Master Software Technology
Software Project Management 2 – [06] Going Agile

Prof. Dr. Lückemeyer, 14.06.2018

Agenda

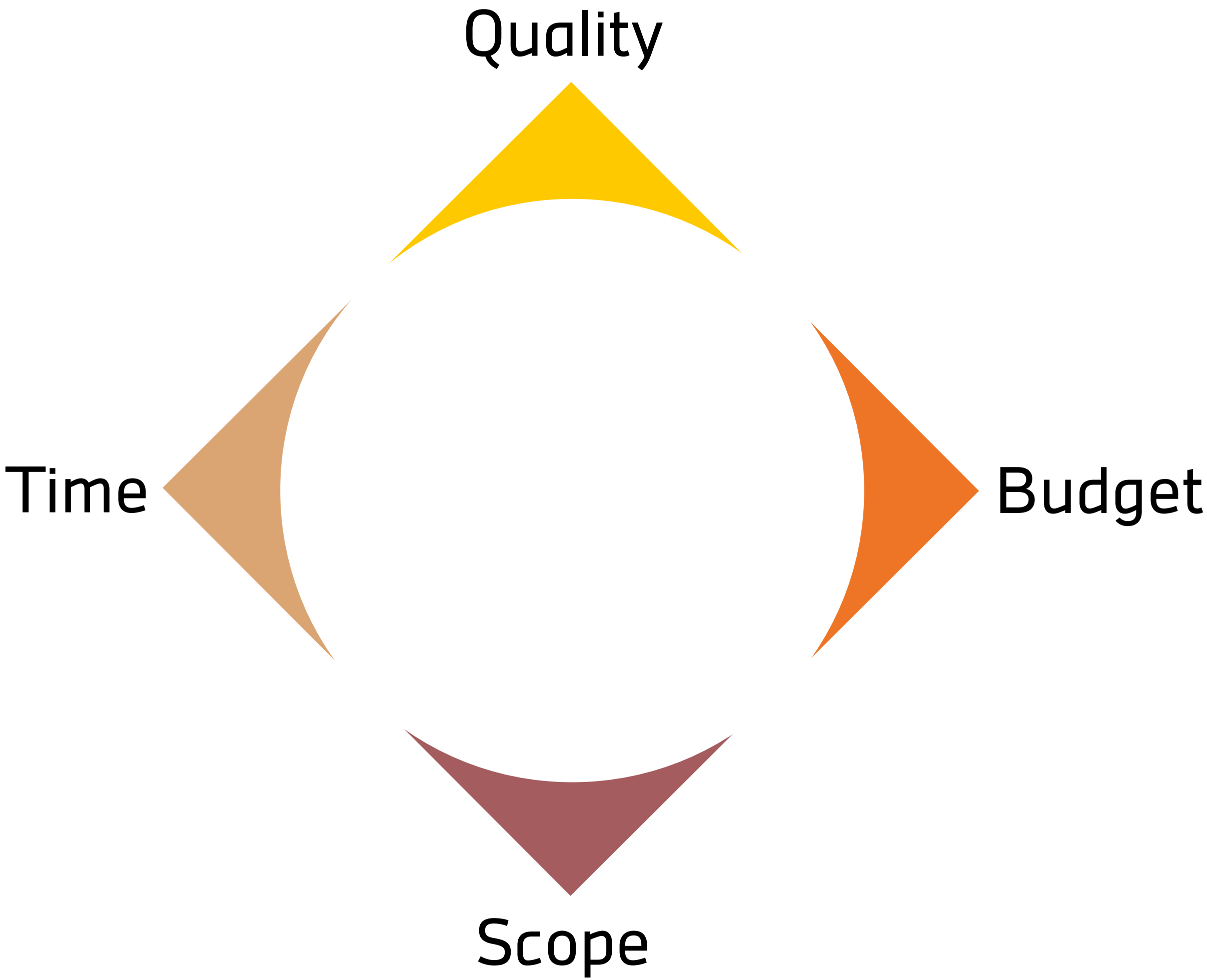
Repetition: Conventional Project Management

- „Magic“ Triangle/Rectangle of Management Dimensions
- Key Project Success Factors
- Building Blocks Revisited

Translating to Agile Project Management

- Repetition: Agile Paradigms
- „Magic“ Rectangle Revisited
- Key Success Factors
- Standard Building Blocks
- Agile Control Cycle
- Scaling Agile

The „Magic“ Triangle/Square



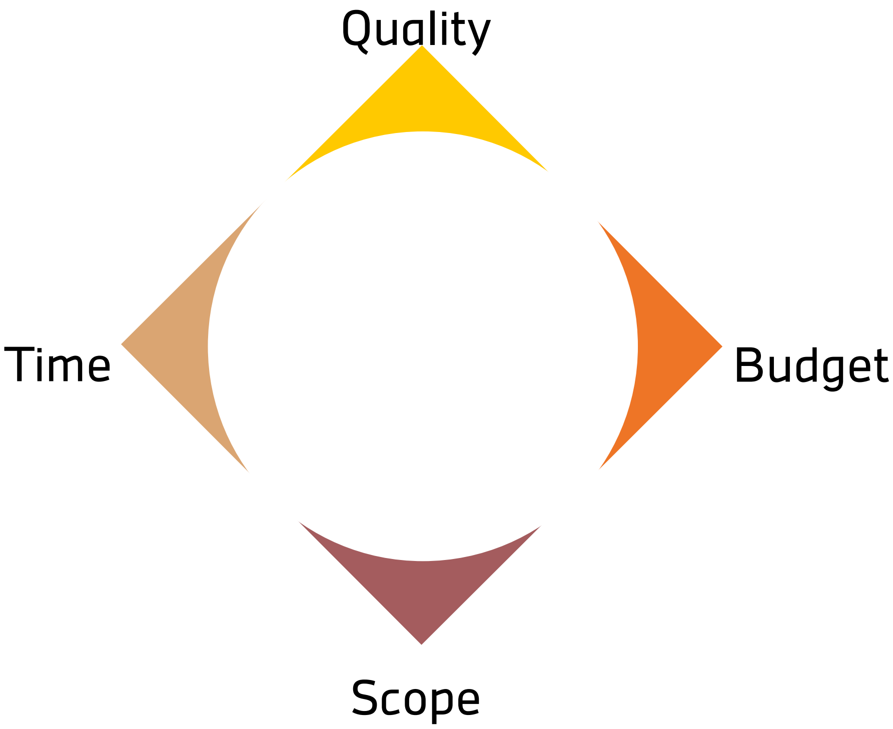
Key Project Success Factors

From Six Sigma:

- Man
- Method (Organisation/Process)
- Measures & Motivation
- Machine
- Materials/Information
- Milieu (Environment)

From Studies (e.g. IKMT 2009):

- User Involvement
- Top Management Support
- Process/Problem Analysis
- Planning and Organisation
- Realistic Expectations



Building Blocks Revisited

PMBOK

- Process Groups
  - Initiation
  - Planning
  - Executing
  - Monitoring & Control
  - Closing
- Project Integration Management
- Project „Rectangle“ Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management

SWEBOK

- SW requirements
- SW design
- SW construction
- SW testing
- SW maintenance
- SW configuration mgmt
- SW engineering management
- SW engineering process
- SW engineering tools & methods
- SW quality
- SW engineering prof. practice
- SW engineering economics

+ foundations & related disciplines

Agile Paradigms: the Agile Manifesto

We have come to value

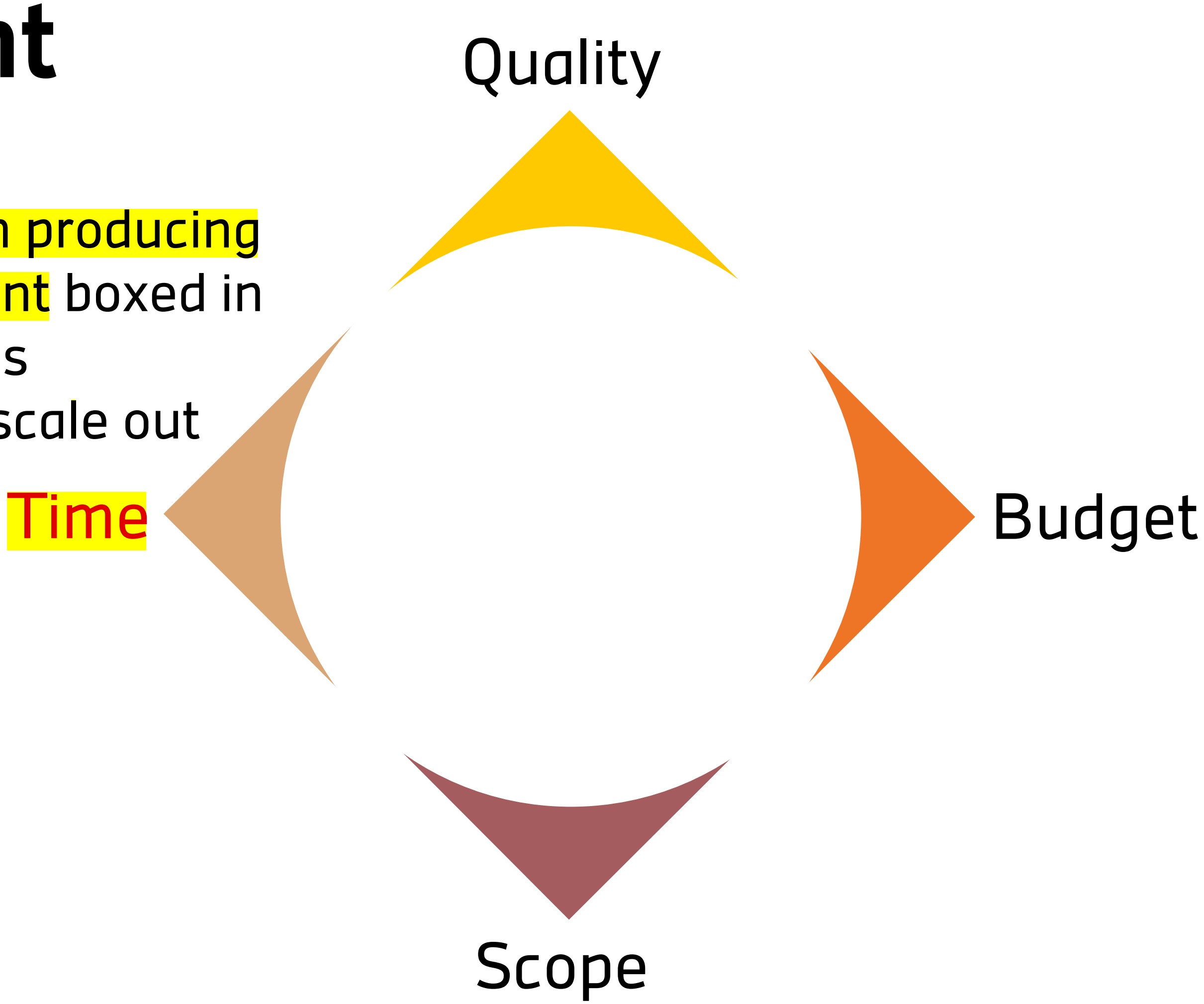
- Individuals and communication > formal processes
- Customer collaboration > formal contracts
- Flexible change adjustment > following a plan
- Working software > documentation

Altered essence from: agilemanifesto.org

Translating to Agile Project Management

Agile Management:

- Time for one iteration producing a deliverable increment boxed in most agile approaches
- Time excess only by scale out on the (horizontal) Time axis (i.e. additional iterations)



Translating to Agile Project Management

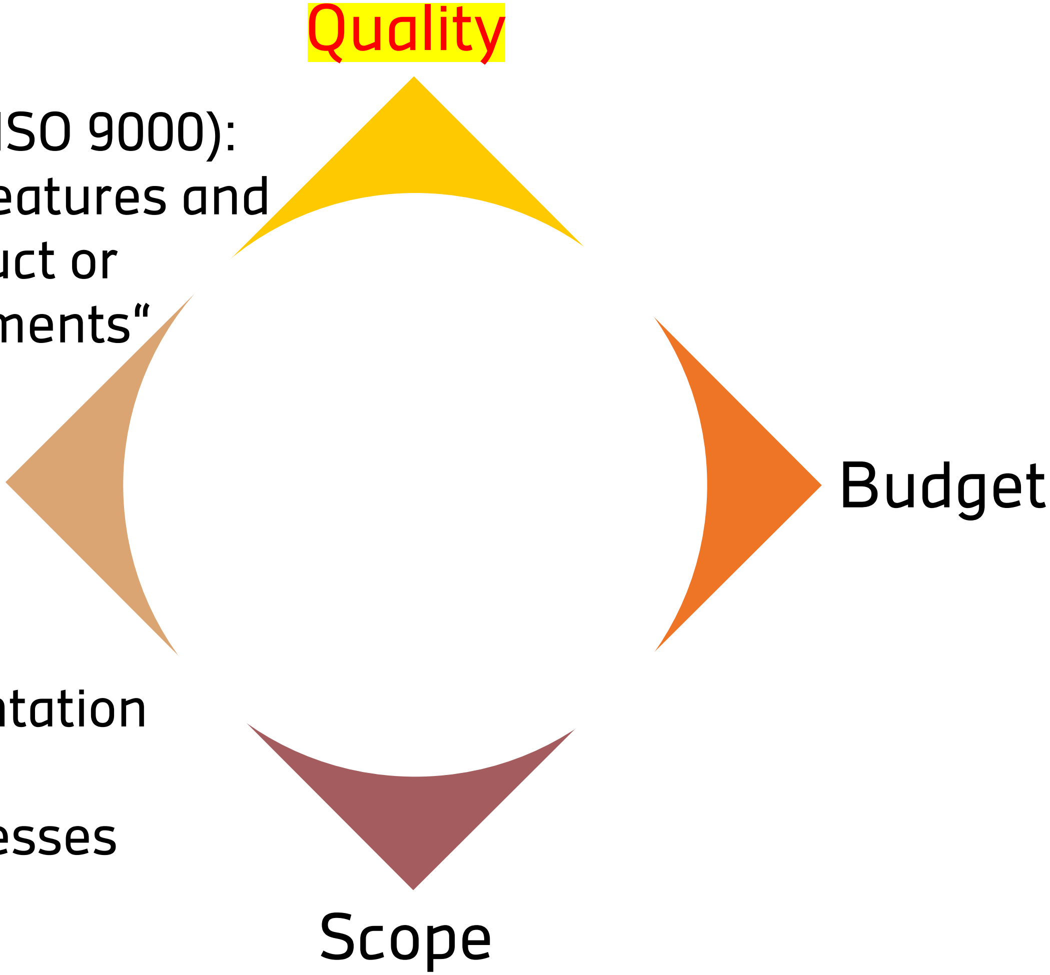
Standard definition of Quality (ISO 9000): „Degree (i.e. [0…1]), to which features and their implementation in a product or service fulfill customer requirements“

Agile Management:

– Quality prime focus as in classical PM

Suffers from

- Improper analysis/implementation (Time/Budget restraints)
- Improper organisation/processes (Time/Budget restraints)
- Scope cuts



Translating to Agile Project Management

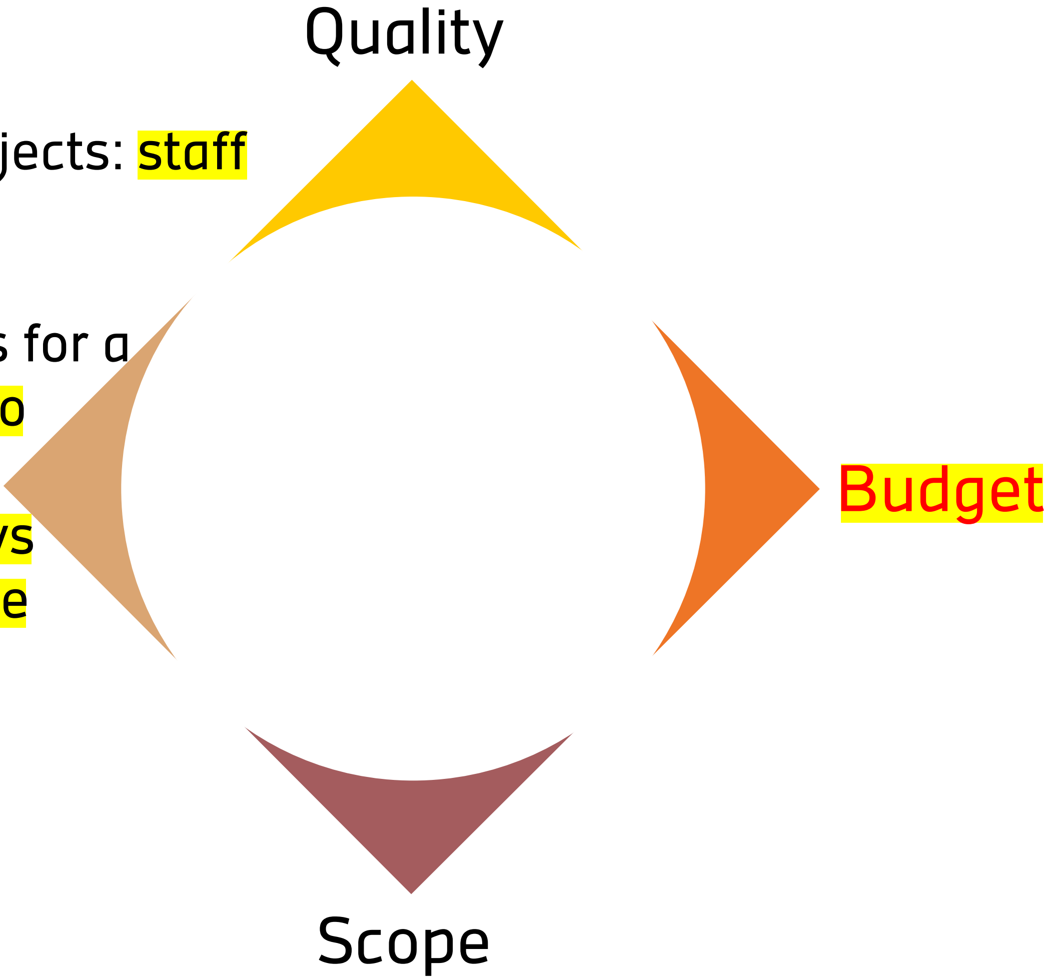
Main Budget driver in all IT projects: staff

Agile Management:

- Budget for an iteration (thus for a Time box) nearly fixed due to (nearly) fixed staff
- Budget excess almost always coupled with scale out on the (horizontal) Time axis

Suffers from:

- Time the staff is occupied
- indirectly: Scope, Quality

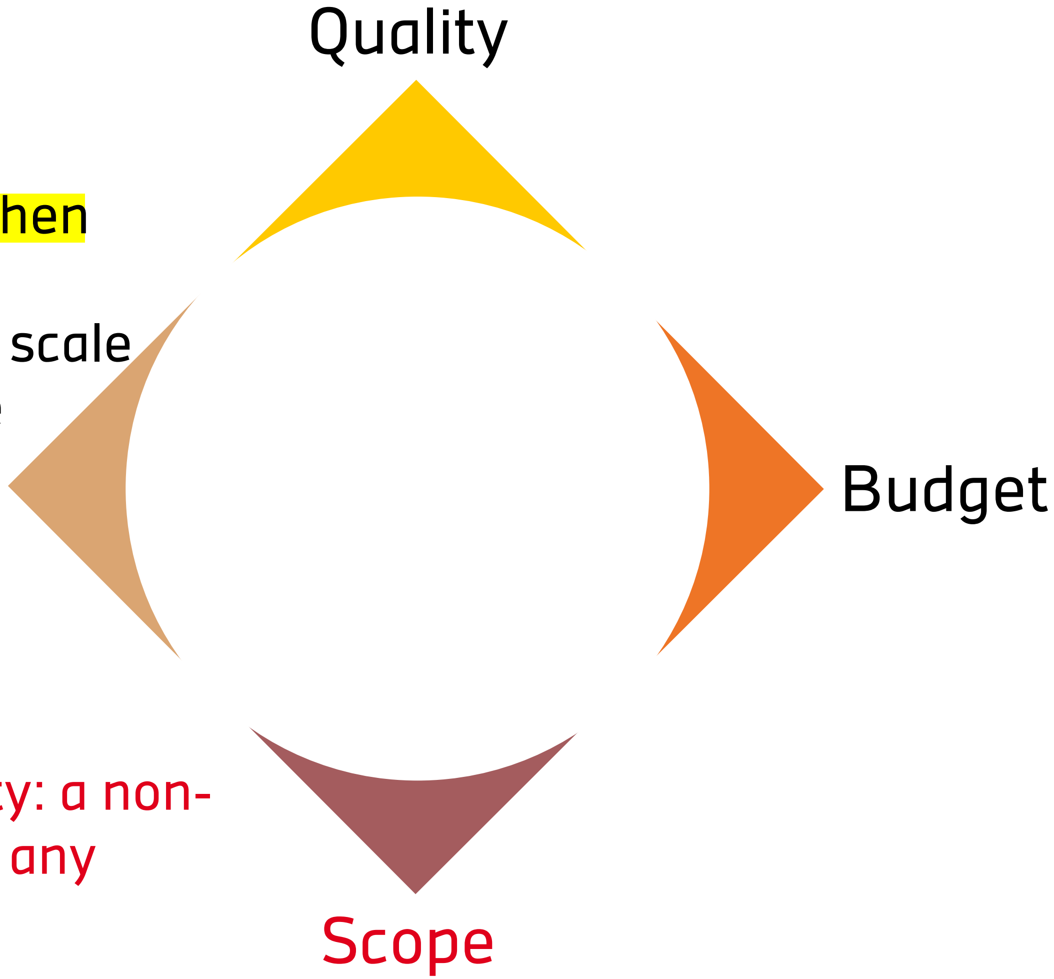


Translating to Agile Project Management

Agile Management:

- Scope is THE thing to cut when problems arise
- almost always coupled with scale out on the (horizontal) Time axis
- Assumption: rather deliver less but accurate and stable functionality

Beware of the impact on Quality: a non-existent feature does not meet any requirement!



Agile assumption: rather less but stable, accurate functionality than unusable solid fundament

Pro

+ More current utility
+ Future utility uncertain
+ More clarity for future iterations
+ Less risk
+ Software as an immaterial good easily changeable at little cost with good tool support

Con

– Loss of architecture overview
– Additional effort for code unused in later iterations
– Additional effort for intermediate changes (refactorings)
– Organizational resistance to (more frequent) changes

How Agile Management adresses key success factors: Six Sigma

- Man: agile management sees man as the key factor
  - capable, responsible developers work in small groups on a broad range of tasks
  - Trust-based direct customer collaboration
- Method (Organisation/Process)
  - Small hierarchies
  - Manager as enabler
  - Lightweight (sometimes down to nearly no) processes
- Machine
- Measures & Motivation
  - Self-chosen tasks in own responsibility/team responsibility
  - Discernable product impact
  - Early feedback by short iterations
- Materials/Information
  - Short iterations lead to very current information
  - Direct customer communication provides accurate information
- Milieu (Environment)
  - Lightweight processes and small groups lead to low environment complexity

How Agile Management adresses key success factors: from Studies

- User Involvement
  - Directly from the Agile Manifesto: Collaboration, Communication
  - Short iterations -> feedback loops
- Top Management Support
  - IT-Company: inherently due to small hierarchies
  - Customer: mandatory with continuous customer involvement
- Process/Problem Analysis
  - Direct communication and small problem sizes facilitate proper analysis
- Planning and Organisation
  - Small groups and iteration sizes reduce complexity
  - Manager as enabler removes organisational aspects from developers
- Realistic Expectations
  - Ensured by short product increments and direct communication

Standard Building Blocks vs. Agile

PMBOK

- Process Groups
  - Initiation
  - Planning
  - Executing
  - Monitoring & Control
  - Closing
- Project Integration Management
- Project „Rectangle“ Management
- Project Human Resource Management
- Project Communications Management
- Project Risk Management
- Project Procurement Management

Agile Management

- Process Groups
  - I: Given by agile methodology or developer
  - P: Small-scale, max. group self-organized
  - E: individually or in small groups
  - M: small loops, early feedback, automatic checks
  - C: given by methodology or def. of done
- In the small: continuously
- See previous slides
- Distribute Roles,
  Manager as Enabler
- In the small: enabling
  in the large: with other stakeholders
- Project Risk Management
- Procurement integrated in iteration planning

Agile Management: Agile Monitoring & Control Cycle

Small control loops due to small iterations and short times

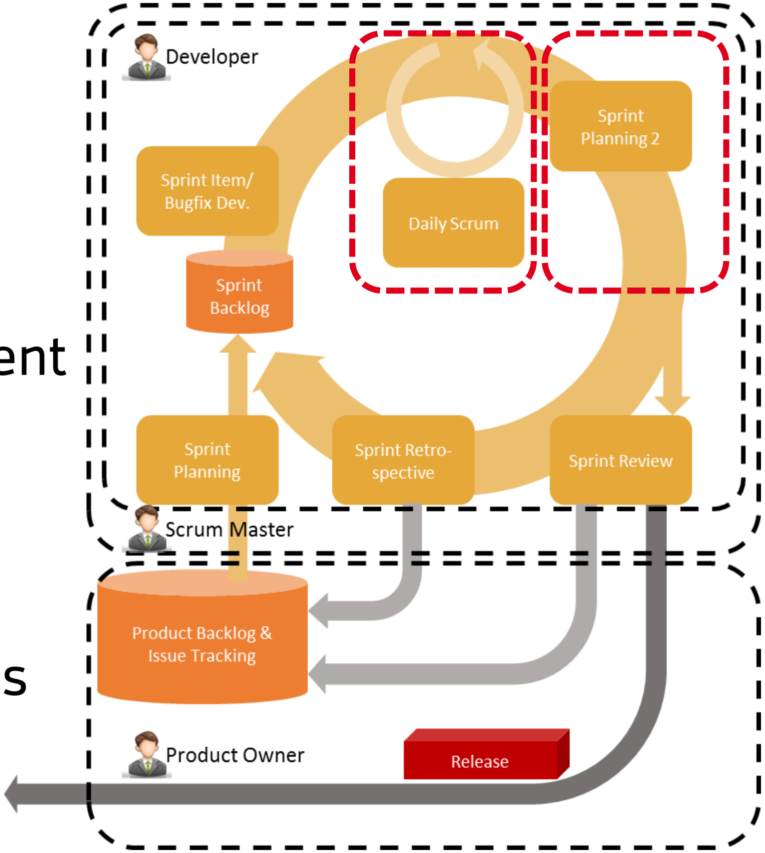
More direct communication and feedback

More and earlier dealing with detail risk and possibilities

- Planned item (still) finished in the current iteration?

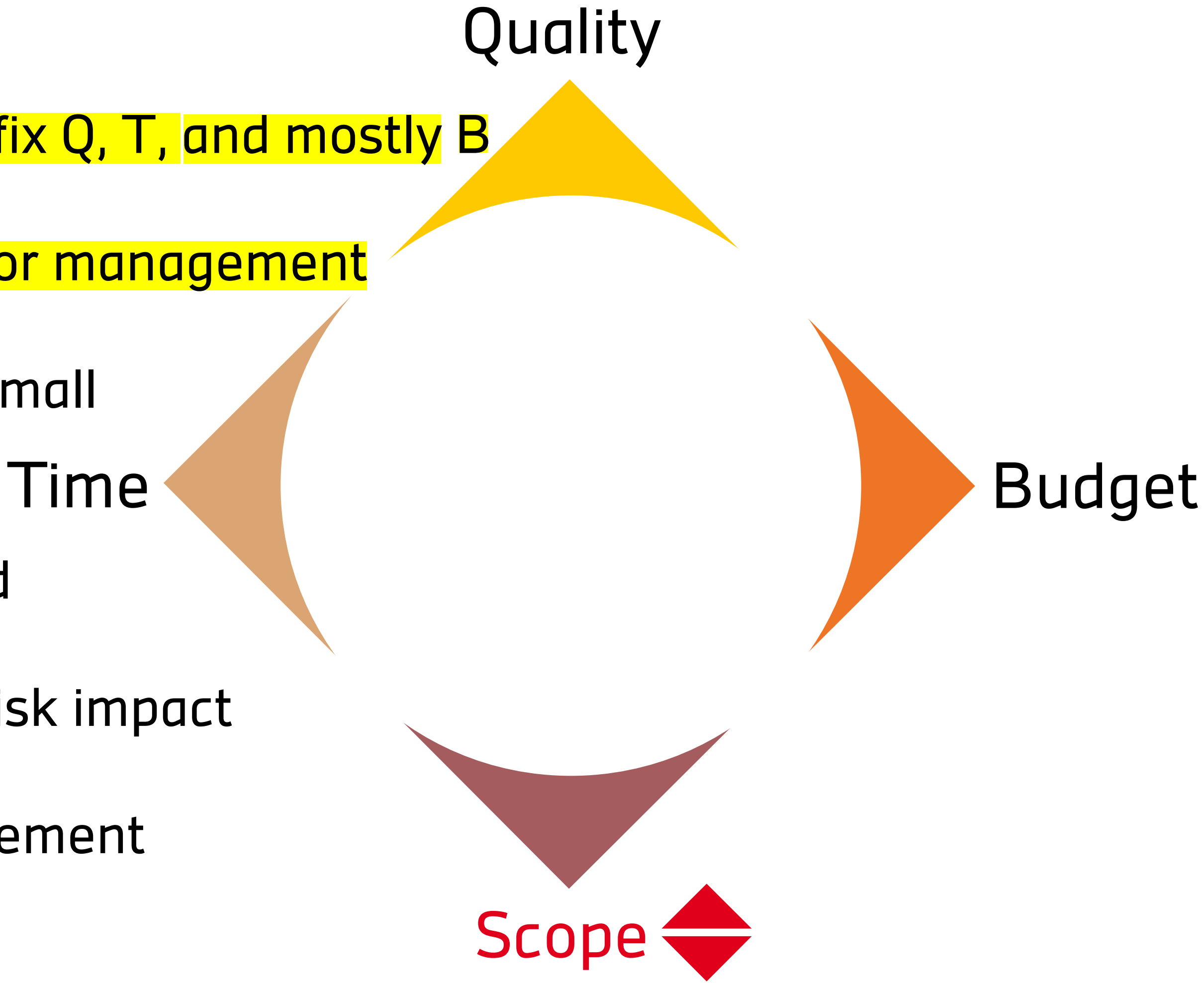
Less replanning effort

- Main option: scoping in/out
- Sometimes: enlarge the team by a member, useful only in expert scenarios



Agile Management: Summary

- Agile Methodologies fix Q, T, and mostly B in an iteration
- Large simplification for management in the small
- Management in the small
  - Enabling
  - HR Management influence enlarged
  - More small risks
  - More immediate risk impact on customer
  - More direct involvement



Agile Management in the Large: Scaling Agile

What if

- The project size is too large for one iteration?

→ Scale horizontally (along the Time axis) and perform multiple iterations

- The speed of a single agile team does not suffice?

→ Scale vertically and employ multiple teams simultaneously

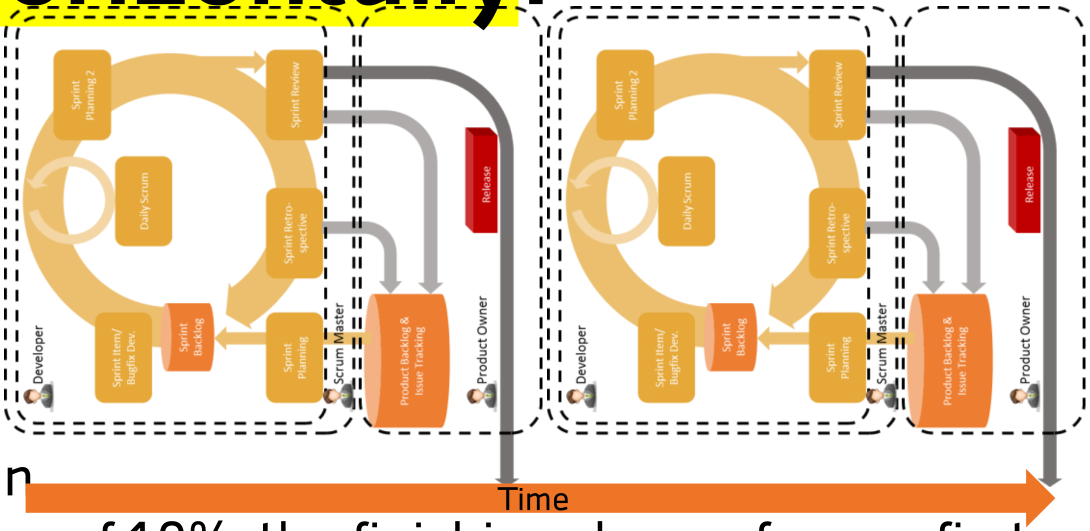
- Both size and speed requirements exceed the capacity of one team?

→ Scale horizontally (along the Time axis) and vertically

Key Practices

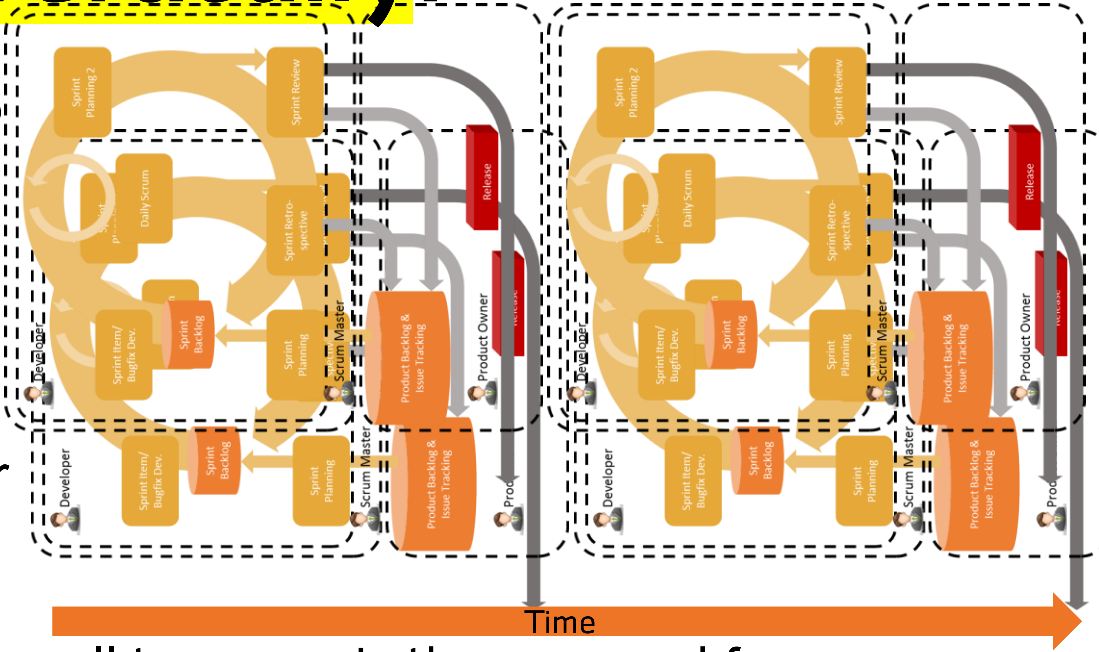
- Cadence and synchronization
- Managing WIP (work in progress)
- Collaboration in solving the biggest problems

Scaling Agile horizontally: consequences



- Dealing with increasing uncertainty on finishing times for items
  - If a team drops an item from an iteration with an evenly distributed chance of 10%, the finishing chance for any first iteration item after two iterations is 81%
  - In addition, the finishing chance for second iteration items after the second iteration is less than 90% due to potential laggers from the first iteration passed on to the second iteration
  - Any items newly appearing during the first iteration lower all these chances even further
- Dealing with increasing HR issues: team development & fluctuation

Scaling Agile vertically: consequences



- How is the team/ individual status communicated between teams?
- Do the teams compete for scarce resources (customer, experts)?
- Does one Manager manage all teams or is there a need for communication between Managers?
- Should all iterations start and end simultaneously or should they run interleaved, or a mixture?
- How and when does the integration of iteration results from other teams take place?
- When does delivery take place?

Scaling Agile: Criteria and Methods

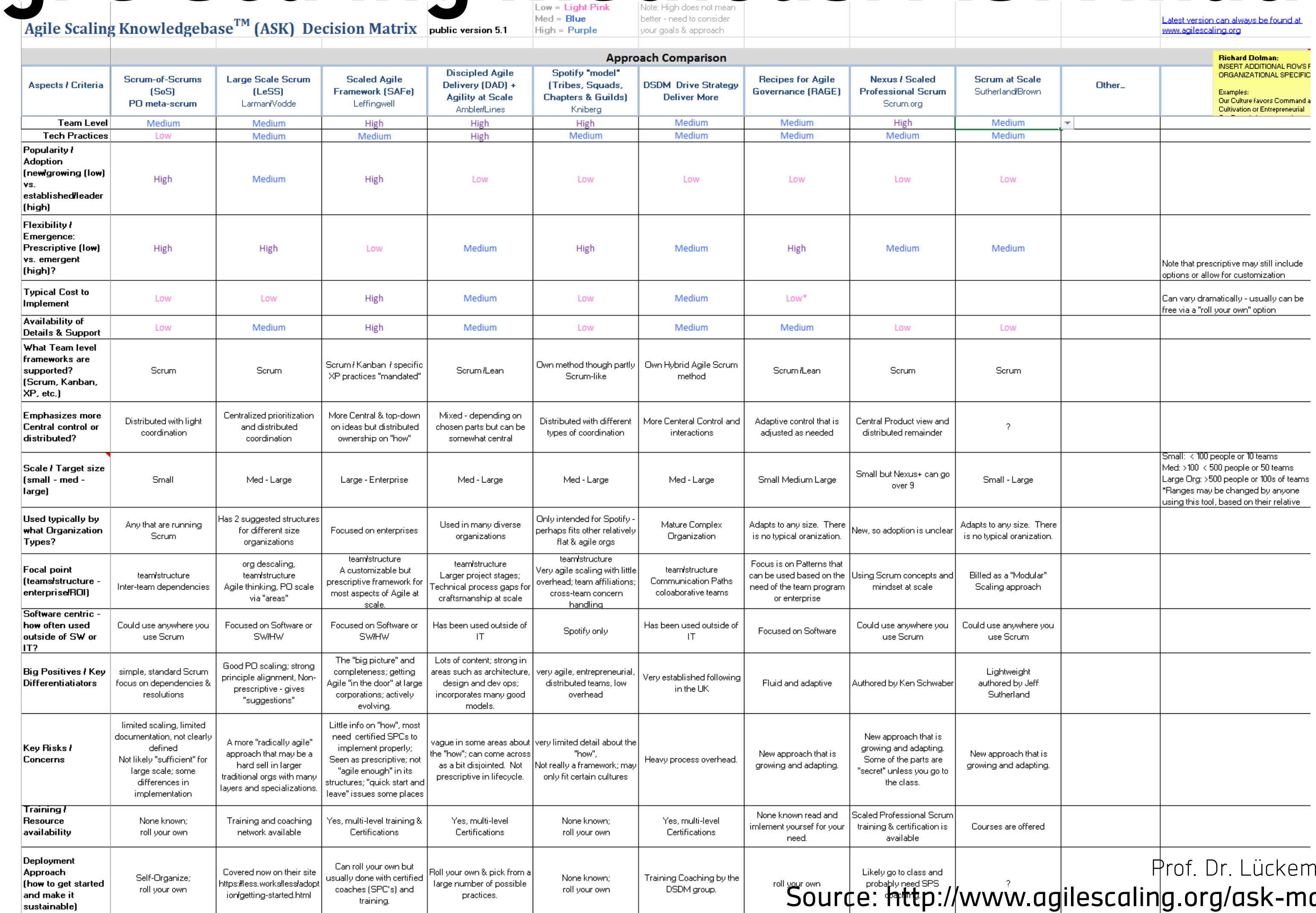
- Completeness of coverage of "levels"
  - Portfolio, Program, Inter-Team, Team, Tech
- Popularity/Adoption (new/growing (low) vs. established/leader (high)
- Typical Cost to Implement
- Flexibility: Prescriptive vs. emergent
- Availability of Details & Support
- Team level framework Support
- Scale/Target size (S/M/L)
- Big Positives/Key Differentiators
- Key Risks/Concerns
- Compatible Organization Types
  - Focal point (teams/structure - enterprise/ROI)
  - Central or distributed control
  - Deployment Approach
  - IT industry focus

- Scrum-of-Scrums (SoS)
- Large Scale Scrum (LeSS)
- Scaled Agile Framework (SAFe)
- Culture-centered Spotify model (Tribes, Squads, Chapters & Guilds)
- Discipled Agile Delivery (DAD) + Agility at Scale
- DSDM Drive Strategy Deliver More
- Recipes for Agile Governance (RAGE)
- Nexus/Scaled Professional Scrum
- Scrum at Scale

Source: http://www.agilescaling.org/ask-matrix.html

Hochschule für Technik Stuttgart

Agile Scaling Methods: ASK Matrix



Agile Scaling Knowledgebase™ (ASK) Decision Matrix

public version 5.1

Low = Light Pink
Med = Blue
High = Purple

Note: High does not mean better - need to consider your goals & approach

Latest version can always be found at www.agilescaling.org

Richard Dolman:
INSERT ADDITIONAL ROWS F
ORGANIZATIONAL SPECIFIC

Examples:
Our Culture favors Command a
Cultivation or Entrepreneurial

Approach Comparison

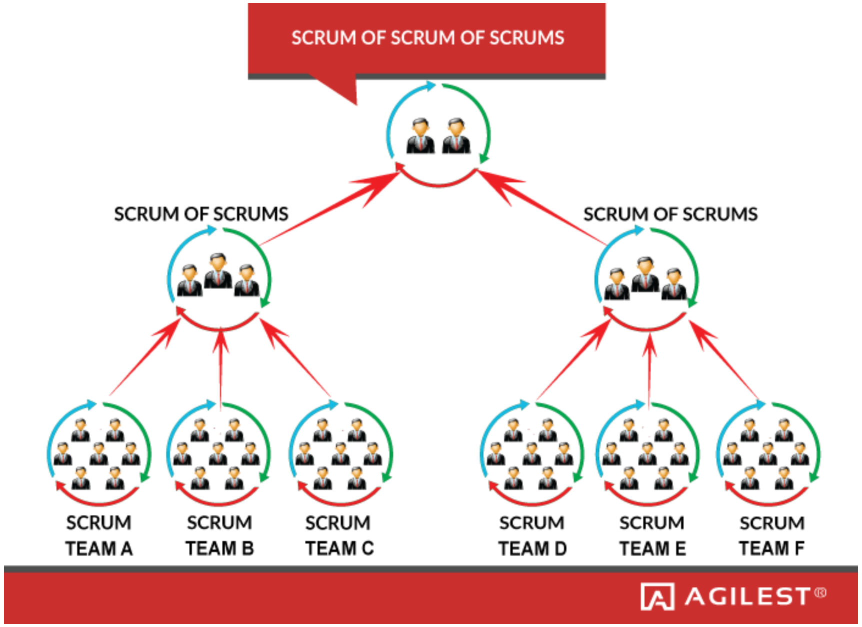
Aspects / Criteria	Scrum-of-Scrums (SoS) PO meta-scrum	Large Scale Scrum (LeSS) Larman/Vodde	Scaled Agile Framework (SAFe) Leffingwell	Discipled Agile Delivery (DAD) + Agility at Scale Ambler/Lines	Spotify "model" (Tribes, Squads, Chapters & Guilds) Kniberg	DSDM Drive Strategy Deliver More	Recipes for Agile Governance (RAGE)	Nexus / Scaled Professional Scrum Scrum.org	Scrum at Scale Sutherland/Brown	Other_	
Team Level	Medium	Medium	High	High	High	Medium	Medium	High	Medium		
Tech Practices	Low	Medium	Medium	High	Medium	Medium	Medium	Medium	Medium		
Popularity / Adoption (new/growing (low) vs. established/leader (high)	High	Medium	High	Low	Low	Low	Low	Low	Low		
Flexibility / Emergence: Prescriptive (low) vs. emergent (high)?	High	High	Low	Medium	High	Medium	High	Medium	Medium		Note that prescriptive may still include options or allow for customization
Typical Cost to Implement	Low	Low	High	Medium	Low	Medium	Low*				Can vary dramatically - usually can be free via a "roll your own" option
Availability of Details & Support	Low	Medium	High	Medium	Low	Medium	Medium	Low	Low		
What Team level frameworks are supported? (Scrum, Kanban, XP, etc.)	Scrum	Scrum	Scrum / Kanban / specific XP practices "mandated"	Scrum /Lean	Own method though partly Scrum-like	Own Hybrid Agile Scrum method	Scrum /Lean	Scrum	Scrum		
Emphasizes more Central control or distributed?	Distributed with light coordination	Centralized prioritization and distributed coordination	More Central & top-down on ideas but distributed ownership on "how"	Mixed - depending on chosen parts but can be somewhat central	Distributed with different types of coordination	More Centeral Control and interactions	Adaptive control that is adjusted as needed	Central Product view and distributed remainder	?		
Scale / Target size (small - med - large)	Small	Med - Large	Large - Enterprise	Med - Large	Med - Large	Med - Large	Small Medium Large	Small but Nexus+ can go over 9	Small - Large		Small: < 100 people or 10 teams Med: >100 < 500 people or 50 teams Large Org: >500 people or 100s of teams *Ranges may be changed by anyone using this tool, based on their relative
Used typically by what Organization Types?	Any that are running Scrum	Has 2 suggested structures for different size organizations	Focused on enterprises	Used in many diverse organizations	Only intended for Spotify - perhaps fits other relatively flat & agile orgs	Mature Complex Organization	Adapts to any size. There is no typical oranization.	New, so adoption is unclear	Adapts to any size. There is no typical oranization.		
Focal point (teams/structure - enterprise/ROI)	team/structure Inter-team dependencies	org descaling, team/structure Agile thinking, PO scale via "areas"	team/structure A customizable but prescriptive framework for most aspects of Agile at scale.	team/structure Larger project stages; Technical process gaps for craftsmanship at scale	team/structure Very agile scaling with little overhead; team affiliations; cross-team concern handling	team/structure Communication Paths coloaborative teams	Focus is on Patterns that can be used based on the need of the team program or enterprise	Using Scrum concepts and mindset at scale	Billed as a "Modular" Scaling approach		
Software centric - how often used outside of SW or IT?	Could use anywhere you use Scrum	Focused on Software or SW/HW	Focused on Software or SW/HW	Has been used outside of IT	Spotify only	Has been used outside of IT	Focused on Software	Could use anywhere you use Scrum	Could use anywhere you use Scrum		
Big Positives / Key Differentiatiators	simple, standard Scrum focus on dependencies & resolutions	Good PO scaling; strong principle alignment, Non-prescriptive - gives "suggestions"	The "big picture" and completeness; getting Agile "in the door" at large corporations; actively evolving.	Lots of content; strong in areas such as architecture, design and dev ops; incorporates many good models.	very agile, entrepreneurial, distributed teams, low overhead	Very established following in the UK	Fluid and adaptive	Authored by Ken Schwaber	Lightweight authored by Jeff Sutherland		
Key Risks / Concerns	limited scaling, limited documentation, not clearly defined Not likely "sufficient" for large scale; some differences in implementation	A more "radically agile" approach that may be a hard sell in larger traditional orgs with many layers and specializations.	Little info on "how", most need certified SPCs to implement properly; Seen as prescriptive; not "agile enough" in its structures; "quick start and leave" issues some places	vague in some areas about the "how"; can come across as a bit disjointed. Not prescriptive in lifecycle.	very limited detail about the "how", Not really a framework; may only fit certain cultures	Heavy process overhead.	New approach that is growing and adapting.	New approach that is growing and adapting. Some of the parts are "secret" unless you go to the class.	New approach that is growing and adapting.		
Training / Resource availability	None known; roll your own	Training and coaching network available	Yes, multi-level training & Certifications	Yes, multi-level Certifications	None known; roll your own	Yes, multi-level Certifications	None known read and imlement yoursef for your need.	Scaled Professional Scrum training & certification is available	Courses are offered		
Deployment Approach (how to get started and make it sustainable)	Self-Organize; roll your own	Covered now on their site https://less.works/less/adoption/getting-started.html	Can roll your own but usually done with certified coaches (SPC's) and training.	Roll your own & pick from a large number of possible practices.	None known; roll your own	Training Coaching by the DSDM group.	roll your own	Likely go to class and probably need SPS coaching.	?		

Source: http://www.agilescaling.org/ask-matrix.html

Scrum of Scrums

Oldest approach
Still commonly used
Low-scale (max. about five teams), lightweight scaling
Emphasis on coordinative meetings

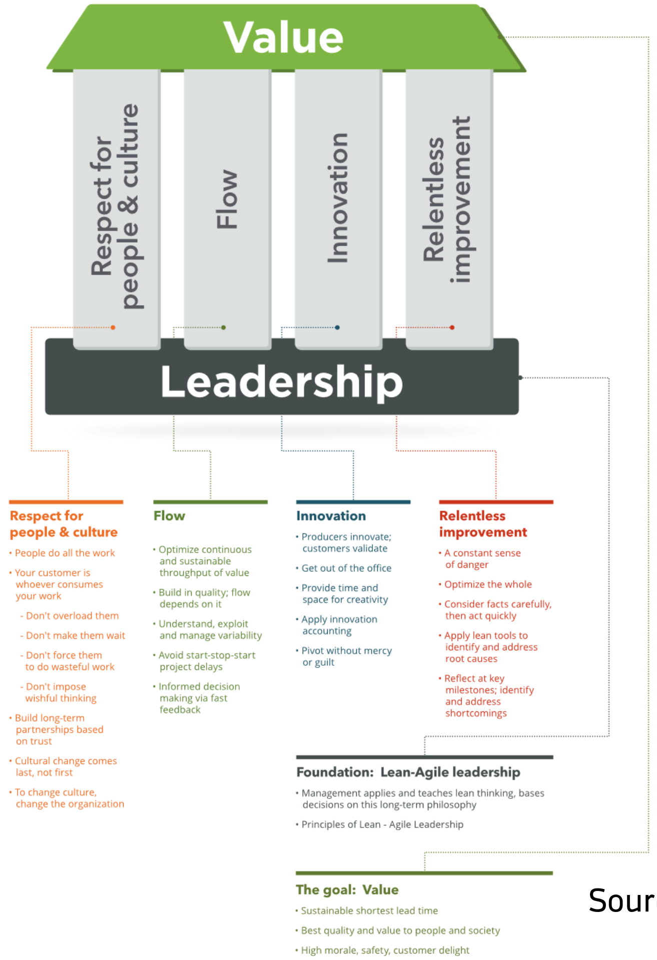
- Ambassador from each Scrum team
- Further team members as needed
- Not limited to 15 minute timebox



Source: https://www.agilest.org/scaled-agile/scrum-of-scrums/

SAFe: Mindset

The SAFe® House of Lean



Respect for people & culture

- People do all the work
- Your customer is whoever consumes your work
  - Don't overload them
  - Don't make them wait
  - Don't force them to do wasteful work
  - Don't impose wishful thinking
- Build long-term partnerships based on trust
- Cultural change comes last, not first
- To change culture, change the organization

Flow

- Optimize continuous and sustainable throughput of value
- Build in quality; flow depends on it
- Understand, exploit and manage variability
- Avoid start-stop-start project delays
- Informed decision making via fast feedback

Innovation

- Producers innovate; customers validate
- Get out of the office
- Provide time and space for creativity
- Apply innovation accounting
- Pivot without mercy or guilt

Relentless improvement

- A constant sense of danger
- Optimize the whole
- Consider facts carefully, then act quickly
- Apply lean tools to identify and address root causes
- Reflect at key milestones; identify and address shortcomings

Foundation: Lean-Agile leadership

- Management applies and teaches lean thinking, bases decisions on this long-term philosophy
- Principles of Lean - Agile Leadership

The goal: Value

- Sustainable shortest lead time
- Best quality and value to people and society
- High morale, safety, customer delight

SAFe® Lean-Agile Principles

> *The impression that "our problems are different" is a common disease that afflicts management the world over. They are different, to be sure, but the principles that will help to improve the quality of product and service are universal in nature.*
>
> *—W. Edwards Deming*

#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 length**

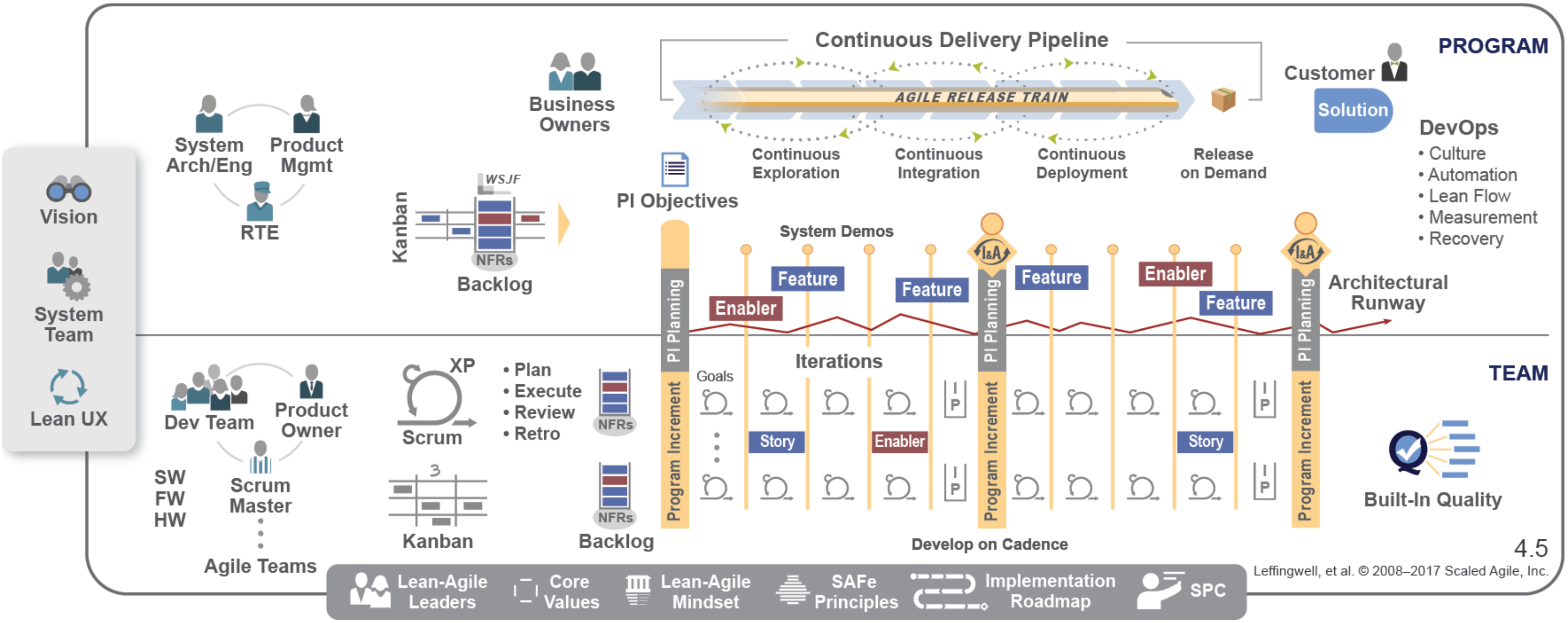
#7 **Apply cadence, synchronize with cross-domain planning**

#8 **Unlock the intrinsic motivation of knowledge workers**

#9 **Decentralize decision-making**

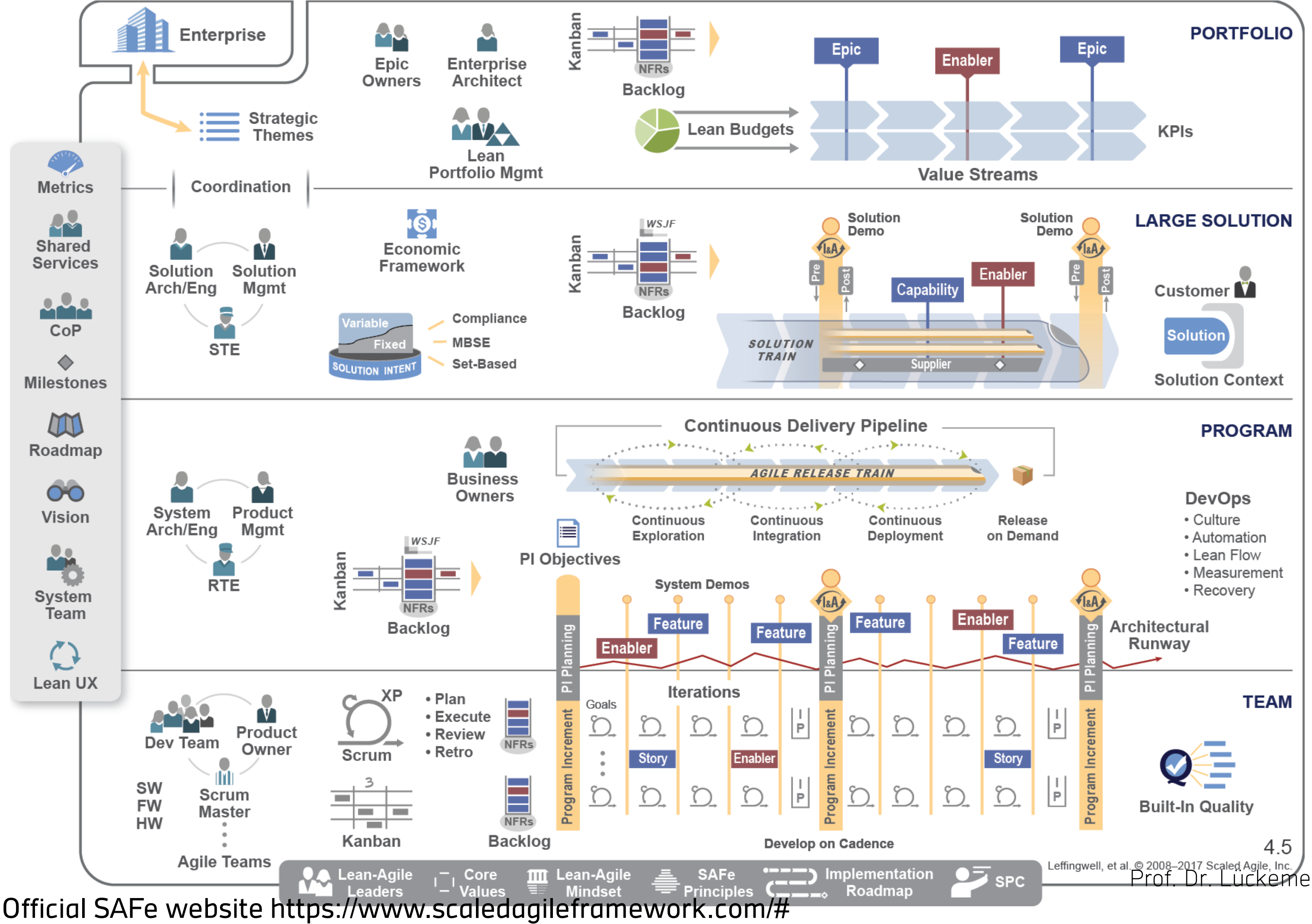
Source: Official SAFe website https://www.scaledagileframework.com/#

SAFe: Essential



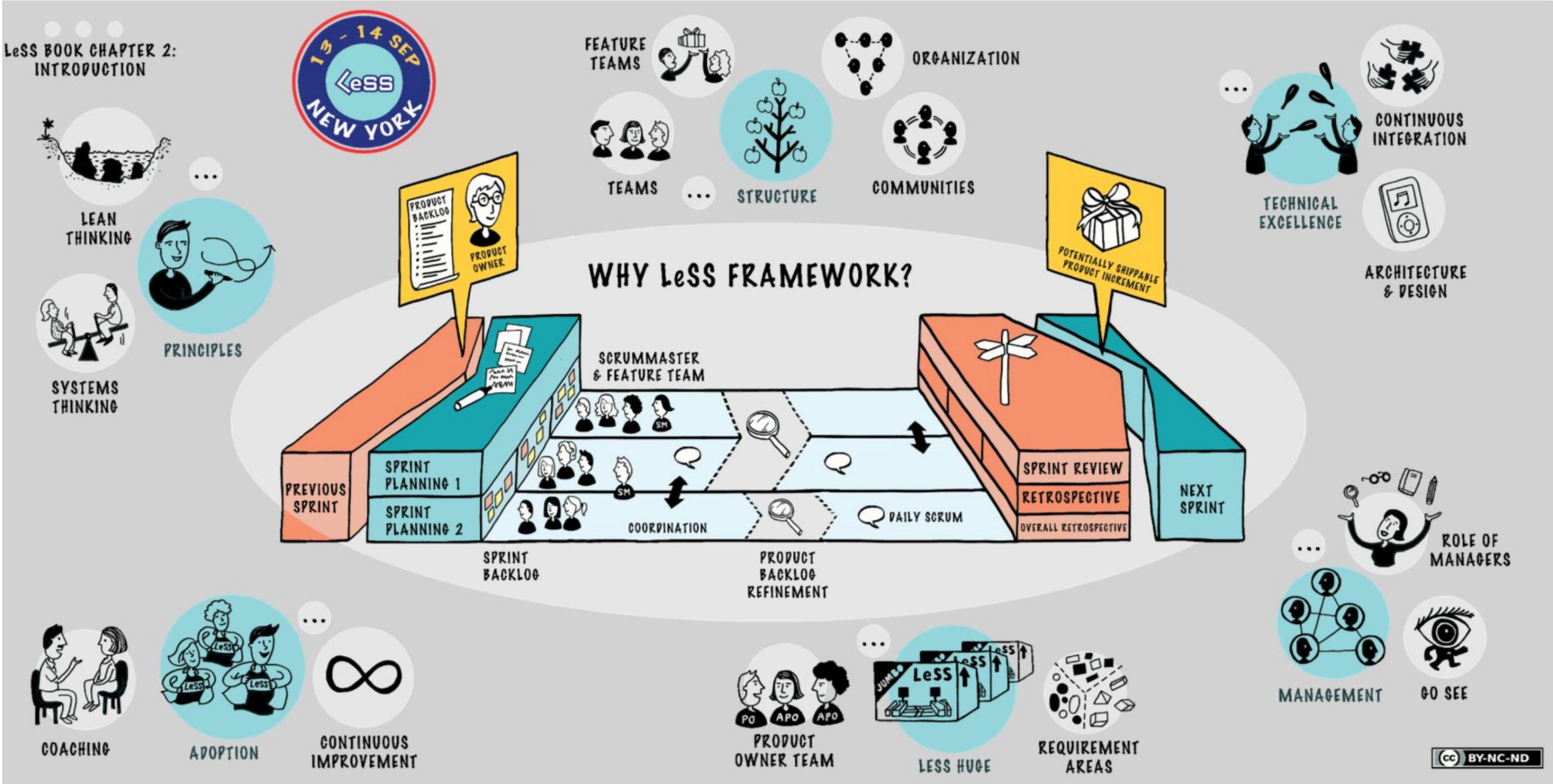
Source: Official SAFe website https://www.scaledagileframework.com/#

SAFe: Full



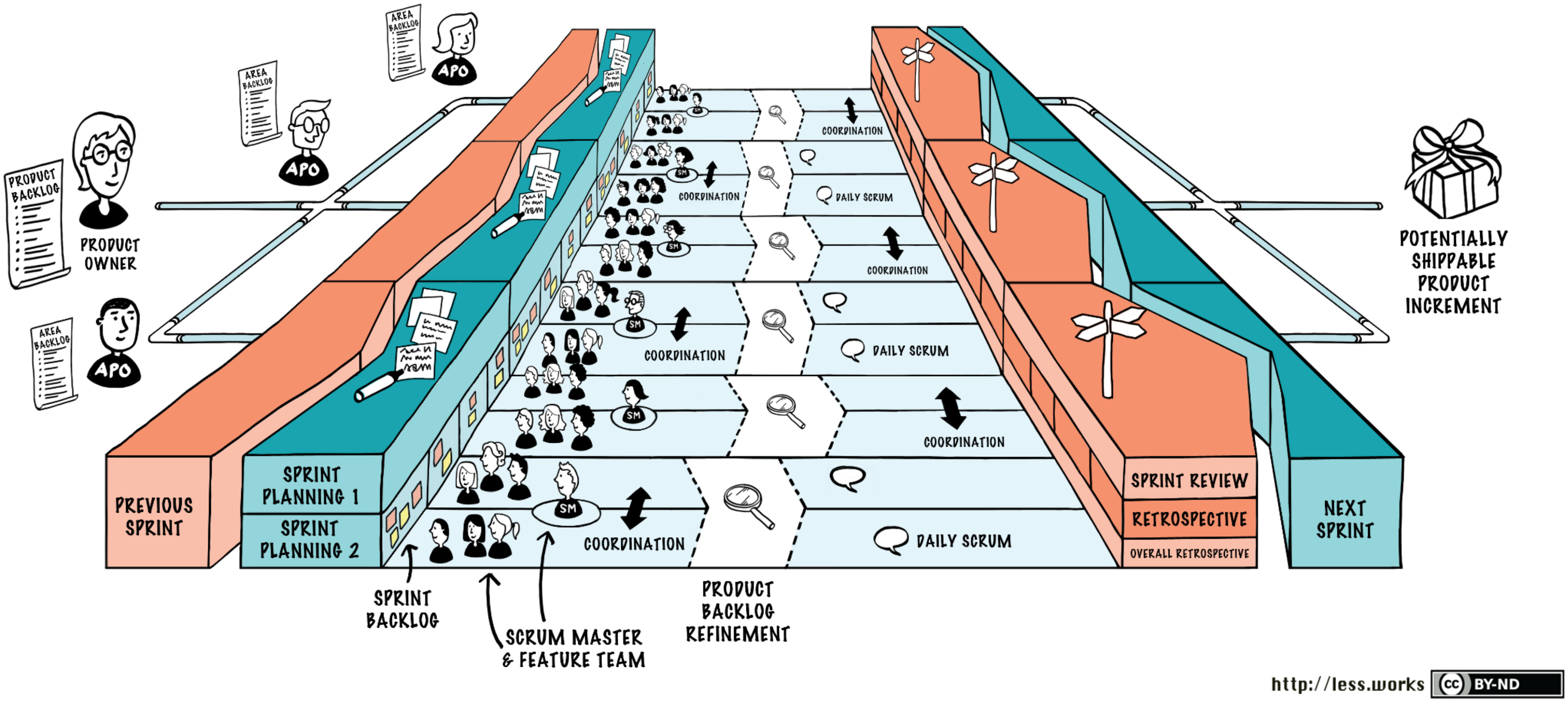
Source: Official SAFe website https://www.scaledagileframework.com/#

LeSS



Source: Official LeSS website https://less.works/less/framework/index.html

LeSS Huge

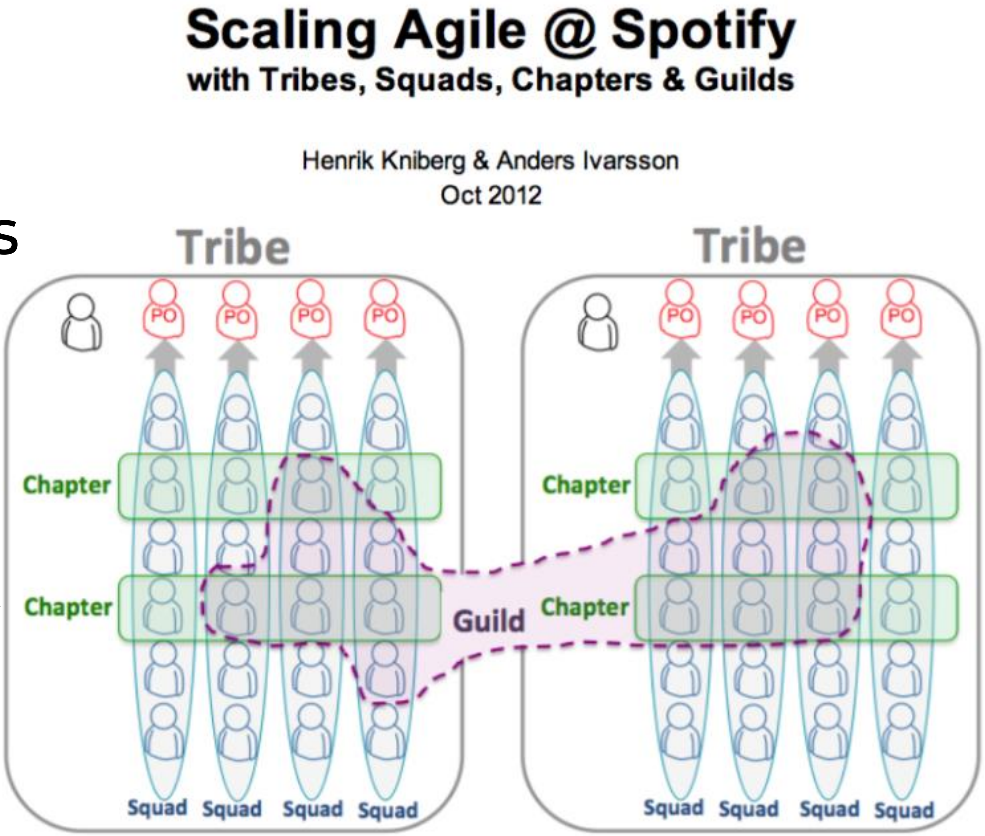


Source: Official LeSS website https://less.works/less/less-huge/index.html

Culture Centered @ Spotify

Idea: keep a startup culture with small independent units

Squad: Team
Tribe: Group of Teams working in similar area
Chapter: People with similar knowledge inside Tribe
Guild: People with similar interests



Scaling Agile @ Spotify
with Tribes, Squads, Chapters & Guilds

Henrik Kniberg & Anders Ivarsson
Oct 2012

Source: https://nbry.wordpress.com/2013/03/01/how-small-innovation-teams-hit-the-nail/

Agile Management: Conclusions

Agile approaches show short-term benefit by reduced overhead especially in small-size scenarios

– Such scenarios benefit from the built-in lower management complexity compared to standard building blocks that have to be tailored appropriately

Avoiding the „big bang“ helps reduce risk and complexity, but agile approaches cannot produce magic

– In large-scale projects, considerable effort goes especially into scaling vertically – specifically into project communication and integration
– The division into several all-purpose teams leads to an enlarged integration risk

Agile applies modularization to Development Methodology and Management

THANK YOU VERY MUCH FOR YOUR ATTENTION!