Lean & Agile

Enterprise Frameworks

Scaled Agile Framework

SAFe 6.0 Tutorial

Dr. David F. Rico, Pmp, Csep, Ebas, Baf, Fcp, Fct, Acp, Csm, Safe, DevOps, Aws

Website: http://davidfrico.com

Agile Cost of Quality: http://www.davidfrico.com/agile-vs-trad-coq.pdf
DevOps Return on Investment (ROI): http://davidfrico.com/rico-devops-roi.pdf

Dave's NEW Business Agility Video: http://www.youtube.com/watch?v=hTvtsAkL8xU
Dave's NEWER Scaled Agile Framework SAFe 4.5 Video: http://youtu.be/1TAuCRq5a34
Dave's NEWEST Development Operations Security Video: http://youtu.be/OBAdu4_t2EU
Dave's BRAND-NEW ROI of Lean Thinking Principles Video: http://youtu.be/wkMfaPAxO6E
Dave's REALLY-NEW ROI of Evolutionary Design Principles Video: http://youtu.be/TcXI26ClRb0
Dave's EXTREMELY-NEW ROI of Organizational Agility Principles Video: http://youtu.be/HOzDM5krtes

DoD Fighter Jets versus Amazon Web Services: http://davidfrico.com/dod-agile-principles.pdf
Principles of Collaborative Contracts: http://davidfrico.com/collaborative-contract-principles.pdf
Principles of Lean Organizational Leadership: http://davidfrico.com/lean-leadership-principles.pdf
Principles of Evolutionary Architecture: http://davidfrico.com/evolutionary-architecture-principles.pdf
Principles of CI, CD, & DevOps - Development Operations: http://davidfrico.com/devops-principles.pdf
Principles of SAFe Transformations - Scaled Agile Framework: http://davidfrico.com/safe-principles.pdf
Principles of Maximizing SAFe ROI - Scaled Agile Framework: http://davidfrico.com/safe-roi-principles.pdf
Principles of Lean-Agile - Contract Statements of Work (SOW): http://davidfrico.com/agile-sow-principles.pdf
Principles of Department of Defense (DoD) – Cloud Computing: http://davidfrico.com/dod-cloud-principles.pdf
Economic Value of Agile Businesses, Enterprises & Organizations - http://davidfrico.com/value-of-business-agility.pdf
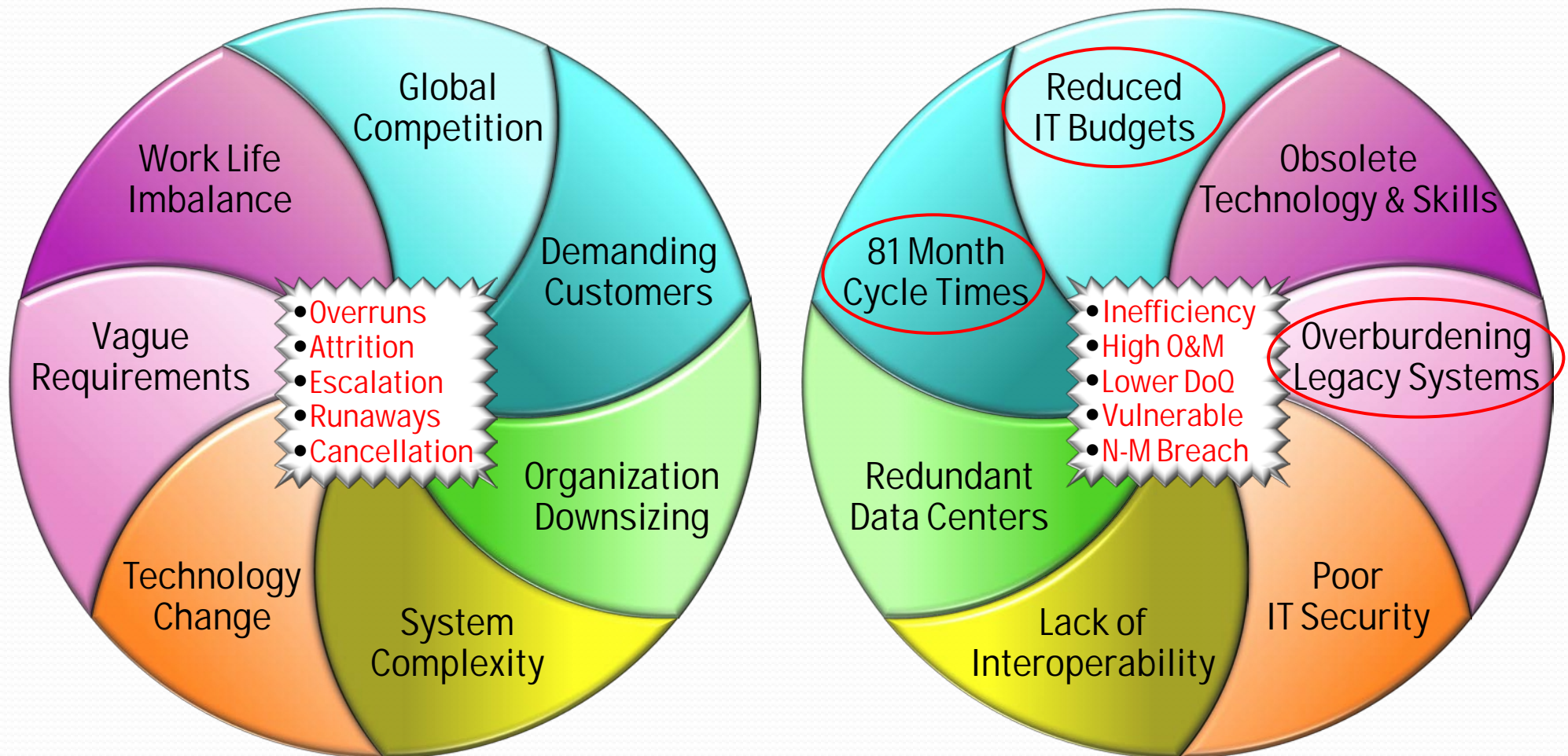
Author Background

- ☐ Gov't contractor with 38+ years of IT experience
- ☐ B.S. Comp. Sci., M.S. Soft. Eng., & D.M. Info. Sys.
- ☞ ☐ Large gov't projects in U.S., Far/Mid-East, & Europe
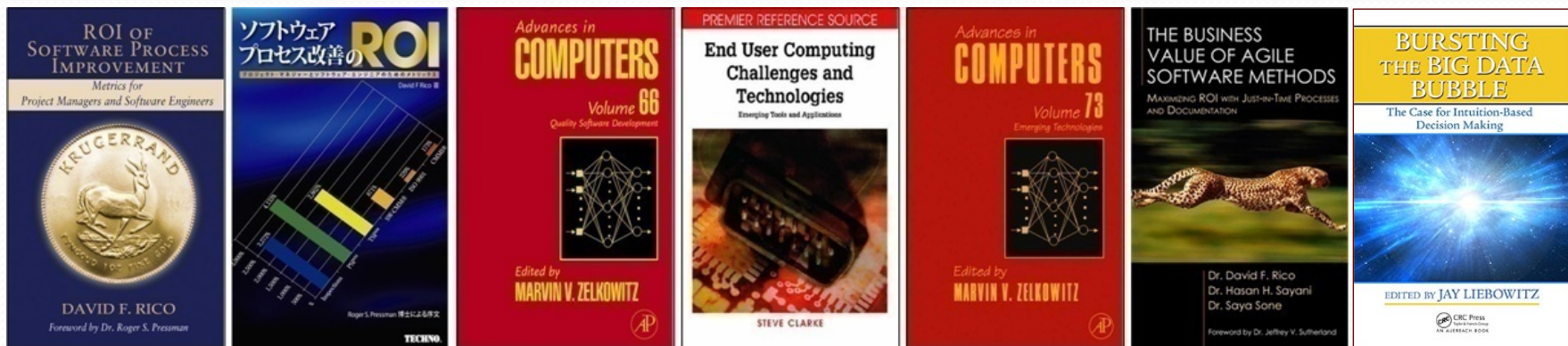
→ *Career systems & software engineering methodologist*
→ *Lean-Agile, Six Sigma, CMMI, ISO 9001, DoD 5000*
→ *NASA, USAF, Navy, Army, DISA, & DARPA projects*
→ *Published seven books & numerous journal articles*
→ *Intn'l keynote speaker, 290 talks to 135,000 people*
→ *Specializes in metrics, models, & cost engineering*
→ *Cloud Computing, SOA, Web Services, FOSS, etc.*
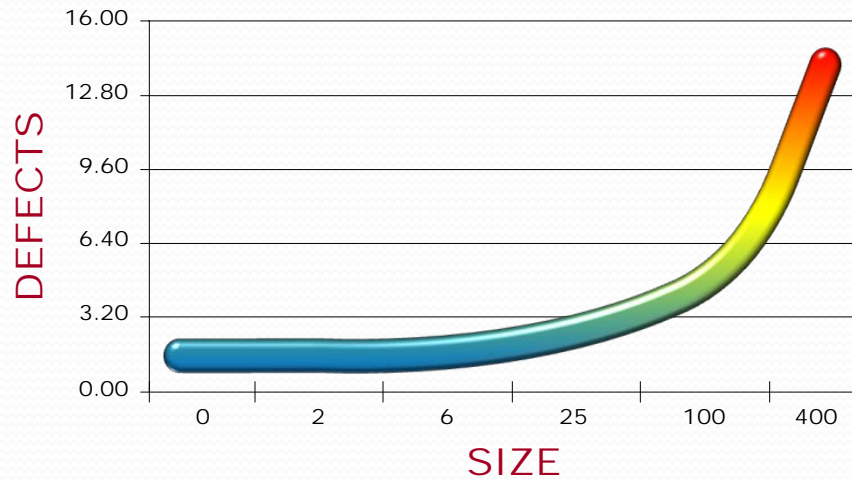→ *Professor at 7 Washington, DC-area universities*
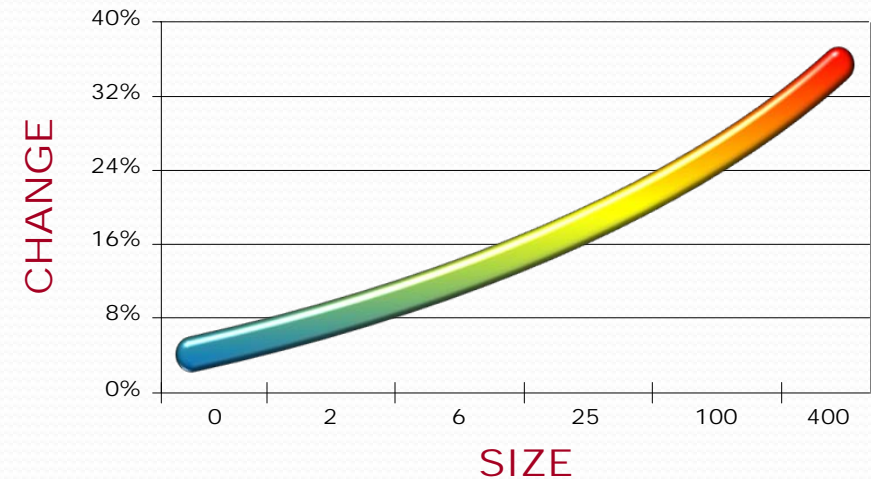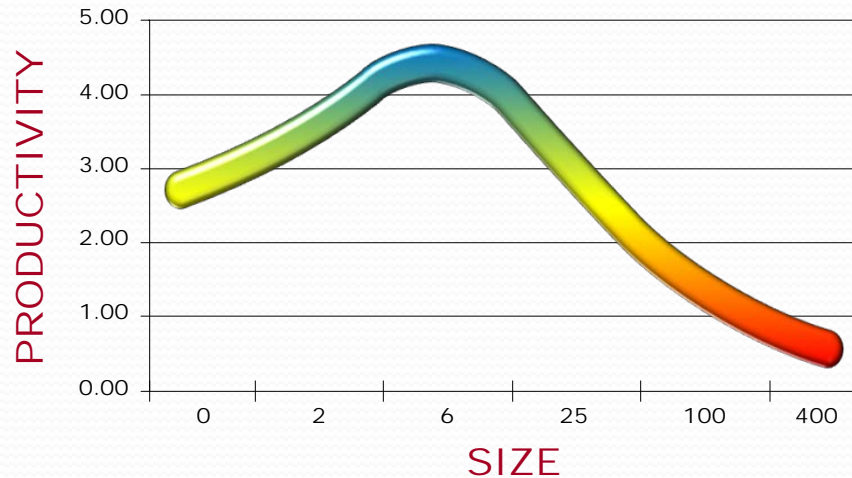
Today's WHIRLWIND Environment

- Work Life Imbalance
- Global Competition
- Demanding Customers
- Vague Requirements
  - Overruns
  - Attrition
  - Escalation
  - Runaways
  - Cancellation
- Organization Downsizing
- Technology Change
- System Complexity

- Reduced IT Budgets
- Obsolete Technology & Skills
- 81 Month Cycle Times
  - Inefficiency
  - High O&M
  - Lower DoQ
  - Vulnerable
  - N-M Breach
- Overburdening Legacy Systems
- Redundant Data Centers
- Lack of Interoperability
- Poor IT Security

Pine, B. J. (1993). *Mass customization*: *The new frontier in business competition*. Boston, MA: Harvard Business School Press.
Pontius, R. W. (2012). Acquisition of IT: Improving efficiency and effectiveness in IT acquisition in the DoD. *Second Annual AFEI/NDIA Conference on Agile in DoD, Springfield, VA, USA*.

Large TRADITIONAL Projects

Size vs. Quality

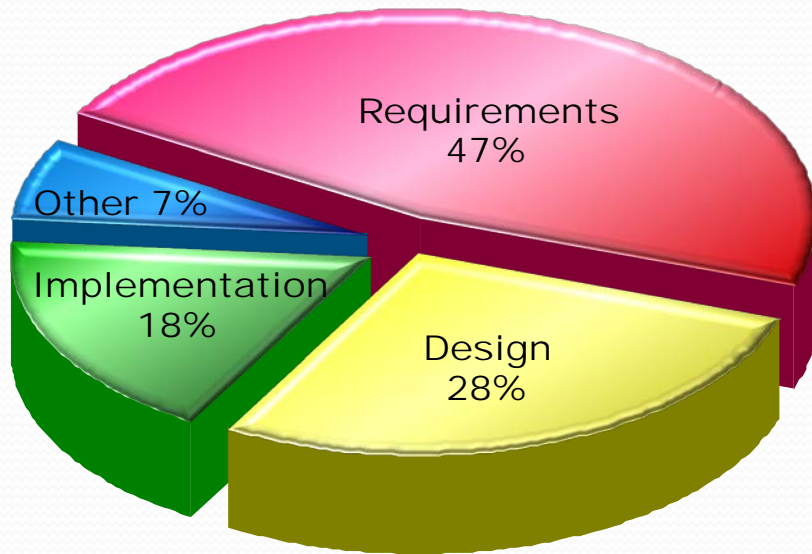### Size vs. Change

Size vs. Productivity

Size vs. Success

Jones, C. (1991). *Applied software measurement: Assuring productivity and quality*. New York, NY: McGraw-Hill.

4
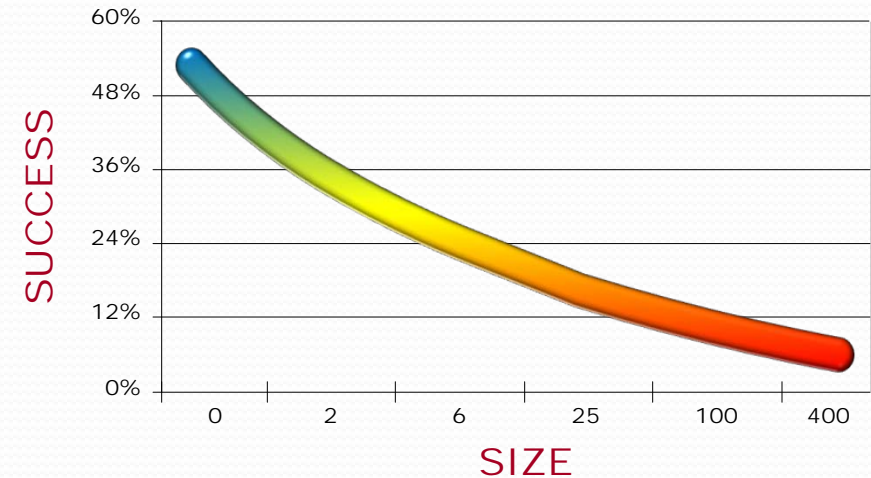
Large TRADITIONAL Projects—Cont'd

DEFECTS

- Requirements 47%
- Design 28%
- Implementation 18%
- Other 7%

WASTE

- Never 45%
- Rarely 19%
- Sometimes 16%
- Often 13%
- Always 7%

IT PROJECT FAILURES

Year	Green	Yellow	Red
2010	33%	41%	26%
2008	32%	44%	24%
2006	35%	46%	19%
2004	29%	53%	18%
2002	34%	51%	15%
2000	28%	49%	23%
1998	26%	46%	28%
1996	27%	33%	40%
1994	16%	53%	31%

0% 20% 40% 60% 80% 100%
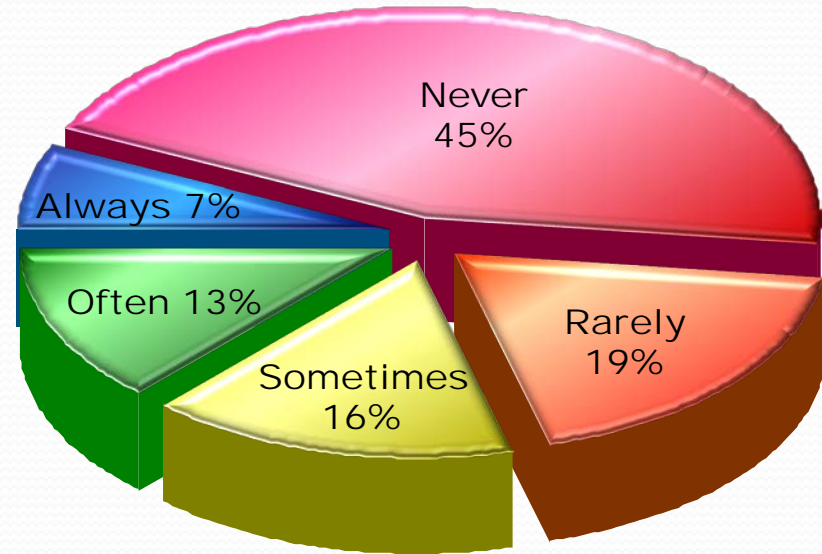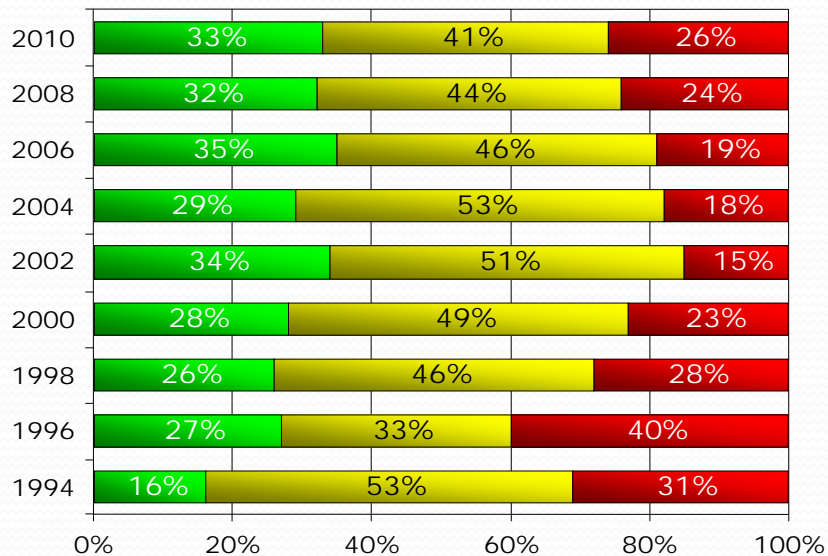
GLOBAL IT PROJECT FAILURES

$1.8, $1.4, $1.1, $0.7, $0.4, $0.0

2002 2003 2004 2005 2006 2007 2008 2009 2010

5
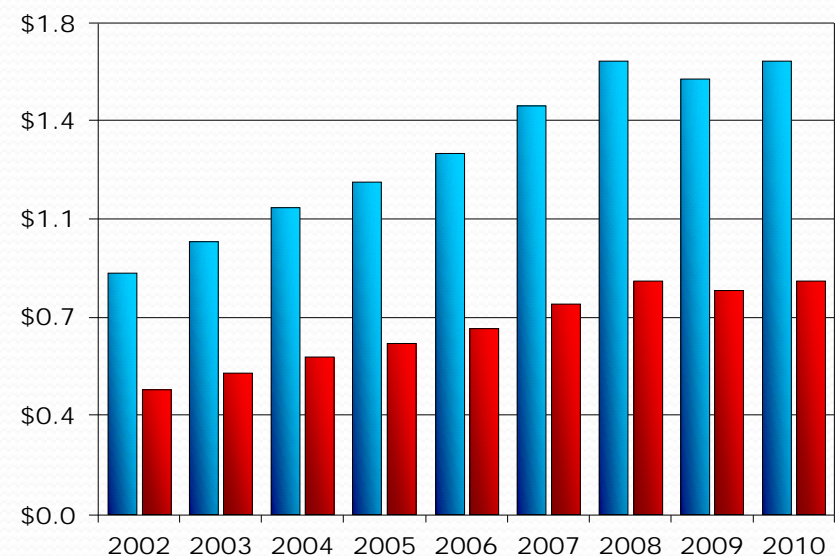
Internet of Things—Dinosaur Killer

IoT is an Extinction Level Event

- 25-50B Devices on IOT
- 5-10B Internet Hosts
- 4-8B Mobile Phones
- 2-3B End User Sys
- Mass Business Failure

Strategy vs. Tactics — Sun Tzu

Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.

- Sun Tzu

What is Agility?

□ **A-gil-i-ty** (ə-ˈji-lə-tē) Property consisting of quickness, lightness, and ease of movement; To be very nimble

- *The ability to create and* **respond to change** *in order to profit in a turbulent global business environment*

- *The ability to* **quickly reprioritize** *use of resources when requirements, technology, and knowledge shift*

- *A very* **fast response** *to sudden market changes and emerging threats by intensive* **customer interaction**

- *Use of* **evolutionary**, **incremental**, *and* **iterative** *delivery to converge on an optimal customer solution*

- *Maximizing* **BUSINESS VALUE** *with right sized, just-enough, and just-in-time processes and documentation*

Highsmith, J. A. (2002). *Agile software development ecosystems*. Boston, MA: Addison-Wesley.

What are **Agile Values?**

- ☐ People-centric way to create innovative solutions
- ☐ Product-centric alternative to documents/process
- ☞ ☐ Market-centric model to maximize business value

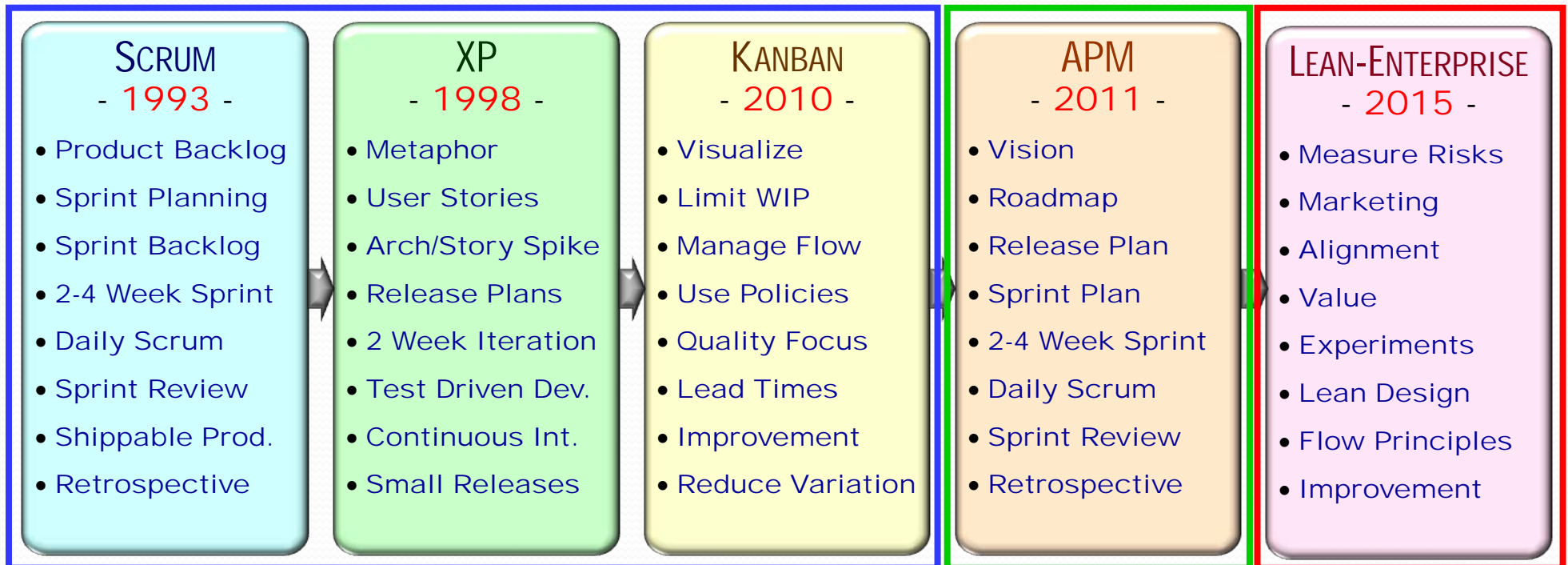|	
CUSTOMER COLLABORATION **VS CONTRACT NEGOTIATION**	**INDIVIDUALS & INTERACTIONS** **VS PROCESSES AND TOOLS**
WORKING PRODUCTS **VS COMPREHENSIVE DOCUMENTATION**	**RESPONDING TO CHANGE** **VS FOLLOWING A PLAN**

Models of LEAN & AGILE METHODS

- Numerous models of lean & agile methods
- Based on principles of flexible manufacturing
☞ - Include team, project, & enterprise management

SCRUM - 1993 -	XP - 1998 -	KANBAN - 2010 -	APM - 2011 -	LEAN-ENTERPRISE - 2015 -
• Product Backlog	• Metaphor	• Visualize	• Vision	• Measure Risks
• Sprint Planning	• User Stories	• Limit WIP	• Roadmap	• Marketing
• Sprint Backlog	• Arch/Story Spike	• Manage Flow	• Release Plan	• Alignment
• 2-4 Week Sprint	• Release Plans	• Use Policies	• Sprint Plan	• Value
• Daily Scrum	• 2 Week Iteration	• Quality Focus	• 2-4 Week Sprint	• Experiments
• Sprint Review	• Test Driven Dev.	• Lead Times	• Daily Scrum	• Lean Design
• Shippable Prod.	• Continuous Int.	• Improvement	• Sprint Review	• Flow Principles
• Retrospective	• Small Releases	• Reduce Variation	• Retrospective	• Improvement

Schwaber, K., & Beedle, M. (2001). *Agile software development with scrum*. Upper Saddle River, NJ: Prentice-Hall.
Beck, K. (2000). *Extreme programming explained*: Embrace change. Reading, MA: Addison-Wesley.
Anderson, D. J. (2010). Kanban: Successful evolutionary change for your technology business. Sequim, WA: Blue Hole Press.
Layton, M. C., & Maurer, R. (2011). *Agile project management for dummies*. Hoboken, NJ: Wiley Publishing.
Humble, J., Molesky, J., & O'Reilly, B. (2015). *Lean enterprise*: How high performance organizations innovate at scale. Sebastopol, CA: O'Reilly Media.

Definition of PORTFOLIO MANAGEMENT

- **Portfolio**. Subportfolio, program, project, operations
- **Portfolio Mgt**. Manage these to achieve strategic obj.
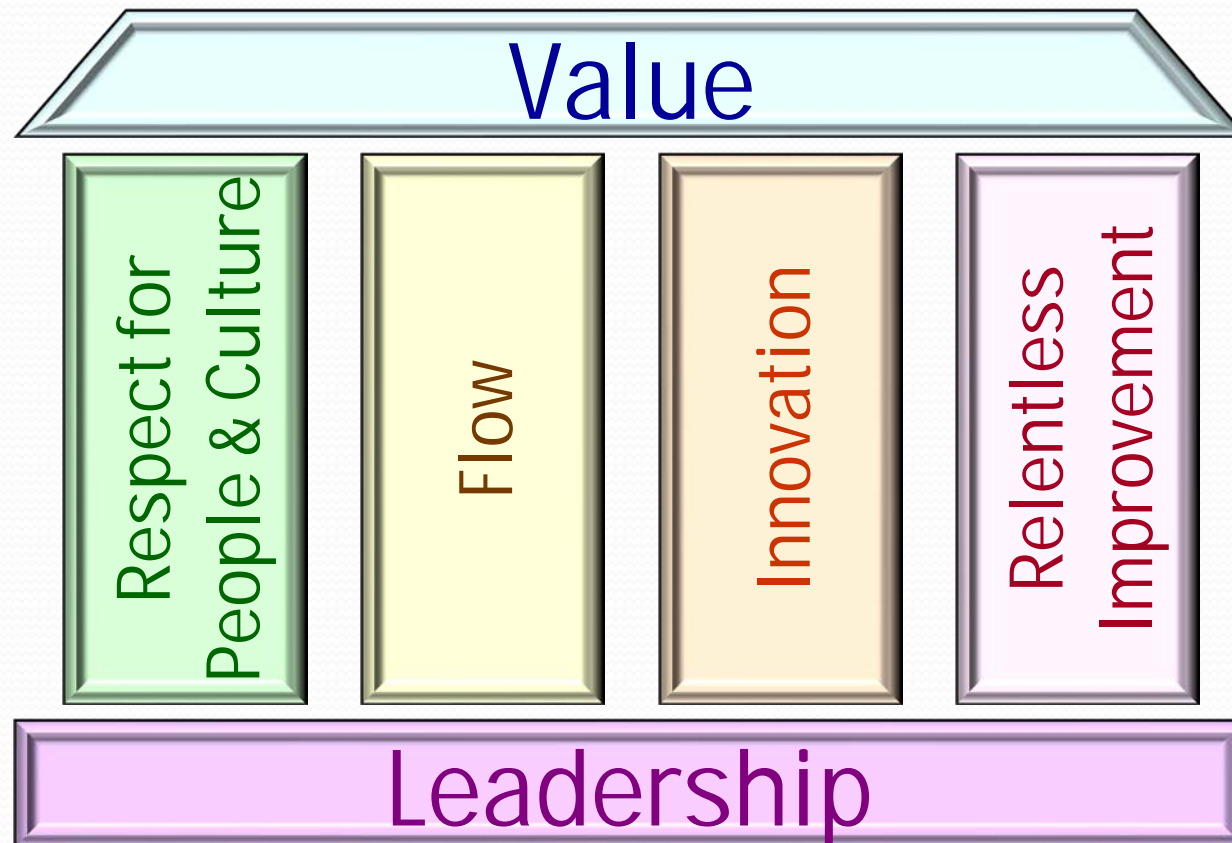- ☞ **Objectives**. Includes efficiency, effectiveness, & value

VISION

MISSION

STRATEGY & OBJECTIVES

PORTFOLIO MANAGEMENT

OPERATIONS

PROGRAMS & PROJECTS

ORGANIZATIONAL RESOURCES

Skrabak, J. L. (2013). *The standard for portfolio management* (*Third Edition*). Newtown Square: PA: Project Management Institute.

Lean & Agile FRAMEWORK?

- **Frame-work** (frām'wûrk') A support structure, skeletal enclosure, or scaffolding platform; Hypothetical model

  - *A multi-tiered framework for using* lean & agile methods *at the* enterprise, portfolio, program, & project *levels*

  - *An approach embracing values and principles of* lean thinking, product development flow, & agile methods

  - *Adaptable framework for* collaboration, prioritizing work, iterative development, & responding to change

  - *Tools for agile* scaling, *rigorous and disciplined* planning & architecture, *and a sharp focus on* product quality

  - *Maximizes* **BUSINESS VALUE** *of organizations, programs, & projects with lean-agile values, principles, & practices*

Leffingwell, D. (2011). *Agile software requirements*: *Lean requirements practices for teams, programs, and the enterprise.* Boston, MA: Pearson Education.

What are Lean Values?

- ☐ Time-centric way to compete on speed & time
- ☐ Customer-centric model to optimize cost & quality
- ☞ ☐ Pull-centric alternative to wasteful mass production

Value

| Respect for People & Culture | Flow | Innovation | Relentless Improvement |

Leadership

Leffingwell, D. (2017). *The SAFe house of lean*. Retrieved February 19, 2018, from http://www.scaledagileframework.com

How do Lean & Agile INTERSECT?

- ☐ Agile is naturally lean and based on small batches
- ☐ Agile directly supports six principles of lean thinking
- ☐ Agile may be converted to a continuous flow system

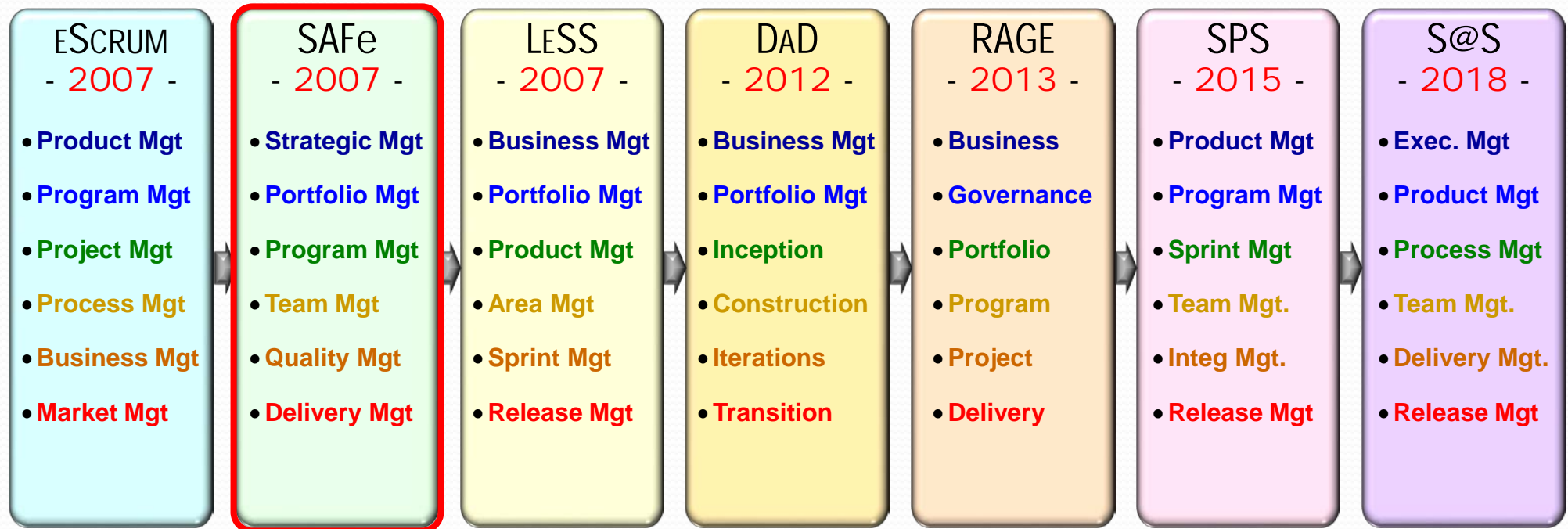| Agile Values	Lean Pillars	Lean Principles	Lean & Agile Practices	Flow Principles
Empowered Teams	Respect for People	Relationships	• Customer relationships, satisfaction, trust, and loyalty • Team authority, empowerment, and resources • Team identification, cohesion, and communication	Decentralization
		Customer Value	• Product vision, mission, needs, and capabilities • Product scope, constraints, and business value • Product objectives, specifications, and performance	Economic View
Customer Collaboration		Value Stream	• As is policies, processes, procedures, and instructions • To be business processes, flowcharts, and swim lanes • Initial workflow analysis, metrication, and optimization	WIP Constraints & Kanban
Iterative Delivery	Continuous Improvement	Continuous Flow	• Batch size, work in process, and artifact size constraints • Cadence, queue size, buffers, slack, and bottlenecks • Workflow, test, integration, and deployment automation	Control Cadence & Small Batches
		Customer Pull	• Roadmaps, releases, iterations, and product priorities • Epics, themes, feature sets, features, and user stories • Product demonstrations, feedback, and new backlogs	Fast Feedback
Responding to Change		Perfection	• Refactor, test driven design, and continuous integration • Standups, retrospectives, and process improvements • Organization, project, and process adaptability/flexibility	Manage Queues/ Exploit Variability

❶ ❷ ❸

Womack, J. P., & Jones, D. T. (1996). *Lean thinking*: *Banish waste and create wealth in your corporation*. New York, NY: Free Press.
Reinertsen, D. G. (2009). *The principles of product development flow*: *Second generation lean product development*. New York, NY: Celeritas.
Reagan, R. B., & Rico, D. F. (2010). Lean and agile acquisition and systems engineering: A paradigm whose time has come. *DoD AT&L Magazine, 39*(6).

Models of AGILE FRAMEWORKS

- ☐ Numerous models of agile portfolio mgt. emerging
- ☐ Based on lean-kanban, release planning, and Scrum
- ☐ Include organization, program, & project management

EScrum - 2007 -	SAFe - 2007 -	LeSS - 2007 -	DAD - 2012 -	RAGE - 2013 -	SPS - 2015 -	S@S - 2018 -
• Product Mgt	• Strategic Mgt	• Business Mgt	• Business Mgt	• Business	• Product Mgt	• Exec. Mgt
• Program Mgt	• Portfolio Mgt	• Portfolio Mgt	• Portfolio Mgt	• Governance	• Program Mgt	• Product Mgt
• Project Mgt	• Program Mgt	• Product Mgt	• Inception	• Portfolio	• Sprint Mgt	• Process Mgt
• Process Mgt	• Team Mgt	• Area Mgt	• Construction	• Program	• Team Mgt.	• Team Mgt.
• Business Mgt	• Quality Mgt	• Sprint Mgt	• Iterations	• Project	• Integ Mgt.	• Delivery Mgt.
• Market Mgt	• Delivery Mgt	• Release Mgt	• Transition	• Delivery	• Release Mgt	• Release Mgt

Schwaber, K. (2007). *The enterprise and scrum*. Redmond, WA: Microsoft Press.
Leffingwell, D. (2007). *Scaling software agility*: *Best practices for large enterprises*. Boston, MA: Pearson Education.
Larman, C., & Vodde, B. (2008). *Scaling lean and agile development*: *Thinking and organizational tools for large-scale scrum*. Boston, MA: Addison-Wesley.
Ambler, S. W., & Lines, M. (2012). *Disciplined agile delivery*: A practitioner's guide to agile software delivery in the enterprise. Boston, MA: Pearson Education.
Thompson, K. (2013). *cPrime's R.A.G.E. is unleashed*: Agile leaders rejoice! Retrieved March 28, 2014, from http://www.cprime.com/tag/agile-governance
Schwaber, K. (2015). *The definitive guide to nexus*: The exoskeleton of scaled scrum development. Lexington, MA: Scrum.Org
Sutherland, J. (2018). *Scrum-at-Scale (S@S) guide*. Cambridge, MA: Scrum.Inc.

Enterprise Scrum (EScrum)

- ☐ Created by Ken Schwaber of Scrum Alliance in 2007
- ☐ Application of Scrum at any place in the enterprise
- ☞ ☐ Basic Scrum with extensive backlog grooming

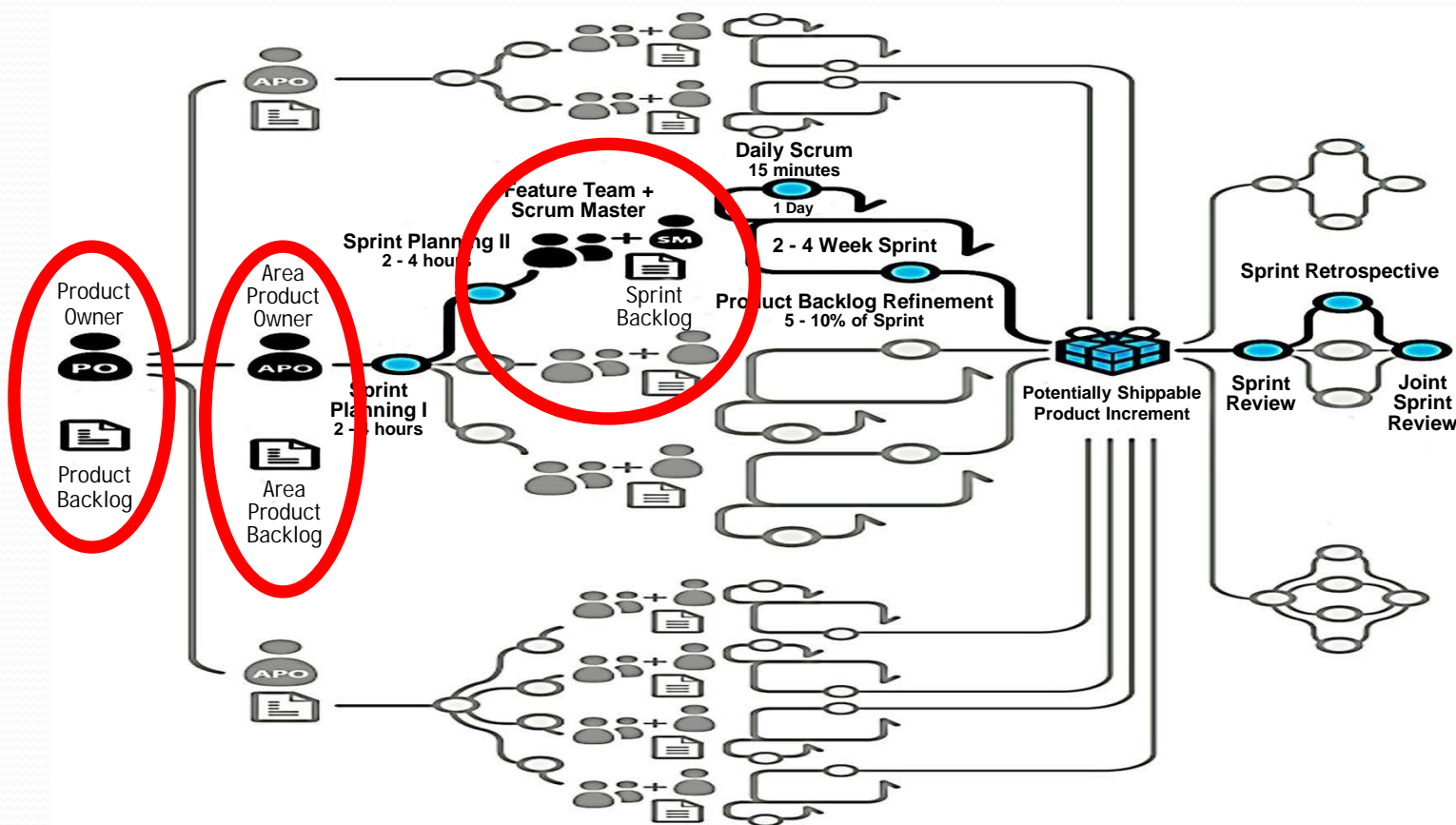Schwaber, K. (2007). *The enterprise and scrum*. Redmond, WA: Microsoft Press.

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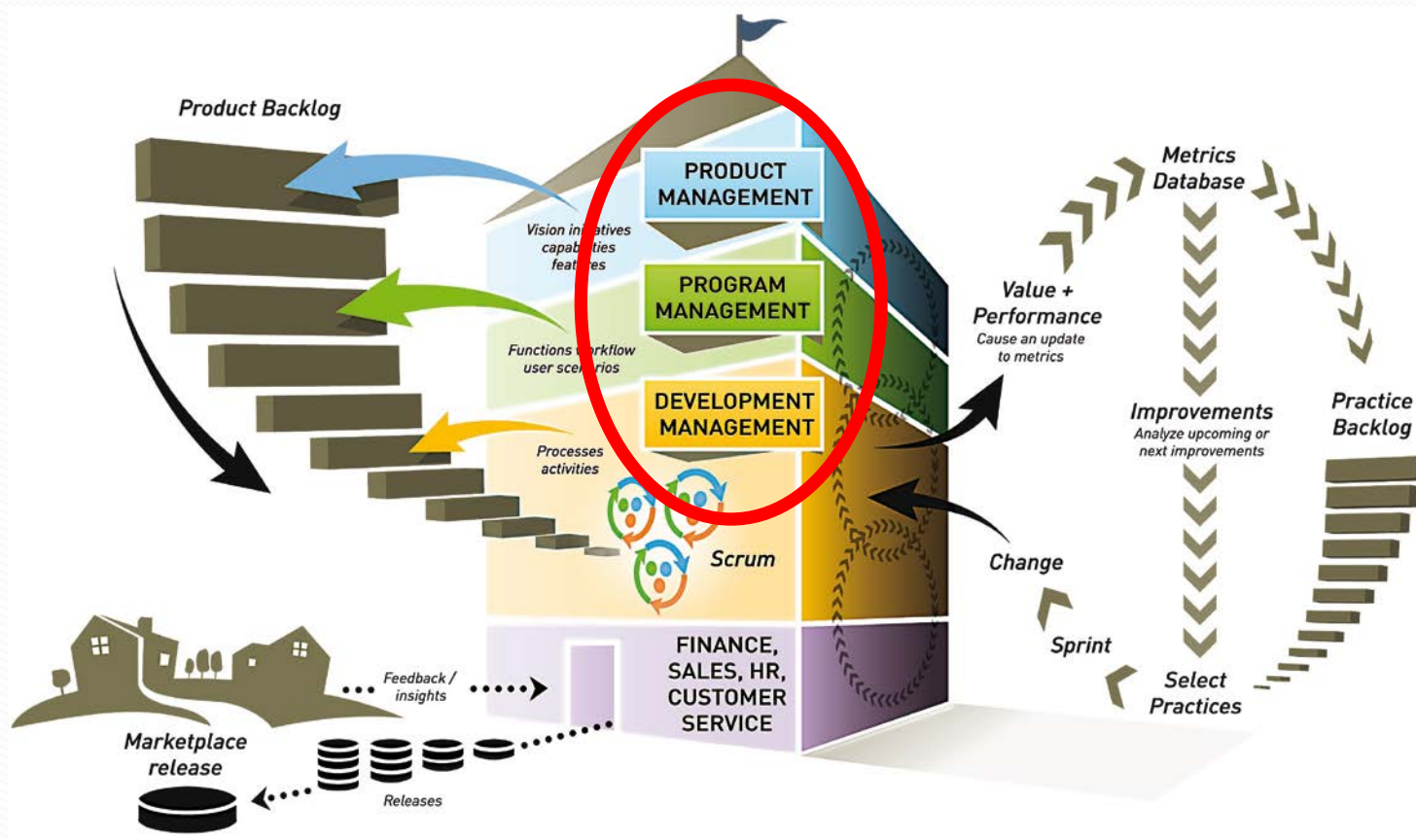
Scaled Agile Framework (SAFE)

- Created by Dean Leffingwell of Rally in 2007
- Knowledge to scale agile practices to enterprise
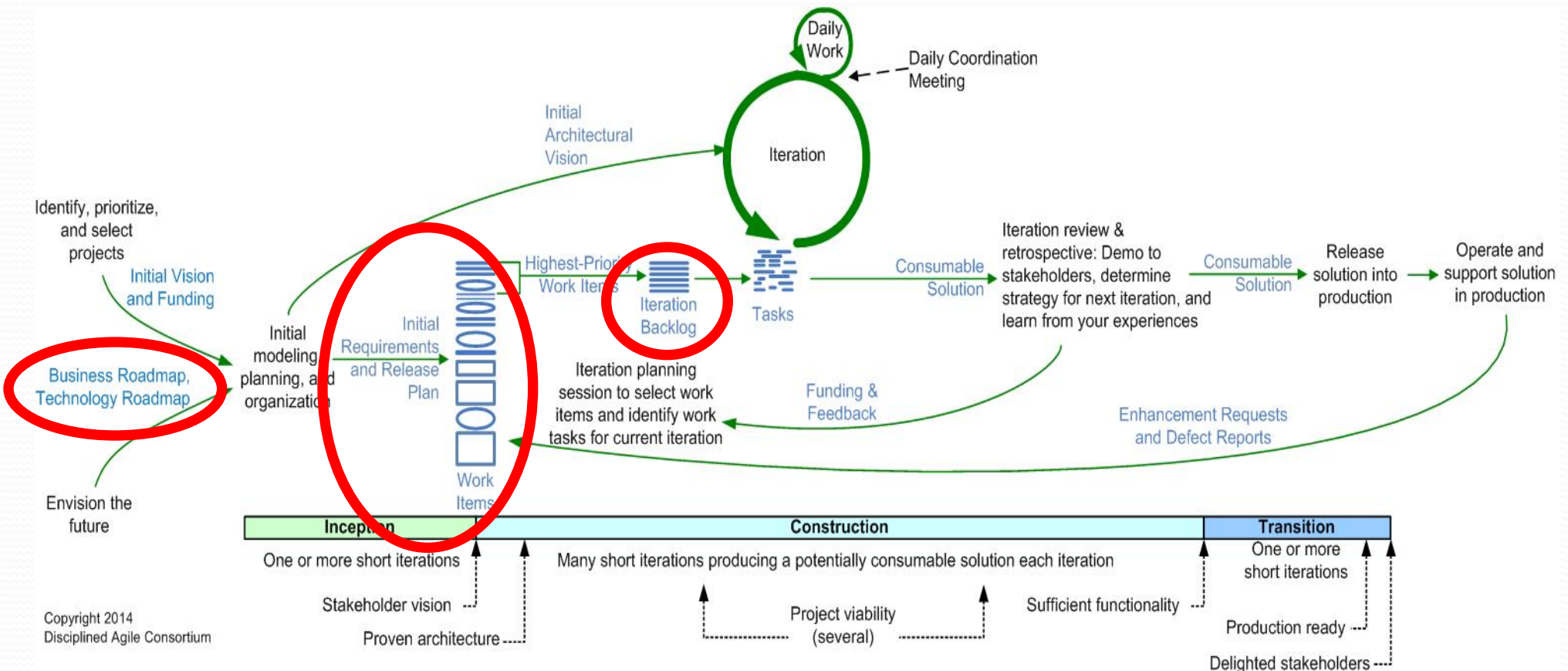- Hybrid of Kanban, XP release planning, and Scrum
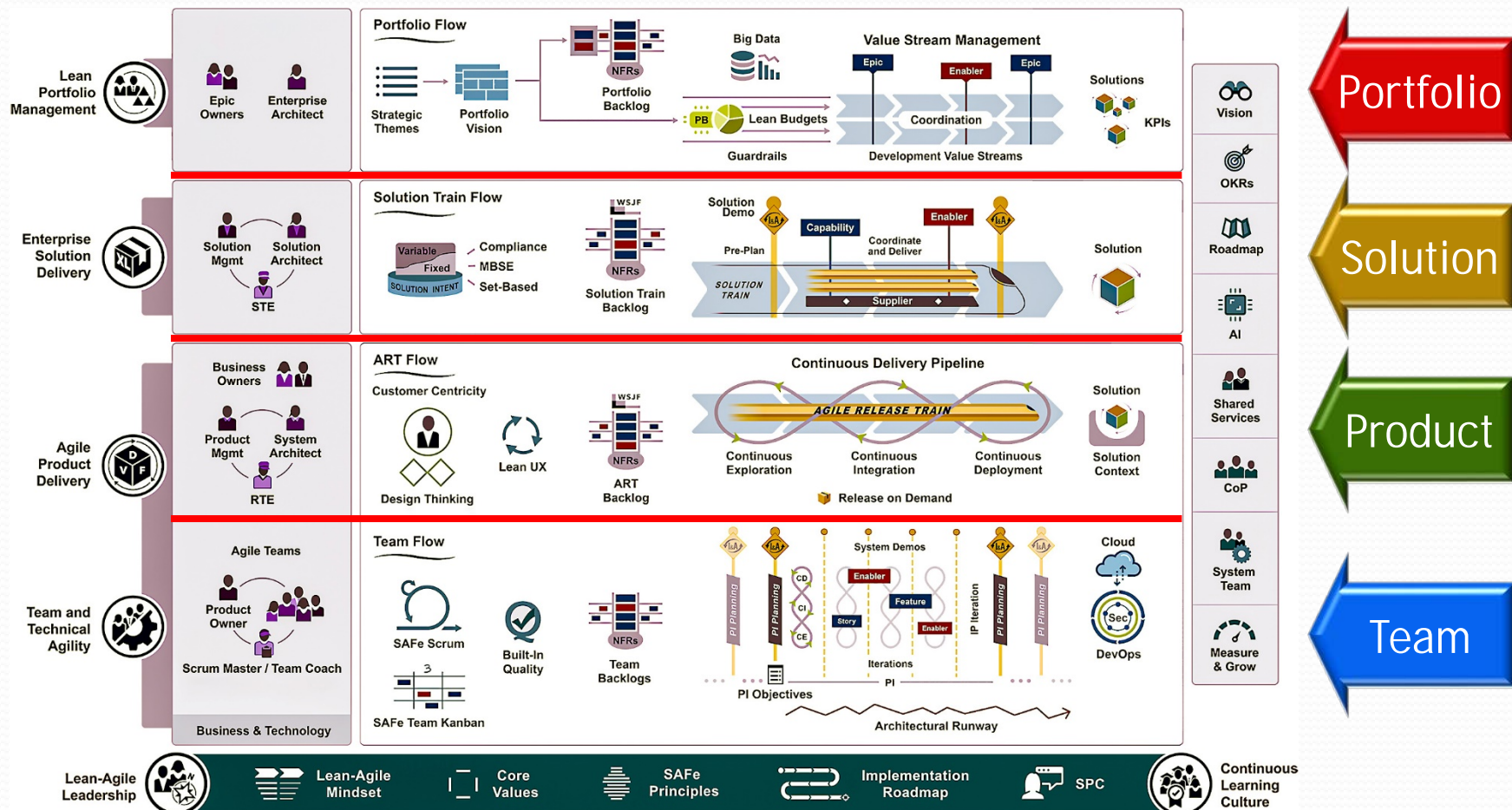
Large Scale Scrum (LᴇSS)

- ☐ Created by Craig Larman of Valtech in 2008
- ☐ Scrum for larger projects of 500 to 1,500 people
- ☞ ☐ Model to <u>nest product owners</u>, <u>backlogs</u>, and <u>teams</u>

Larman, C., & Vodde, B. (2008). *Scaling lean and agile development*: *Thinking and organizational tools for large-scale scrum*. Boston, MA: Addison-Wesley.

Disciplined Agile Delivery (DAD)

- Created by Scott Ambler of IBM in 2012
- People, learning-centric hybrid agile IT delivery
- ☞ Scrum mapping to a model-driven RUP framework

Ambler, S. W., & Lines, M. (2012). *Disciplined agile delivery*: *A practitioner's guide to agile software delivery in the enterprise*. Boston, MA: Pearson Education.

Recipes for Agile Governance (RAGE)

- Created by Kevin Thompson of cPrime in 2013
- Agile governance model for large Scrum projects
- Traditional-agile hybrid of portfolio-project planning

Thompson, K. (2013). *cPrime's R.A.G.E. is unleashed: Agile leaders rejoice!* Retrieved March 28, 2014, from http://www.cprime.com/tag/agile-governance
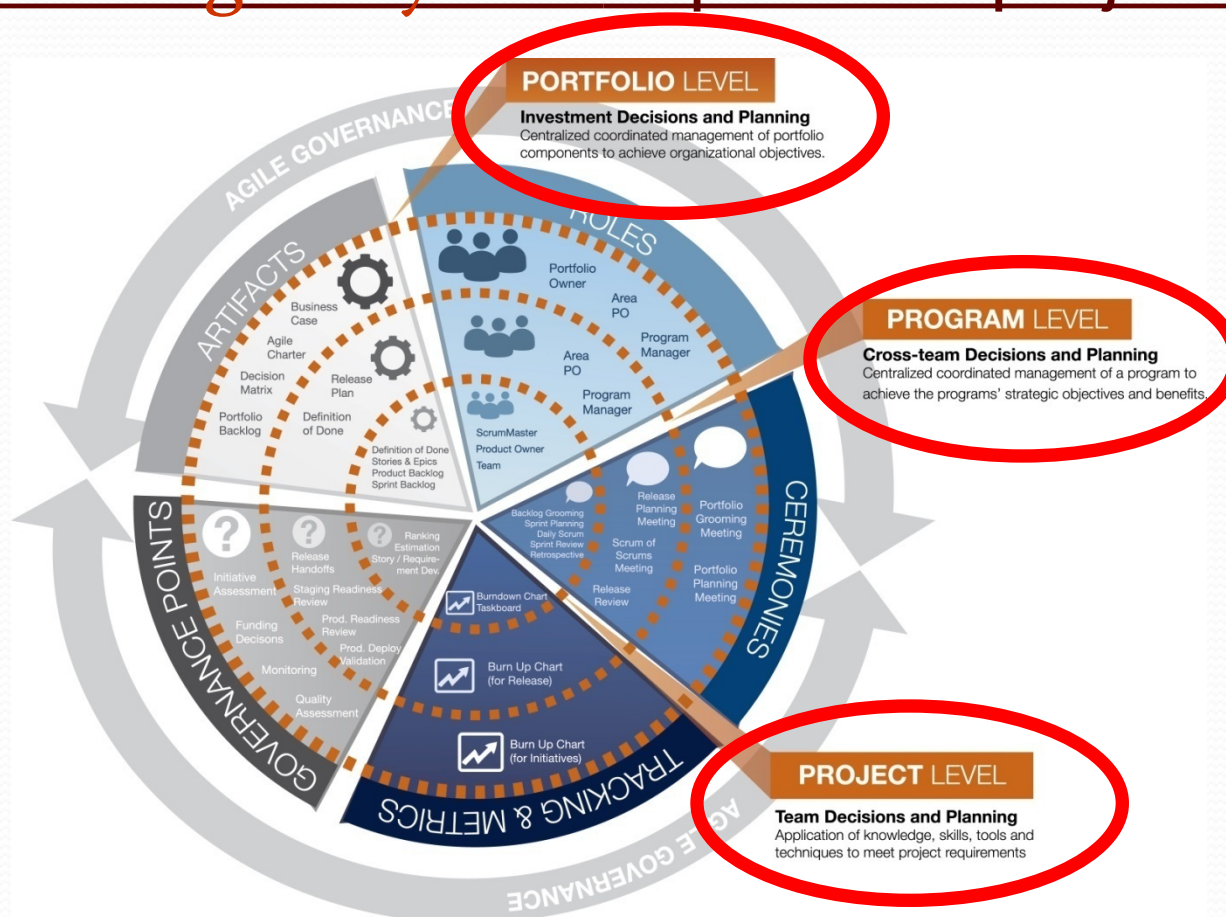
Scaled Professional Scrum (SPS)

- Created by Ken Schwaber of Scrum.Org in 2015
- Used to develop & sustain scaled Scrum initiatives
- ☞ Formalization of 10 year old Scrum of Scrum concept

Schwaber, K. (2015). *The definitive guide to nexus*: *The exoskeleton of scaled scrum development*. Lexington, MA: Scrum.Org
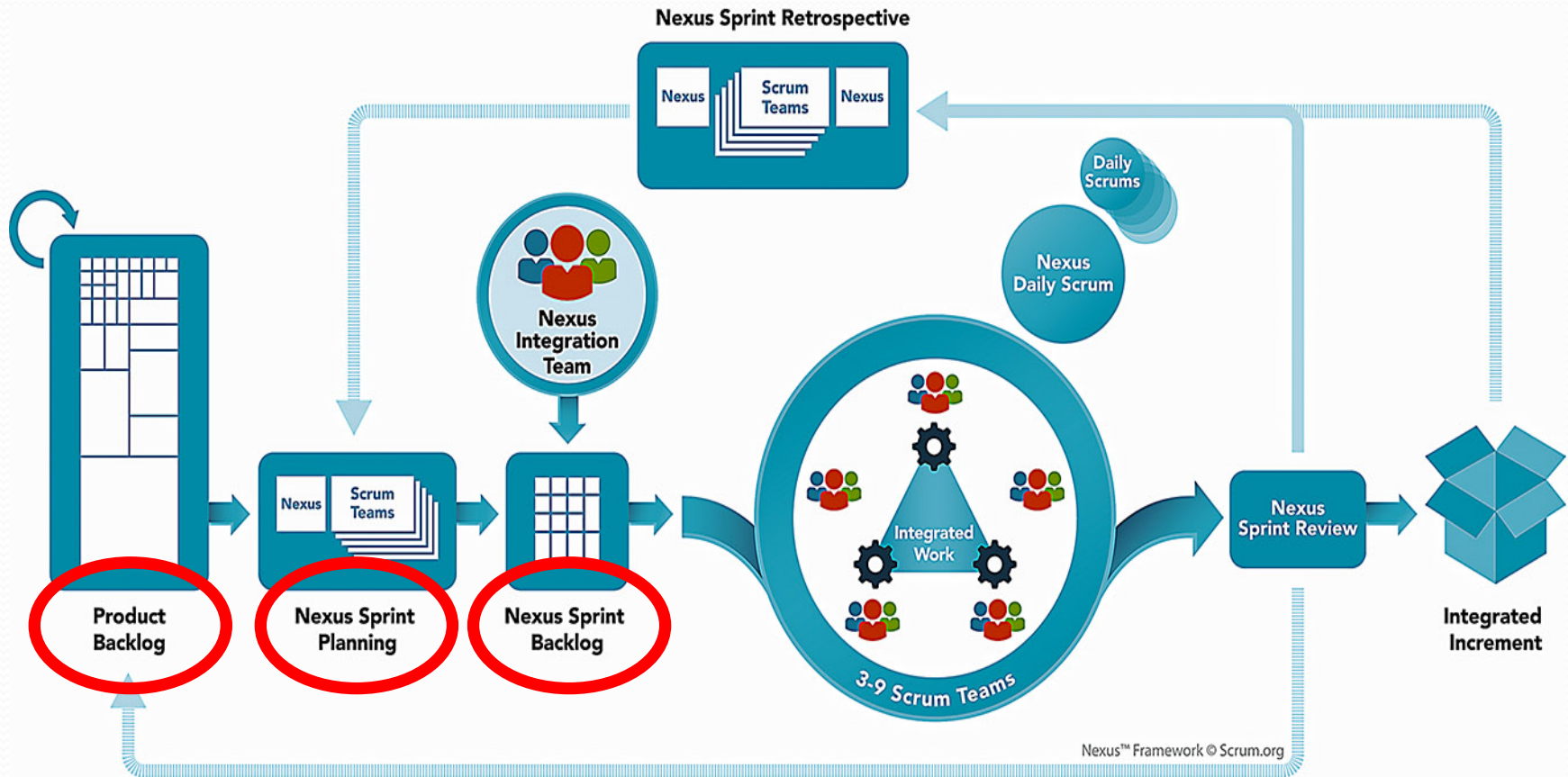
Scrum at Scale (S@S)

- Created by Jeff Sutherland of Scrum, Inc. in 2018
- Formal method to incrementally scale Scrum teams
- Developed to compete with Agile Scaling frameworks

Sutherland, J. (2018). *Scrum-at-Scale (S@S) guide*. Cambridge, MA: Scrum.Inc.
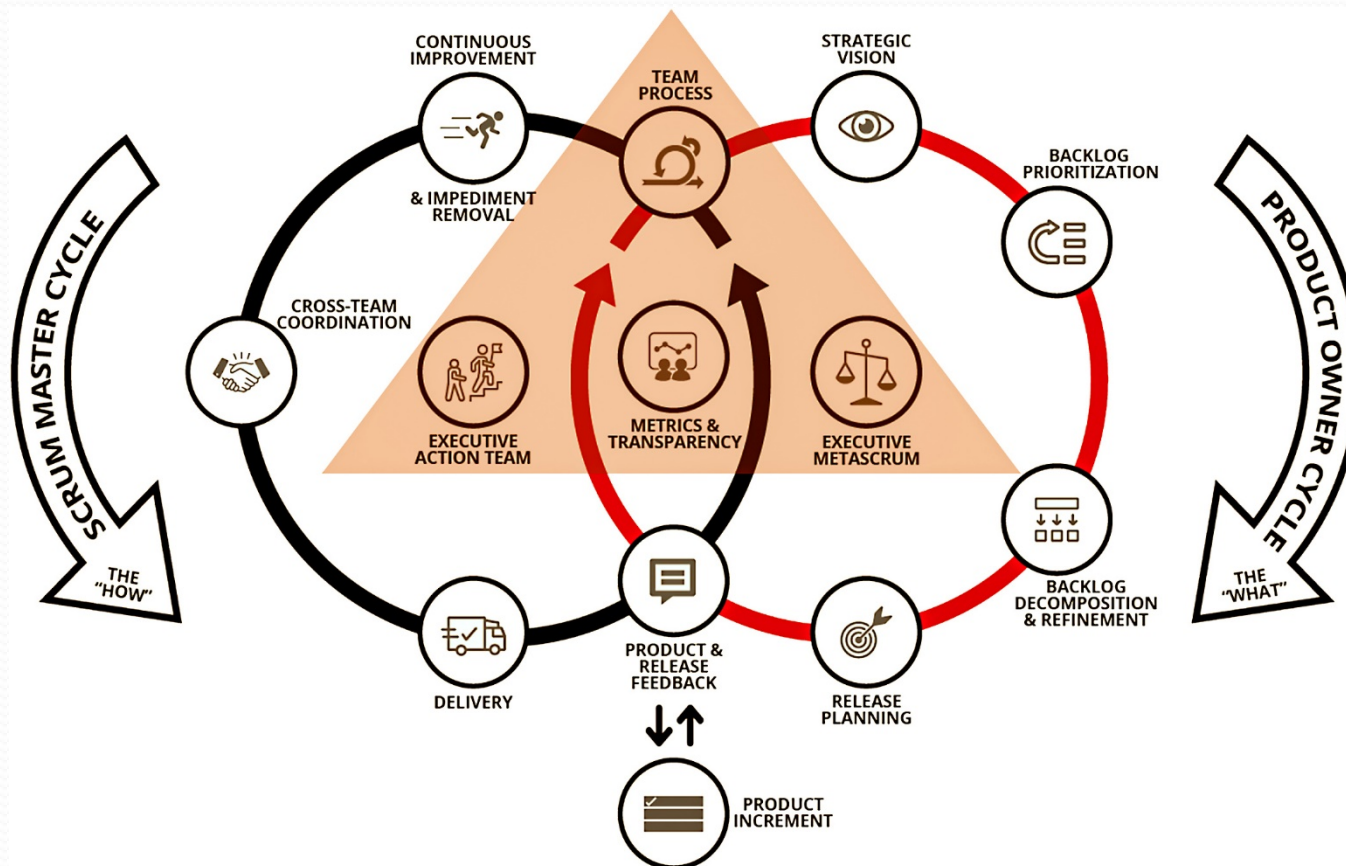
Agile Enterprise F/W COMPARISON

- Numerous lean-agile enterprise frameworks emerging
- eScrum & LeSS were 1st but SAFe & S@S dominate
- SAFe is the most widely-used (with ample resources)

Factor	eScrum	SAFe	LeSS	DaD	RAGE	SPS	S@S
Simple	✔	✔	✔	✔	✔	✔	✔
Well-Defined		✔		✔		✔	✔
Web Portal		✔			✔		
Books	✔	✔	✔	✔			
Measurable		✔					✔
Results	✔	✔		✔			✔
Training & Cert		✔					✔
Consultants		✔					✔
Tools		✔					
Popularity	✔	✔					
International		✔	✔	✔			✔
Fortune 500	✔	✔		✔			✔
Government		✔			✔		
Lean-Kanban		✔	✔				

Rico, D. F. (2014). *Scaled agile framework (SAFe) comparison*. Retrieved June 4, 2014 from http://davidfrico.com/safe-comparison.xls

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Portfolio Management — Box

All models are wrong
but some are useful

George E.P. Box

SAFe REVISITED

- ☐ Proven, public well-defined F/W for scaling Lean-Agile
- ☐ Synchronizes alignment, collaboration, and deliveries
- ☐ Quality, execution, alignment, & transparency focus
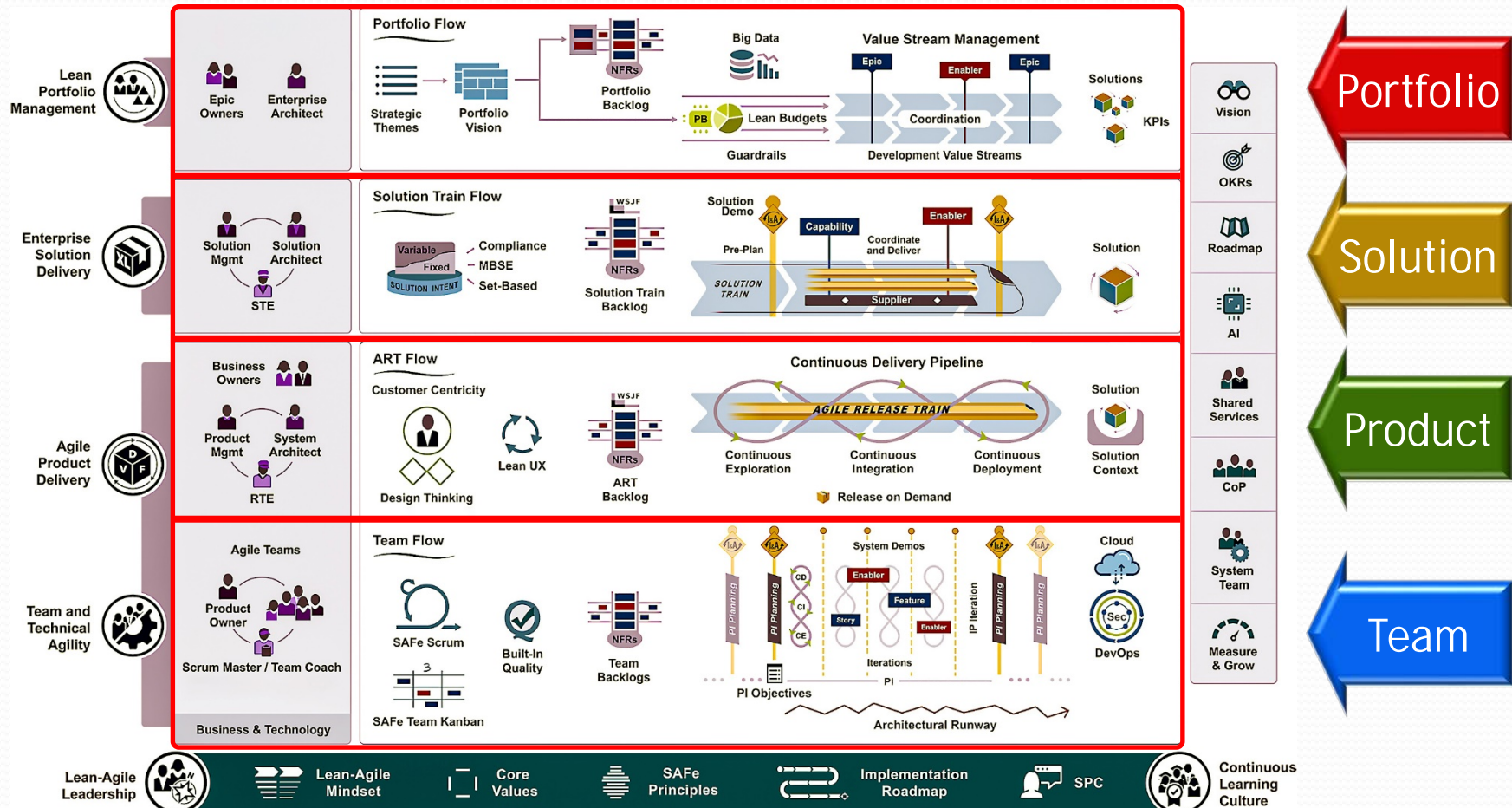
SAFe SCALING

- ☐ SAFe created to address Scaling & Discipline
- ☐ Early models such as Scrum & XP were scalable
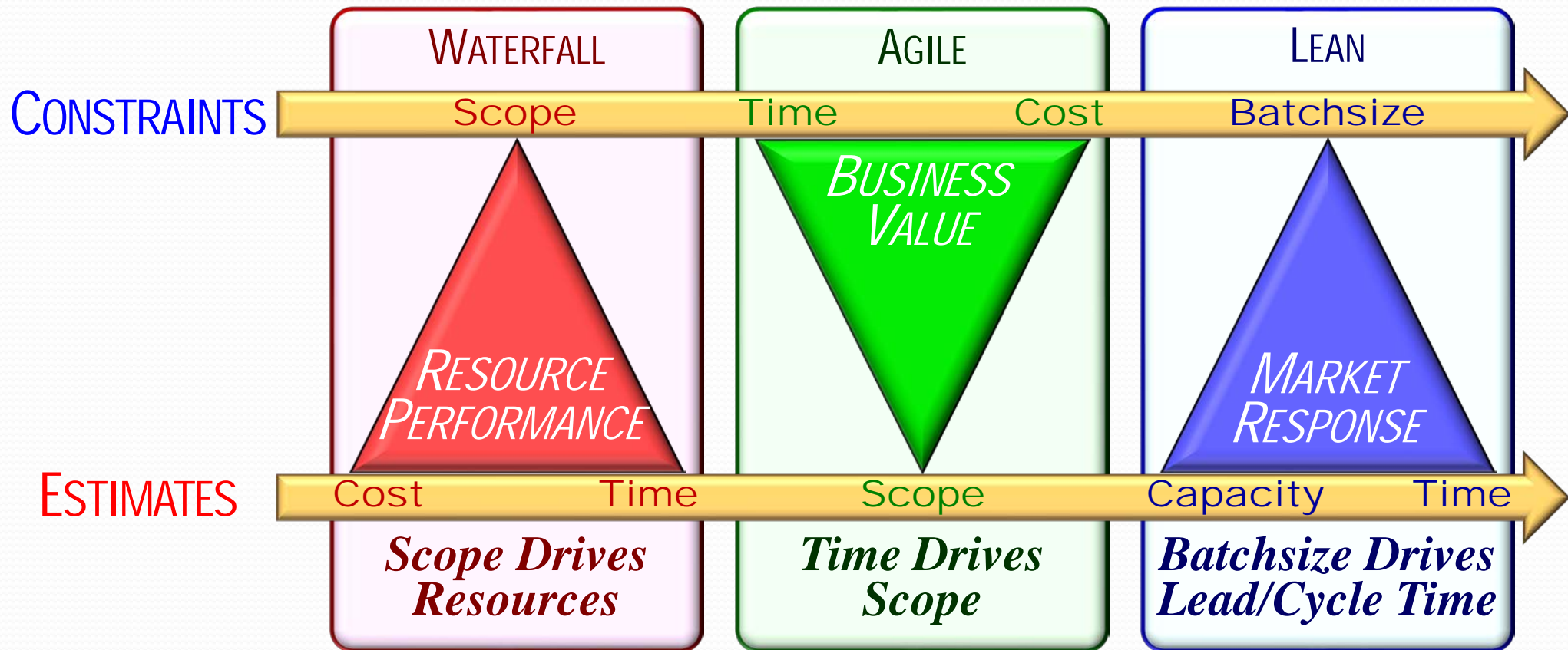- ☐ SAFe introduces Enterprise & Portfolio integration
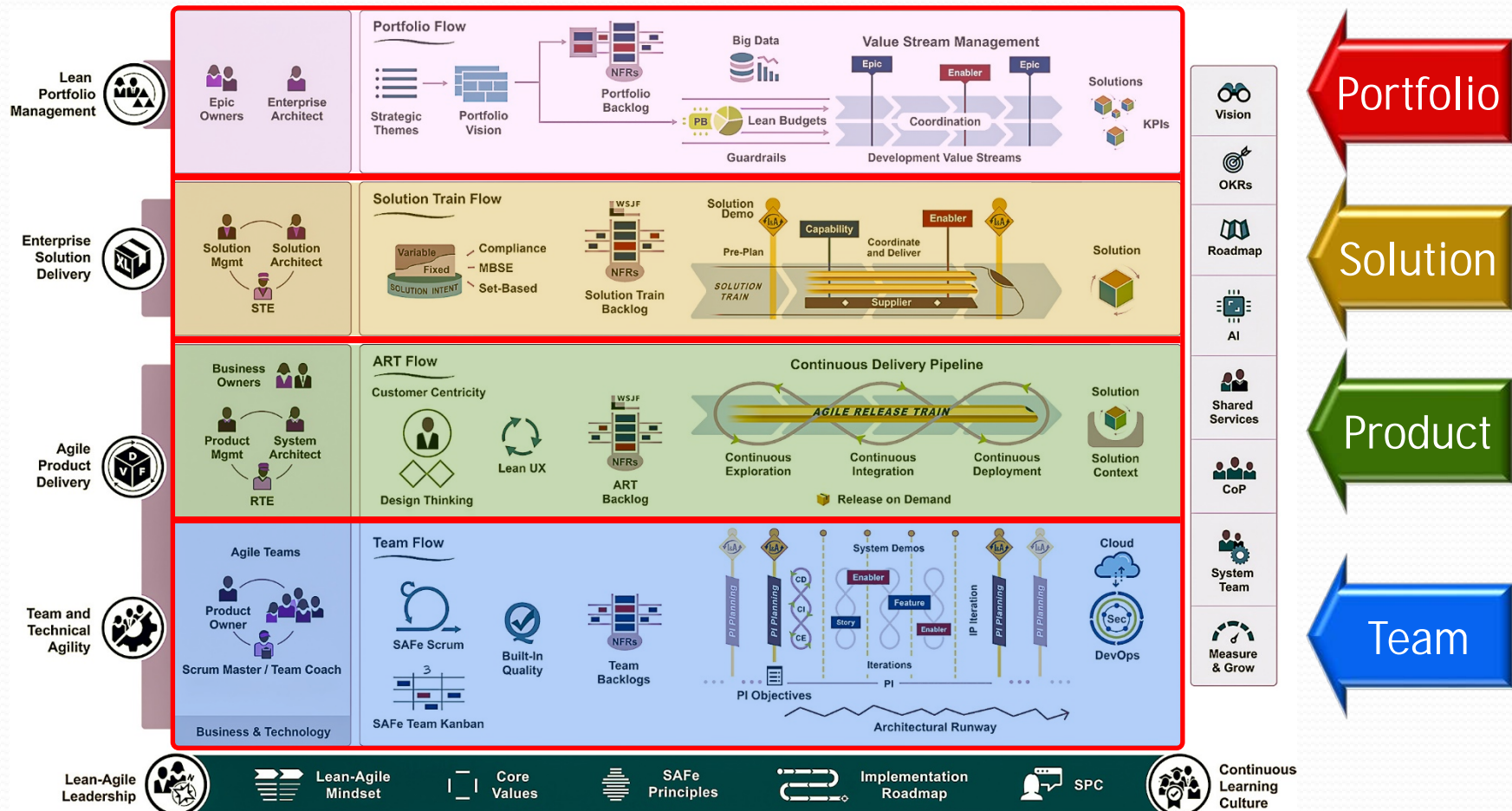
PfMP vs. SAFe vs. Scrum

- ☐ Scrum created to address Agile team mgt.
- ☐ SAFe created to address Agile program mgt.
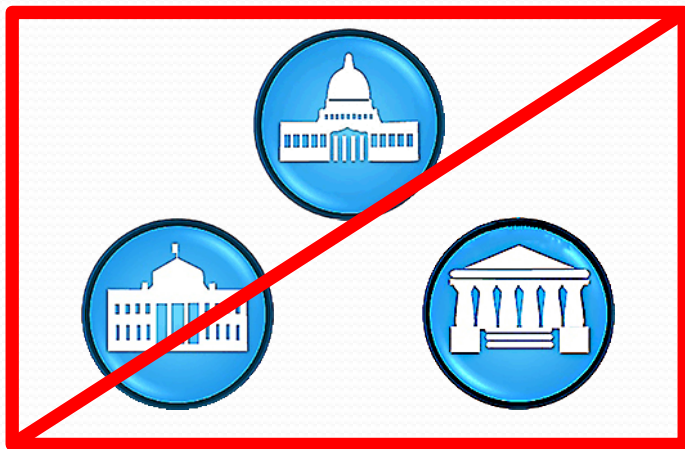- ☐ PfMp created to address Portfolio management
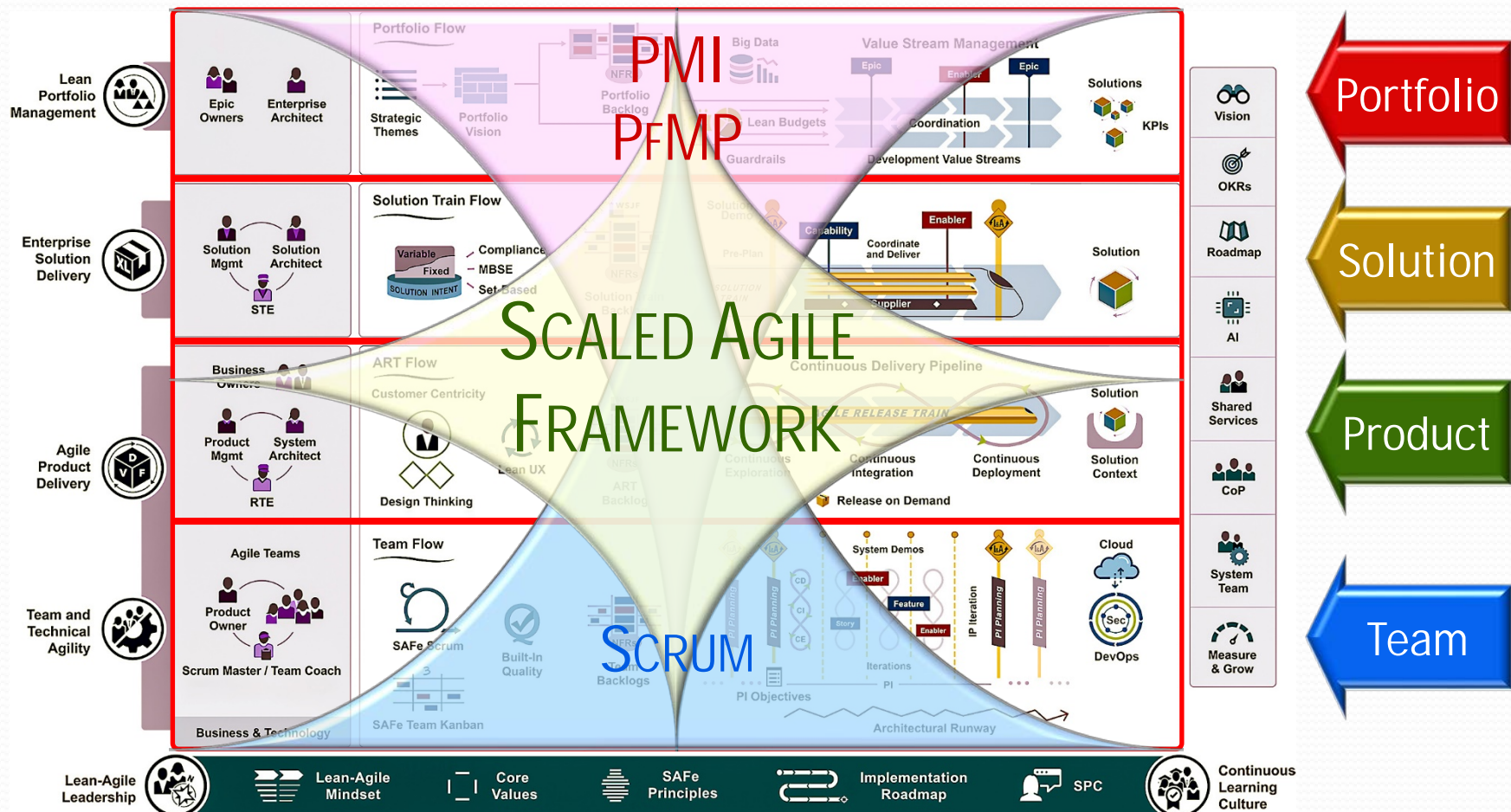
SAFe GOLDILOCKS Zone

- Traditional project management is scope-based
- Agile project management is primarily time-based
- ☞ Batchsize, capacity, & time key to market response

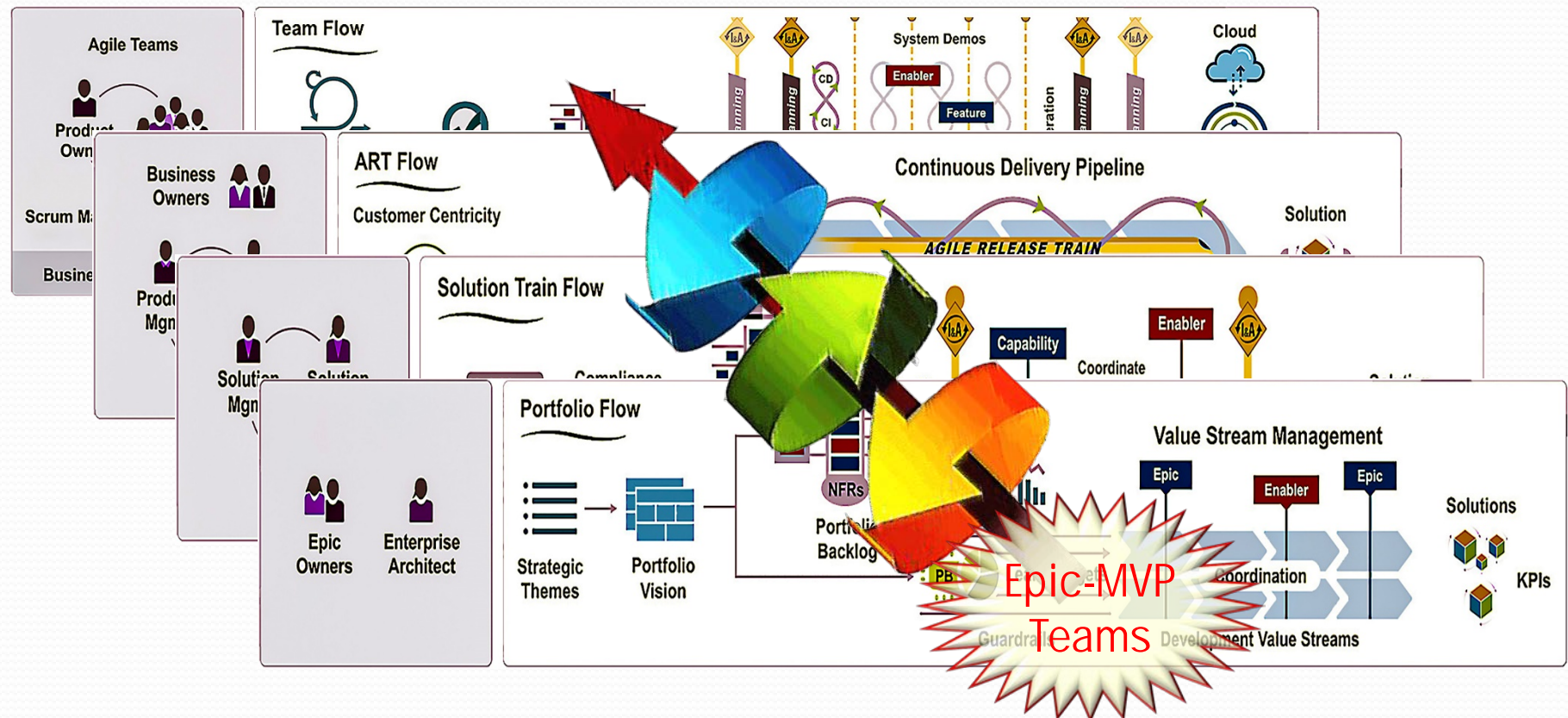|	WATERFALL	AGILE	LEAN
CONSTRAINTS	Scope	Time Cost	Batchsize
	RESOURCE PERFORMANCE	BUSINESS VALUE	MARKET RESPONSE
ESTIMATES	Cost Time	Scope	Capacity Time
	Scope Drives Resources	Time Drives Scope	Batchsize Drives Lead/Cycle Time

Rico, D. F. (2017). *Lean triangle: Triple constraints*. Retrieved December 17, 2017, from http://davidfrico.com/lean-triangle.pdf

Sylvester, T. (2013). *Waterfall, agile, and the triple constraint*. Retrieved December 16, 2017, from http://tom-sylvester.com/lean-agile/waterfall-agile-the-triple-constraint

Pound, E. S., Bell, J. H., Spearman, M. L. (2014). *Factory physics: How leaders improve performance in a post-lean six sigma world*. New York, NY: McGraw-Hill Education.

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SAFe ANTI-PATTERNS

- □ SAFe is NOT a U.S. Government Hierarchy
- □ SAFE is NOT a Contract Hierarchy/Bureaucracy
- ☞ □ SAFe is DEFINITELY NOT a Waterfall Life Cycle

Rico, D. F. (2017). *Scaled agile framework (SAFe) arguments: Point vs. counterpoint.* Retrieved December 17, 2017, from http://davidfrico.com/safe-arguments.pdf
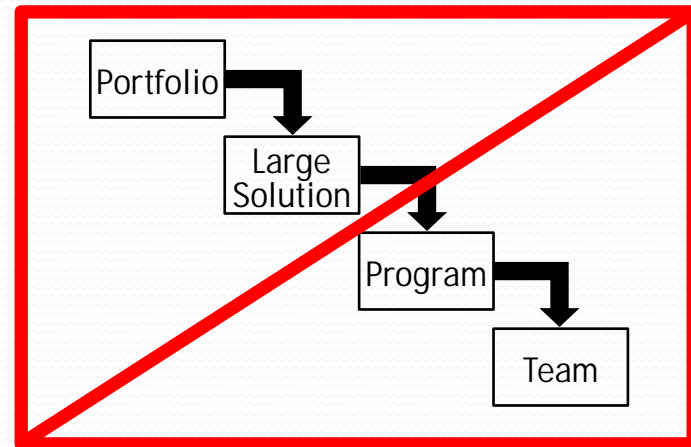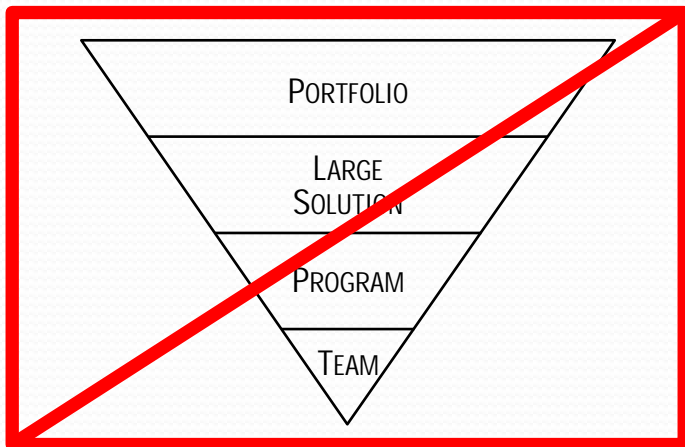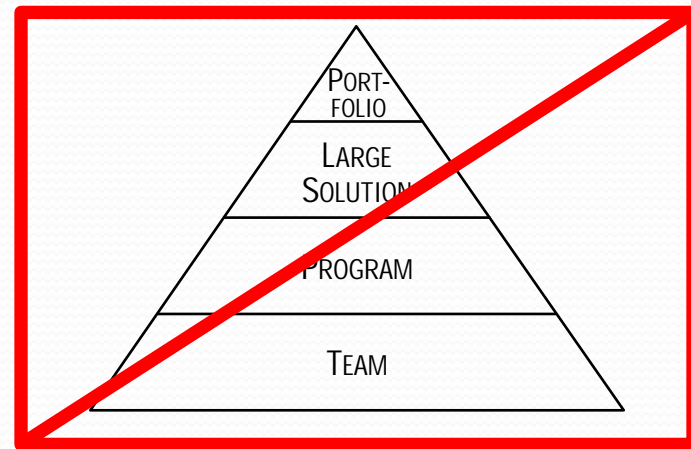
SAFe Epic-MVP Teams

- □ SAFe cross functional teams cut across levels
- □ Inc. portfolio, solution, program, & team functions
- ☞ □ Purpose is to shepherd epics through value streams

Rico, D. F. (2017). *A short scaled agile framework* (*SAFe*) *case study*. Retrieved December 17, 2017, from http://davidfrico.com/safe-case-study.pdf

SAFe CROSS FUNCTIONAL Teams

- ☐ SAFe Epic-MVP teams consist of diverse personnel
- ☐ Teams range from Epic owners through development
- ☞ ☐ Include scoping, analysis, planning, & implementation
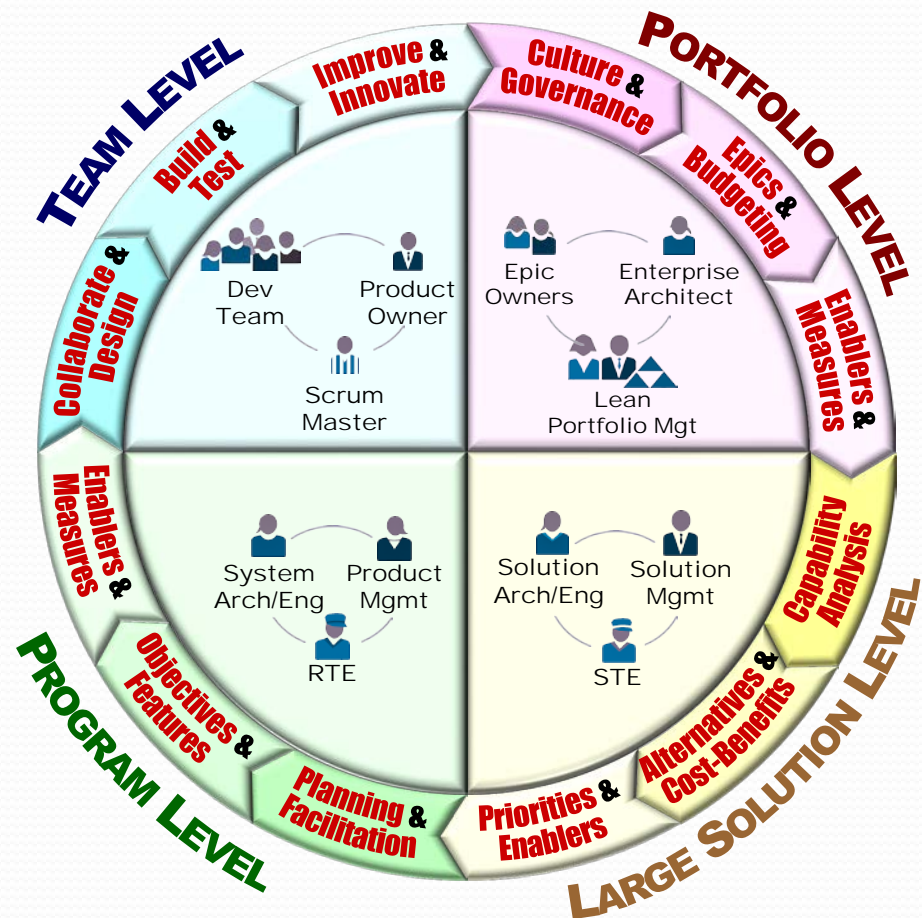
- ● ONE TEAM VS. HIERARCHY
- ● ALIGNMENT OF WHOLE TEAM
- ● BOTTOM UP DECISION MAKING
- ★ PREFERRED BY U.S. GOVERNMENT
- ● LEAN, JUST-IN-TIME, FRICTION-FREE
- ● CODIFIES LEAN-AGILE BEST PRACTICES
- ● FULL TRANSPARENCY & COMMUNICATION

★ USAF, USA, CDC, CIA, CMS, USC, USCG, DOD, DFAS, DHS, FAA, FBI, GSA, HHS, DOJ, USMC, NASA, NGA, NIH, NNSA, NRO, NSA, USN, SSA, DOS, USPTO, USPS, VA, ETC.

Rico, D. F. (2017). *A short scaled agile framework (SAFe) case study*. Retrieved December 17, 2017, from http://davidfrico.com/safe-case-study.pdf

SAFe Epic Evolution

☞ ☐ Portfolio & program epics begin at top levels
☞ ☐ Epics scoped, analyzed, & split by tech. architects
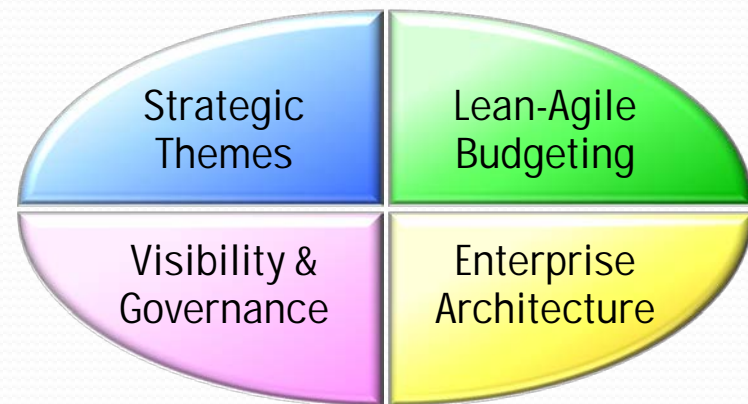☞ ☐ Narrow epics are built, tested, deployed, & evaluated
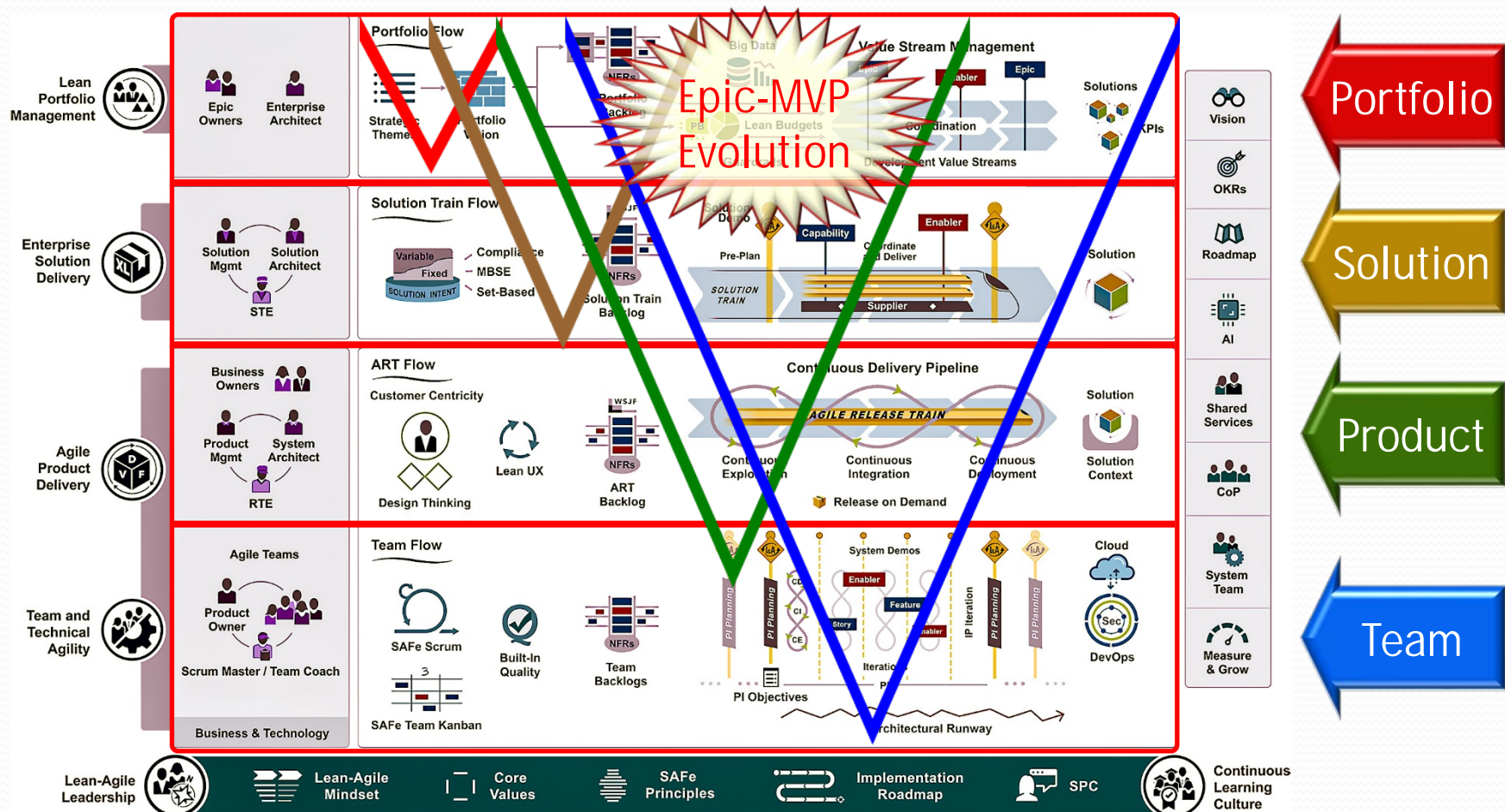
SAFe PORTFOLIO Level

- ☐ Business objectives mapped to strategic themes
- ☐ Enterprise architecture, Kanban, & economic cases
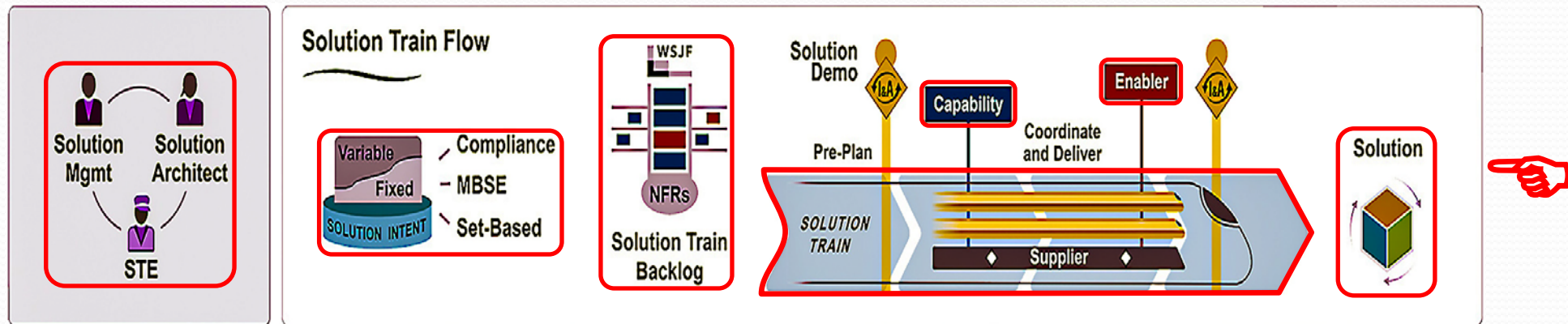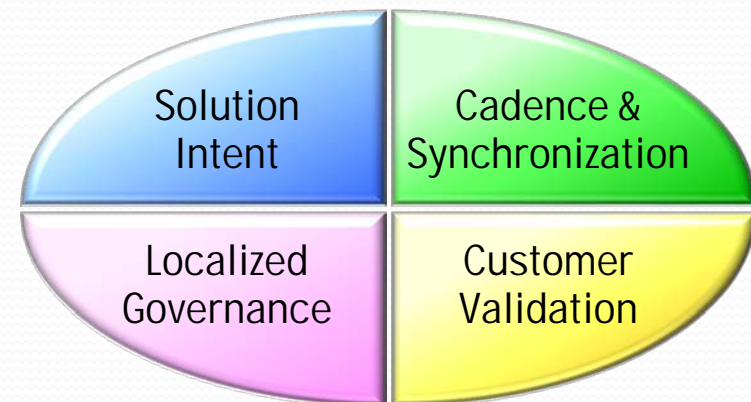- ☐ Value delivery via epics, enablers, and solution trains

SAFe LARGE SOLUTION Level

- ☐ Economic framework and solution train budgeting
- ☐ Agile architecture, solution train engineer & Kanban
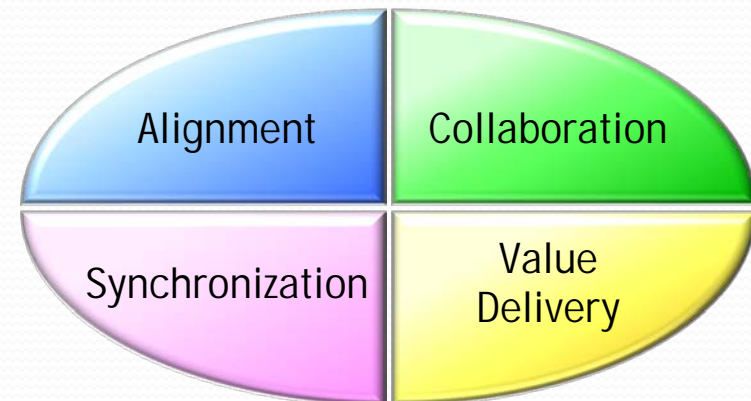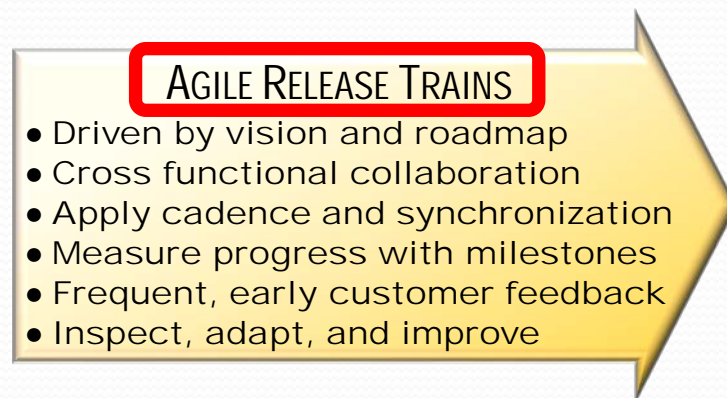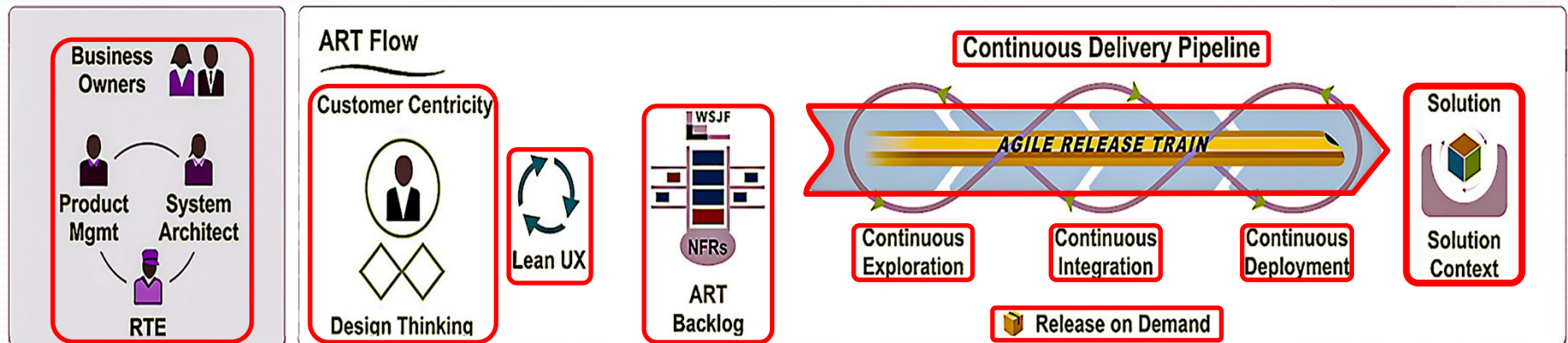- ☞ ☐ Solution deliveries via capabilities and release trains

Leffingwell, D. (2017). *Scaled agile framework (SAFe)*. Retrieved July 4, 2017 from http://www.scaledagileframework.com
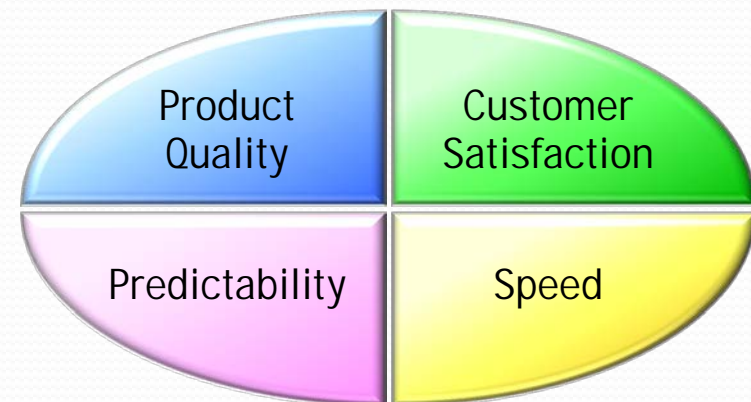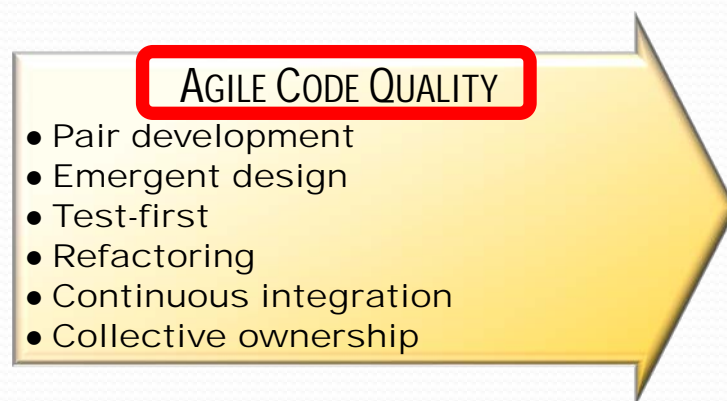
SAFe PROGRAM Level

- ☐ Product and release management team-of-team
- ☐ Common mission, backlog, estimates, and sprints
- ☞ ☐ Value delivery via program-level enablers & features

Leffingwell, D. (2017). *Scaled agile framework (SAFe)*. Retrieved July 4, 2017 from http://www.scaledagileframework.com

SAFe TEAM Level

☞
- ☐ Empowered, self-organizing cross-functional teams
- ☐ Hybrid of Scrum PM & XP technical best practices
- ☐ Value delivery via empowerment, quality, and CI

Leffingwell, D. (2017). *Scaled agile framework (SAFe)*. Retrieved July 4, 2017 from http://www.scaledagileframework.com
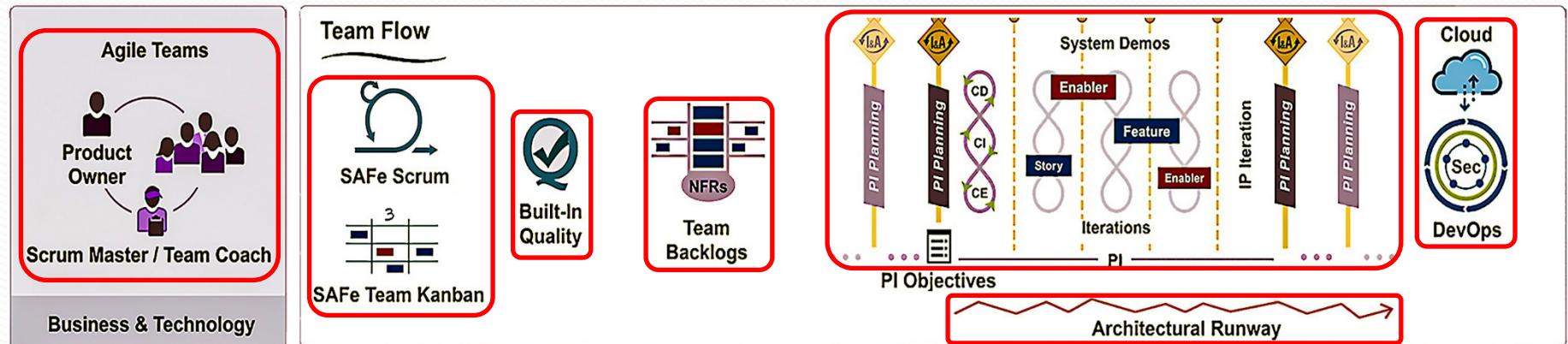
SAFe REQUIREMENTS Model

- □ SAFe has a scalable, multi-level requirements model
- □ Epics very similar to minimum viable product (MVP)
- ☞ □ Hierarchy of epics, capabilities, features, & stories

Leffingwell, D. (2017). *Scaled agile framework (SAFe)*. Retrieved July 4, 2017 from http://www.scaledagileframework.com
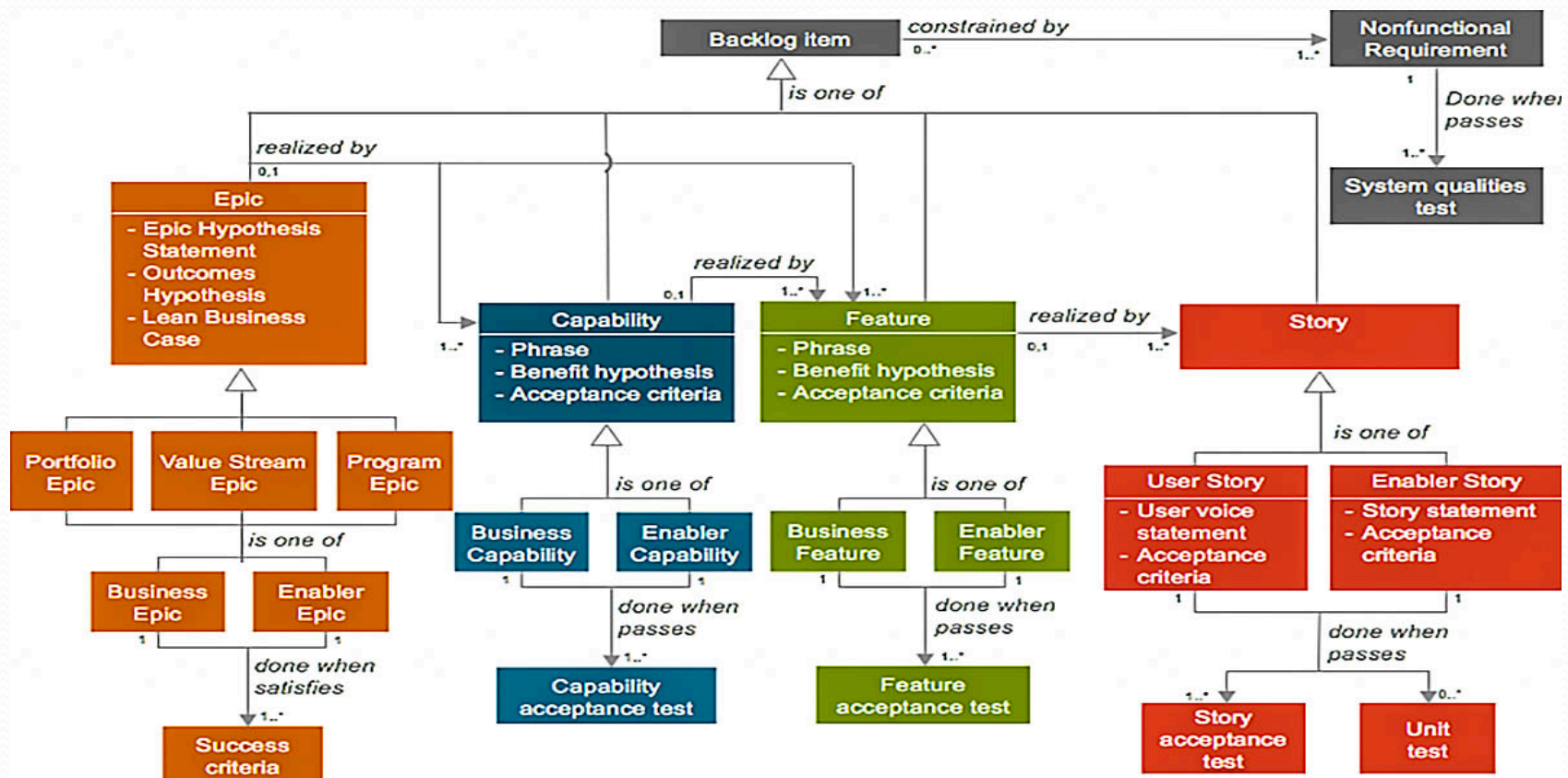
SAFe Roles & Responsibilities

- ☐ Basic SAFe RACI matrix (role, resp., cons, inf.)
- ☐ Product owners & arch. resp. for epics & enablers
- ☞ ☐ Multi-level product owners, architects, & facilitators

| Level	Role / Artifact	Strategic Themes	Business Epics	Enabler Epics	Portfolio Backlog	Capabilities	Solution Epics	Solution Enablers	Nonfunctional Req	Solution Backlog	Solution Kanban	Features	Program Epics	Program Enablers	Program Backlog	Program Kanban	PI Objectives	Arch Runway	User Stories	Enabler Stories	Iteration Goals	Team Backlog	Team PI Obj
Portfolio	Lean Portfolio Management	✓			✓																		
	Epic Owners		✓																				
	Enterprise Architect			✓																			
Large Solution	Customer																						
	Solution Management					✓	✓			✓													
	Solution Architect							✓	✓														
	Solution Train Engineer										✓												
	Supplier																						
Program	Product Management											✓	✓		✓								
	System Architect													✓				✓					
	Release Train Engineer															✓	✓						
	Business Owner																						
Team	Agile Team																				✓		✓
	Product Owner																		✓	✓		✓	
	Scrum Master																						
	Development Team																						

SAFe METRICS

- ☐ Late big bang integration increases WIP backlog
- ☐ Agile testing early and often reduces WIP backlog
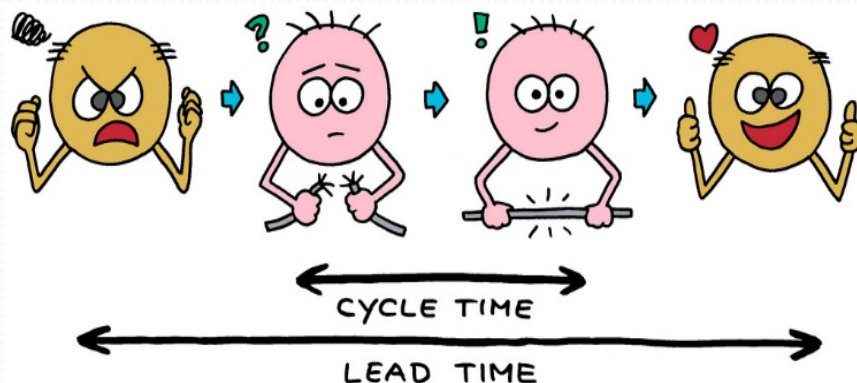- ☞ ☐ CI/CD/DevOps lower WIP, Cycle Time, & Lead Time

KANBAN BOARD
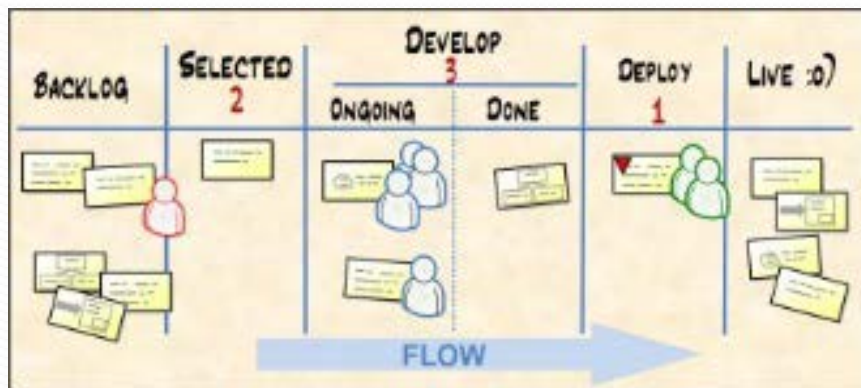
CUMULATIVE FLOW DIAGRAM
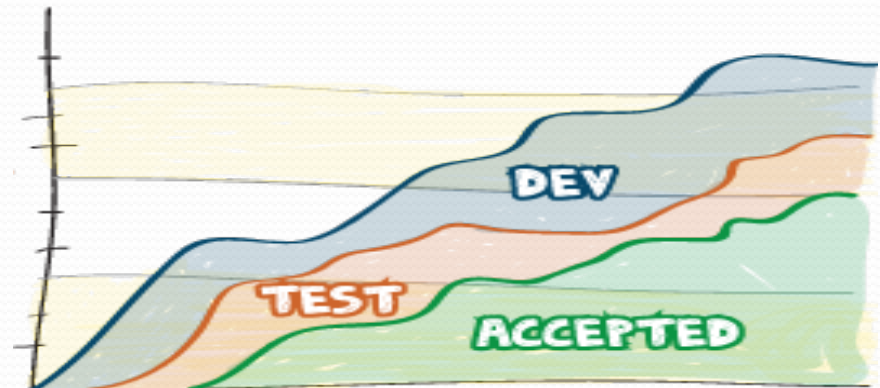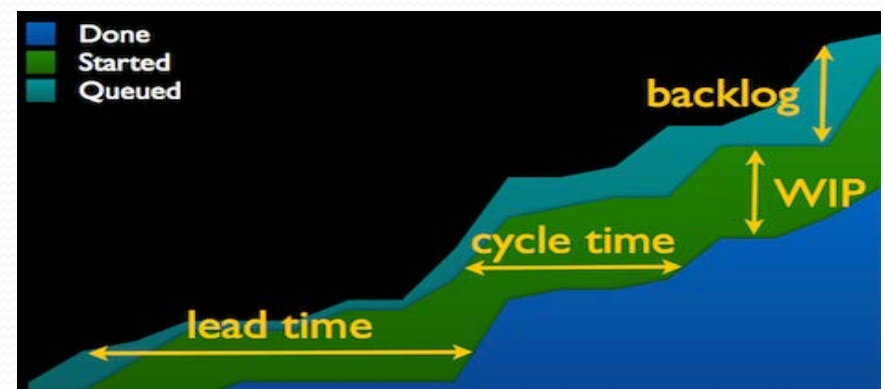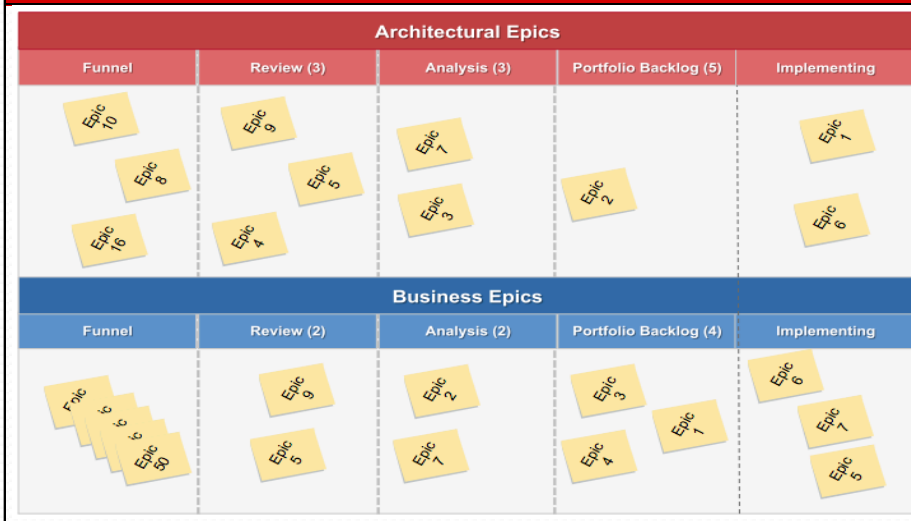
LEAD TIME & CYCLE TIME

PUTTING IT ALL TOGETHER

Nightingale, C. (2015). *Seven lean metrics to improve flow*. Franklin, TN: LeanKit.
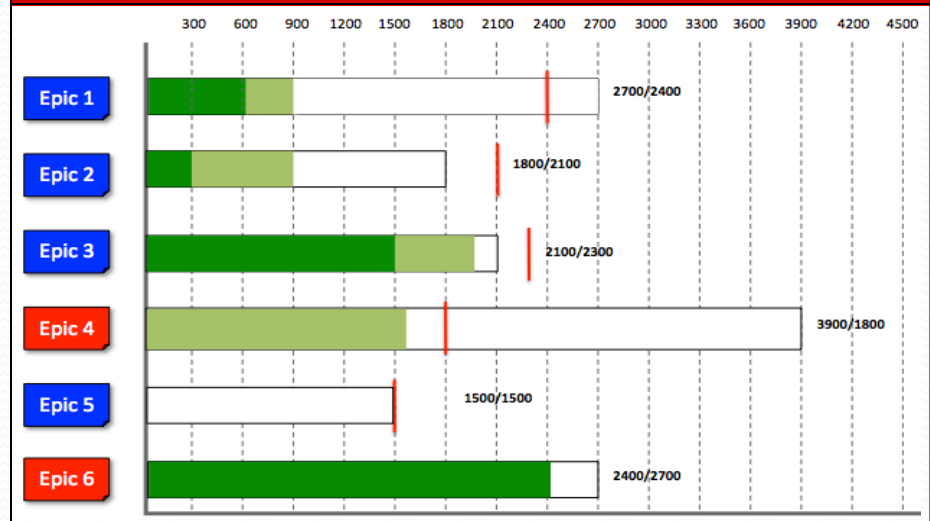
SAFe METRICS—Cont'd
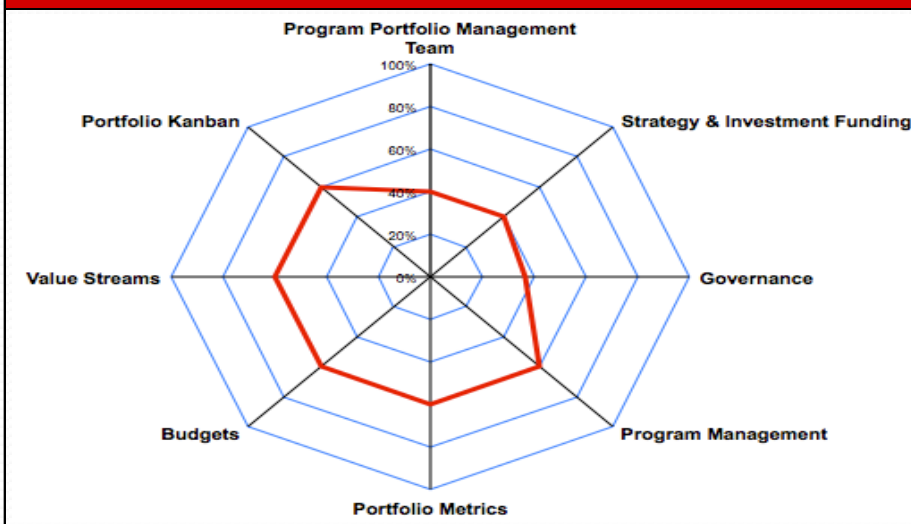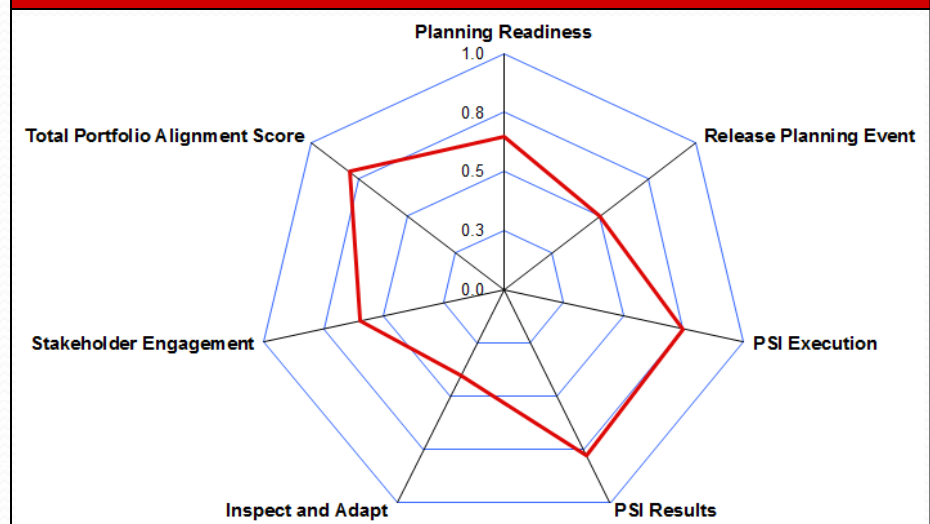

Portfolio Kanban

Epic Progress

Portfolio Radar

Release Train Radar

SAFe METRICS—Cont'd

☞ □ Basic SAFe metrics & assessments at all levels
□ Many are rollups of burndown, velocity, & bus. value
□ Multi-level kanbans, backlogs, & performance tracking

Portfolio	Lean Portfolio Metrics	Comprehensive but Lean set of metrics that can be used to assess internal and external progress for an entire portfolio.
	Portfolio Kanban	Ensures Epics and Enablers are reasoned and analyzed prior to a PI boundary, prioritized, and have acceptance criteria.
	Epic Burn-up Chart	Tracks progress toward epic completion, i.e., Initial estimate, Work completed, and Cumulative work completed.
	Epic Progress Measure	At-a-glance view of the status of all epics in a portfolio, i.e., Epic X, progress, and current vs. initial est. story points.
	Enterprise Scorecard	Four perspectives to measure performance for each portfolio, i.e., Efficiency, Value delivery, Quality, and Agility.
	LPM Self Assessment	Structured, periodic self-assessment to continuously measure and improve portfolio processes.
	Value Stream KPIs	Set of criteria or KPIs to evaluate value stream investments, i.e., revenues, innovation, intangibles, and lean metrics.
Large Solution	Solution Kanban Board	Ensures Capabilities and Enablers are reasoned and analyzed prior to PI boundary, prioritized, and have acc. criteria.
	Solution Predictability	Aggregation of individual predictability measures for ARTs to assess the overall predictability of Solution Trains.
	Solution Performance	Aggregation of individual performance measures for ARTs to assess the overall performance of Solution Trains.
	Economic Framework	Decision rules to align work to financial objectives of Solution and guide economic decision-making process.
	WSJF	Prioritization model used to sequence jobs (e.g., Features, Capabilities, and Epics) to maximize economic benefit.
	Cost of Delay	A way of communicating the impact of time on the outcomes we hope to achieve, i.e., combining urgency and value.
	Duration (Job Size)	Length of time required to complete an epic, enabler, capability, or feature, i.e., size or complexity in story points.
Program	Feature Progress	Tracks feature and enabler status during PI and indicates which features are on track or behind, i.e., plan vs. actual.
	Program Kanban	Ensures Features are reasoned and analyzed prior to a PI boundary, prioritized, and have acceptance criteria.
	Program Predictability	Aggregation of Team PI Performance Reports to assess the predictability of ART, i.e., planned vs. actual business value.
	Program Performance	Aggregation of team metrics collected at end of PI, i.e., functionality (velocity, etc.) and quality (tests, defects, etc.).
	PI Burn-down Chart	Shows progress toward PI timebox to track work planned for PI against work accepted, i.e., iterations vs. story points.
	Cumulative Flow	Graph to visualize amount of work waiting to be done (backlog), work in progress (started), and completed (validated).
	Art Self Assessment	Structured, periodic self-assessment to continuously measure and improve program processes.
Team	CD Pipeline Efficiency	Measures efficiency of steps in terms of touch and wait time, i.e., analysis, backlog, build, validate, deploy, release, etc.
	Deployments and Releases	Deployment and release frequency progress as a ratio of deployment to production vs. product release frequency.
	Recovery over time	How often physical or logical rollbacks performed by overlaying points in time for deployment, release, and rollbacks.
	Innovation Indicators	Hypothesis measures of MMF and MVP business outcomes based upon actionable innovation accounting measures.
	Hypotheses Tested	Number of successful vs. unsuccessful hypothesis tests (with goal of increasing the number, frequency, and success).
	Team Performance	Individual team metrics collected at end of PI, i.e., functionality (velocity, etc.) and quality (tests, defects, etc.).
	Team Kanban	Ensures Stories and tasks are reasoned and analyzed prior to a PI boundary, prioritized, and have acceptance criteria.
	Team Business Value	Estimate of actual business value achieved for each team's PI objectives during a PI demo by customer and agile team.
	Team Self-Assessment	Structured, periodic self-assessment to continuously measure and improve team processes.

Leffingwell, D. (2017). *Scaled agile framework (SAFe)*. Retrieved September 18, 2017 from http://www.scaledagileframework.com

SAFe Case Studies

- Most U.S. Fortune 500 companies adopting SAFe
- Goal to integrate enterprise, portfolios, and systems
- Capital One going through end-to-end SAFe adoption

John Deere
- Agricultural automation
- 800 developers on 80 teams
- Rolled out SAFe in one year
- Transitioned to open spaces
- Field issue resolution up 42%
- Quality improvement up 50%
- Warranty expense down 50%
- Time to production down 20%
- Time to market down 20%
- Job engagement up 10%

Spotify
- Television cable/DVR boxes
- Embedded & server-side
- 150 developers on 15 teams
- Cycle time - 12 to 4 months
- Support 11 million+ DVRs
- Design features vs. layers
- Releases delivered on-time
- 100% capabilities delivered
- 95% requirements delivered
- Fully automated sprint tests

Comcast
- GUI-based point of sale sys
- Switched from CMMI to SAFe
- 120 developers on 12 teams
- QA to new feature focus
- Used Rally adoption model
- 10% productivity improvement
- 10% cost of quality reduction
- 200% improved defect density
- Production defects down 50%
- Value vs. compliance focus

Leffingwell, D. (2014). *Scaled agile framework (SAFe) case studies*. Denver, CO: Leffingwell, LLC.
Rico, D. F. (2014). *Scaled agile framework (SAFe) benefits*. Retrieved June 2, 2014, from http://davidfrico.com/safe-benefits.txt
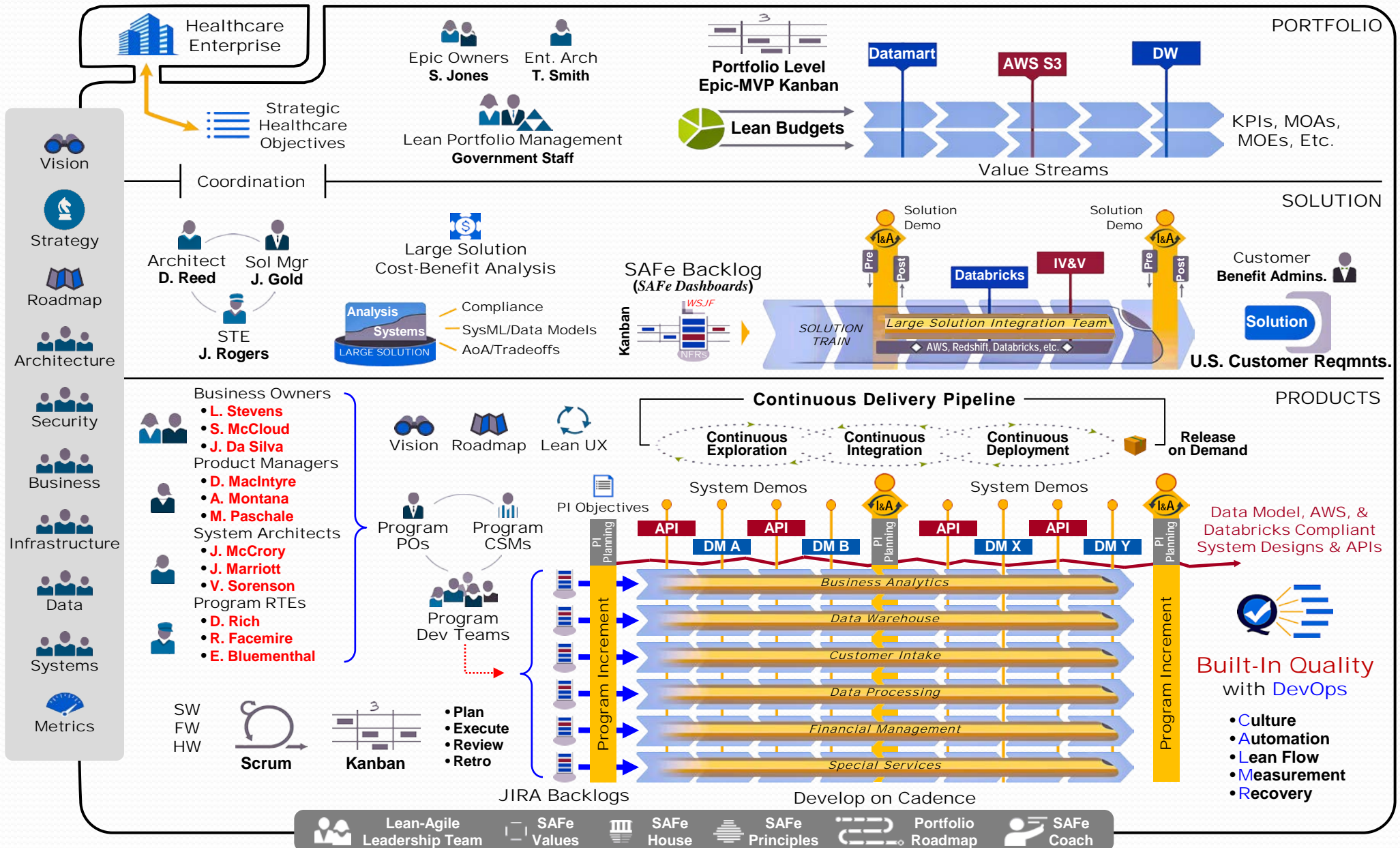
SAFe Case Study

SAFe CASE STUDY Governance
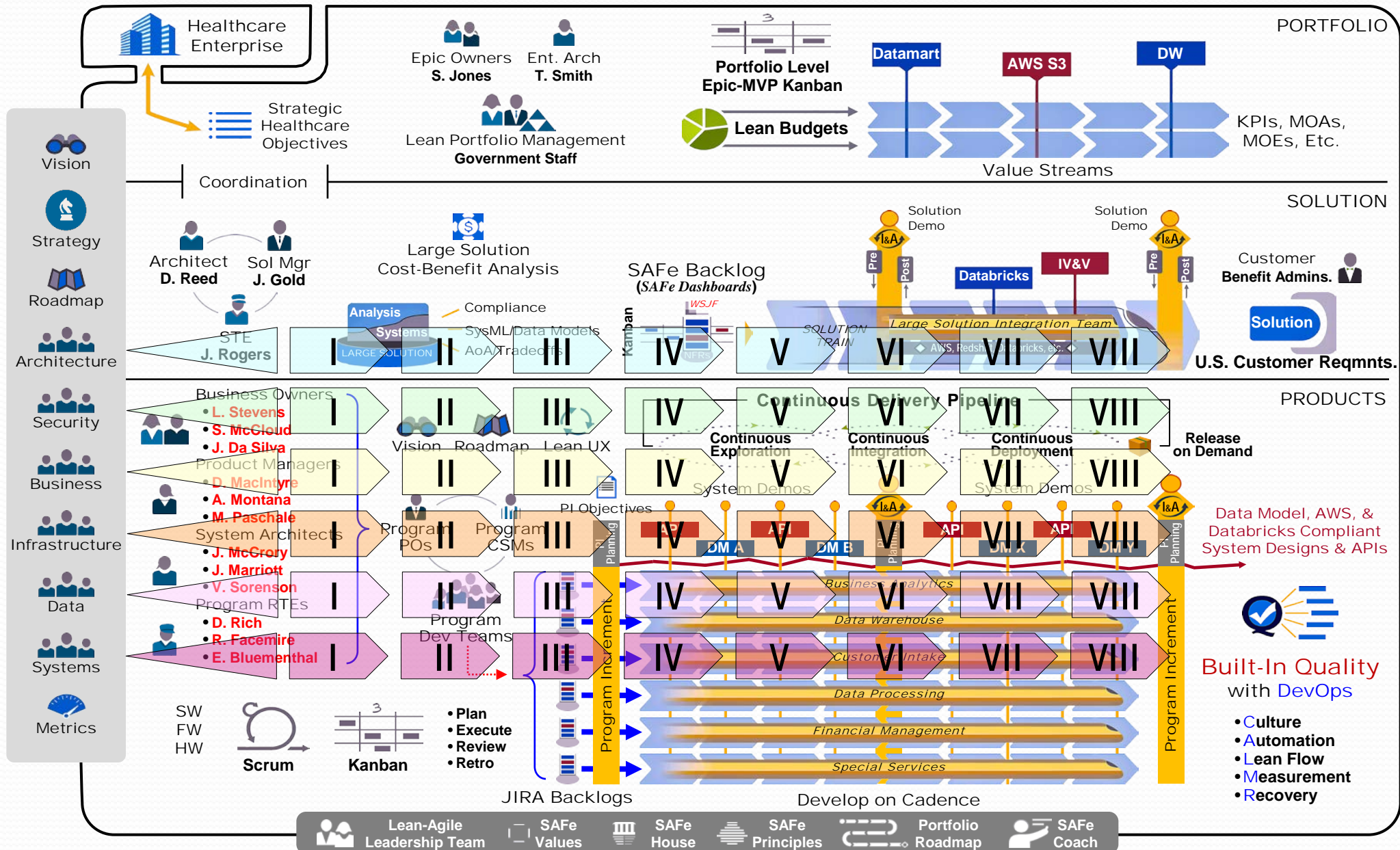
SAFe CASE STUDY Impact

- *Trained and certified team on SAFe principles.*
- *Rigorously follow daily lean and agile ceremonies.*
- *Rolled out SAFe Program Increment Planning (twice).*
- *Implemented SAFe on state-of-the-art ALM Workflow tool.*
- *Practice essential SAFe for managing portfolio deliverables.*
- *Established, measure, and track Lean-Agile performance metrics.*
- *Implemented analytics for automated reporting of the performance.*
- *Began agile assessments of large solutions within overall portfolio.*
- *Positive impacts on overall portfolio lean-agile thought-leadership.*
- *Rapidly transforming culture from traditional to lean-agile thinking.*

SAFe Case Study Lessons Learned

- ☐ Must consider factors critical to SAFe success
- ☐ SAFe culture changes begins with bold leadership
- 👉 ☐ Leadership, contracts, experience, & coaching are key

Success Factor	Success Elements	Score
Buyer Enterprise	Visions, strategies, policies & guidelines	🙂 - ✔
Buyer Leadership	Knowledge, training, experience, & support	😐 - ↔
Buyer Team Leads	Knowledge, training, experience, & support	🙂 - ✔
Supplier Agreements	OC, Values, principles, practices, & tools	😐 - ↔
Supplier Enterprise	Visions, strategies, policies & guidelines	🙁 - ✖
Supplier Leadership	Knowledge, training, experience, & support	🙂 - ✔
Supplier Team Leads	Knowledge, training, experience, & support	😐 - ↔
Supplier Experience	OC, Values, principles, practices, & tools	🙁 - ✖
Supplier ALM Tools	Management, documents, reports, & delivery	🙁 - ✖
Supplier Coaching	OC, Values, principles, practices, & tools	🙂 - ✔

Holler, R. (2017). *11th annual state of agile survey*: *State of agile development*. Atlanta, GA: VersionOne.

Leffingwell, D. (2017). *Scaled agile framework (SAFe)*. Retrieved March 1, 2017 from http://www.scaledagileframework.com

Rico, D. F. (2017). Lean & agile org. change: Innovative models to successfully implement process improvement. Retrieved December 21, 2017, from http://davidfrico.com

Rico, D. F. (2017). Lean & agile org. leadership: Some leadership history, theory, models, & 360 degree assessments. Retrieved December 21, 2017, from http://davidfrico.com

SAFe BUSINESS VALUE Drivers

SAFe is a de facto international standard multi-tiered reference model, skeletal framework, and scaffolding platform for applying Lean & Agile principles to large Information Technology (IT) portfolios, programs, and projects (*in Fortune 500 firms, Government Agencies, and Europe*)

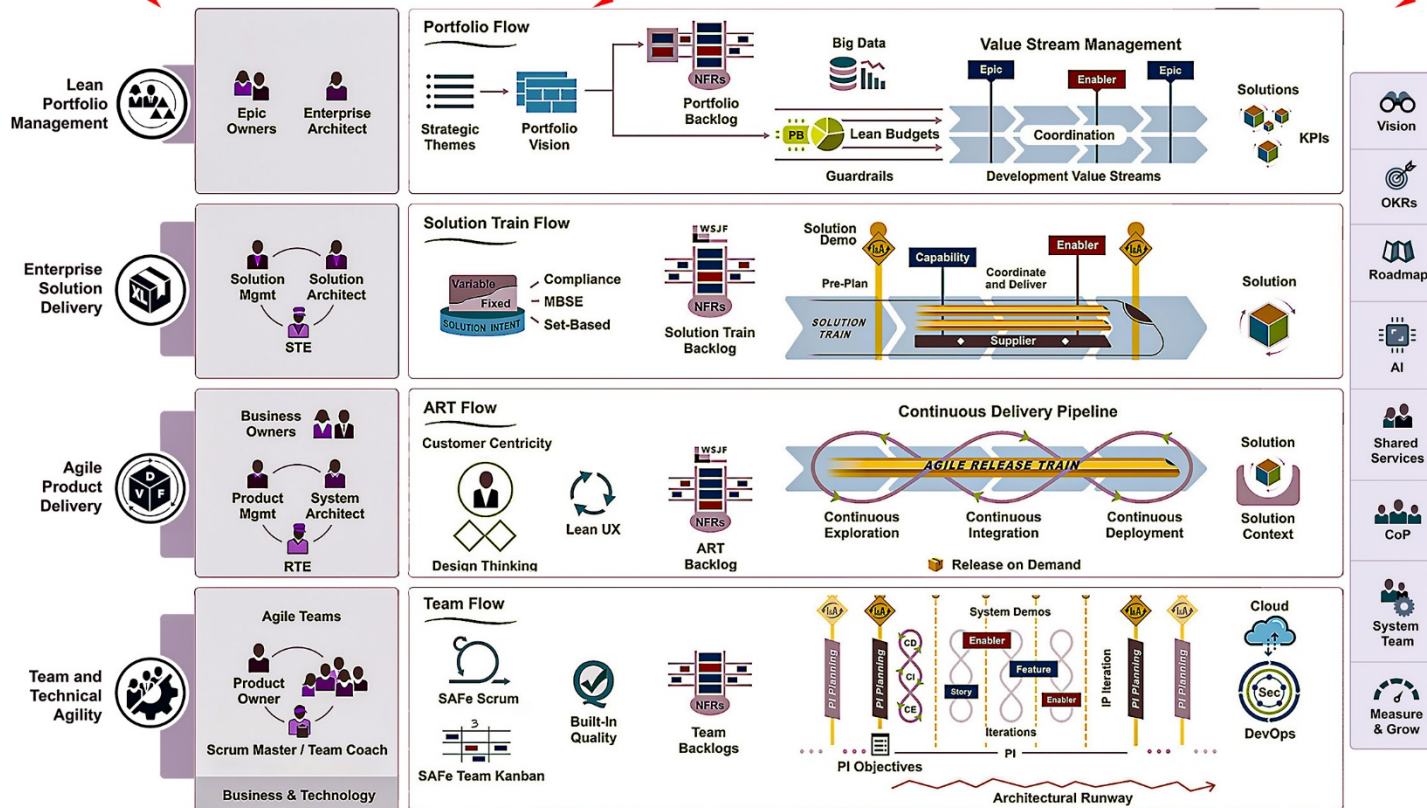## NEW SAFe INNOVATION ENGINE

Hypothesis driven Continuous Exploration, Integration, Deployment, and Release on Demand to rapidly cycle through automated experimental microservices designs to quickly yield profitable innovations ...

OVERARCHING SAFe PRINCIPLES

- Hiring extremely smart and highly motivated people
- Establishing top-level stretch goals and operating boundaries
- Engaging people in forming a unified vision and operating plan
- Encouraging them to select simple, powerful, and flexible solutions
- Empowering people to unleash their creative energy to get the job done
- Getting out of their way, removing barriers and obstacles, and letting them succeed
- Not hindering success with back-breaking bureaucracy, red-tape, and merciless overlords

OVERARCHING SAFe PRINCIPLES OF LEAN THINKING

- Small batches of simple modularized MVP designs
- Severe workload constraints to free queue congestion
- Fast lead and cycle times by eliminating unneeded bureaucracy
- Pull-based just-in-time demand Kanbans based on priority and job size
- Small highly-motivated teams based on collaboration, communication, and trust
- Maximum process and product visualization and transparency for optimal workflow
- Decentralized bottoms-up decision-making, empowerment, and continuous improvement

Lean Portfolio Management — Epic Owners, Enterprise Architect

Portfolio Flow — Strategic Themes, Portfolio Vision, Portfolio Backlog, NFRs, Big Data, Value Stream Management, Epic, Enabler, Epic, Lean Budgets, PB, Coordination, Guardrails, Development Value Streams, Solutions, KPIs

Enterprise Solution Delivery — Solution Mgmt, Solution Architect, STE

Solution Train Flow — Variable, Fixed, SOLUTION INTENT, Compliance, MBSE, Set-Based, WSJF, NFRs, Solution Train Backlog, Solution Demo, Capability, Pre-Plan, Coordinate and Deliver, Enabler, SOLUTION TRAIN, Supplier, Solution

Agile Product Delivery — Business Owners, Product Mgmt, System Architect, RTE

ART Flow — Customer Centricity, Lean UX, Design Thinking, WSJF, NFRs, ART Backlog, Continuous Delivery Pipeline, AGILE RELEASE TRAIN, Continuous Exploration, Continuous Integration, Continuous Deployment, Release on Demand, Solution, Solution Context

Team and Technical Agility — Agile Teams, Product Owner, Scrum Master / Team Coach, Business & Technology

Team Flow — SAFe Scrum, SAFe Team Kanban, Built-In Quality, NFRs, Team Backlogs, System Demos, Enabler, Feature, Story, Enabler, CD, CI, CE, Iterations, IP Iteration, PI Planning, PI Objectives, PI, Architectural Runway, Cloud, System Team, Sec, DevOps

Vision, OKRs, Roadmap, AI, Shared Services, CoP, System Team, Measure & Grow

PORTFOLIO KANBAN
for Lean, demand and pull-based just-in-time **TASK ORDER** planning and tracking

SOLUTION KANBAN
for Lean, demand and pull-based just-in-time **ARCHITECTURE** planning and tracking

PRODUCT KANBAN
based on bottoms-up **BIG-ROOM PLANNING** of system vision, roadmap, release objectives, and features

TEAM KANBANS
of small lean and agile **SCRUM GROUPS** coding working tested operational software at regular intervals

Lean-Agile Leadership | Lean-Agile Mindset | Core Values | SAFe Principles | Implementation Roadmap | SPC | **Continuous Learning Culture**

SAFe is a framework to help large businesses, enterprises, organizations, government agencies, portfolios, and programs apply and realize the benefits of Lean and Agile principles (*i.e., enable complex entities to think, act, and be small, fast, innovative, and adapt to changing market conditions*)

SAFe BENEFITS

- Cycle time and quality are most notable improvement
- Productivity on par with Scrum at 10X above normal
- Data shows SAFe scales to teams of 1,000+ people

| Benefit	Nokia	SEI	Telstra	BMC	Trade Station	Discount Tire	Valpak	Mitchell	John Deere	Spotify	Comcast	Average
App	Maps	Trading	DW	IT	Trading	Retail	Market	Insurance	Agricult.	Cable	PoS	
Weeks	95.3	2		52				52	52		52	51
People	520	400	75	300	100		90	300	800	150	120	286
Teams	66	30	9	10	10		9	60	80	15	12	30
Satis		25%	29%					15%				23%
Costs			50%								10%	20%
Product				2000%		25%					10%	678%
Quality			95%					44%	50%		50%	60%
Cycle			600%	600%				300%	50%	300%		370%
ROI				2500%	200%							1350%
Morale			43%					63%	10%			39%

Leffingwell, D. (2014). *Scaled agile framework (SAFe) case studies*. Denver, CO: Leffingwell, LLC.
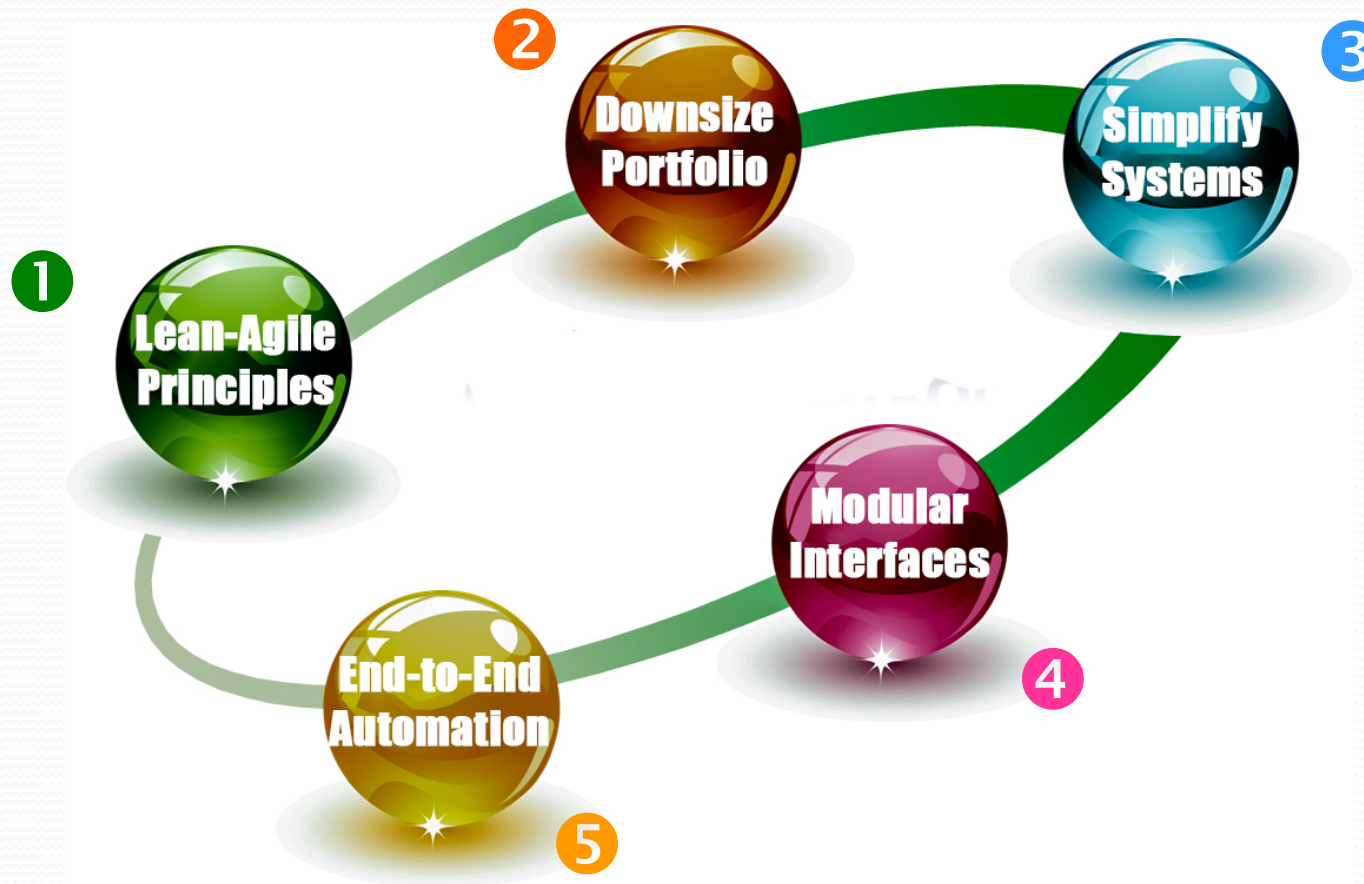Rico, D. F. (2014). *Scaled agile framework (SAFe) benefits*. Retrieved June 2, 2014, from http://davidfrico.com/safe-benefits.txt

SAFe ROADMAP—Top-Down (*Big Bang*)

- ☐ Roadmap necessary for successful SAFe introduction
- ☐ Traditional big-bang—*story maps & incrementalism okay*
- ☞ ☐ Keys are top-down commitment, training, & resources

Leffingwell, D. (2025). *Scaled agile framework* (*SAFe*). Retrieved April 26, 2025 from http://www.scaledagileframework.com
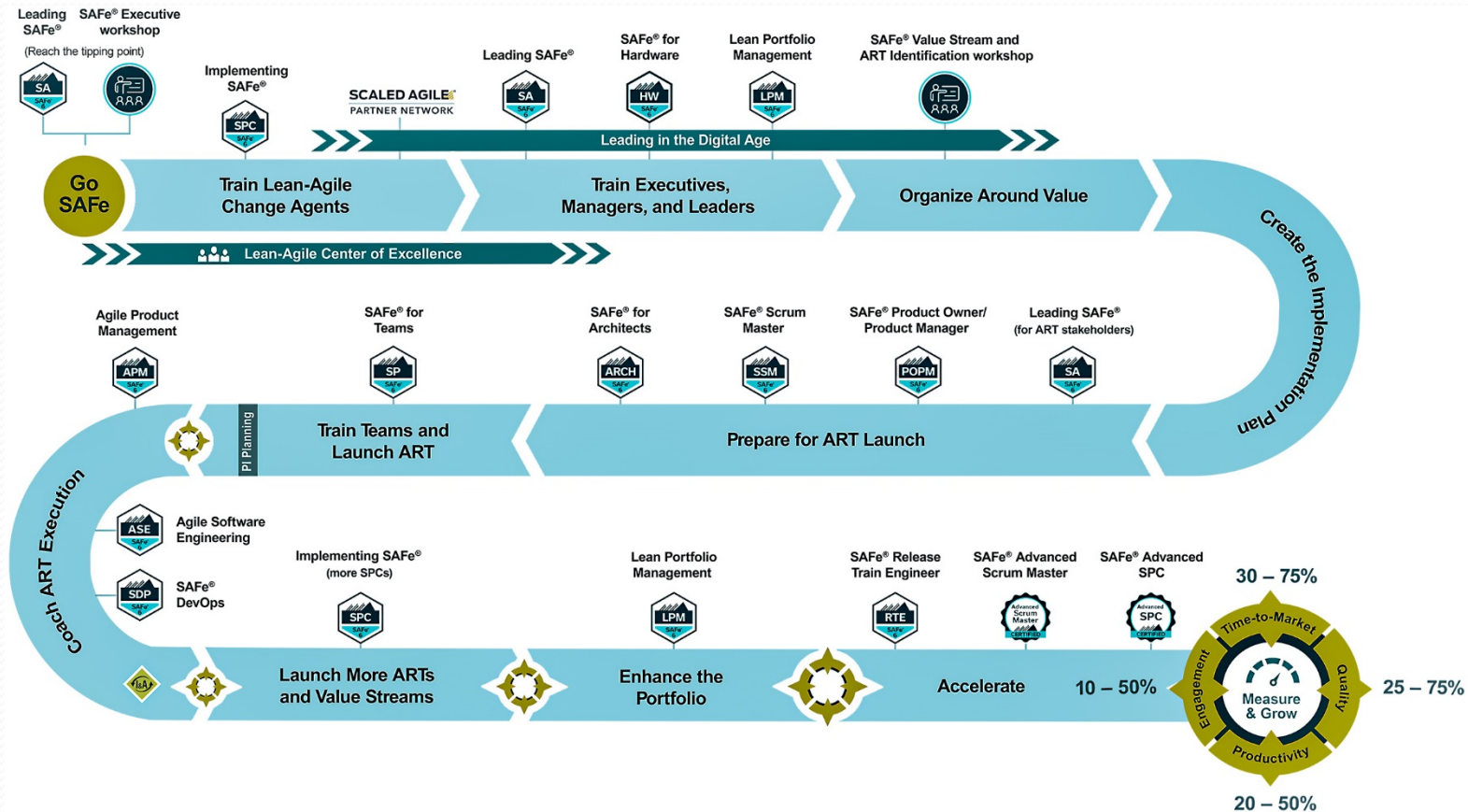
SAFe IMPLEMENTATION Pointers

- Everything begins with lean & agile principles
- Next step is smaller portfolio & simpler designs
- Final step is modular interfaces & E2E automation

Kim, G., Debois, P., Willis, J., & Humble, J. *The devops handbook*: *How to create world-class agility, reliability, and security in technology organizations*. Portland, OR: IT Revolution Press.

SAFe Assessments

- ☐ SAFe health radar tools rapidly emerging
- ☐ Captures most SAFe dimensions and variables
- ☞ ☐ Includes portfolio, solution, program, & team level

Elatta, S. (2015). *Agility health radar*. Omaha, NE: Agile Transformation, Inc.
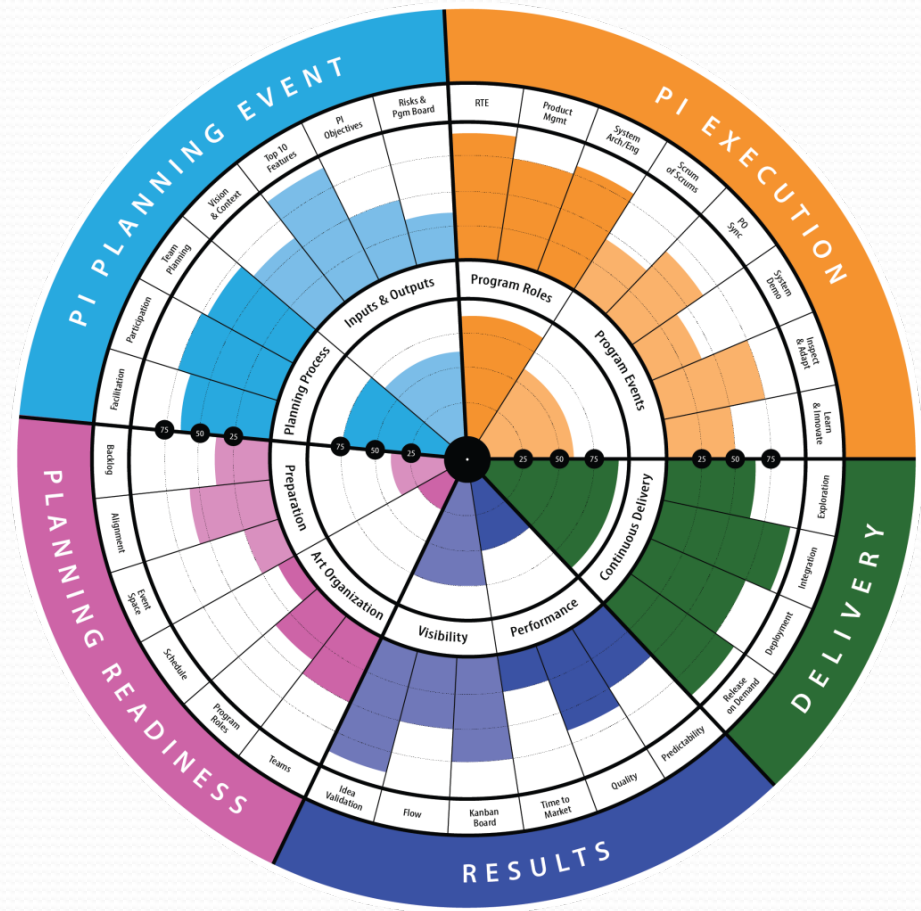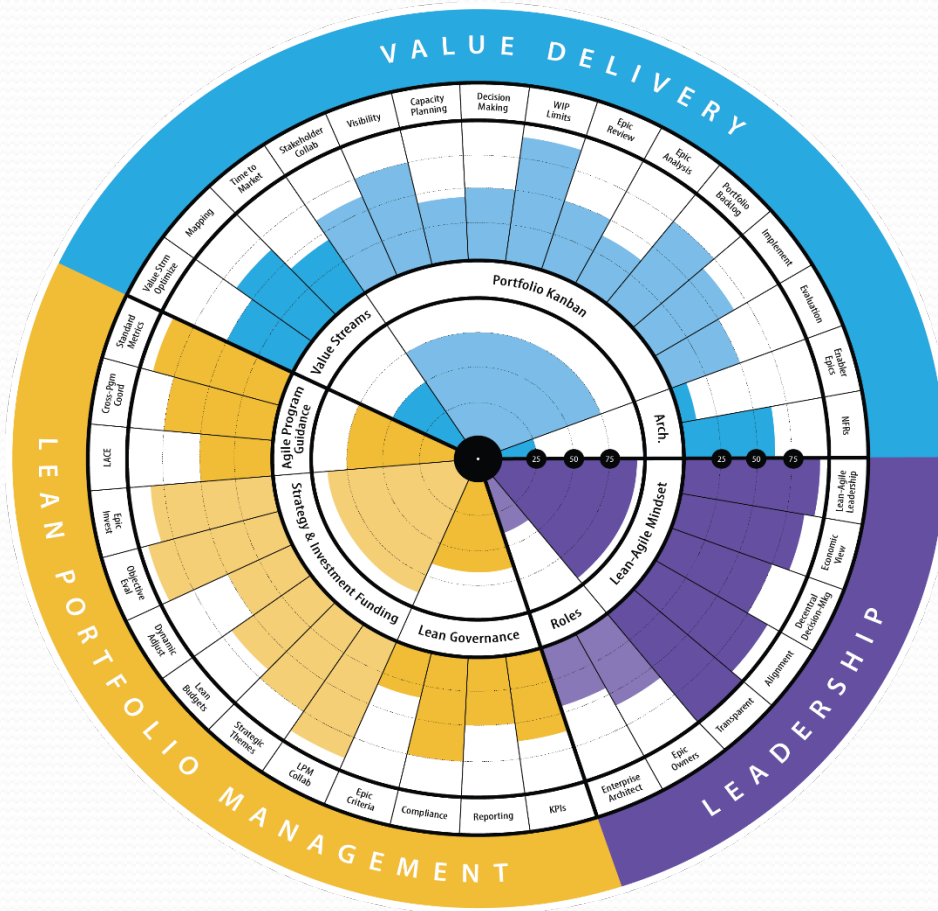
SAFe ADOPTION

- ☐ **1.4 million** SAFe professionals globally (& growing)
- ☐ Over **70%** of U.S. firms have SAFe certified people
- ☞ ☐ **50%** prefer SAFe for scaling lean-agile principles

SAFe POINT *vs.* COUNTERPOINT

- ☐ SAFe is not a method of putting lipstick on a pig
- ☐ SAFe is a 21st century portfolio management model
- ☞ ☐ SAFe based on smaller batches, bottlenecks, & delays

WHAT SAFe IS NOT ...	What SAFe is ...
• **Way to bootstrap lean-agile onto traditional methods**	• **Approach to implement lean-agile on large projects**
• **Slow process of activities, documents, & stage gates**	• **Speed up with smaller batches, bottlenecks, & delays**
• **Codification of legislative, executive, & judicial branch**	• **Solve big problems with light cross-functional teams**
• Way to embed lean-agile deep within gov't waterfalls	• Alternative to ineffective/inefficient waterfall standards
• Top-down, hierarchical command-n-control gov. model	• Lean-agile governance model for large programs
• Heavyweight bureaucracy of waste, WIP, and red-tape	• Minimal set of proven lean & agile best practices
• Traditional push-based requirements generation meth.	• Pull-based, just-in-time Kanban system for key epics
• Lipstick on traditional sequential, linear, & waterfall pig	• Pull-based DevOps pipeline to quickly implement epics
• Manual step-by-step prescriptive straightjacket	• Way to manage commercial cloud-based tech stack
• Traditional manufacturing era portfolio management	• New method of 21st century portfolio management
• Sprint Waterfalling, Scrummerfalling, or SAFerfalling	• Iterative, incremental, agile, & evolutionary paradigm
• Way to swallow whole elephant & choke productivity	• A method to eat a large elephant one bite at a time
• Means to build over-scoped & overregulated systems	• A way to build big systems with smaller scale initiatives
• Way to flowdown bad planning decisions on dev teams	• Bottoms up way to collect insights from technologists
• Method to enslave, control, and silence programmers	• Method of empowerment, ownership, & craftsmanship
• Way to capture ideas from armies of middle managers	• Method to efficiently implement high priority initiatives

Rico, D. F. (2017). *Scaled agile framework (SAFe) arguments: Point vs. counterpoint.* Retrieved December 17, 2017, from http://davidfrico.com/safe-arguments.pdf

SAFe Values & Principles

- ☐ SAFe is a values and principles-based reference model
- ☐ People try to turn SAFe into a set of physics equations
- ☞ ☐ SAFe offers a continuum abstract, process, & science

- **Values** - *SAFe is an aggregate set of Lean AND Agile values and principles (in its PUREST form).*
- **Principles** - *SAFe is PRINCIPLES-based like the U.S. Digital Services Playbook or Agile Manifesto.*
- **Beginners** - *Beginners RUSH into a set RIGID TANGIBLE PRACTICES that support SAFe model.*
- **Practices** - *These practices include rigid requirement hierarchies, PI planning, Scrum, Kanban, etc.*
- **Reminder** - *SAFe practitioners should FIRST stop to pay HOMAGE to SAFe's values and principles.*
- **Fundamentals** - *Emphasize EVERYTHING must BEGIN and END with SAFe's values and principles.*
- **Tendencies** - *Human beings are un-NATURALLY left-brained analytical and mathematical creatures.*
- **Mistakes** - *We RUSH into hard practices, processes, tools, artifacts, contracts, plans, metrics, etc.*
- **Trainers** - *Trainers pummel SAFe students with its equations, processes, artifacts, and ceremonies.*
- **Manifesto** - *SAFe supports Agile Manifesto (collaboration, teamwork, working SW, & adaptability).*
- **Soft-Skills** - *SAFe supports SOFT concepts like conversation, visualization, emotional intelligence, servant leadership, empowerment, simplicity, flexibility, informality, and continuous improvement.*
- **Continuum** - *SAFe SUPPORTS a CONTINUUM or range of IDEAS (abstract, procedural, scientific).*
- **Lean-Focus** - *SAFe is skewed towards LEAN principles such as Kanban, so it's not SAFe vs. Kanban.*
- **Adaptability** - *Don't get wed to one set of principles, because the 21st century is moving at lightspeed.*

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Rico, D. F. (2018). *SAFe is an aggregate set of values and principles*: *First, foremost, and always*. Retrieved February 10, 2018 from http://davidfrico.com/safe-story.txt

SAFe SUMMARY

☞ → *SAFe is overarching* framework *for* Lean-Agile *thinking*

☞ → *SAFe like* US Digital Service Playbook/Agile Manifesto

☞ → *SAFe used by over* 200,000 people *in* 70% of IT firms

☞ → *SAFe is* preferred approach *for* U.S. gov't IT contracts

☞ → *SAFe supports* CI, CD, DevOps, AppSec, UX, *and* DoE

→ *SAFe is extremely* well-defined *in books and Internet*

→ *SAFe has ample* training, certification, consulting, *etc.*

→ *SAFe leads to increased* productivity *and* quality

→ *SAFe supported by* dozens *of* automated ALM tools

☞ → *SAFe based on* soft-skills—visualization, conversation, cooperation, collaboration, transparency, trust, *etc.*

Portfolio Management — Porter
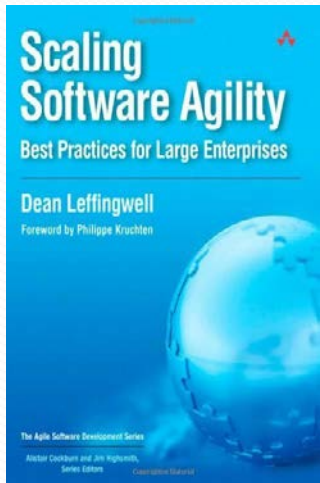

The essence of strategy is choosing what not to do.
Michael Porter

SAFe RESOURCES

- ☐ Guides to lean systems & software development
- ☐ Illustrates key principles, concepts, and practices
- ☞ ☐ <u>Keys to applying lean ideas systems development</u>
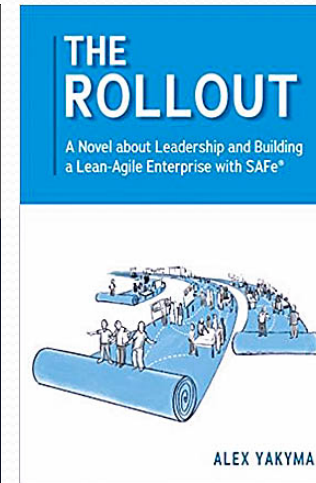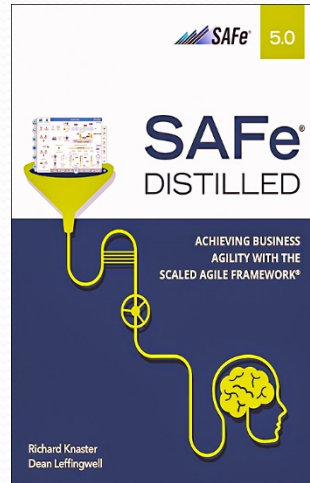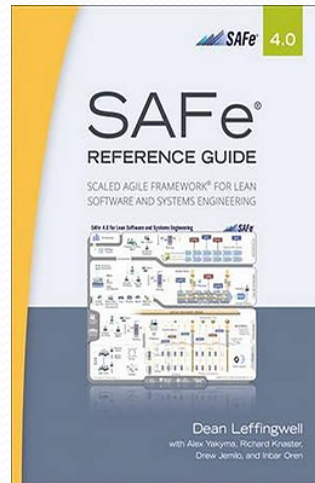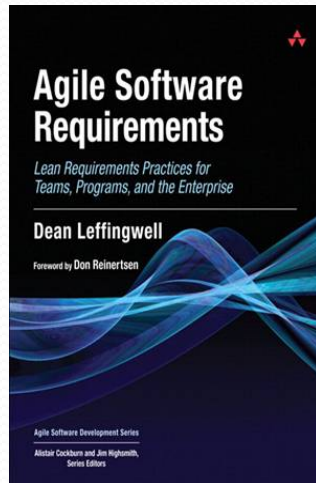
Leffingwell, D. (2007). *Scaling software agility*: *Best practices for large enterprises*. Boston, MA: Pearson Education.

Leffingwell, D. (2011). *Agile software requirements*: *Lean requirements practices for teams, programs, and the enterpri*se. Boston, MA: Pearson Education.

Leffingwell, D. (2017). *SAFe reference guide*: *Scaled agile framework for lean software and systems engineering*. Boston, MA: Pearson Education.
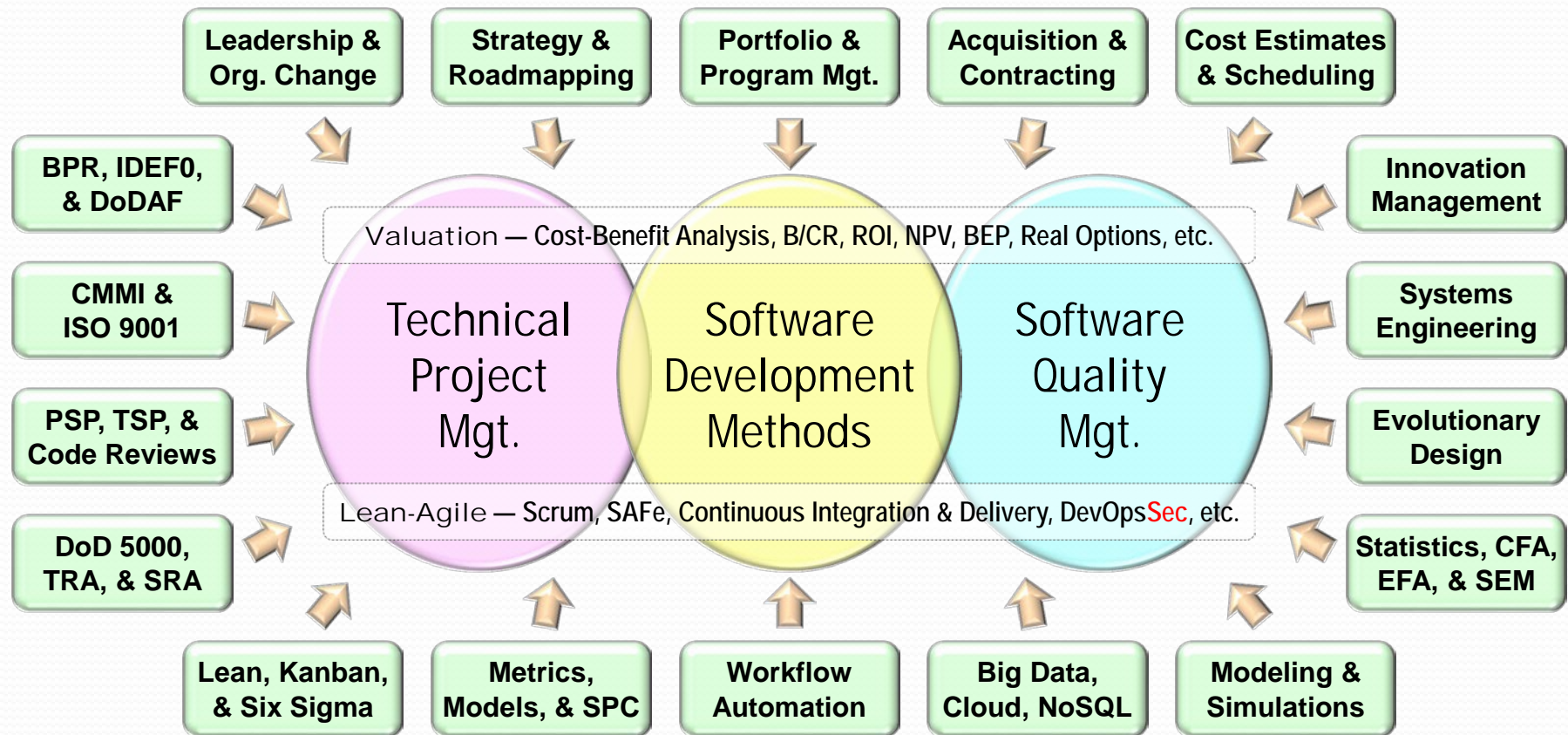
Knaster, R., & Leffingwell, D. (2020). *SAFe 5.0 distilled: Achieving business agility with the scaled agile framework*. Boston, MA: Pearson Education.

Yakyma, A. (2016). *The rollout*: *A novel about leadership and building a lean-agile enterprise with safe*. Boulder, CO: Yakyma Press.

Wilmhurst, D., & Quick, L. (2019). *SAFe coaches handbook: Proven tips and techniques for launching and running SAFe teams, ARTs, and portfolios in an agile enterprise*. Birmingham, UK: Packt Publishing.

Dave's PROFESSIONAL CAPABILITIES

Leadership & Org. Change	Strategy & Roadmapping	Portfolio & Program Mgt.	Acquisition & Contracting	Cost Estimates & Scheduling

BPR, IDEF0, & DoDAF	
CMMI & ISO 9001	
PSP, TSP, & Code Reviews	
DoD 5000, TRA, & SRA	

Valuation — Cost-Benefit Analysis, B/CR, ROI, NPV, BEP, Real Options, etc.

Technical Project Mgt.

Software Development Methods

Software Quality Mgt.

Lean-Agile — Scrum, SAFe, Continuous Integration & Delivery, DevOpsSec, etc.

Innovation Management

Systems Engineering

Evolutionary Design

Statistics, CFA, EFA, & SEM

Lean, Kanban, & Six Sigma	Metrics, Models, & SPC	Workflow Automation	Big Data, Cloud, NoSQL	Modeling & Simulations

STRENGTHS – Communicating Complex Ideas • Brownbags & Webinars • Datasheets & Whitepapers • Reviews & Audits • Comparisons & Tradeoffs • Brainstorming & Ideation • Data Mining & Business Cases • Metrics & Models • Tiger Teams & Shortfuse Tasks • Strategy, Roadmaps, & Plans • Concept Frameworks & Multi-Attribute Models • Etc.

38+ YEARS IN IT INDUSTRY

- **Data mining**. **Metrics, benchmarks, & performance**.
- **Simplification**. **Refactoring, refinement, & streamlining**.
- **Assessments**. **Audits, reviews, appraisals, & risk analysis**.
- **Coaching**. **Diagnosing, debugging, & restarting stalled projects**.
- **Business cases**. **Cost, benefit, & return-on-investment (ROI) analysis**.
- **Communications**. **Executive summaries, white papers, & lightning talks**.
- **Strategy & tactics**. **Program, project, task, & activity scoping, charters, & plans**.

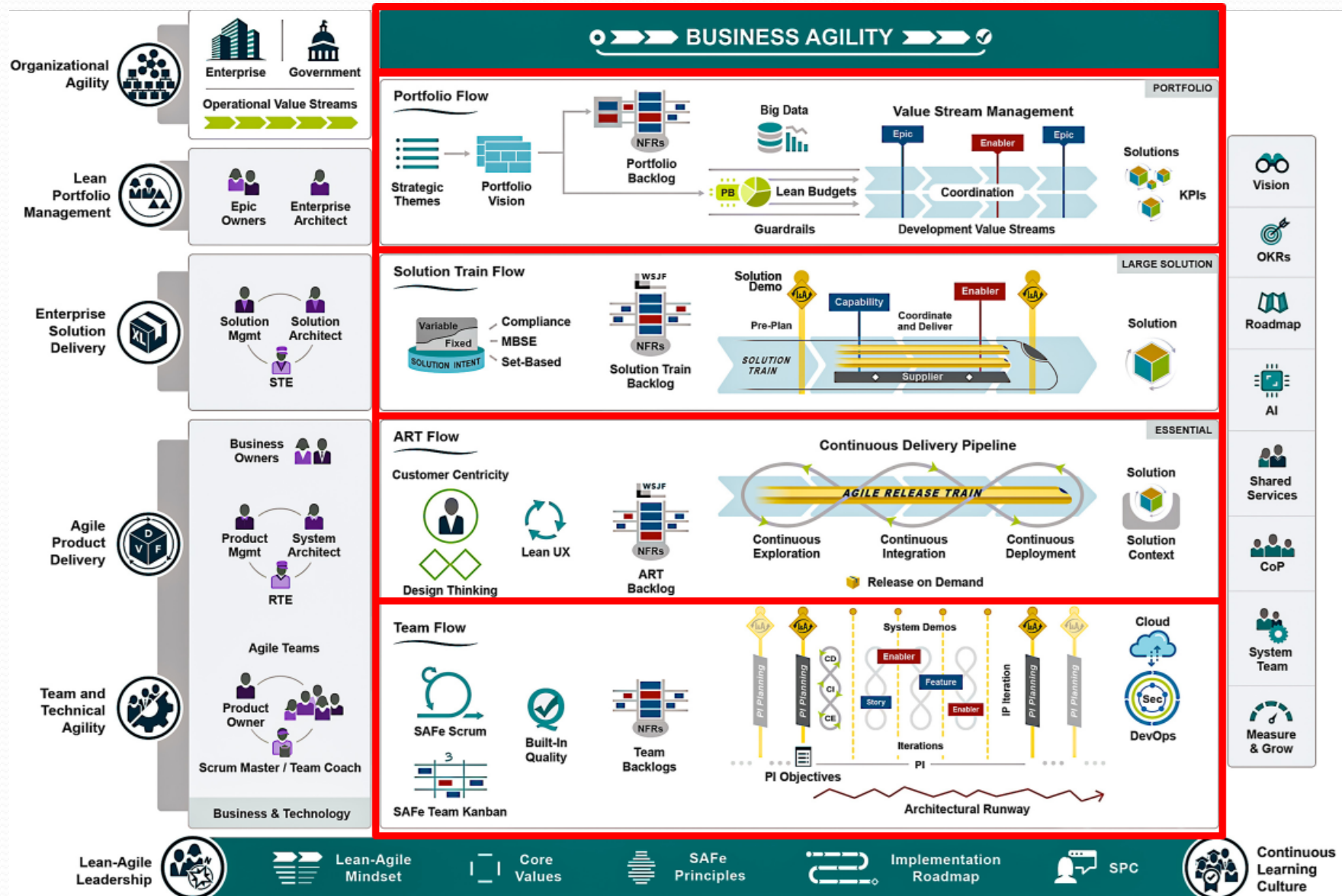**PMP, CSEP, FCP, FCT, ACP, CSM, SAFE, & DEVOPS**

Backup Slides

SAFe Picture #1—Proven
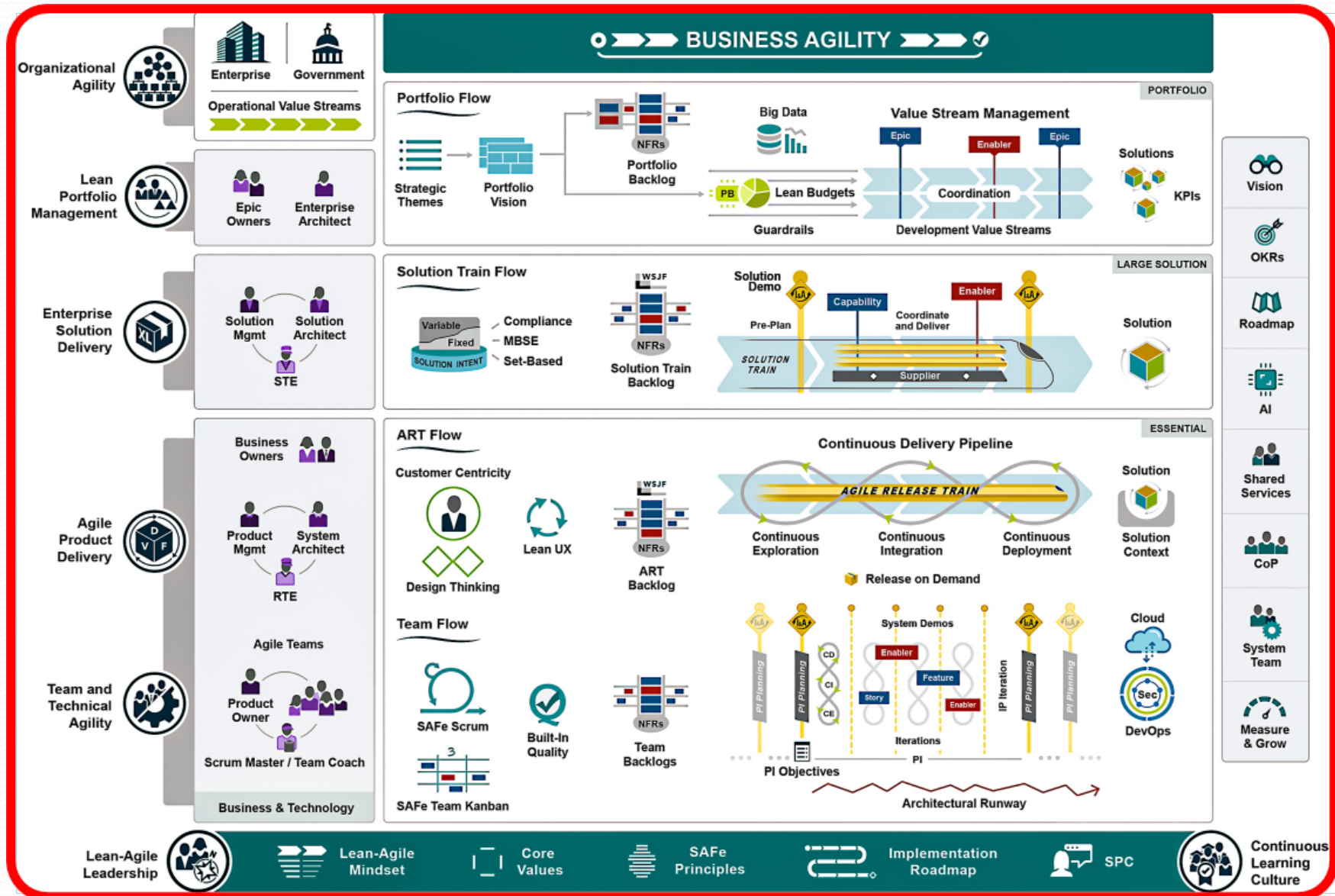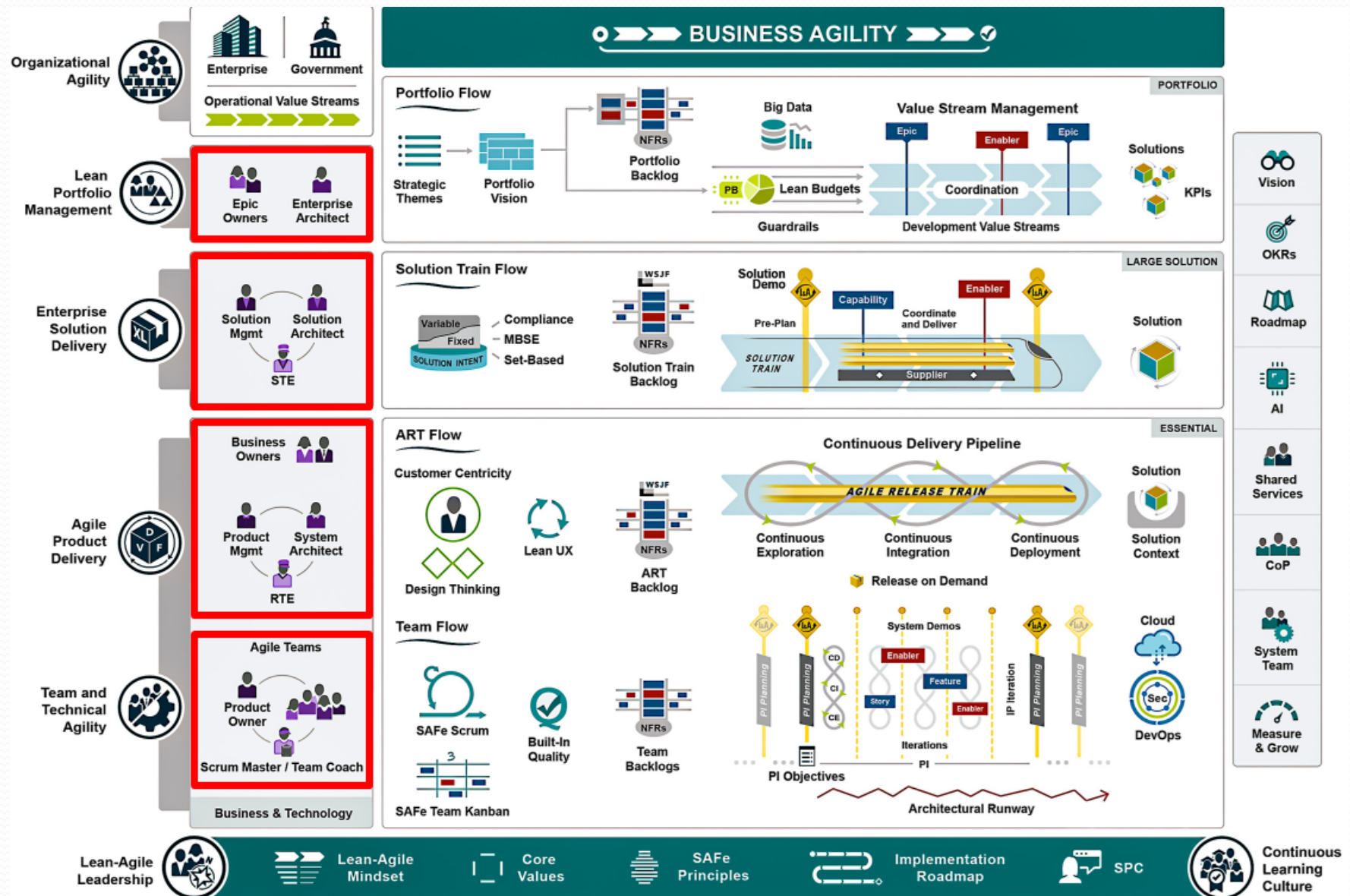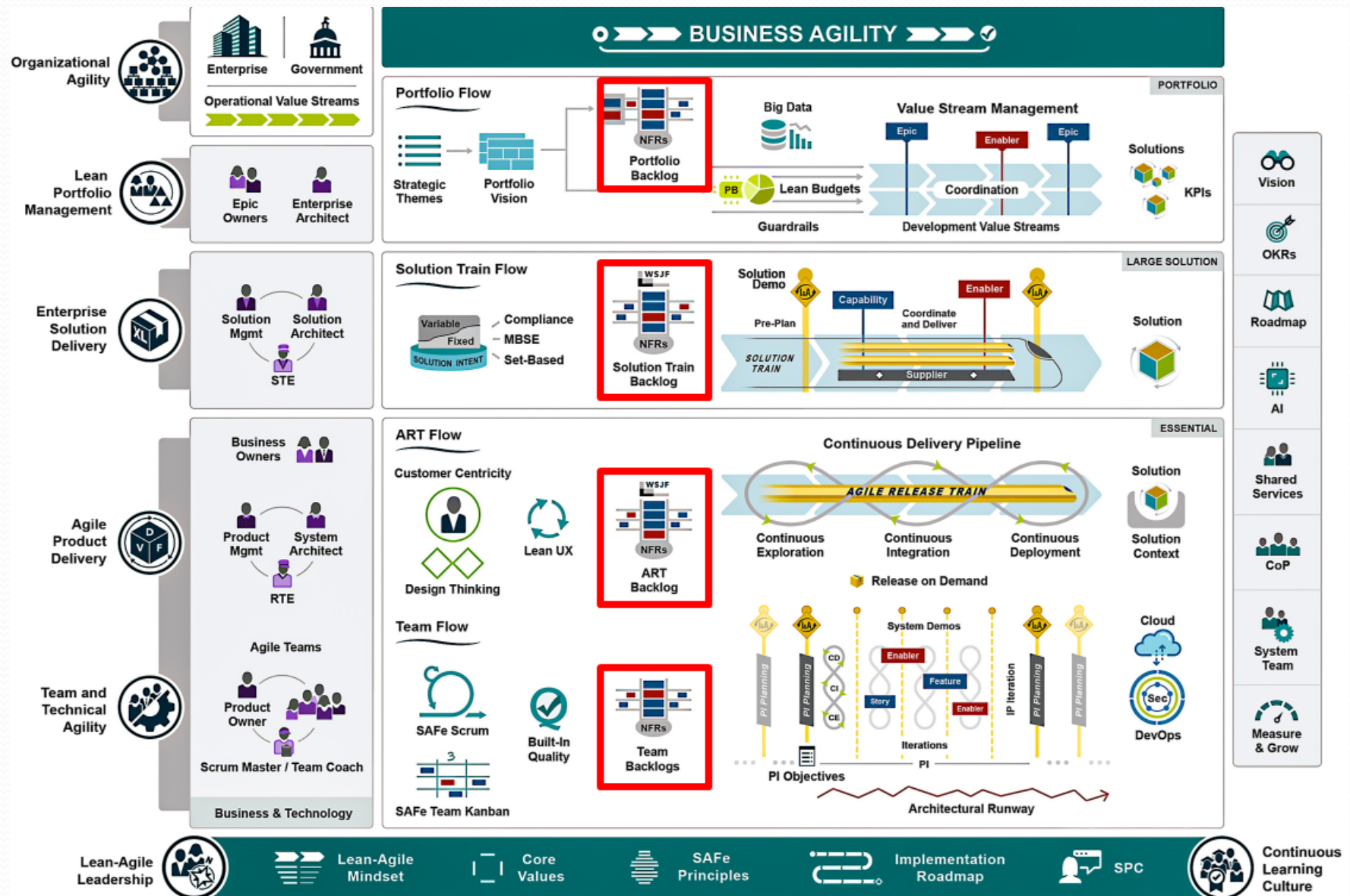
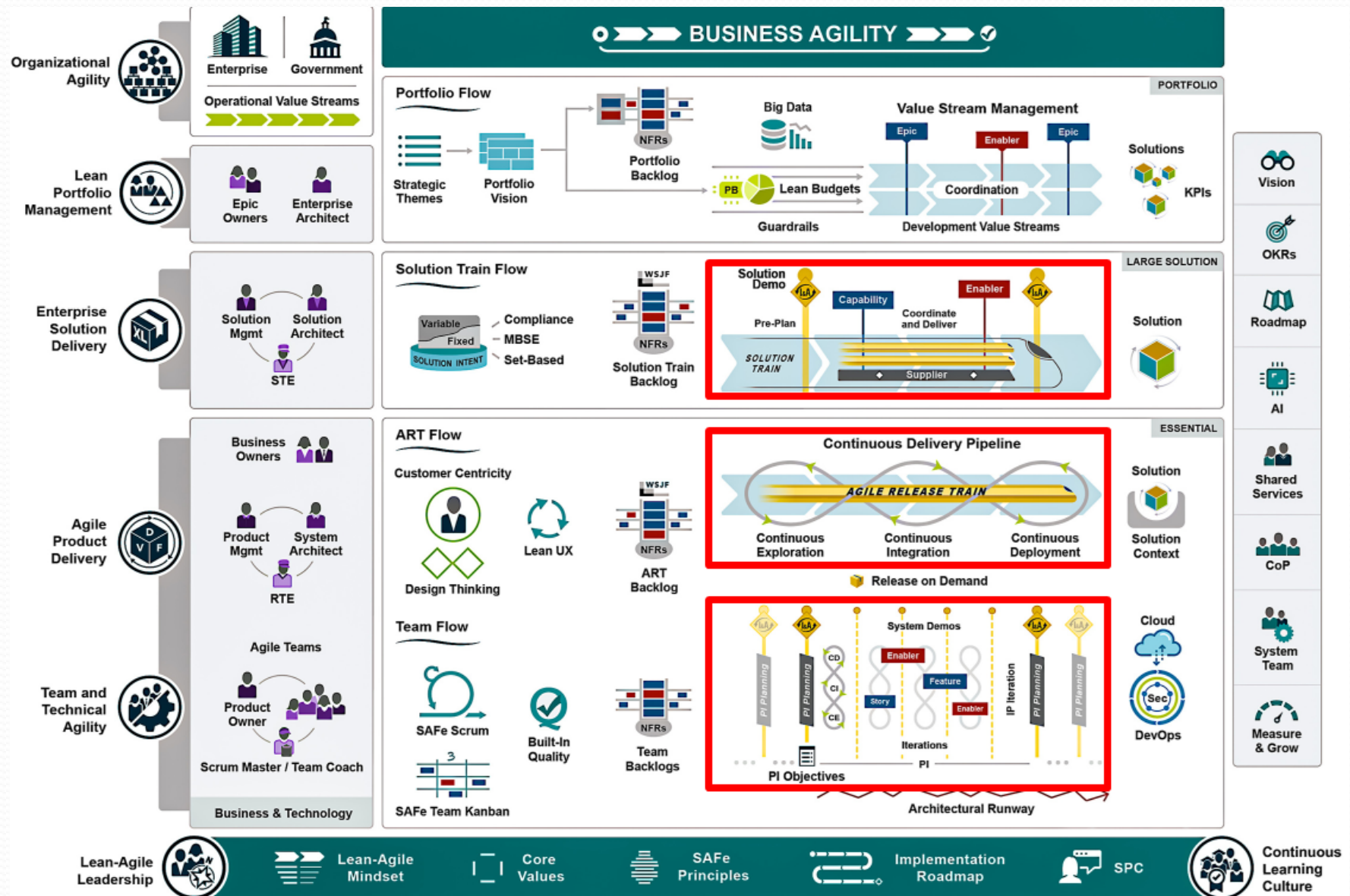# SAFe Picture #2—Levels

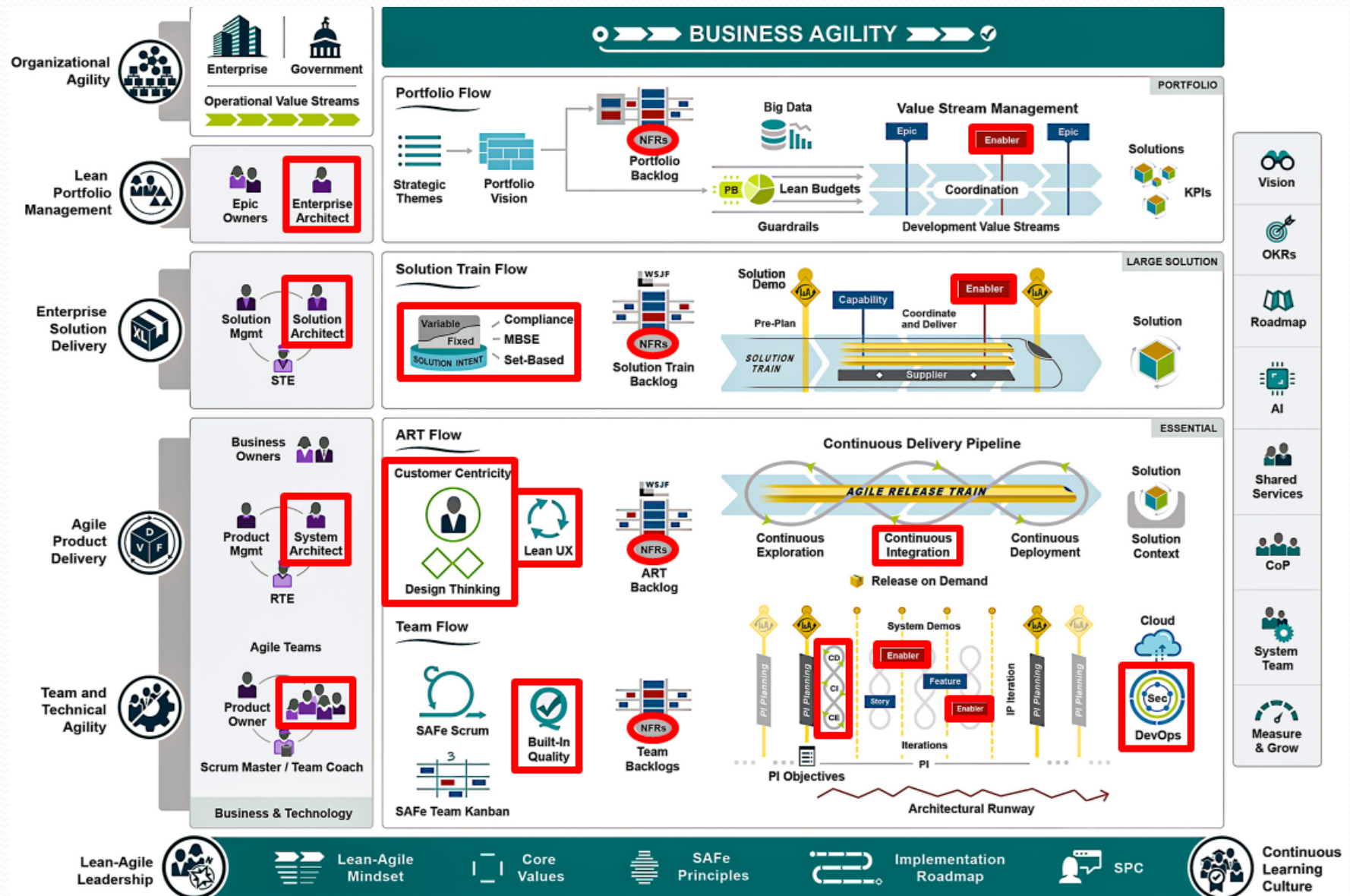# SAFe Picture #3—People

SAFe Picture #4—Backlogs

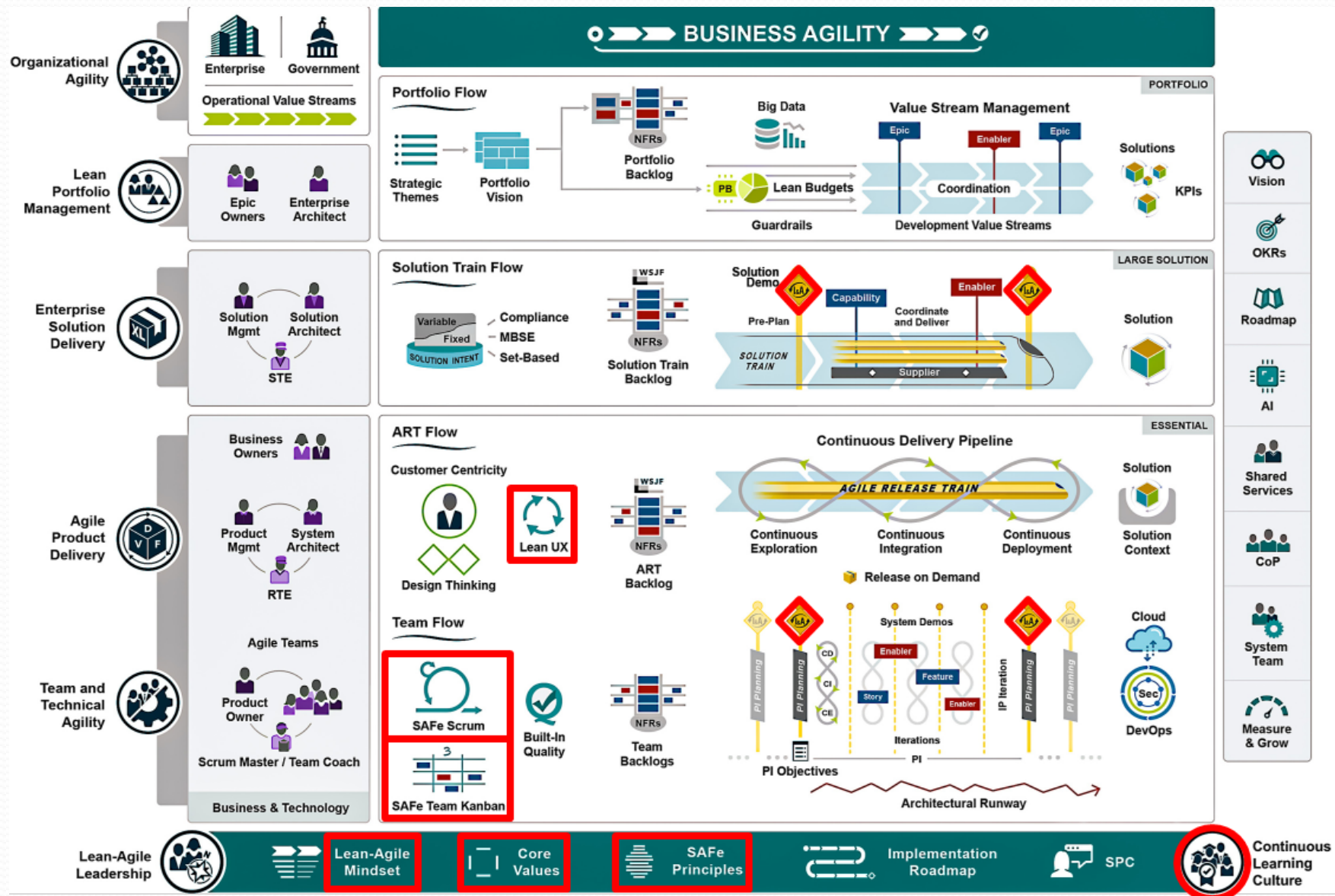# SAFe Picture #5—Cadence

SAFe Picture #7—Improvement

SAFe Picture #8—Value Delivery