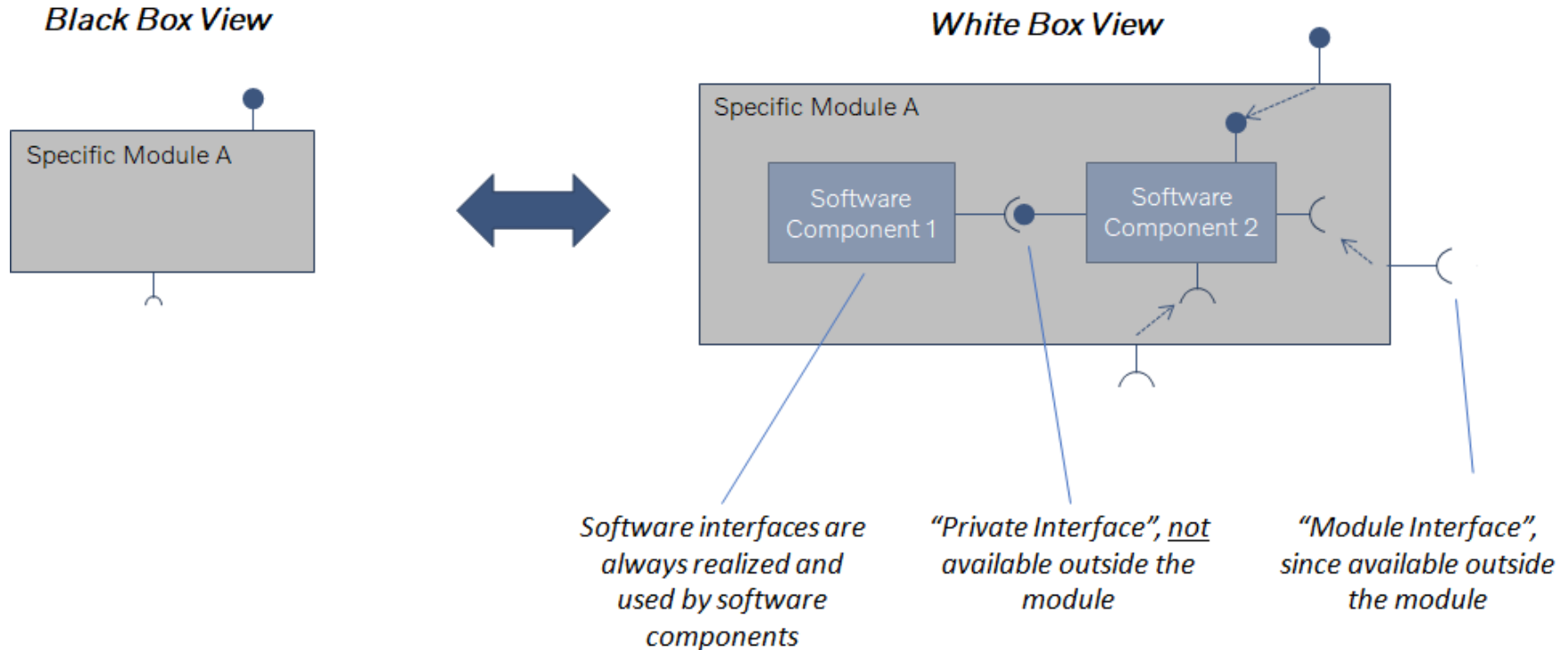
SUITABLE CANDIDATES

Project Leaders
Managers
Product Owners
...or equivalent skills

How Much Architecture?

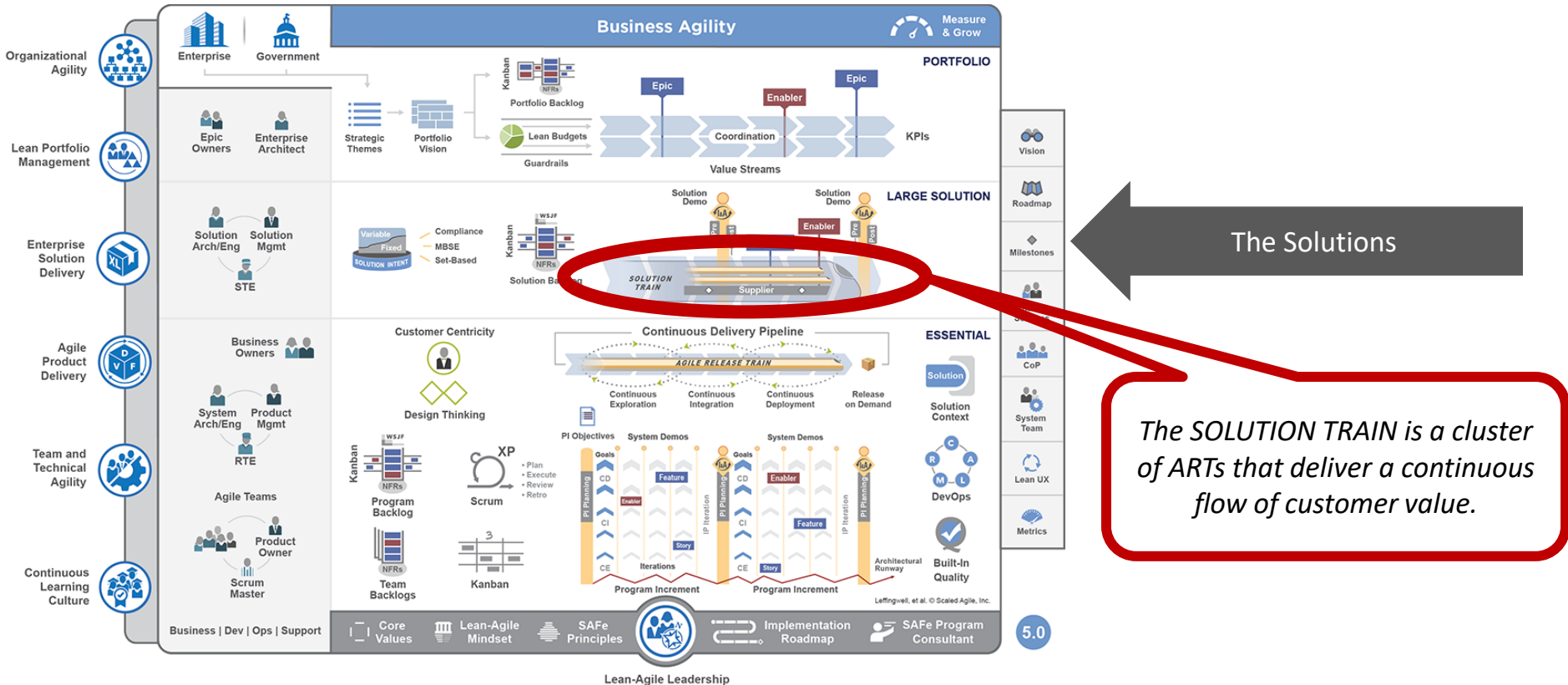


Modules and Interfaces

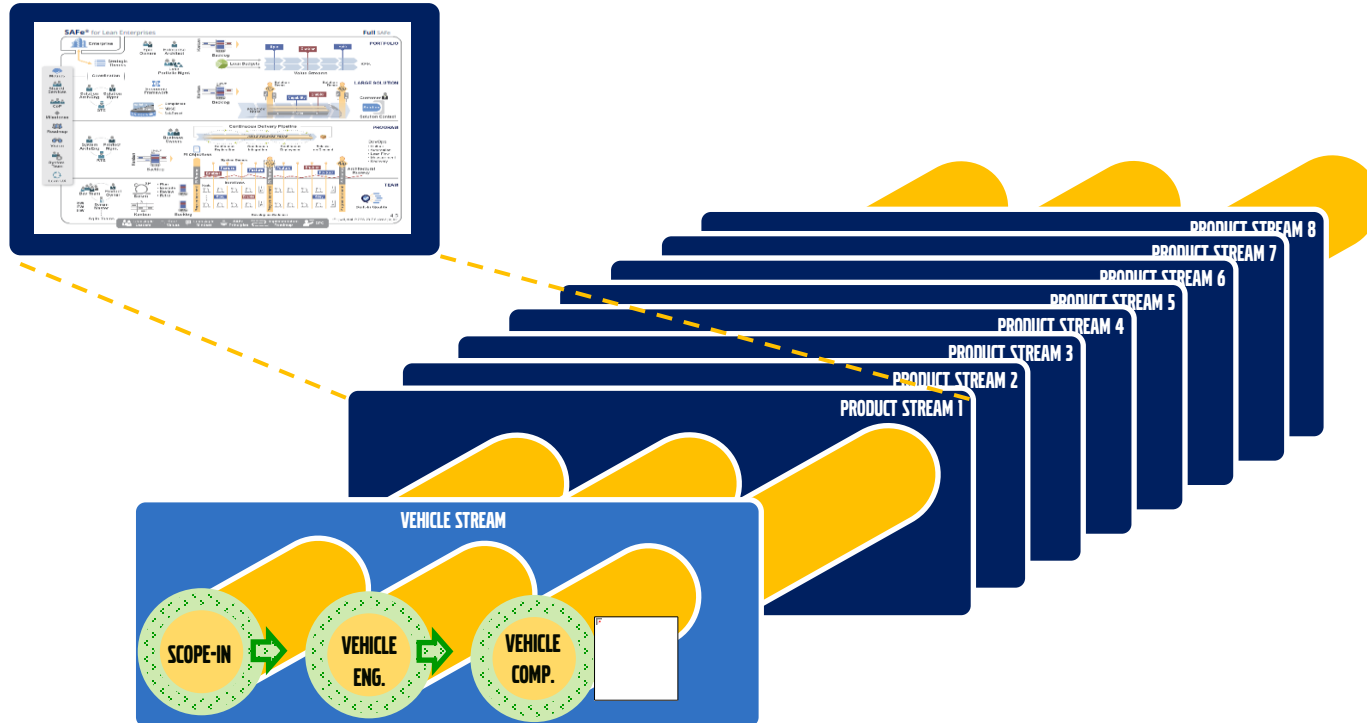




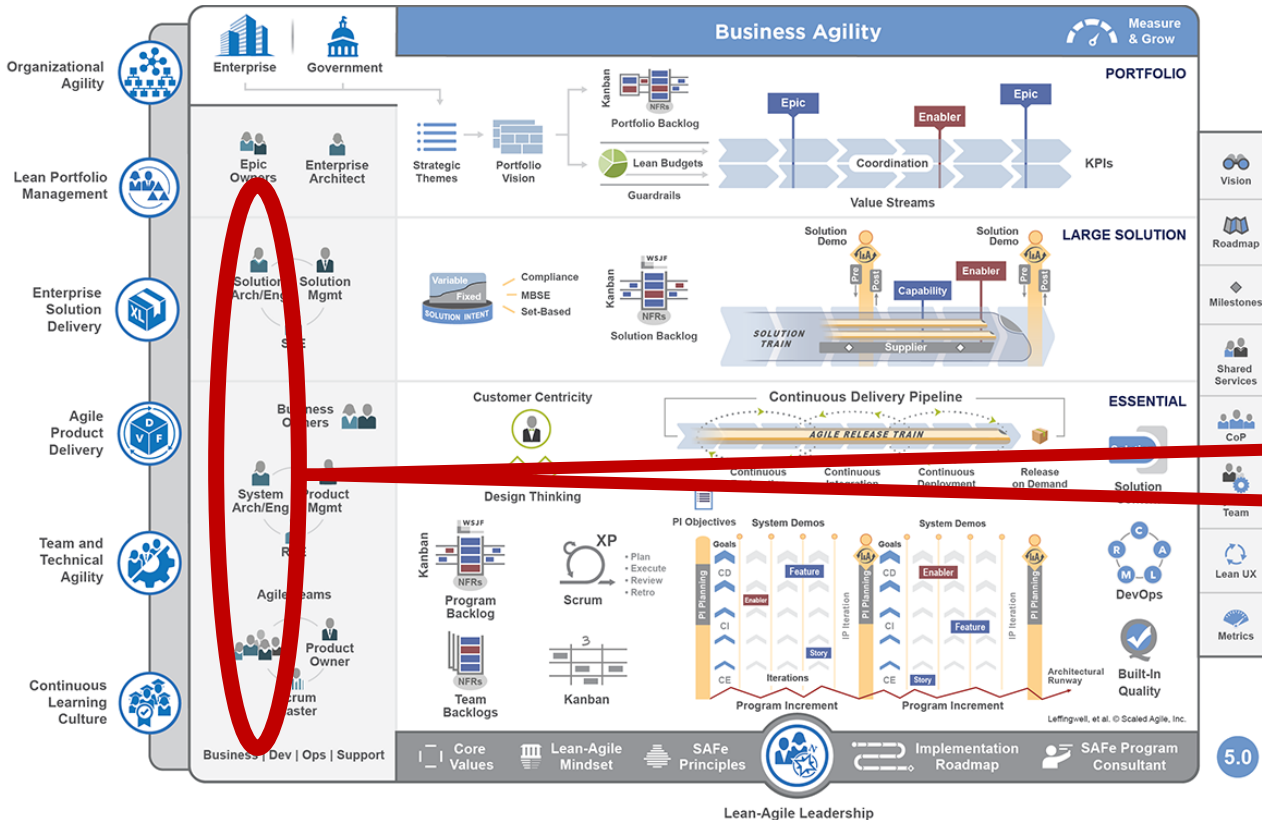
Solution train



Cross product stream management

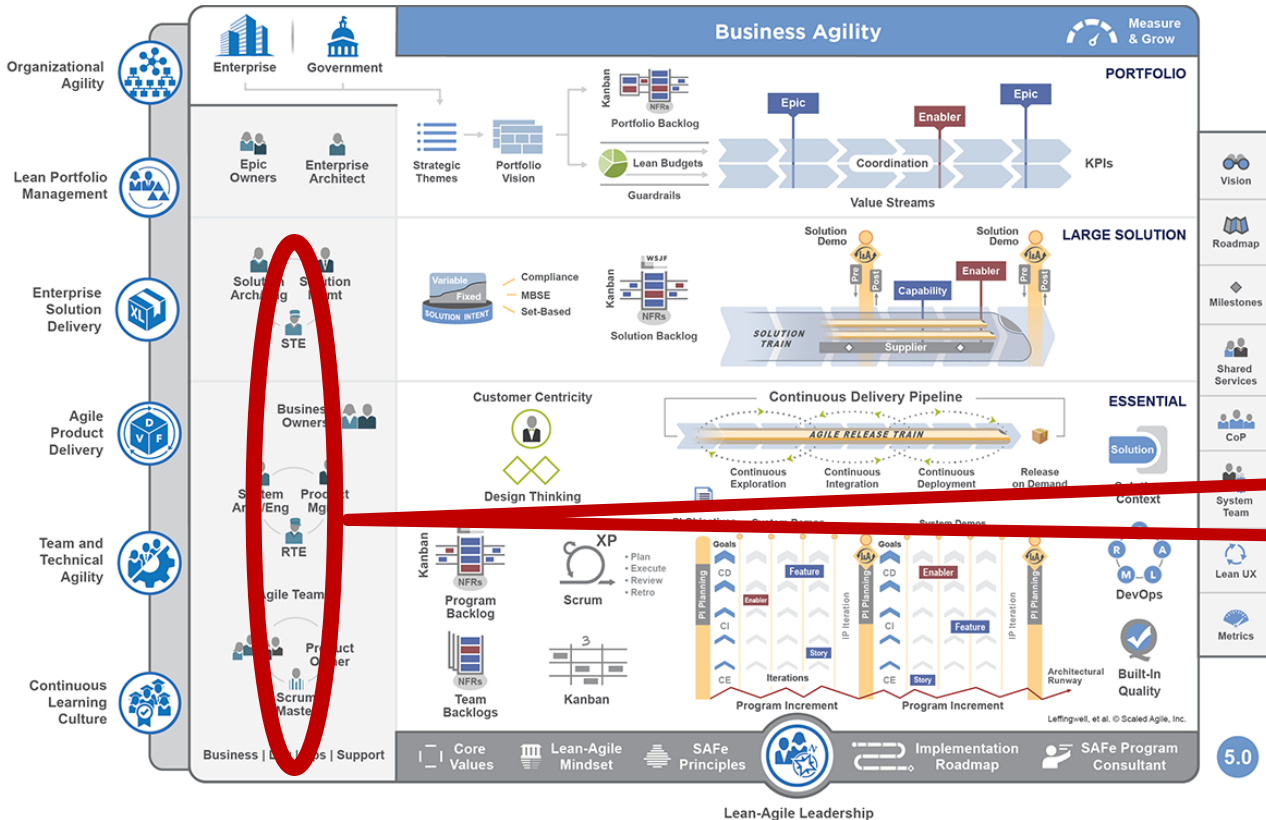


Cross collaboration – Product development

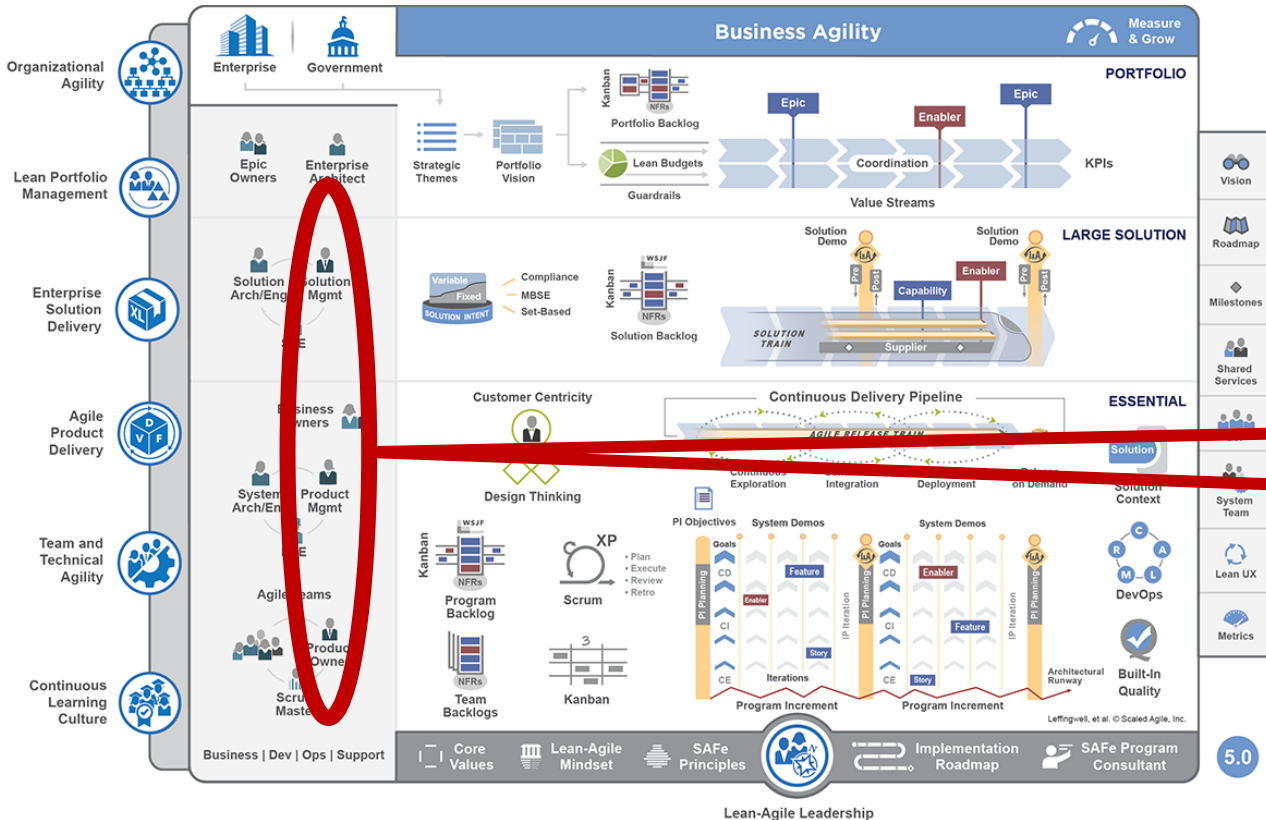


Development teams, System Engineers and Architects collaborate to develop and maintain the product

Cross collaboration - Flow and value

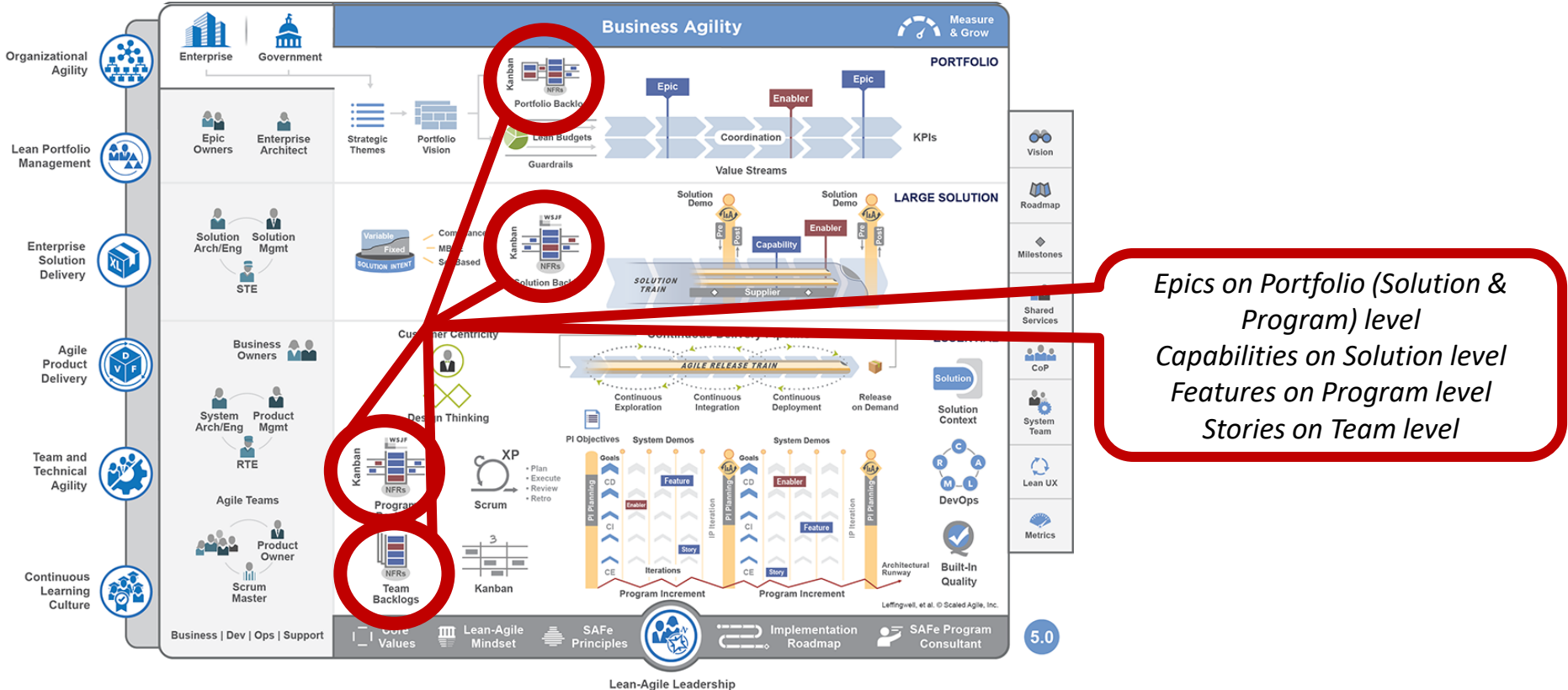


Cross collaboration – Product content

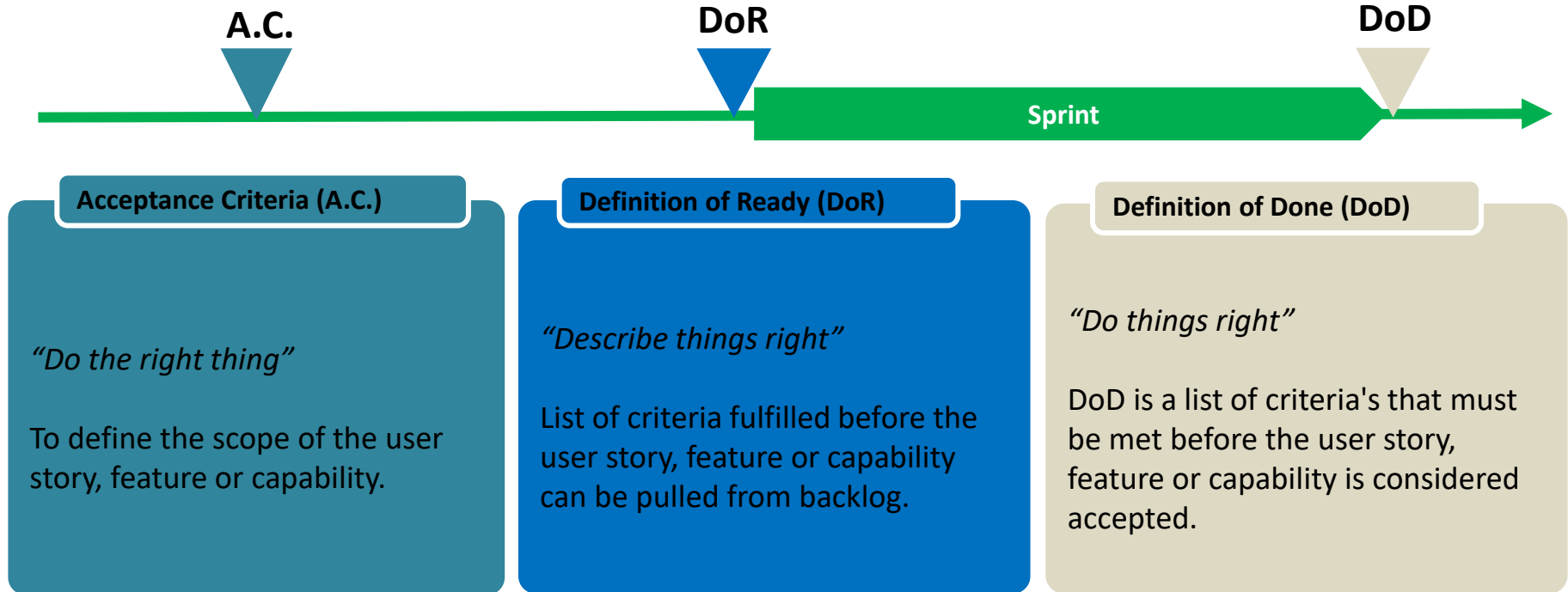


Product Owner, Product Manager and Solution Manager collaborate to assure the right product content cross levels

Cross collaboration – Backlog items

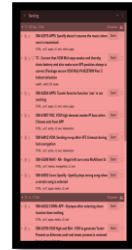


Acceptance Criteria, DoR and DoD

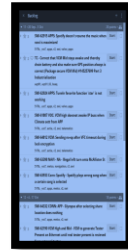


Product backlog vs. Project backlog (push)

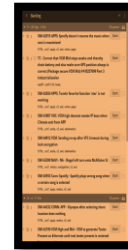
Project A



Project B

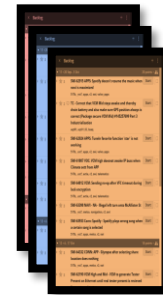


Project C



Tasks are pushed to the team from projects. It is up to the individual to prioritize.

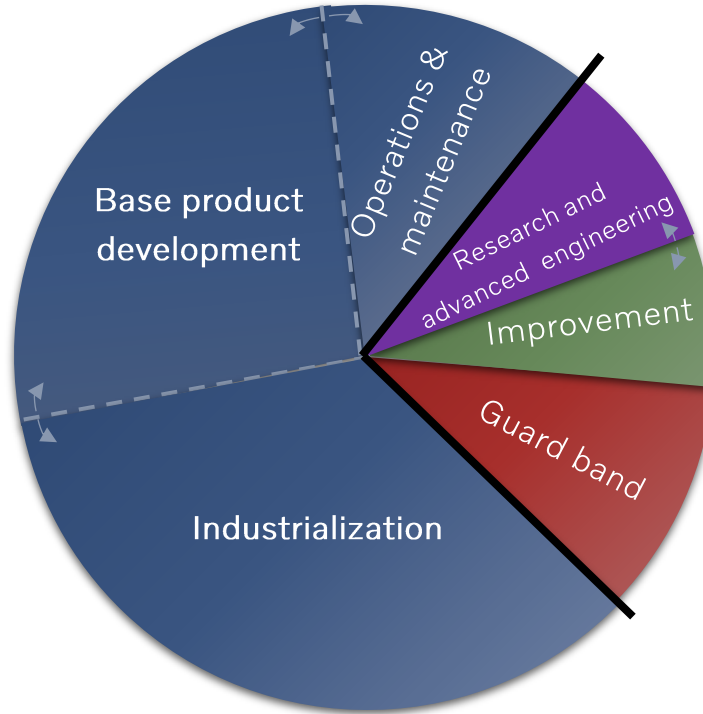
The projects are aware of the over commitment and try to make sure their tasks are prioritized



Capacity allocation for a sustainable development

Development 70%

- The development capacity is divided between the following areas:
 - Industrialization
 - Base product development
 - Operations & Maintenance (where PC is involved)
- The capacity allocated to each area is defined before each PI
- The capacity allocated to each area is defined on PCMT/RDMT/Solution levels
- Top level capacity is balanced between ARTs and teams depending on involvement in prioritized jobs



Safe guard 30%

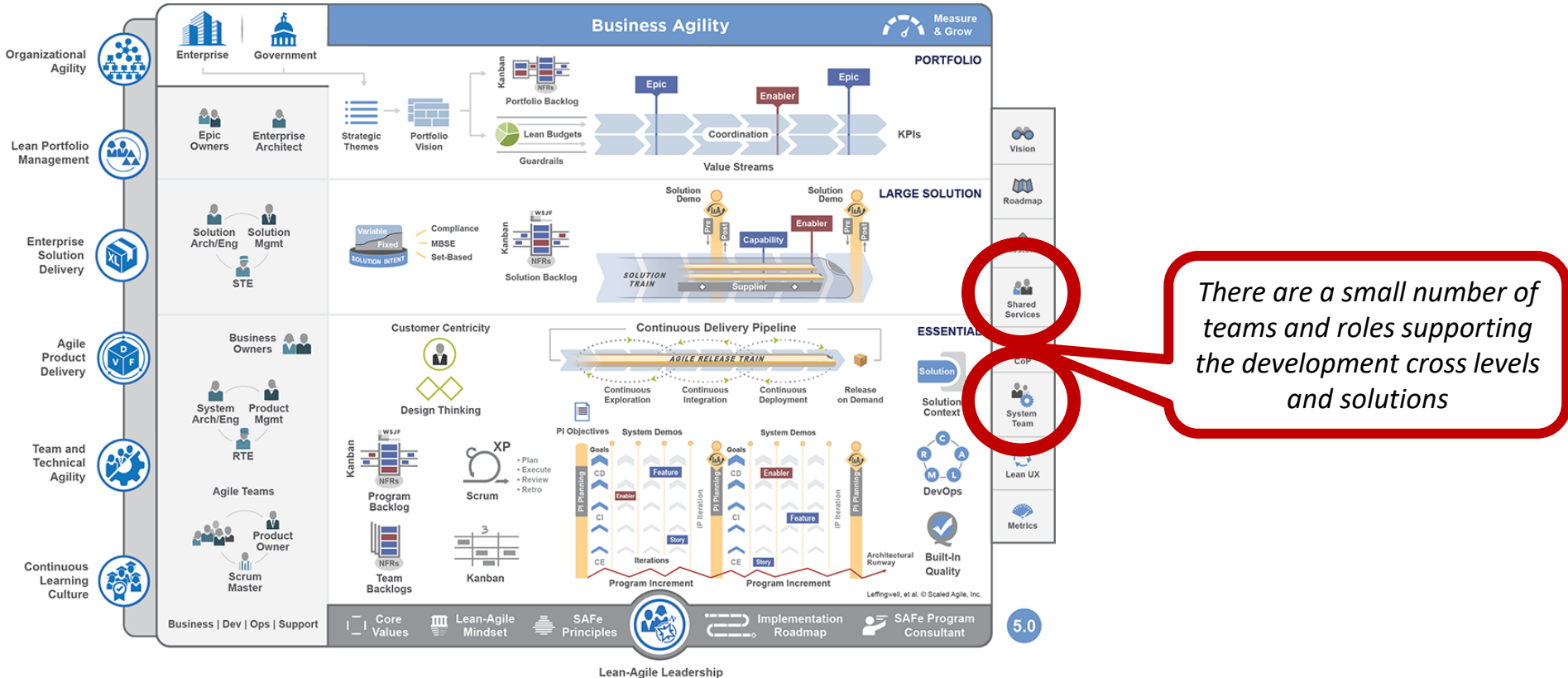
Research and Advanced Engineering
Including innovation

Improvement
Way of working
Flow impediments
Processes, methods and tools

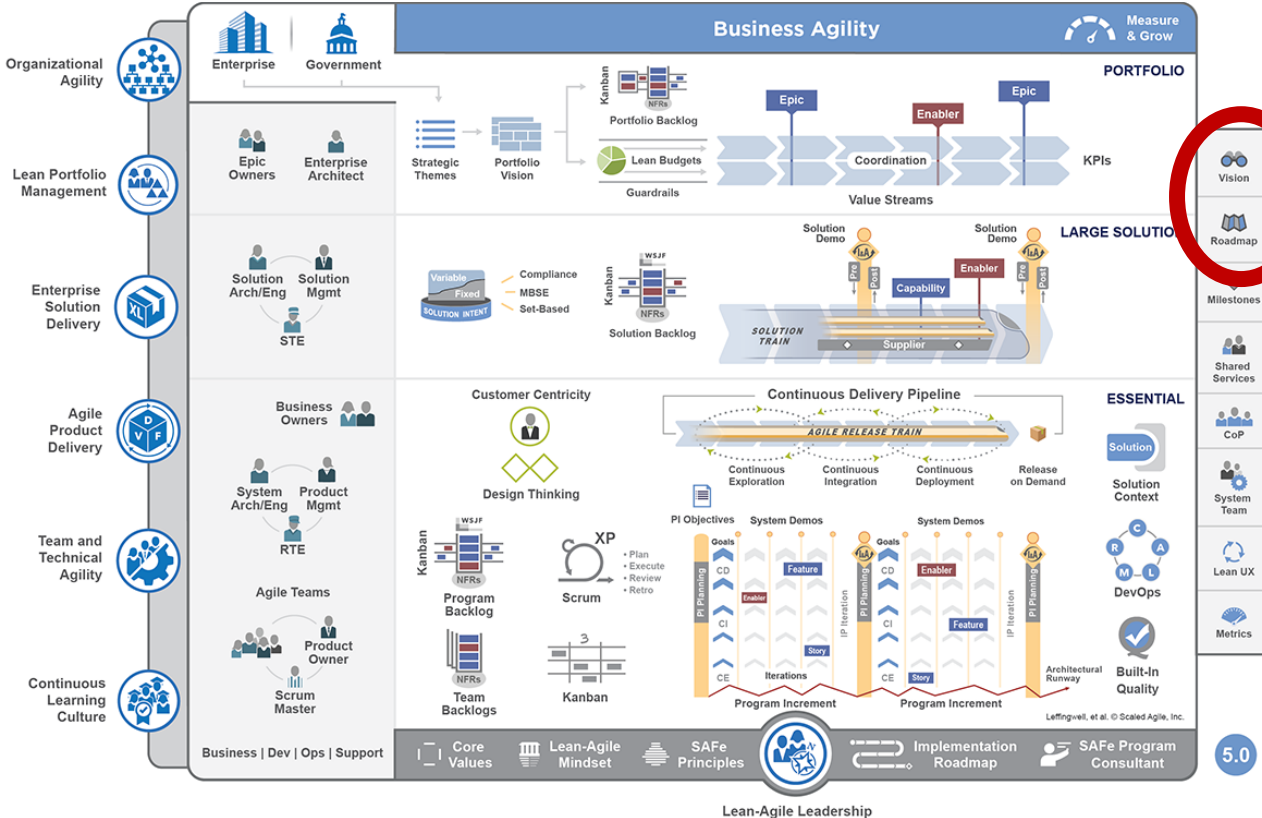
Guard band 15%
Buffer for committed work
Unexpected urgent work
Deliver on stretch items
Line activities

Always safe guard capacity to improve productivity and stay healthy over time

Cross collaboration - Shared Services and System Teams



Roadmap and Vision



- Vision
- Roadmap
- Milestones
- Shared Services
- CoP
- System Team
- Lean UX
- Metrics

The Roadmap is a schedule of events and Milestones that communicate planned Solution deliverables over a planning horizon.

The Vision is a description of the future state of the Solution under development. It reflects Customer and stakeholder needs and Capabilities.

Challenges and success factors of adopting SAgile

The main challenges involved in scaling up...

63%

The corporate culture is in conflict with agile principles

34%

There is insufficient training

20%

Equipment, data, and monitoring are fragmented

45%

Lack of support at management level

Source: Harvard Business Review 2020

... and the key factors to make scaled agile practices work

52%

In-house agile coaches

41%

Consistent practices and processes

48%

Support from the corporate hierarchy

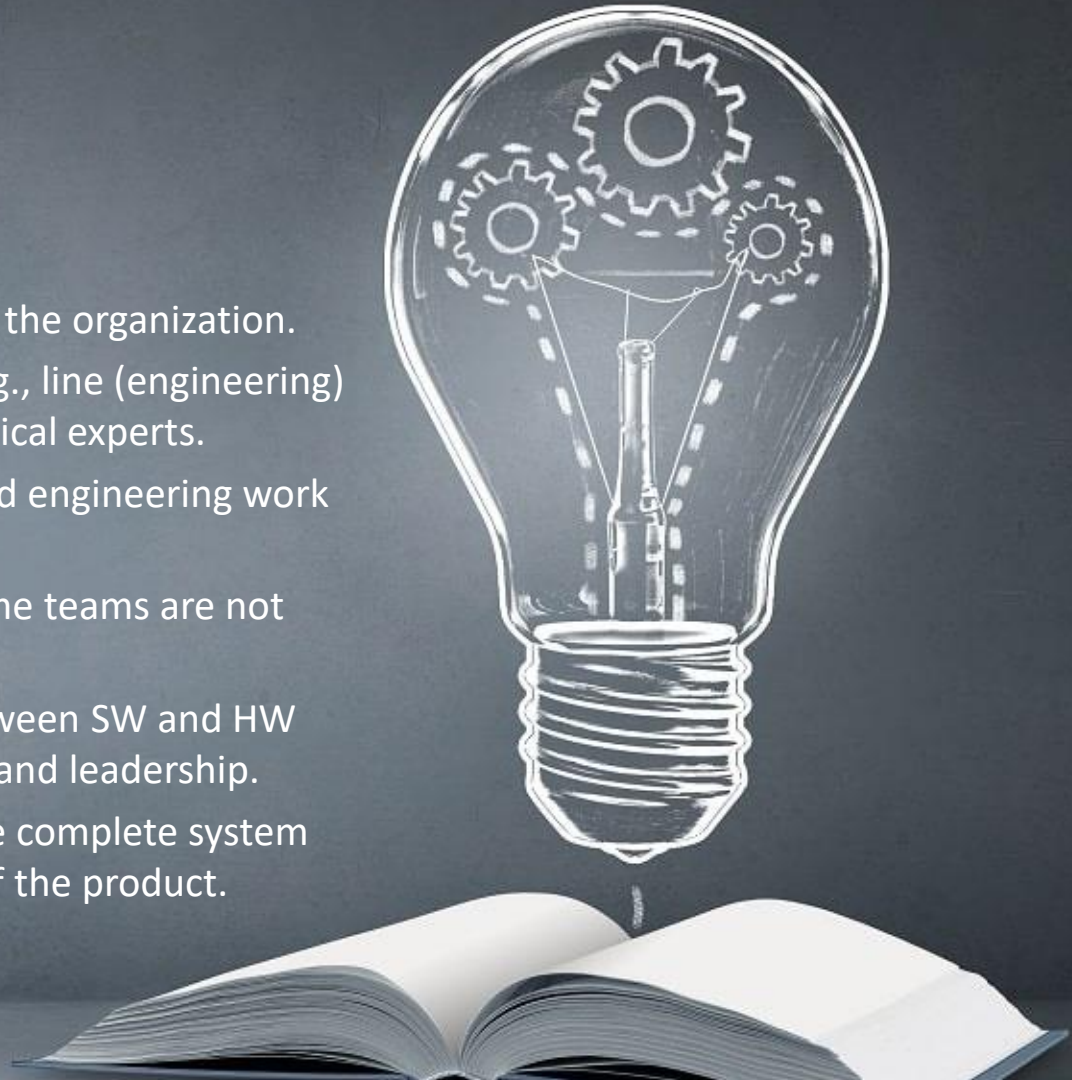
36%

Implementation of a tool shared by all teams

Source: Harvard Business Review 2020

Lessons learned

1. Do not mandate all SAFe roles in the organization.
2. Many other roles are needed, e.g., line (engineering) managers, project leaders, technical experts.
3. Balance between ceremonies and engineering work to assure timely delivery.
4. Be cautious of the fake agile, some teams are not meant for Scrum. React.
5. Acknowledge the difference between SW and HW related to development process and leadership.
6. Employ strong governance of the complete system development to assure quality of the product.
7. One size doesn't fit all.



What's in there to stay?

1. Scrum, Kanban, Scrumban, XP software development teams and related roles.
2. Continuous integration and continuous deployment (strong DevOps). Applicable to the development of both software and hardware electronics.
3. Prioritization and alignment – synchronization of the development and deliveries.
4. Data driven decisions and continuous feedback loops.
5. Quite many other agile, lean and SAFe practices that teams themselves find useful.

Is agile dead?

There is nothing wrong with agile and its principles, it's the mastery of scaling agile in pressured markets that is hard to achieve. Agile is not a silver bullet for all problems.

According to Prof. Bosch: [link](#) to blog

- BAPO (Business -> Architecture -> Process -> Organization)
- Feedback loops – are we investing into the right thing?
- Experimentation over comprehensive planning

Agile is not a silver bullet for assuring quality and increasing development speed.

