SAFe® for Teams

Establishing Team Agility for Agile Release Trains

5.0.1

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

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SAFe® for Lean Enterprises

Full Configuration

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Portfolio Configuration

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Large Solution Configuration

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Essential Configuration

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BUSINESS AGILITY

MEASURE & GROW

Enterprise Solution Delivery

- Apply Lean system engineering to build really big systems
- Coordinate and align the full supply chain
- Continually evolve live systems

Lean System and Solution Engineering

Coordinating Trains and Suppliers

Continually Evolve Live Systems

Lean Portfolio Management

- Align strategy, funding, and execution
- Optimize operations across the portfolio
- Lightweight governance empowers decentralized decision-making

Strategy & Investment Funding

Lean Governance

Agile Portfolio Operations

Agile Product Delivery

- The customer is the center of your product strategy
- Develop on cadence and release on demand
- Continuously explore, integrate, deploy, and innovate

Customer Centricity & Design Thinking

Develop on Cadence Release on Demand

DevOps and the Continuous Delivery Pipeline

Customer Centricity

Organizational Agility

- Create an enterprise-wide, Lean-Agile mindset
- Lean out business operations
- Respond quickly to opportunities and threats

Lean-thinking People and Agile Teams

Lean Business Operations

Strategy Agility

Team And Technical Agility

- High-performing, cross-functional, Agile teams
- Business and technical teams build business solutions
- Quality business solutions delight customers

Agile Teams

Teams of Agile Teams

Built-in Quality

Lean-Agile Leadership

- Inspire others by modeling desired behaviors
- Align mindset, words, and actions to Lean-Agile values and principles
- Actively lead the change and guide others to the new way of working

Leading by Example

Mindset & Principles

Leading Change

Continuous Learning Culture

- Everyone in the organization learns and grows together
- Exploration and creativity are part of the organization's DNA
- Continuously improving solutions, services, and processes is everyone's responsibility

Learning Organization

Innovation Culture

Relentless Improvement

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SAFe® Implementation Roadmap

SCALED AGILE®

1/23/20 scaledagileframework.com/implementation-roadmap

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SAFe® Courses and Certifications

Course	Description	Certification
Leading SAFe®	Thriving in the Digital Age with Business Agility	SA SAFe 5 *with SAFe® 5 Agilist Certification*
Implementing SAFe®	Achieving Business Agility with the Scaled Agile Framework	SPC SAFe 5 *with SAFe® 5 Program Consultant Certification*
SAFe® for Government	Applying Lean-Agile Practices in the Public Sector with SAFe®	SGP SAFe 5 *with SAFe® 5 Government Practitioner Certification*
Lean Portfolio Management	Aligning Strategy with Execution	LPM SAFe 5 *with SAFe® 5 Lean Portfolio Manager Certification*
SAFe® Product Owner/Product Manager	Delivering Value through Effective Program Increment Execution	POPM SAFe 5 *with SAFe® 5 Product Owner/Product Manager Certification*
Agile Product Management	Using Design Thinking to Create Valuable Products in the Lean Enterprise	APM SAFe 5 *with SAFe® 5 Agile Product Manager Certification*
SAFe® Scrum Master	Applying the Scrum Master Role within a SAFe® Enterprise	SSM SAFe 5 *with SAFe® 5 Scrum Master Certification*
SAFe® Advanced Scrum Master	Advancing Scrum Master Servant Leadership with SAFe®	SASM SAFe 5 *with SAFe® 5 Advanced Scrum Master Certification*
SAFe® Release Train Engineer	Facilitating Lean-Agile Program Execution	RTE SAFe 5 *with SAFe® 5 Release Train Engineer Certification*
SAFe® for Architects	Architecting for Continuous Value Flow with SAFe®	ARCH SAFe 5 *with SAFe® 5 Architect Certification*
SAFe® DevOps	Optimizing Your Value Stream	SDP SAFe 5 *with SAFe® 5 DevOps Practitioner Certification*
SAFe® for Teams	Establishing Team Agility for Agile Release Trains	SP SAFe 5 *with SAFe® 5 Practitioner Certification*
Agile Software Engineering	Enabling Technical Agility for the Lean Enterprise	ASE SAFe 5 *with SAFe® 5 Agile Software Engineer Certification*

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Digital Workbook User Guide

Frequently Asked Questions

Q: How can I take notes in my digital workbook?

A: After each lesson, there is a notes page that allows you to type notes directly into the workbook. Remember to save your workbook to your personal computer to save any content you may have added.

If you open the digital workbook with a product like Adobe Acrobat, there are functions that allow you to add your own text boxes, add bookmarks, highlight text, and add comments. Remember to save your workbook to your personal computer to save any content you may have added.

For additional assistance in annotating your digital workbook, please refer to the tutorials and support articles for the PDF reader of your choice.

Q: What other features are included in the digital workbook?

A: Action plan slides are followed by editable digital action plan worksheets. All videos have a hyperlink directly below the slide that will take you to the correct URL. If you click on assets in the front matter, you will be taken to resources on the Scaled Agile Framework website, like the Implementation Roadmap and course certification pages.

Q: How do I fill out the action plan in my digital workbook?

A: To add text to a blue text field, click within the blue box and type. Remember to save your workbook to your personal computer to save any content you may have added.

Q: Is my digital workbook saved on the community platform?

A: The original digital workbook file will always be available to you in your Learning Plan on the SAFe Community Platform. However, any text or content added to your digital workbook must be saved on your personal computer. Remember to save your workbook to your personal computer to save any content you may have added.

Q: Can I share my digital workbook with my coworkers?

A: No. You cannot share your digital workbook. It is for personal use only, so you may not reproduce or distribute it.

Q: Can I print the digital workbook?

A: Yes. You may print the digital workbook for your personal use. The file is letter sized and full color, so make sure to adjust your printing preferences accordingly.

SAFe® for Teams

Establishing Team Agility for Agile Release Trains

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

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Logistics

- Course meeting times
- Breaks
- Eliminate distractions
- Ask questions
- Be patient
- Working agreements

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Course goals

At the end of this course you should be able to:

- Apply SAFe to scale Lean and Agile delivery in your Enterprise
- Know your team and its role on the Agile Release Train
- Know all other teams on the train, their roles, and the dependencies between teams
- Plan Iterations
- Execute Iterations and demonstrate value
- Plan program increments
- Integrate with and work with other teams on the train

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Course map

- Lesson 1: Introducing SAFe
- Lesson 2: Building an Agile Team
- Lesson 3: Planning the Iteration
- Lesson 4: Executing the Iteration
- Lesson 5: Executing the Program Increment (PI)
- Lesson 6: Becoming a Certified SAFe Practitioner

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Activity: Introducing the SAFe Practitioner Action Plan

- **Step 1:** In your workbook you will find the *SAFe Practitioner Action Plan*
- **Step 2:** At the end of each lesson, you will have an opportunity to add ideas, insights, and improvement items as a takeaway from each of the lessons

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Lesson 1

Introducing SAFe

Learning Objectives:

1.1 Connect with the Scaled Agile Framework

1.2 Explore Lean, the Agile Manifesto, and SAFe Principles

1.3 Identify Scrum, Kanban, and Quality Practices

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

1.1 Connect with the Scaled Agile Framework

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How do we keep pace?

Our development methods must keep pace with an increasingly complex world.

- We've had Moore's Law for hardware, and now software is eating the world
- Our development practices haven't kept pace; Agile shows the greatest promise but was developed for small teams
- We need a new approach, one that harnesses the power of Agile and Lean and applies to the needs of the enterprises who build the world's most important software and systems

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Digital disruption is affecting every industry across the globe.
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We thought we'd be developing like this.
SCANNING
9

But sometimes,
it feels like this.

Agile doesn't fit our large complex and heavily regulated solutions
DevOps and Continuous Delivery are impossible in our environment
Budget processes inhibit Agility and innovation
Problems discovered too late
No way to improve systematically
Our leadership style and company culture clashes with Agility
Quality is low
Late delivery
Cannot release value when customers need it
Under-estimated dependencies
Technical debt is growing
Team-level Agile or ad hoc Agile processes are not enough
Poor morale
How can we complete when our retrospectives read like this?
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SAFe® for Lean Enterprises is a knowledge base of proven, integrated principles, practices, and competencies for achieving business agility by implementing Lean, Agile, and DevOps at scale.

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Why SAFe?

SAFe business benefits are derived directly from case studies written by SAFe customers

Source: https://v5.scaledagileframework.com/case-studies

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SAFe: Roots, past, present, and future
2011
Field experience at enterprise scale
Now…
SAFe 1.0
SAFe 2.0
SAFe 3.0
LSE
SAFe 4.0
SAFe 4.5
SAFe 4.6
SAFe 5.0
Lean product development | Agile development | DevOps | Systems thinking
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14

Seven Core Competencies of Business Agility
Execution
Strategy
Enterprise Solution Delivery
Agile Product Delivery
Team and Technical Agility
Customer Centricity
Lean Portfolio Management
Organizational Agility
Continuous Learning Culture
Lean-Agile Leadership
15

Lean-Agile Leadership provides the foundation

- Inspire others by modeling desired behaviors
- Align mindset, words, and actions to Lean-Agile values and principles
- Actively lead the change and guide others to the new way of working

Leading by Example

Mindset & Principles

Leading Change

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Team and Technical Agility is the engine

- High-performing, cross-functional Agile teams
- Business and technical teams build business Solutions
- Quality business Solutions delight Customers

Agile Teams

Teams of Agile Teams

Built-In Quality

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Agile Product Delivery provides the focus on Customer and execution

- The Customer is the center of your product strategy
- Develop on cadence and Release on Demand
- Continuously explore, integrate, deploy, and innovate

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Organizational Agility provides the flexibility to change

- Create an enterprise-wide, Lean-Agile mindset
- Lean out business operations
- Respond quickly to opportunities and threats

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Continuous Learning Culture transforms the culture

- Everyone in the organization learns and grows together
- Exploration and creativity are part of the organization's DNA
- Continuously improving solutions, services, and processes is everyone's responsibility

Learning Organization

Innovation Culture

Relentless Improvement

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Enterprise Solution Delivery drives delivery of highly complex systems

- Apply Lean system engineering to build really big systems
- Coordinate and align the full supply chain
- Continually evolve live systems

Lean System and Solution Engineering

Coordinate Trains and Suppliers

Continually Evolve Live Systems

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Lean Portfolio Management aligns execution to strategy

- Align strategy, funding, and execution
- Optimize operations across the portfolio
- Lightweight governance empowers decentralized decision-making

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SAFe configurations

Four configurations provide the right Solution for each Enterprise.

Full Configuration

Large Solution Configuration

Portfolio Configuration

Essential Configuration

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Positioning an Agile Team in a SAFe Enterprise

Essential SAFe contains:

Roles and activities, and events and processes which Agile Teams use to build and deliver value in the context of the ART

Agile Teams

Agile Release Train

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1.2 Explore Lean, the Agile Manifesto, and SAFe Principles

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SAFe House of Lean

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Value

Achieve the shortest sustainable lead time with:

- The best quality and value to people and society
- High morale, safety, and Customer delight

There is only one boss. The customer. And he can fire everybody in the company.
—Sam Walton

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Respect for people and culture

- Generative culture
- People do all the work
- Your Customer is whoever consumes your work
- Build long-term partnerships based on trust
- To change the culture, you have to change the organization

Culture eats strategy for breakfast.
—Peter Drucker

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Flow

- Optimize sustainable value delivery
- Build in quality
- Understand, exploit, and manage variability
- Move from projects to products

Operating a product development process near full utilization is an economic disaster.
—Don Reinertsen

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Innovation

- Innovative people
- Provide time and space for innovation
- Go see, "Gemba"
- Experimentation and feedback
- Innovation riptides
- Pivot without mercy or guilt

Innovation comes from the producer.
—W. Edwards Deming

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Relentless Improvement

- A constant sense of danger
- Optimize the whole
- Problem solving culture
- Base improvements on facts
- Reflect at key Milestones

Those who adapt the fastest win.

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Leadership

- Lead by example
- Adopt a growth mindset
- Exemplify the values and principles of Lean-Agile and SAFe
- Develop people
- Lead the change
- Foster psychological safety

People are already doing their best;
the problems are with the system.
Only management can change the system.
—W. Edwards Deming

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Activity: Assessing a Lean mindset

Duration 5 min

- **Step 1:** Assess where your team stands in embracing a Lean mindset.
- **Step 2:** Discuss the results of the self-assessment. Do you have similar low or high scores?

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Lean Mindset Self-Assessment

Step 1: Assess where your team stands in embracing a Lean mindset.

Step 2: Discuss the results of the self-assessment. Do you have similar low or high scores?

	(low) 1	2	3	4	(high) 5
Value delivery					
Respect for people and culture					
Flow					
Innovation					
Relentless improvement					
Leadership					

Notes

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The Agile Manifesto

We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to value:

Individuals and interactions over processes and tools

Working software over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

agilemanifesto.org

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The Agile Manifesto Principles

1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference for the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.

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The Agile Manifesto Principles

7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity—the art of maximizing the amount of work not done—is *essential.*
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

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Activity: Agile Manifesto principles

Prepare 5 min

Share 3 min

- **Step 1:** Review the principles behind the Agile Manifesto
- **Step 2:** Select one or more principles in your group
- **Step 3:** Discuss as a team how these principles apply in your context.
- **Step 4:** Provide an example of how you would apply one of the principles to your context and share with class

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SAFe® Lean-Agile Principles

#1 Take an economic view

#2 Apply systems thinking

#3 Assume variability; preserve options

#4 Build incrementally with fast, integrated learning cycles

#5 Base milestones on objective evaluation of working systems

#6 Visualize and limit WIP, reduce batch sizes, and manage queue lengths

#7 Apply cadence, synchronize with cross-domain planning

#8 Unlock the intrinsic motivation of knowledge workers

#9 Decentralize decision-making

#10 Organize around value

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Video link: https://vimeo.com/320364003/fcc9769bc6

Agile economics: Deliver early and often

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Use Iterations and Program Increments to learn quickly

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Base milestones on objective evaluation of working systems

- Build the system in increments, each of which is an integration point that demonstrates some evidence of the feasibility of the solution in process.
- Milestones based on objective evaluation of working systems.

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Visualize and limit WIP, reduce batch size, and manage queue lengths

Little's Law

$$W_q = \frac{L_q}{\lambda}$$

Average wait time = average queue length / average processing rate

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Visualize and limit work in progress

One team's big visible information radiator (BVIR)

How is this team doing? How do you know that?

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Activity: Experience a large batch size

Duration 5 min

- **Step 1:** Create groups of five people with 10 coins per group. Designate one person as the timekeeper. The remaining four people will be processing the coins.
- **Step 2:** Person by person, flip the 10 coins one at a time, recording your own results (heads or tails).
- **Step 3:** Pass all 10 coins at the same time to the next person who repeats Step 2, until all four members complete the task.
- **Step 4:** The timekeeper stops the timer and records the total time.

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Activity: Experience a small batch size

Duration 5 min

- **Step 1:** Make sure the timekeeper is ready to start the timer
- **Step 2:** This time, each person flips one coin at a time, records the result (heads or tails), and immediately passes the coin to the next person
- **Step 3:** The timekeeper will stop the timer when the last person flips the last coin and then records the result

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Part 1: https://vimeo.com/256459905/5a104a61c5
Part 2: https://vimeo.com/256460187/3c08a15bd3
Part 3: https://vimeo.com/256460427/438210fe17

Reduce batch size for higher predictability

Principles of Product Development Flow, Don Reinertsen

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Apply cadence, synchronize with cross-domain planning

Cadence-based planning limits variability.

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1.3 Identify Scrum, Kanban, and Quality Practices

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From traditional development to Agile

Instead of a large group...

...working on all of the requirements...

...and integrating and delivering value toward the end of development,

Have small teams working together as a program...

...working on small batches of requirements...

...and delivering value in short timeboxes with frequent integration and improvement cycles.

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Agile for teams: Scrum

- Roles:
  - Agile Team
  - Scrum Master (SM)
  - Product Owner (PO)
- Events:
  - Iteration Planning
  - Daily stand-up (DSU)
  - Iteration review
  - Iteration retrospective

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Agile for teams: Kanban

Visualize work flow. Limit work in process. Improve flow.

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Video: Designing your team's Kanban system

Duration 4 min

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Video link: https://vimeo.com/339425532/e05c067fbf

Quality practices provides the basis for Technical Agility

Examples for quality practices inspired from eXtreme Programming (XP)

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Teams in SAFe are part of an Agile Release Train

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The ART and teams continuously deliver value

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Taking Action: Mindset, principles, and practices

Prepare 5 min

Share 3 min

- **Step 1:** Think about the topics we discussed about Lean-Agile Mindset, the Agile Manifesto, the SAFe Principles and the Scrum, Kanban and quality practices
- **Step 2:** As a team, brainstorm 1-3 actions you could take to improve in any of those areas
- **Step 3:** Individually, write down one idea in your Action Plan and share with the class

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SAFe Practitioner Action Plan

Lesson 1:
Introducing SAFe

#1 Take an economic view

#2 Apply systems thinking

#3 Assume variability; preserve options

#4 Build incrementally with fast, integrated learning cycles

#5 Base milestones on objective evaluation of working systems

#6 Visualize and limit WIP, reduce batch sizes, and manage queue lengths

#7 Apply cadence, synchronize with cross-domain planning

#8 Unlock the intrinsic motivation of knowledge workers

#9 Decentralize decision-making

#10 Organize around value

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Step 1: Think about the topics we discussed about Lean-Agile Mindset, the Agile Manifesto, the SAFe Principles and the Scrum, Kanban and quality practices

Step 2: As a team, brainstorm 1-3 actions you could take to improve in any of those areas

Step 3: Individually, write down one idea in your Action Plan and share with the class

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Lesson review

In this lesson you:

- Connected with SAFe
- Explored Lean, the Agile Manifesto, and SAFe Principles
- Identified Scrum, Kanban, and XP practices

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Lesson 1 notes

Enter your notes below:

67e5rtygsdfgsdfgsdfg

Reminder: If using a digital workbook, save your PDF often so you don't lose any of your notes.

Lesson 2

Building an Agile Team

Learning Objectives:

2.1 Build your team

2.2 Explore the Scrum Master and Product Owner roles

2.3 Meet the teams and people on the train

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

2.1 Build your team

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The power of a high performing team

We, the work, and the knowledge are all one.

- A self-organizing team dynamically interacts with itself and the organization.
- Team members create new points of view and resolve contradictions through dialogue
- The team is energized with intentions, vision, interest, and mission
- Leaders provide autonomy, variety, trust, and commitment

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Teams create and challenge norms

- There is creative chaos via demanding performance goals
- The team is challenged to question every norm of development
- Equal access to information at all levels is critical

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Build cross-functional Agile Teams

- Agile teams are cross-functional, self-organizing entities that can define, build test, and where applicable, deploy increments of value
- They are optimized for communication and delivery of value
- They deliver value every two weeks

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Discussion: Agile Teams in your workplace

Prepare 5 min
Share 3 min

- **Step 1:** Discuss these questions
  - What would a cross functional team look like at your workplace?
  - How would this change the results your team delivers?
- **Step 2:** Be prepared to share with the class

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Activity: Experience teams – Purpose

Duration 5 min

Purpose

- Experience how an Agile Team functions
- Get as many balls through the team as possible within two minutes
- After two minutes, the team is allowed an additional minute (one minute retrospective) to discuss the process and how it could be improved. The game is played a total of three times. (Three two minute Iterations).

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Activity: Experience teams – Rules

Duration 5 min

Rules

- Everyone is part of one big team
- Each ball must have air-time
- Each ball must be touched at least once by every team member
- Balls cannot be passed to your direct neighbor (to your immediate left or right)
- Each ball must return to the same person who introduced it into the system
- There are a total of three Iterations

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Activity: Experience teams

Prepare 15 min | Share 5 min

- **Step 1:** Organize into teams
- **Step 2:** As a team, estimate how many balls you think you can process in two minutes
- **Step 3:** Run the 2-minute Iteration following the rules (get as many balls through the team as possible)
- **Step 4:** Take one minute (run the 1-minute Retrospective) to discuss how you can improve the process

Note: To get credit, you must provide an estimate for the number of balls you think you can process before each iteration.

- **Step 5:** Summarize your experience as a team:
  - What were some of the challenges?
  - How were you able to improve the process with each Iteration?

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A co-located Agile Team is a key component of Agile development

Collocation is:

- Critical for the Agile Team to be effective
- Recommended for programs to have efficient product development flow
- If you have distributed team members, development must be compensated with efficient remote interaction (video-conferencing, sharing and collaboration tools, Agile lifecycle management tools, etc.)

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WHITEBOARDS
HIGHER PARTITIONS BETWEEN PODS
LOWER PARTITIONS BETWEEN TEAM WORKSPACES
INDIVIDUAL WORKSPACES
VIDEO CONFERENCING SCREEN

SEPARATE SHARED MEETING ROOM WITH VIDEO CAPABILITES
VIDEO CONFERENCING CAPABILITIES
PRIVATE PHONE CUBICLES NEARBY

Organize people in Value Streams

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Organizing teams around value

Maximize velocity by minimizing dependencies and handoffs, while sustaining architectural robustness and system qualities.

A team can be organized around:

- Features
- Components

It is far less desirable to organize around:

Software Example	Business Example
Architectural layer (Platform, middleware, UI, DB, business logic, etc.)	Service intake vs fulfilment vs customer interaction
Other (Programming language, spoken language, technology, location)	Business function
	Sub-process

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Finding the right trade-off: Feature and component teams

Use feature teams for:

- The fastest velocity
- To minimize dependencies
- To develop T-shaped skills

Use component teams in case of:

- High reuse, high technical specialization, and critical NFRs
- Creating each component as a 'potentially replaceable part of the system with well-defined interfaces'

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Feature Team A
Feature Team B
Presentation Layer
Business Logic
Database
Linux Kernel
New Feature A
New Feature B

Component Teams
PO
SM
Presentation Layer
Business Logic
Database
Linux Kernel
New Feature A
New Feature B

Activity: Building your team

Prepare 10 min

Share 5 min

- **Step 1:** As a team, discuss each team member's responsibilities and skill sets.
- **Step 2:** Create your team name. Note: Team names should not be the names of components, subsystems, or Feature areas. Instead, create a fun name, a team mascot, and a team cheer.
- **Step 3:** Discuss your role as a feature or component team.
- **Step 4:** Discuss what your team is responsible for and what other things you can do.
- **Step 5:** Prepare a short presentation about your team (team name, role on the train, and special skills on the team that other teams should know about).

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2.2 Explore the Scrum Master and Product Owner roles

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Roles on the Agile Team

Agile Team

- Create and refine User Stories and acceptance criteria
- Define, build, test, and deliver Stories
- Develop and commit to team PI Objectives and Iteration plans
- Five to eleven members

Scrum Master

- Coaches the Agile Team and facilitates team meetings
- Removes impediments and protects the team from outside influence
- Attends scrum of scrum meetings

Product Owner

- Defines and accepts Stories
- Acts as the Customer for developer questions
- Works with Product Management to plan Program Increments (PI)

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The Scrum Master in the Enterprise

- Coordinates with other Scrum Masters, the System Team, and shared resources in the ART PI Planning meetings
- Works with the above teams throughout each Iteration and PI
- Coordinates with other Scrum Masters and the Release Train Engineer in Scrum of Scrums
- Helps team understand and operate within its capacity
- Helps teams operate under architectural and portfolio governance, system-level integration, and System Demos
- Fosters team adoption of Agile technical practices

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The Product Owner in the Enterprise

- Establishes the sequence of backlog items based on program priorities, events, and dependencies with other teams
- Operates as part of an extended Product Management Team
- Understands how the Enterprise backlog structure operates with Epics, Capabilities, Features, and Stories
- Uses PI Objectives and Iteration Goals to communicate with management
- Coordinates with other Product Owners, the System Team, and shared services in the PI Planning meetings
- Works with other Product Owners and the Product Management team throughout each Iteration and PI

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Activity: Scrum roles and responsibilities

Prepare 8 min

Share 2 min

- **Step 1:** With your team, draw the following Venn diagram on a flipchart sheet
- **Step 2:** Review the responsibility cards
- **Step 3:** Place them either in the role or at an intersection of the Venn diagram
- **Step 3:** Present your Venn diagram to the class

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2.3 Meet the teams and people on the train

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The Agile Release Train (ART)

- Each ART is a virtual organization of 5 – 12 teams (typically 50 – 125 people) that plans, commits, and develops and deploys together.
- Agile Release Trains:
  - Align teams to a common business and technology mission
  - Deliver a continuous flow of value

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Roles on the Agile Release Train

Product Management owns, defines, and prioritizes the Program Backlog.

- **Release Train Engineer** acts as the chief Scrum Master for the train.
- **Product Management** owns, defines, and prioritizes the Program Backlog.
- **System Architect/Engineering** provides architectural guidance and technical enablement to the teams on the train.
- **System Team** provides processes and tools to integrate and evaluate assets early and often.
- **Business Owners** are key stakeholders on the Agile Release Train.

AGILE RELEASE TRAIN

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Activity: Know the people on the train

Prepare 20 min

- **Step 1:** The RTE introduces him/herself
- **Step 2:** The RTE presents the main players on the train:
  - Product Management
  - System Architect/Engineering
  - Lean UX
  - Shared Services
- **Step 3:** Each team presents itself (name, area of responsibility, special skills)

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Action Plan: The Agile Team

Prepare 5 min

Share 3 min

- **Step 1:** Think about the topics we discussed in this lesson
- **Step 2:** As a team, brainstorm one to three actions you could take to improve in any of those areas
- **Step 3**: Individually write down one idea in your Action Plan and then share it with the class

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Lesson 2:
Building an Agile Team

Step 1: Think about the topics we discussed in this lesson

Step 2: As a team, brainstorm one to three actions you could take to improve in any of those areas

Step 3: Individually write down one idea in your Action Plan and then share it with the class

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Lesson review

In this lesson you:

- Built your team and learned about their roles
- Explored the roles of the Scrum Master and the Product Owner
- Met the people and teams on the train and learned about their roles

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Lesson 2 notes

Enter your notes below:

Reminder: If using a digital workbook, save your PDF often so you don't lose any of your notes.

Lesson 3

Planning the Iteration

Learning Objectives:

3.1 Prepare the backlog

3.2 Plan the Iteration

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

3.1 Prepare the backlog

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Define Features for the Program Backlog

Features are services that fulfill user needs.

- Feature is an industry-standard term familiar to marketing and Product Management
- Expressed as a phrase, value is expressed in terms of benefits
- Features are identified, prioritized, estimated, and maintained in the Program Backlog

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Features have a benefit hypothesis and acceptance criteria

- Feature is an industry-standard term that describes a specific system behavior
- Benefit hypothesis justifies Feature implementation cost and provides business perspective when making scope decisions
- Acceptance criteria is typically defined during Program Backlog refinement
- Features reflect functional and nonfunctional requirements
- Features fit into one PI

Feature:

- In-service software update

Acceptance Criteria:

- Nonstop routing availability
- Automatic and manual update support
- Rollback capability
- Support through existing admin tools
- All enabled services are running after the update

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Features have a benefit hypothesis and acceptance criteria

Software Example

Multi-factor Authentication

Benefit hypothesis

Enhanced user security will reduce risk of a system data breach

Acceptance criteria

1. USB tokens as a first layer
2. Password authentication second layer
3. Multiple tokens on a single device
4. User activity log reflecting both authentication factors
5. Data breach tests pass

Business Example

Create GDPR Incident Response Plan

Benefit hypothesis

Organizational readiness to quickly respond to incidents

Acceptance criteria

1. Incident response plan is fully documented
2. Incident response plan is reviewed and approved by PO
3. Incident response is compliant with legal requirements

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The Team Backlog

- Contains all the work for the team
- Created by the Product Owner and the team
- Prioritized by the Product Owner
- Contains user and Enabler Stories
  - User stories provide Customers with value
  - Enabler Stories build the infrastructure and architecture that makes user stories possible
- Stories in the backlog are prioritized
- Stories for the next Iteration are more detailed than Stories for later Iterations
- Nonfunctional requirements (NFRs) are a constraint on the backlog

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User stories

User stories are:

- Short descriptions of a small piece of desired functionality, written in the user's language
- Recommended form of expression is the user-voice form, as follows:
  As a (user role), I want to (activity), so that (business value)

As a driver, I want to limit the amount of money before I fuel so that I can control my expenditure.

As a driver, I want to get a receipt after fueling so that I can expense the purchase.

As the Finance Department, we want to print receipts only for drivers who request them so that we save on paper.

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Using personas to better understand users

Personas are detailed fictional characters acting as a representative user.

Jane - Mileage sensitive
- Law-abiding driver
- Obeys all traffic signs
- Wants to save on gas

As Jane, I want to travel at the legal limit and operate in an energy saving manner so that I do not get a ticket and I save money

Bob - Time sensitive
- Impatient driver
- Ignores traffic signs if they slow him down

As Bob, I want to travel at the maximum speed the roadway and my vehicle safely allows so that I arrive quickly

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INVEST in a good Story

- Write Stories that can be developed separately
- Write Stories in which scope can be negotiated
- Write Stories that are valuable to the Customer
- Write Stories that can be estimated
- Write Stories that can fit in an Iteration
- Write Stories that are testable

I	Independent
N	Negotiable
V	Valuable
E	Estimable
S	Small
T	Testable

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Writing good Stories: The 3Cs

Card

Written on a card or in the tool and may annotate with notes

As a spouse, I want a clean garage so that I can park my car and not trip on my way to the door.

Conversation

The details are in a conversation with the Product Owner

What about the bikes?

Oh yeah, hang the bikes.

Confirmation

Acceptance criteria confirm the Story correctness

- Tools have been put away
- Items on the floor have been returned to the proper shelf
- Bikes have been hung

Source: 3Cs coined by Ron Jeffries

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Enabler Stories

Enabler Stories build the groundwork for future user stories. There are four types of Enabler Stories:

- **Infrastructure:** Build development and testing frameworks that enable a faster and more efficient development process
- **Architecture:** Build the Architectural Runway, which enables smoother and faster development
- **Exploration:** Build understanding of what is needed by the Customer to understand prospective Solutions and evaluate alternatives
- **Compliance:** Facilitate specific activities such as verification and validation, documentation, signoffs, regulatory submissions, and approvals

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Splitting Stories

- In support of small batches for flow, decrease size to minimum:
  - Split Stories into essential and non-essential parts and eliminate the non-essential
  - Ensure you have something releasable
- In support of feedback
  - Deploy small Stories to get technical/user feedback quickly (maximize feedback)
- In support of Iteration Planning:
  - Split Stories so they fit into an Iteration

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Apply some common splitting techniques

Splitting techniques:

- Business rule variations (e.g. single variation, then remainder)
- Workflow steps (for multi-step stories)
- Simple/complex (e.g. search for single word, then for phrases)
- Scenarios (e.g. use case exceptions)

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Activity: Break Features into Stories

Prepare 15 min

Share 5 min

Work with your team to break Features from the Program Backlog into Stories.

- **Step 1:** Select a Feature from the Program Backlog (your own or use the example provided in your workbook)
- **Step 2:** As a team, break the Feature into Stories in a way that they still retain a business value
- **Step 3:** Write them down on sticky notes and share some examples with the class

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Program Backlog Example Features

Feature:	**Flexible search**
Benefit:	Users will have a flexible, easy-to-use search capability to locate books.
Description:	Search by author, title, or genre from a single search field. Mispelling subsitutions (i.e., "Did you mean ..."). Present results as per-match algorithm.
Feature:	**Shopping Cart**
Benefit:	Users can manage items in a shopping cart for immediate or future purchase.
Description:	Users can easily access their cart from any page, view the same infromation displayed in the book list, change the quantity, remove it from their cart, or save it for later. A subtotal for all items in their shopping cart should be displayed at the bottom. Items saved for later should appear below that.
Feature:	**Purchase by credit card**
Benefit:	Users can purchase products from us (as soon as implemented–only beta up until then)
Description:	Users can select from their preferred credit card and shipping address as defined in their profile or add new ones. Visa, Mastercard, Discover, and Diners Club are required. American Express is optional. Must be PCI compliant.
Feature:	**Shipping method selection**
Benefit:	Users can select a shipping method based on cost, delivery speed, and carrier.
Description:	Users can select a shipping method based on the price, delivery speed, and estimated delivery date for all major carriers (USPS, UPS, and FedEx).
Feature:	**Profile management**
Benefit:	Users can create and maintain their profiles rather than enter in their information each time they order.
Description:	Users can manage their login credentials (ID, password), personal information (name, email address, home address), nickname for book rating and commenting, credit card information (multiple), and shipping address (multiple). Physical addresses, email addresses, and credit card info should be verified as valid. Passwords must meet current security standards.
Feature:	**Book detail**
Benefit:	Users can see informative and enticing details about a book.
Description:	Display book name, book cover (which can be enlarged when clicked), author and bio, book description, genre, publishing info (publisher, release date, etc.), book rating, and comments. Hyperlink author's name to a list of other books by the same author.
Feature:	**Book list sorting**
Benefit:	Users can sort a list of books in a number of ways to more easily find what they are looking for.
Description:	Sort by book title, author, price, book rating, and release date. Allow for users to select the number of search results to appear on each page.

Behavior-driven development: From ambiguity to precision

- Behavior is often first described in general terms, which can be ambiguous
- Specific examples of behavior provide better understanding
- The examples can directly become tests, or they can lead to specific behaviors which then are transformed into tests

Example

Discovery of behavior → Formulation of specific tests → Automation of tests

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Acceptance criteria

- Acceptance criteria provide the details of the Story from a testing point of view
- Acceptance criteria are created by the Agile Team

As a driver, I want to limit the amount of money before I fuel so that I can control my expenditure.

Acceptance criteria

1. **Given that the driver indicated a maximum amount of money When the fuel cost reaches the amount Then the fueling process stops automatically**
2. **...**

As a driver, I want to get a receipt after fueling so that I can expense the purchase.

Acceptance criteria

1. **Given that the fueling is over When driver asked for the receipt Then it is printed and includes: amount fueled, amount paid, tax, vehicle number, date, time**

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Sequencing Stories

- Primary economic prioritization happens in the Program Backlog. Agile Teams sequence work for efficient execution of business priorities.
- The Product Owner and the Team sequence work based on:
  - Story priorities inherited from Program Backlog priorities
  - Events, Milestones, releases, and other commitments made during PI Planning
  - Dependencies with other teams
  - Local priorities
  - Capacity allocations for defects, maintenance, and refactors
- Initial sequencing happens during PI Planning
- Adjustments happen at Iteration boundaries

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3.2 Plan the Iteration

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Plan and commit

Purpose	Define and commit to what will be built in the Iteration
Process	▸ The Product Owner defines what ▸ The team defines how and how much ▸ Four hours max
Result	Iteration Goals and backlog of the team's commitment
Reciprocal commitment	▸ Team commits to delivering specific value ▸ Business commits to leaving priorities unchanged during the Iteration

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Iteration Planning flow

1. Establishing capacity
2. Story analysis and estimating
3. Detailing Stories
4. Developing Iteration goals
5. Committing to Iteration goals

Iteration Planning

- **Timebox: Four hours or less**
- **This meeting is by and for the team**
- **SMEs may attend as required**

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Capacity allocation for a healthy balance

- By having capacity allocation defined, the Product Owner doesn't need to prioritize unlike things against each other
- Once the capacity allocation is set, the PO and team can prioritize like things against each other

Capacity allocation

- **Helps alleviate velocity degradation due to technical debt**
- **Keeps existing Customers happy with bug fixes and enhancements**
- **Can change at Iteration or PI boundaries**

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Using size to estimate duration

Establish velocity by looking at the average output of the last Iterations.

Definition of Velocity

Velocity is the number of points of Stories accepted in the Iteration. Make sure to always use the average velocity for the the most recent Iterations.

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Establishing capacity before historical data exists

- For every full-time developer and tester on the team, give the team 8 points (adjust for part-timers)
- Subtract 1 point for every team member vacation day and holiday
- Find a small Story that would take about a half day to develop and a half day to test and validate, and call it a 1
- Estimate every other Story relative to that one
- Never look back (don't worry about recalibrating)

Example: Assuming a 7-person team composed of 3 developers, 2 testers, 1 Product Owner, and 1 Scrum Master, with no vacations, etc.

Exclude Scrum Master and Product Owner from the calculation.

Estimated Capacity = 5 X 8 pts = 40 pts/Iteration

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Story analysis and estimation

- The Product Owner presents Stories in order of priority
- Each Story
  - Is discussed and analyzed by the team
  - Has its acceptance criteria refined
  - Is estimated
- The process continues until the estimation of the Stories has reached the capacity of the team

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Estimate Stories with relative Story points

Compared with other Stories, an 8-point Story should take relatively four times longer than a 2-point story.

- A Story point is a singular number that represents:
  - Volume: How much is there?
  - Complexity: How hard is it?
  - Knowledge: What do we know?
  - Uncertainty: What's not known?
- Story points are relative. They are not connected to any specific unit of measure.

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Apply Estimating Poker for fast, relative estimating

Steps

1. Each estimator gets a deck of cards
2. A job is read
3. Estimators privately select cards
4. Cards are turned over
5. The team discusses differences
6. The team re-estimates

Mike Cohn, *Agile Estimating and Planning*, 2005

- Estimating Poker combines expert opinion, analogy, and disaggregation for quick but reliable estimates
- All team members participate

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Estimation is a whole-team exercise

- Increases accuracy by including all perspectives
- Builds understanding
- Creates shared commitment

Warning: Estimation performed by a manager, Architect, or select group negates these benefits.

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How much time to spend estimating

A little effort helps a lot. A lot of effort only helps a little.

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Activity: Estimate Stories

Prepare 10 min

Share 3 min

- **Step 1:** As a team, use the Estimating Poker cards to estimate the Stories you previously created.
- **Step 2:** Share with the class:
  - Where do you find challenges when engaged in Story estimation?
  - Are you as a team aligned around the combination of qualities that represent a Story point (volume, complexity, knowledge, uncertainty)?

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Detailing Stories

Detailing Stories is mostly used by beginner teams. Team members discuss:

- Who would be the best person to accomplish it?
- Approximately how long would it take?
- What are dependencies it may have to other Stories?

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Iteration goals

Iteration goals provide clarity, commitment, and management information. They serve three purposes:

- Align team members to a common purpose
- Align Program Teams to common PI Objectives and manage dependencies
- Provide continuous management information

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Iteration goals: Examples

Software Example

Iteration Goals

1. Finalize and push last name search and first name morphology
2. Index 80% of remaining data
3. Other Stories:
   - Establish search replication validation protocol
   - Refactor artifact dictionary schema

Business Example

Iteration Goals

1. Roll out the GDPR incident report procedures
2. Prepare for external audit
3. Obtain approvals for financial report

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Commit to the Iteration goals

Team commitments are not just to the work. They are committed to other teams, the program, and the stakeholders.

A team meets its commitment:

By doing everything they said they would do,

- or -

in the event that it is not feasible, they must immediately raise the concern.

Commitment

Too much holding to a commitment can lead to burnout, inflexibility, and quality problems.

Adaptability

Too little commitment can lead to unpredictability and lack of focus on results.

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Iteration planning for Kanban teams

- Some teams have a more responsive nature to their work, such as maintenance teams and System Teams
- These teams find less value in trying to plan the Iteration in detail
- Kanban teams still publish Iteration goals, which consist of the known parts of their work
- They commit to the goals as well as service level agreements (SLA) for incoming work based on their known historical lead time

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Video: Implementing Kanban

Duration 3 min

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Video link: https://vimeo.com/339425816/4312669c69

Taking action: Planning the Iteration

Prepare 5 min

Share 3 min

- **Step 1:** Think about the activities you were engaged in as a team
- **Step 2:** Brainstorm one to three actions you could take to improve in any of those areas related to Iteration Planning as a team
- **Step 3**: Individually write down at least one improvement item
- **Step 4:** Share one item you discussed as a team and one item you individually wrote in your Action Plan

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Lesson 3:
Planning the Iteration

Step 1: Think about the activities you were engaged in as a team

Step 2: Brainstorm one to three actions you could take to improve in any of those areas related to Iteration Planning as a team

Step 3: Individually write down at least one improvement item

Step 4: Share one item you discussed as a team and one item you individually wrote in your Action Plan

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Lesson review

In this lesson you:

- Prepared your backlog of Stories by breaking down Features
- Planned your Iteration using Story estimation

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Lesson 3 notes

Enter your notes below:

Reminder: If using a digital workbook, save your PDF often so you don't lose any of your notes.

Lesson 4

Executing the Iteration

Learning Objectives:

4.1 Visualize the flow of work

4.2 Measure the flow of work

4.3 Build quality in

4.4 Continuously integrate, deploy, and release

4.5 Improve flow with communication and synchronization

4.6 Demonstrate value

4.7 Retrospect and improve

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

4.1 Visualize the flow of work

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Visualize the flow of work

- What is the flow of work for your team?
- What are the steps it takes to get a Story to done?

Example: Flow of Work

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Setting WIP limits

- WIP limits improve the flow of work
- Some steps have no WIP limits, while others serve as buffers and have minimum as well as maximum WIP

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Activity: Visualize the flow of work

Prepare 8 min | Share 2 min

- **Step 1:** Consider the Stories you estimated in the previous lesson
- **Step 2:** Define the steps you need to turn the Stories into value
- **Step 3:** As a team, using a flip chart sheet or your Remote Group Document, build your current flow of work and assign WIP limits
- **Step 4:** Be prepared to share your flow of work with the class

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4.2 Measure the flow of work

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Track status with burn-up charts and cumulative flow diagrams (CFDs)

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Understand cumulative flow diagrams (CFD)

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What can you learn from a CFD?

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4.3 Build quality in

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Activity: Expressing “Build quality in”

Prepare 10 min

Present 5 min

- **Step 1:** As a team, discuss what building quality in means to you and your organization
- **Step 2:** Create a poster to reflect the different aspects of building quality in
- **Step 3:** Present your poster to the class

Poster

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Build quality in with Technical Agility

Building quality in:

- Ensures that every increment of the Solution reflects quality standards
- Is required for high, sustainable development velocity
- Software quality practices (most inspired by XP) include Continuous Integration, Test-First, refactoring, pair work, collective ownership, and more
- Hardware quality is supported by exploratory, early Iterations; frequent system-level integration; design verification; MBSE; and Set-Based Design

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Emergent design and intentional architecture

- Every team deserves to see the bigger picture.
- Every team is empowered to design their part.
- Emergent design -Teams grow the system design as user stories require
- Intentional architecture - Fosters team alignment and defines the Architectural Runway
- A balance between emergent design and intentional architecture is required for speed of development and maintainability.

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Architectural Runway

Architectural Runway includes existing code, hardware components, business infrastructure, etc. that enable near-term business features.

- Enablers build up the runway
- Features consume it
- Architectural Runway must be continuously maintained
- Use Capacity Allocation (a percentrage of train's overall capacity in a PI) for Enablers that extend the runway

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Architectural Runway: Examples

Software Example

A new, fuzzy search algorithm will enable a variety of future Features that can accept potentially erroneous user input

Business Example

HR Example: A job architecture and hiring strategy for Agile talent to enable the company's growth

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Traditional testing (V-Model) delays feedback

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Shift testing left for fast and continuous feedback

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Test first naturally creates a pyramid of tests

The Test Pyramid advocates a balanced portfolio of tests with many small, low-level, automated tests and fewer large, manual tests.

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An inverted Test Pyramid is a test strategy anti-pattern

Slows development, delays feedback, encourages larger batches

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4.4 Continuously integrate, deploy, and release

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Video: What is DevOps?

Duration 5 min

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Video link: https://vimeo.com/342037390/3a25026214

A CALMR approach to DevOps

- **C**ulture - Establish a culture of shared responsibility for development, deployment, and operations.
- **A**utomation - Automate the Continuous Delivery Pipeline.
- **L**ean flow - Keep batch sizes small, limit WIP, and provide extreme visibility.
- **M**easurement - Measure the flow through the pipeline. Implement full-stack telemetry.
- **R**ecovery - Architect and enable low-risk releases. Establish fast recovery, fast reversion, and fast fix-forward.

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Discussion: CALMR Approach

Duration 3 min

- **Step 1:** Discuss as a team:
  - What opportunities do you have in your current context to apply the concepts in the CALMR approach?
- **Step 2:** Be prepared to share with the class

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Video link: https://vimeo.com/342037858/f10a115479

Discussion: Continuous delivery culture

Prepare 5 min | Share 3 min

- **Step 1:** As a team, discuss the following:
  - How is your culture or environment ready for continuous delivery?
  - What does "continuous" mean to you and your team?
- **Step 2:** Be prepared to share some insights with the class

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The Continuous Delivery Pipeline enables the flow of value

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Continuous code integration

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Trunk-based development

Teams continuously integrate assets (leaving as little as possible to the System Team).

- Avoid physical branching for software
- Frequently integrate hardware branches

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The four Activities of Continuous Deployment

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Separate deploy from release

- Separate deploy to production from release
- Hide all new functionality under Feature toggles
- Test processes with a sub-set of users before exposing new functionality to all users

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Develop on cadence. Release on Demand.

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Discussion: Continuous integration and deployment challenges

Prepare 15 min | Share 5 min

- **Step 1:** Think about the various aspects of environment, culture, tools, and people and discuss as a team:
  - What are the challenges to continuously integrating?
  - What are the challenges to continuously deploying?
- **Step 2:** As a team, prepare a list of three to five items that make it hard to continuously integrate and deploy. What may be some ways to solve them?
- **Step 3:** Be prepared to share with the class.

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4.5 Improve flow with communication and synchronization

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Communication and synchronization with daily stand-ups

Basic Scrum pattern meeting agenda

Each person answers:

1. What did I do yesterday to advance the Iteration Goals?
2. What will I do today to advance the Iteration Goals?
3. Are there any impediments that will prevent the team from meeting the Iteration Goals?

The Meet-After agenda

1. Review topics the Scrum Master wrote on the meet-after board
2. Involved parties discuss, uninvolved people leave

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Activity: Reenact the daily stand-up (DSU) meeting

Prepare 15 min | Share 5 min

You will participate in and observe a reenactment of the daily stand-up meeting. Let's have four or five volunteers play the roles of *team members*. Your instructor will play the role of the *Scrum Master*.

- **Step 1**: As an observer, take notes and reflect on the following:
  - How long do you think the meeting should be?
  - Where should it take place?
  - What is the main purpose of the daily stand-up?
- **Step 2:** Share some of your insights as an observer

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Video: Backlog Refinement Workshop

Duration 5 min

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Video link: https://vimeo.com/337783229/fa3cde973f

The backlog refinement session

The backlog refinement session is a preview and elaboration of upcoming Stories.

- Helps the team think about new Stories prior to Iteration Planning
- Provides enough time to identify and resolve dependencies and issues that could impact the next Iteration
- The team can improve Stories, add acceptance criteria, and point out missing information to the Product Owner
- Most of the focus is on the next Iteration, but it allows time to discuss future Iterations and even Features for the next PI

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4.6 Demonstrate value

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The Iteration review

- The iteration review provides the true measure of progress by showing working software functionality, hardware components, etc.
- Preparation for the review starts with planning
- Teams demonstrate every Story, spike*, refactor, and NFR
- Attendees are the team and its stakeholders
- *Spike is a research Story, considered an exploration style Enabler

Demonstrating a working, tested team increment

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Iteration review guidelines

- **Timebox:** 1 to 2 hours.
- **Preparation:** Review preparation should be limited to 1 to 2 hours. Minimize presentation. Work from the repository of Stories.
- **Attendees:** If a major stakeholder cannot attend, the Product Owner should follow up individually.

Sample Iteration review agenda

1. Review business context and Iteration goals
2. Demo and solicit feedback of each Story, spike, refactor, and NFR
3. Discuss Stories not completed and why
4. Identify risks, impediments
5. Revise Team Backlog and team PI Objectives as needed

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Two views from the Iteration review based on a working system

- **How we did in the Iteration**
  - Did we meet the goal?
  - Story-by-Story review
- **How we are doing in the PI**
  - Review of PI Objectives
  - Review of remaining PI scope and reprioritizing if necessary

Iteration Review

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SAFe definition of done

Team Increment	System Increment	Solution Increment	Release
• Stories satisfy acceptance criteria • Acceptance tests passed (automated where practical) • Unit and component tests coded, passed, and included in the Build-Verify-Test (BVT) • Cumulative unit tests passed • Assets are under version control • Engineering standards followed • NFRs met • No must-fix defects • Stories accepted by Product Owner	• Stories completed by all teams in the ART and integrated • Completed features meet acceptance criteria • NFRs met • No must-fix defects • Verification and validation of key scenarios • Included in build definition and deployment process • Increment demonstrated, feedback achieved • Accepted by Product Management	• Capabilities completed by all trains and meet acceptance criteria • Deployed/installed in the staging environment • NFRs met • System end-to-end integration, verification, and validation done • No must-fix defects • Included in build definition and deployment/transition process • Documentation updated • Solution demonstrated, feedback achieved • Accepted by Solution Management	• All capabilities done and meet acceptance criteria • End-to-end integration and solution V&V done • Regression testing done • NFRs met • No must-fix defects • Release documentation complete • All standards met • Approved by Solution and Release Management

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Discussion: What is your definition of done?

Prepare 5 min

Share 3 min

- **Step 1:** As a team, craft a definition of what it means to you to finish a Story
- **Step 2:** Considering the criteria in the Team Increment, discuss some criteria that comprise your definition of done
- **Step 3:** Be prepared to share with the class

Team discussing DoD

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4.7 Retrospect and improve

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Iteration retrospective

- **Timebox:** 30 to 60 minutes
- **Purpose:** Pick one or two items that can be done better for next Iteration
- **Outcome:** Enter improvement items into the Team Backlog

Sample agenda

Part 1: Quantitative
1. Review the improvement backlog items targeted for this Iteration. Were they all accomplished?
2. Did the team meet the goals (yes/no)?
3. Collect and review the agreed-to Iteration print Metrics.

Part 2: Qualitative
1. What went well?
2. What didn't?
3. What we can do better next time?

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Iteration Metrics

Functionality	Iteration 1	Iteration 2	Iteration 3
Velocity planned			
Velocity actual			
# Stories planned			
# Stories accepted			
% Stories accepted			
Quality			
Unit test coverage %			
# Defects			
# New test cases			
# New test cases automated			
Total tests			
Total % tests automated			
# Refactors			

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Activity: Reenact the Iteration retrospective

Prepare 8 min

Share 2 min

In your team, reenact an Iteration retrospective of this course so far.

- **Step 1**: Pick someone in your team to play the role of the Scrum Master and to facilitate the Iteration review
- **Step 2:** As a team, participate in the retrospective by discussing the following:
  - What went well?
  - What didn't go so well?
  - What can be done better?
- **Step 3:** Share some of your team's insights with the class

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Action Plan: Executing the Iteration

Prepare 5 min

Share 3 min

- **Step 1:** Think about the activities you were engaged in as a team
- **Step 2:** Brainstorm one to three actions you could take to improve in any of those areas related to Iteration execution as a team
- **Step 3:** Individually write down at least one improvement item
- **Step 4:** Share one item you discussed as a team and one item you individually wrote in your Action Plan

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Lesson 4:
Executing the Iteration

Step 1: Think about the activities you were engaged in as a team

Step 2: Brainstorm one to three actions you could take to improve in any of those areas related to Iteration execution as a team

Step 3: Individually write down at least one improvement item

Step 4: Share one item you discussed as a team and one item you individually wrote in your Action Plan

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Lesson review

In this lesson you:

- Defined and visualized the initial flow of work with your team
- Explored how to measure the flow of work
- Recognized techniques to build quality into development process
- Discussed how to continuously integrate, deploy, and release value
- Explored how to demonstrate value to team stakeholders
- Practiced running retrospectives

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Lesson 4 notes

Enter your notes below:

Reminder: If using a digital workbook, save your PDF often so you don't lose any of your notes.

Lesson 5

Executing the PI

Learning Objectives:

5.1 Plan Together

5.2 Integrate and demonstrate together

5.3 Learn together

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

5.1 Plan together
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Video link: https://vimeo.com/361407444/407333b725

Align to a mission with PI Objectives

Objectives are business summaries of what each team intends to deliver in the upcoming PI.

- They often map directly to the Features in the backlog. For example:
  - An aggregation of a set of Features
  - A milestone like a trade show
  - An Enabler Feature supporting the implementation
  - A major refactoring

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PI Planning

Cadence-based PI Planning meetings are the heartbeat of the Agile Enterprise.

- Two days every 8 – 12 weeks (10 weeks is typical)
- Everyone attends in person if possible
- Product Management owns Feature priorities
- Agile teams own Story planning and high-level estimates
- Architect/Engineering and UX* work as intermediaries for governance, interfaces, and dependencies
- *UX – Lean User Experience on how the user interacts with the system.

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Maintain predictability with uncommitted objectives

Uncommitted objectives help improve the predictability of delivering business value. Uncommitted objectives do count in velocity/capacity.

- They are planned and aren't extra things teams do just in case you have time
- They are not included in the commitment, thereby making the commitment more reliable
- If a team has low confidence in meeting a PI Objective, encourage them to make it an uncommitted objective
- If an item has many unknowns, consider making it an uncommitted objective and planning for early spikes

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SMART team PI Objectives

Teams should write their PI Objectives in the SMART format.

- ***S***pecific - States the intended outcome as simply, concisely, and explicitly as possible (Hint: Try starting with an action verb).
- ***M***easurable - It should be clear what a team needs to do to achieve the objective. The measures may be descriptive, yes/no, quantitative, or provide a range.
- ***A***chievable - Achieving the objective should be within the team's control and influence
- ***R***ealistic - Recognize factors that cannot be controlled.(Hint: Avoid making overly optimistic assumptions)
- ***T***ime-bound - The time period for achievement must be within the PI, and, therefore, all objectives must be scoped appropriately.

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Activity: Identify program roles

Duration 3 min

- **Step 1:** Get excited about the upcoming PI simulation!
- **Step 2:** Make sure all program roles have been assigned.

Simulation role	Assigned to
Executive	Volunteer
Product Manager	Volunteer
System Architect, UX and Development Manager	Volunteer

Example: Your Instructor will be the RTE, a volunteer will be the Product Manager, etc.

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What is PI Planning?

Program Increment (PI) Planning is a cadence-based, face-to-face event that serves as the heartbeat of the Agile Release Train (ART), aligning all the teams on the ART to a shared mission and Vision.

The Agile Manifesto states, “The most efficient and effective method of conveying information to and within a development team is a face-to-face conversation.”

SAFe takes this to the next level with PI planning, a routine, face-to-face event, with a standard agenda that includes a presentation of business context and vision followed by team planning breakouts—where the teams create their Iteration plans and objectives for the upcoming PI.

In the next few hours you will be immersed in a PI Planning simulation. With your teams, you will estimate your starting velocity and you will plan a short Program Increment with two iterations. You will get to observe a Scrum of Scrums event and you will present a summary of your team’s draft PI Objectives.

Later, your trainer will demonstrate how business value is assigned to the objectives, how program risks are managed and you will recognize the value of the confidence vote. Get excited!

There is no magic in SAFe . . . except maybe for PI Planning. - Dean Leffingwell

Simulation: Why are we here?

Alignment to a common mission

We are here to gain alignment and commitment around a clear set of prioritized objectives. I will now review the agenda for the next two days of the PI Planning Event.

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Simulation: Day 1 agenda

Presented by RTE

8:00 ▸ 9:00	Business Context	▸ State of the business and upcoming objectives
9:00 ▸ 10:30	Product/Solution Vision	▸ Vision and prioritized Features
10:30 ▸ 11:30	Architecture Vision and development practices	▸ Architecture, common frameworks, etc. ▸ Agile tooling, engineering practices, etc.
11:30 ▸ 1:00	Planning context and lunch	▸ Facilitator explains planning process
1:00 ▸ 4:00	Team breakouts	▸ Teams develop draft plans and identify risks and impediments ▸ Architects and Product Managers circulate
4:00 ▸ 5:00	Draft plan review	▸ Teams present draft plans, risks, and impediments
5:00 ▸ 6:00	Management review and problem solving	▸ Adjustments made based on challenges, risks, and impediments

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Simulation: Day 2 agenda

PI Planning Agenda
DAY 2

Presented by RTE

8:00 ▸ 9:00	Planning adjustments	▸ Planning adjustments made based on previous day's management meeting
9:00 ▸ 11:00	Team breakouts	▸ Teams develop final plans and refine risks and impediments ▸ Business Owners circulate and assign business value to team objectives
11:00 ▸ 1:00	Final plan review and lunch	▸ Teams present final plans, risks, and impediments
1:00 ▸ 2:00	Program risks	▸ Remaining program-level risks are discussed and ROAMed
2:00 ▸ 2:15	PI confidence vote	▸ Team and program confidence vote
2:15 ▸ ???	Plan rework if necessary	▸ If necessary, planning continues until commitment is achieved
After commitment	Planning retrospective and moving forward	▸ Retrospective ▸ Moving forward ▸ Final instructions

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Simulation: Briefings

Executive

Product Manager

System Architect

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Simulation: Planning guidance

Expect this first PI Planning to feel a bit chaotic. Future PI Planning meetings will become more routine.

Product Owners: You have the content authority to make decisions at the user Story level

Scrum Masters: Your responsibility is to manage the timebox, the dependencies, and the ambiguities

Agile Team: Your responsibility is to define users Stories, plan them into the Iteration, and work out interdependencies with other teams

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Simulation: Planning requirements

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Simulation: Using historical data to calculate velocity

Establish velocity by looking at the average output of the last Iterations.

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Simulation: Calculate your capacity

Calculating Iteration capacity

- For every full-time Agile Team member contributing to Solution development, give the team 8 points (adjust for part-timers).
- Subtract 1 point for every team member vacation day and holiday.
- Find a small Story that would take about a half day to develop and a half day to test and validate. Call it a 1.
- Estimate every other Story relative to that one.

Example:
A 7-person team composed of 3 developers, 2 testers, 1 Product Owner, and 1 Scrum Master
Exclude The Scrum Master, Product Owner, and vacation time from the calculation
Calculated capacity: 5 x 8 points = 40 points per Iteration

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Estimating velocity and calculating capacity: A brief introduction

Agile teams use story points to relatively estimate user stories in story points. With relative estimating, the size (effort) for each backlog item is compared to other stories. For example, an eight-point story is four times the effort as a two-point story. The team's velocity for an iteration is equal to the sum of all the stories completed in the prior iteration. Knowing a team's velocity assists with planning and helps limit Work in Process (WIP)—teams don't take on more stories than their prior velocity would allow. Velocity is also used to estimate how long it takes to deliver Features or Epics, which are also forecasted in story points.

Keep in mind, velocity is based on historical data of the team's completed story points. For the purpose of this PI Planning simulation you will be referring to calculating Iterations capacity, since velocity is not established yet.

Velocity and Capacity

What is Velocity?
The team's velocity for an iteration is equal to the sum of the points for all the completed stories that met their Definition of Done (DoD). As the team works together over time, their historical trend of average completed story points per iteration builds a reliable picture of the team's velocity.

What is Capacity?
Capacity is the portion of the team's velocity that is actually available for any given iteration. Vacations, training, and other events can make team members unavailable to contribute to an iteration's goals for some portion of the iteration. This decreases the maximum potential velocity for that team for that iteration.

Example:
Assuming a six-person team composed of three developers, two testers, and one PO, with no vacations or holidays, the estimated initial velocity = 5 × 8 points = 40 points/iteration. (Note: Adjusting a bit lower may be necessary if one of the developers and testers is also the Scrum Master.)Using this example, and knowing the number of people on your team (at your table) estimate initial velocity.

Iteration 1 Team Capacity

Iteration 2 Team Capacity

Activity: Team breakout #1

Duration 45 min

Create a draft PI Plan

- **Step 1:** Setup the team area. Enter the capacity for each Iteration.
- **Step 2:** Pick up a Feature from the Product Manager.
- **Step 3:** Estimate the Stories using Story Points.
- **Step 4:** Load the Stories into the Iterations.
- **Step 5:** Write the PI Objectives using clear statements.
- **Step 6:** Identify the uncommitted objectives.
- **Step 7:** Identify any program risks and dependencies.

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Activity: Scrum of scrums (SoS) sync

Duration 5 min

- **Step 1:** Observe the SoS sync, conducted by the RTE
- **Step 2:** Each team's Scrum Master provides the team's current status and addresses the questions from the RTE
- **Step 3:** The RTE holds a meet-after after the sync (limited to 1 – 2 topics for the simulation)

SoS Sync Questions	Team 1	Team 2
Have you identified the capacity for each Iteration in the PI?		
Have you identified most of the Stories for the first two Iterations and begun estimating?		
Have you begun resolving dependencies with other teams?		
Are you discussing trade-offs and conflicting priorities with your Business Owners?		
Have you identified any program risks?		
Will you be ready to start writing PI Objectives in the next 15 minutes?		
Is there anything you need to discuss with other Scrum Masters? If so, stay for the meet-after		

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SoS Sync Question	Team 1	Team 2
Have you identified the capacity for each Iteration in the PI?		
Have you identified most of the Stories for the first two Iterations and begun estimating?		
Have you begun resolving dependencies with other teams?		
Are you discussing trade-offs and conflicting priorities with your Business Owners?		
Have you identified any program risks?		
Will you be ready to start writing PI Objectives in the next 15 minutes?		
Is there anything you need to discuss with other Scrum Masters? If so, stay for the 'Meet After'		

Activity: Draft plan review

Duration 10 min

- **Step 1:** Present the summary of your team's first two Iterations and one or more draft PI Objectives
- **Step 2:** Make sure that you have included the following:
  - Capacity and load for each Iteration
  - Draft PI Objectives
  - Program risks and impediments

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Management review and problem-solving

At the end of day 1, management meets to make adjustments to scope and objectives based on the day's planning.

Common questions during the management review:

- What did we just learn?
- Where do we need to adjust? Vision? Scope? Team assignments?
- Where are the bottlenecks?
- What features must be de-scoped?
- What decisions must we make between now and tomorrow to address these issues?

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Activities during day 2

Make planning adjustments

- Based on the previous day's management review and problem-solving meeting, adjustments are discussed.
- Possible changes:
  - Business priorities
  - Adjustment to Vision
  - Changes to scope
  - Realignment of work and teams

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Team breakout #2

Based on new knowledge and a good night's sleep, teams work to create their final plans.

- In the second team breakout, Business Owners circulate and assign business value to PI Objectives from low (1) to high (10)
- Teams finalize the Program Increment plan
- Teams also consolidate program risks, impediments, and dependencies
- Uncommitted objectives provide the capacity and guard band needed to increase the reliability of cadence-based delivery

Team A

PI Objectives	BV
Proof of concept with mock sounds	10
Help with radar POC	4
Decide to create or buy engine noises	3
Uncommitted	
Proof of concept with real sounds	7

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Final plan review

Teams and Business Owners peer-review all final plans.

Teams and Business Owners peer-review all final plans.

Final plan review agenda:

1. Changes to capacity and load
2. Final PI Objectives with business value
3. Program risks and impediments
4. Q&A session

Final plan review

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Building the final plan

- Final plans are collected at the front of the room
- Final plans are reviewed by all teams
- Business Owners are asked whether they accept the plan
- If accepted, the team's plan and program risk sheet are brought to the front of the room
- If not accepted, the plans stay in place, and the team continues planning after the review

A team's final plan

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Confidence vote: Team and program

After dependencies are resolved and risks are addressed, a confidence vote is taken by the team and program.

A commitment with two parts:

1. Teams agree to do everything in their power to meet the agreed-to objectives
2. In the event that fact patterns dictate that it is simply not achievable, teams agree to escalate immediately so that corrective action can be taken

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Run a planning meeting retrospective

The PI Planning event will evolve over time. Ending with a retrospective will help continuously improve it.

A Team's Retrospective

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Program board: Feature delivery, dependencies, and Milestones

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Video: Program Board

Duration 7 min

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Video link: https://vimeo.com/355401474/4ed0fa500e

5.2 Integrate and demonstrate together

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Program execution

Program events create a closed-loop system to keep the train on the tracks.

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ART sync is used to coordinate progress

Scrum of scrums

- Visibility into progress and impediments
- Facilitated by RTE
- Participants: Scrum Masters, other select team members, SMEs if necessary
- Weekly or more frequently, 30–60 minutes
- Timeboxed and followed by a 'Meet After'

PO Sync

- Visibility into progress, scope, and priority adjustments
- Facilitated by RTE or PM
- Participants: PMs, POs, other stakeholders, and SMEs as necessary
- Weekly or more frequently, 30–60 minutes
- Timeboxed and followed by a 'Meet After'

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Demo the full system increment every two weeks

- Features are functionally complete or 'toggled' so as not to disrupt demonstrable functionality
- New Features work together and with existing functionality
- Happens after the Iteration review (may lag by as much as one Iteration, maximum)
- Demo from a staging environment which resembles production as much as possible

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Discussion: System Demo challenges

Prepare 3 min

Share 2 min

- **Step 1:** As a team, discuss the following:
  - What are challenges to having a new system increment every two weeks?
- **Step 2:** On a flip chart or Remote Group Document aid list three to five challenges and some ways to solve them
- **Step 3:** Be prepared to share with the class

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5.3 Learn together

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Innovation and Planning (IP) Iteration

Facilitate reliability, Program Increment readiness, planning, and innovation during the IP iteration.

- **Innovation:** Opportunity for innovation, hackathons, and infrastructure improvements
- **Planning:** Provides for cadence-based planning
- **Estimating guard band:** For cadence-based delivery

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IP Iteration calendar

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Improving results with the Inspect and Adapt event

Three parts of Inspect and Adapt:

1. **The PI System Demo**
2. **Quantitative and Qualitative Measurement**
3. **Problem-Solving Workshop**

Timebox: 3 – 4 hours per PI

Attendees: Teams and stakeholders

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PI System Demo

- At the end of the PI, teams demonstrate the current state of the Solution to the appropriate stakeholders
- PI System Demo is often led by Product Management, POs, and the System Team
- Business Owners, program stakeholders, Product Management, RTE, Scrum Masters, and teams attend.

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Quantitative and qualitative measurement

The report compares actual business value achieved to planned business value.

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The problem-solving workshop

Teams conduct a short retrospective to systematically address the larger impediments that are limiting velocity.

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Action Plan: Executing the PI

Prepare 5 min

Share 3 min

- **Step 1:** Think about your experience during the simulation of the PI Planning event
- **Step 2:** Brainstorm one to three actions you could take back to your organization
- **Step 3:** Individually write down at least one improvement item
- **Step 4:** Share one item you discussed as a team and one item you individually wrote in your Action Plan

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Lesson 5:
Executing the PI

Step 1: Think about your experience during the simulation of the PI Planning event

Step 2: Brainstorm one to three actions you could take back to your organization

Step 3: Individually write down at least one improvement item

Step 4: Share one item you discussed as a team and one item you individually wrote in your Action Plan

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Lesson review

In this lesson you:

- Planned a Program Increment as a train
- Discussed Program Increment execution
- Discussed the importance and challenges of the System Demo
- Explored how to improve as a team of teams in the Inspect and Adapt event

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Lesson 5 notes

Enter your notes below:

sdfgasdfgadfg

Reminder: If using a digital workbook, save your PDF often so you don't lose any of your notes.

Lesson 6

Becoming a Certified SAFe Practitioner

Learning Objectives:

6.1 Becoming a Certified SAFe Professional

SAFe® Course Attending this course gives students access to the SAFe® Practitioner exam and related preparation materials.

Make the most of your learning

Access the SAFe Community Platform
Mange your member profile, access videos and training resources, join Communities of Practice, and more.

Prepare Yourself
Access your learning plan featuring your digital workbook, study materials, and certification practice test

Become a Certified SAFe Professional
Get certified to validate your knowledge, expand your professional capabilities, and open the door to new career opportunities.

Access SAFe Content and Tools
Access professional development resources and your trainer enablement plan to teach SAFe instructor-led courses.

Collaborate in real time with your team and others
Choose from ready-made templates to easily set up events like PI Planning and retrospectives–all with SAFe Collaborate.

Showcase SAFe Credentials
Display your digital badge to promote your SAFe capabilities and proficiencies throughout your career.

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Video: Become a Certified SAFe Professional

Duration 3 min

Continue to build on the foundation of SAFe learning you began in class by studying and taking the certification exam.

Earning this certification demonstrates and establishes your new knowledge.

Certification details at:

https://bit.ly/2zCu2pa

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Video link: https://vimeo.com/307578726

About SAFe certification: https://www.scaledagile.com/certifications/about-safe-certification/

Video: Welcome to the SAFe Community Platform

Duration 5 min

Want to learn more about the next steps on your SAFe Journey?

Access the SAFe Community Platform and discover all the SAFe resources available for your use!

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Video link: https://vimeo.com/286920560

Certification Exam Sample Questions

These sample questions provide examples of the format and type of questions to expect on the exam (these are not the actual exam questions). Performance on the sample questions is NOT an indicator of the performance on the exam, and it should NOT be considered an assessment tool. A web-enabled version of the sample questions are now available in a flashcard style format (internet required). Use the link below to access the sample question bank and begin preparing for certification.

To get started:

1. Click the link below
2. A browser window will open with the sample questions site
3. Click "Start"
4. Use the left-side menu to scroll and select your course
5. Click "Start" to access the sample questions

Sample questions: http://bit.ly/3aqpP4O

Lesson 6 notes

Enter your notes below:

dzfgsdfg

Reminder: If using a digital workbook, save your PDF often so you don't lose any of your notes.

Appendix 1

Glossary

SAFe Glossary:
Visit the Scaled Agile Framework site (https://v5.scaledagileframework.com/glossary/) to download glossaries translated into other languages