# Lesson 8
Building Large Solutions

1. Introducing the Scaled Agile Framework

2. Embracing a Lean-Agile Mindset

3. Understanding SAFe Principles

4. Experiencing PI Planning

5. Exploring, Executing, and Releasing Value

6. Leading the Lean-Agile Enterprise

7. Empowering a Lean Portfolio

8. Building Large Solutions

SAFe® Course Attending this course gives students access to the SAFe®
Lean-Agile Leader exam and related preparation materials.

Large Solution SAFe is used to coordinate multiple ARTs
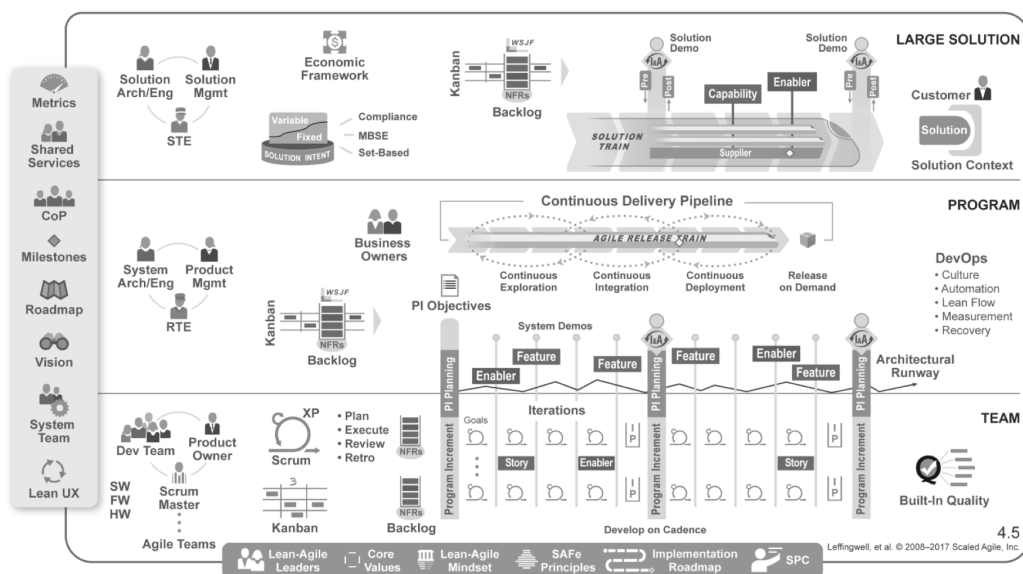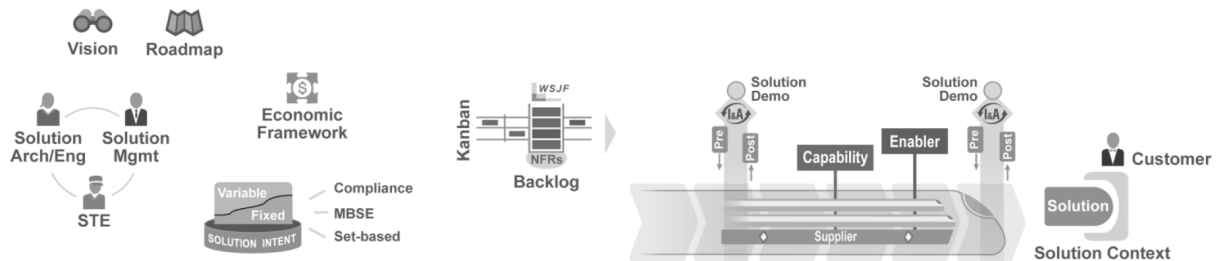
Learning objectives

8.1 Coordinate and integrate multiple ARTs and Suppliers

8.2 Define large solutions

8.1 Coordinate and integrate multiple ARTs and Suppliers

The Solution Train

Solution Trains align ARTs to a common mission.

ARTs power the Solution Train

▸ Each ART within a Solution Train contributes to the development of a large solution

▸ Solution Management, Solution Architect/Engineering and the Solution Train Engineer foster the coordination and the delivery of value
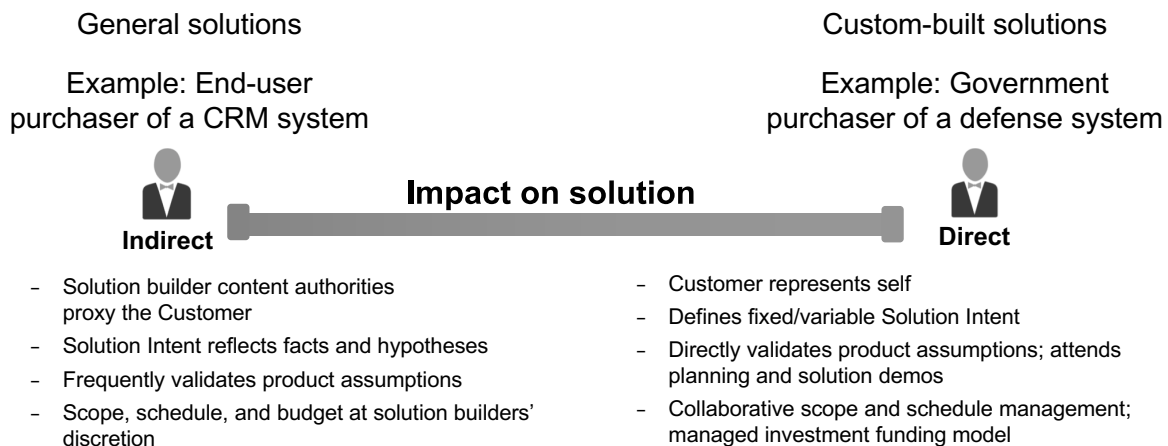
Suppliers play a key role in large solution development

▸ Suppliers often play a key role in Solution development. The overall Value Stream's agility is dependent on suppliers' agility.

▸ Lean-Agile suppliers are treated as another ART, participating in all Solution Train events

▸ Suppliers working in traditional methodologies work against Milestones, but are expected to attend Pre- and Post-PI Planning, Solution Demo and Solution Train Inspect and Adapt

▸ SAFe enterprises help suppliers improve their processes and become more Lean and Agile to the economic benefit of both organizations

SUPPLIER

Customer are inseparable from the development process

Customers are a critical aspect of development. Engaging them into the process depends on type of the solution and the customer's impact.

General solutions   Custom-built solutions

Example: End-user   Example: Government
purchaser of a CRM system   purchaser of a defense system

Impact on solution

Indirect   **Direct**

– Solution builder content authorities proxy the Customer

– Solution Intent reflects facts and hypotheses

– Frequently validates product assumptions

– Scope, schedule, and budget at solution builders' discretion

– Customer represents self

– Defines fixed/variable Solution Intent

– Directly validates product assumptions; attends planning and solution demos

– Collaborative scope and schedule management; managed investment funding model

Prepare with Pre- and Post-PI Planning meetings

▸ Typically attended by: Customers, STE, Solution Mgmt, Solution Architects/Eng, Solution Train stakeholders and select representatives from ARTs and Supplier

▸ Pre-meeting helps build an aligned plan for the next PI and match solution demand to ART capacities

▸ Post-meeting reviews, recaps, communicates and provides feedback

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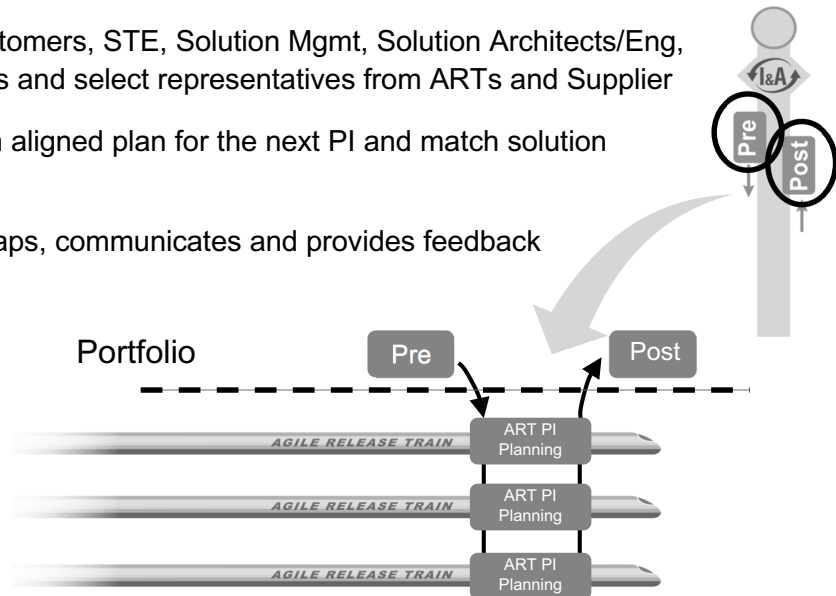
Pre-Planning structure

Pre

Time	
8:00-10:00	PI summary reports
10:00-10:30	Business context & Solution Vision
10:30-11:30	Top X Capabilities
11:30-13:30	Next PI features

Goals

▸ Align Product Managers, System Architects and other ART stakeholders to a common vision

▸ Prepare content for ART PI Planning

Input

▸ Results of the previous PI execution
  – Outcomes of the Solution Demo or, if delayed, ART demos
  – Roll-up of the Program Predictability Measure to the Solution Train

Output

▸ A set of features for every ART

▸ Updates to the ART visions

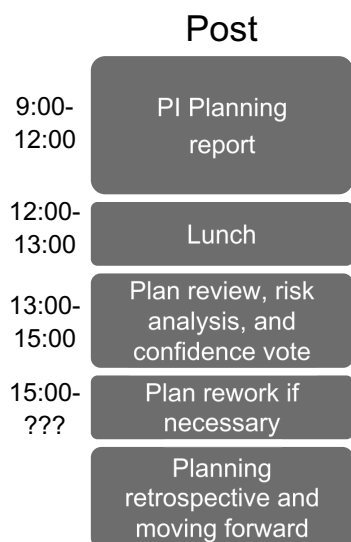## Solution Train management review and problem-solving

After the ARTs finish their management review and problem-solving, the STE facilitates a similar meeting for the Solution Train.

Common questions during the Solution Train management review and problem-solving:

▸ What new dependencies have we identified?

▸ Where do we need to adjust Vision? Scope? Resources?

▸ Where are the bottlenecks?

▸ What Capabilities must be de-scoped?

▸ What decisions must we make between now and tomorrow to address these issues?

Post-Planning structure

Post

Time	Activity
9:00-12:00	PI Planning report
12:00-13:00	Lunch
13:00-15:00	Plan review, risk analysis, and confidence vote
15:00-???	Plan rework if necessary
	Planning retrospective and moving forward

Goals
▸ Understand the PI plan for the entire Solution Train
▸ Make adjustments if necessary and communicate to the ARTs

Input
▸ Program PI Objectives from all ARTs
▸ Solution Train board
▸ Solution risks

Output
▸ Consolidated Solution Train PI Objectives
▸ Solution Train roadmap updates
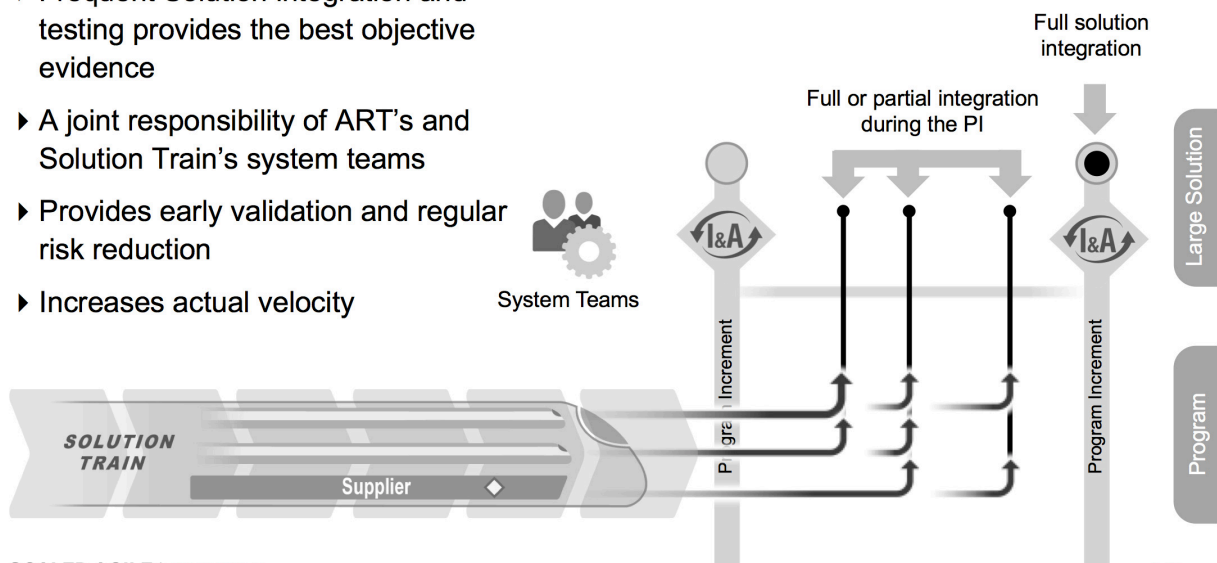
Verify fitness for purpose with the Solution Demo

▸ The Solution Demo is a major event in the life of the Solution

▸ The Solution Train demos a fully integrated Solution, showing accomplishments of the previous Program Increment

▸ Senior managers and high profile stakeholders review the progress

▸ Action and investment decisions are based on this objective evidence

Solution Demo

I&A

Pre

Post

Solution Demo requires frequent solution integration

▸ Frequent Solution integration and testing provides the best objective evidence

▸ A joint responsibility of ART's and Solution Train's system teams

▸ Provides early validation and regular risk reduction

▸ Increases actual velocity

System Teams

Full solution integration

Full or partial integration during the PI

I&A

I&A

Large Solution

Program Increment

Program Increment

Program

SOLUTION TRAIN

Supplier

Solution Train Inspect & Adapt

The Solution Train I&A workshop consists of three parts:

1. Solution Demo
2. Retrospective
3. Problem-solving workshop

Participants are representatives from ARTs and Suppliers building the Solution:

▸ Release Train Engineers, Solution Train Engineer, System and Solution Architect/Engineering, Product and Solution Management, Customers

▸ Portfolio stakeholders may also attend this workshop

Exercise: Why coordinate ARTs?

▸ At your table, discuss how Solution Train events are different from Agile Release Train events

▸ Focus on why this differentiation is important

PREPARE 5 min | SHARE 2 min

8.2 Define large solutions

Solution and Solution Context

▸ A Solution is uniquely associated with one
Value Stream. It is defined by Solution Intent.

▸ The Solution Context defines the environment in which
the solution operates:

- System of systems (e.g. avionics system as part of the
aircraft), product suite (word processor as part of an
office suite)

- Production infrastructure (e.g. cloud environment
where Solution is deployed)

- Other applications or systems in which the target
solution is integrated

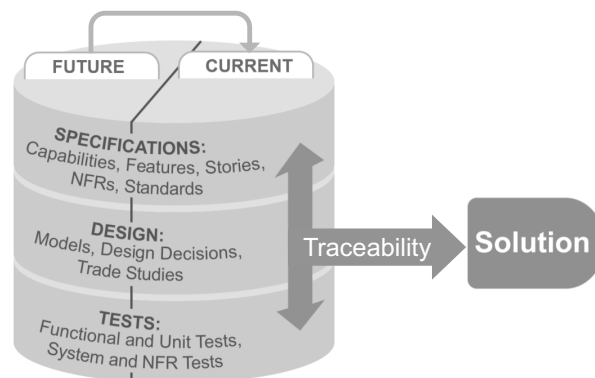Solution Context

Capabilities describe Solution behaviors

A Capability describes the higher level behaviors of a Solution.

▸ They are maintained in the Solution backlog and are prioritized using WSJF

▸ Written using a phrase, statement of benefits and acceptance criteria

▸ Must be structured to fit within a single PI

▸ Capabilities are split into Features for implementation

Solution Backlog
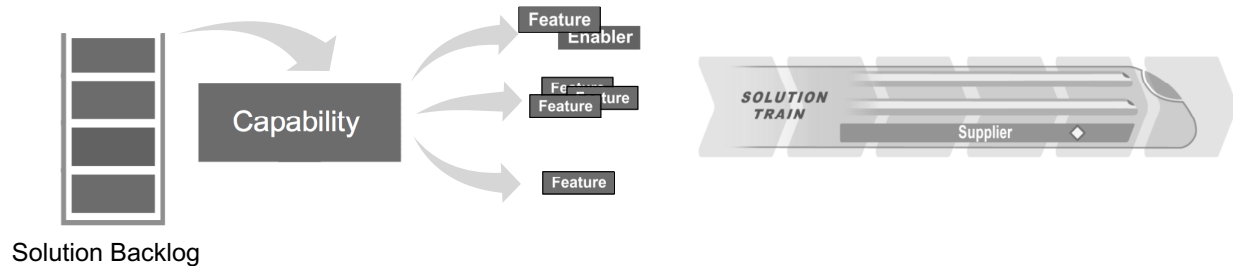
Capture knowledge in Solution Intent

Solution Intent:
Single source of truth as to the intended and actual behavior of the Solution

FUTURE   CURRENT

SPECIFICATIONS: Capabilities, Features, Stories, NFRs, Standards

DESIGN: Models, Design Decisions, Trade Studies

Traceability → Solution

TESTS: Functional and Unit Tests, System and NFR Tests

▸ Record and communicate requirements and design decisions

▸ Facilitate continuous exploration and analysis activities

▸ Align the Customer, the system builders and Suppliers to a common purpose

▸ Support compliance, contractual, traceability, high assurance

## Moving from variable to fixed Solution Intent
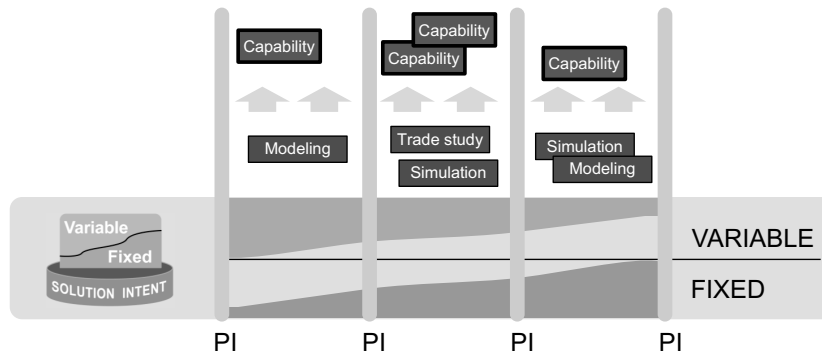
- Preserve flexibility to enable evolution towards optimum solution alternative
- To achieve that, fix only minimum requirements and designs
- Consider the rest as assumptions and hypotheses
- Validate assumptions continuously, through repetitive learning cycles (PIs)
- Drive exploration with Enablers
- Converge on well-defined (fixed) behaviors

Continuously evolve compliance documents

- Evolve specifications and compliance documents each increment
- Ensure alignment across all solution builders
- Generate specifications and compliance documents from models to ensure single source of truth
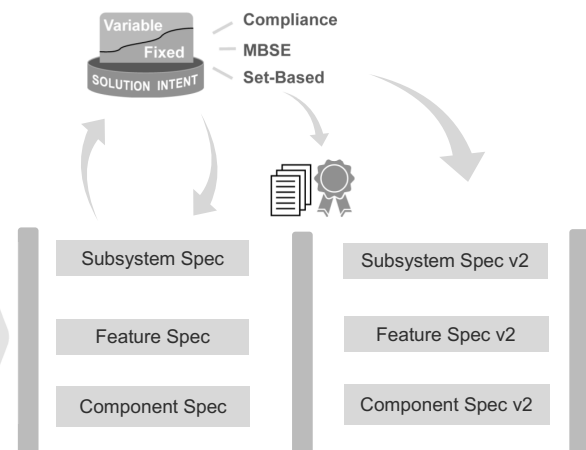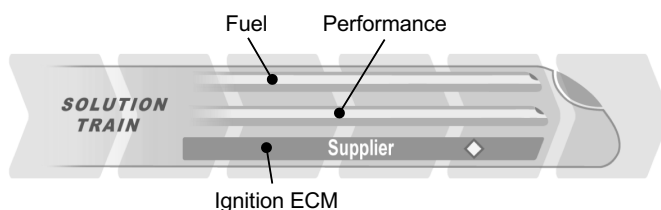
## Exercise: Fixed or variable part of your Solution Intent?

▸ Consider three or four upcoming requirements for your Solution

▸ Are they considered fixed or variable?

▸ Are there any aspects of "fixed" that would still allow for some flexibility?

▸ In either case, how might variability lead to better economic outcomes?

10 min

Lesson summary

In this lesson, you learned how to:

▸ Coordinate and integrate multiple ARTs and Suppliers with Pre and Post-PI Planning, Solution demos, and Solution Train Inspect and Adapt

▸ Define large solutions
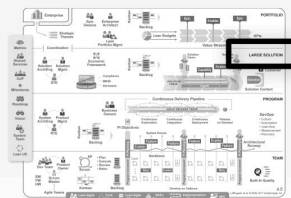
Suggested Scaled Agile Framework reading: "Large Solution Level" article