Scaling Agile

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Dr. Christof Ebert, Vector Consulting Services
Why Vector Consulting Services?

Vector Group is a global market leader in automotive software, services and engineering tools with over 3,300 employees.

Vector Consulting Services is supporting clients worldwide.

Transformation
- Agile Transformation, SPICE
- Cost reduction

Trust
- Safety and Cybersecurity
- Test Methods, PenTest, Supplier Audits

Technology
- Architecture support, e.g., AUTOSAR
- Life-cycle methods, e.g., PREEvision

Training
- Training, Coaching, Certification
- Corporate Competence Programs

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1. Vector and Consulting
2. Scaling Agile
3. ACE: Agile for Critical Engineering
4. Case Study: Agile Transformation
5. The New Normal: #StayCompetitive
Scaling Agile

Outlook 2020: Risk of Vicious Circle

Source: Vector Client Survey 2021.
Details: www.vector.com/trends.
Horizontal axis shows short-term challenges; vertical axis shows mid-term challenges. Sum > 300% due to 5 answers per question. Good validity with 3.5% response rate of 2700 recipients from different industries worldwide.

Vector provides tailored consulting solutions to stay competitive in stormy waters: Efficiency – Quality – Innovation
Challenge: The New Normal

Society impact

Business impact

Assumptions:
- Vaccination and protection with distance, tests, etc.
- Political leadership and less cowing

Assumptions:
- Innovation to maser the new normal
- Companies adopt necessary changes and reinstate trust
Challenge: Critical Systems

Need: Scaling Agile to **orchestrate teams, locations and disciplines**
Challenge: Agile Appears Easy – But Mostly Fails in Industry

“Agile methods are used on team level. They do not scale easily.”

“SAFe has replaced CMMI as a dogmatic and heavy framework.”

“Companies with organization-wide agile culture clearly financially outperform their peers.”

“Agile is often considered as throwing away processes.”

“Agile is highest ranking technology in terms of past AND future impact.”

“30% of companies reach their agile ambitions with change projects. More than half fail.”

“22% of companies are agile. 28% are Start-Up. 27% are in bureaucratic mode. 23% are trapped in change.”

Scaling Agile

Solution: Agile Must Scale for “Real” Industry Needs

Business
- Value focus
- Flexible fast delivery
- Fluid eco-systems and supply chains

Technology
- Safety, cybersecurity
- Adaptive service-oriented architectures
- Legacy evolution

People
- Delivery-oriented empowered teams
- Global collaboration
- Value-minded culture

Process
- Efficient and effective
- Risk mitigation
- Governance
Convergence means that IT needs embedded competences – and vice versa

Criticality is growing with cybersecurity and fast-changing business models

Tesla and Apple are role models as they master agile and continuous delivery on mixed embedded and IT systems

Current focus is on Scrum and Continuous X – moving up the V

Challenges with legacy, dependencies, and continuous compliance, e.g. safety case

Agile must Scale to Critical Systems and Convergence of IT and (embedded) E/E
Industry Dimensions of Agile Scaling: Agile Out of the Cookbook Won’t Suffice

**Agile principles and elements**
- Scrum teams
- Time-boxed sprints
- Epics, user stories
- Backlog, kanban
- Continuous integration
- Clear and simple roles

**What to scale?**
- Business
- People
- Process
- Technology

**How to scale?**
- Focus
- Human centered
- Simplicity

**Agile scaling**
- Requirements engineering
- Architecture development
- Process execution
- Validation, compliance, ...

**Further scaling?**
- Solution
Agile Scaling needs methodology and guidance

Sources:
Vector + IEEE, 2018
Vector ACE, 2019
## Agile Frameworks Have Different Focus and Applicability

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Scrum of Scrums (SoS)</th>
<th>Scaled Agile Framework (SAFe)</th>
<th>Large Scale Scrum (LeSS)</th>
<th>Disciplined Agile Delivery (DAD)</th>
<th>Agile for Critical Engineering (ACE)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong></td>
<td>SW, HW and Systems, flexible</td>
<td>Software</td>
<td>Software</td>
<td>Software</td>
<td>SW, HW and Systems</td>
</tr>
<tr>
<td><strong>Differentiator</strong></td>
<td>Scrum for all situations and scales</td>
<td>Complex with many artifacts, roles, guidelines</td>
<td>Flexibility by using only suggestions</td>
<td>Complex and coverage of many models</td>
<td>Critical systems</td>
</tr>
<tr>
<td><strong>Underlying Technology</strong></td>
<td>Scrum</td>
<td>Scrum and other agile principles, Lean</td>
<td>Scrum</td>
<td>Scrum / Lean</td>
<td>Scrum / Lean</td>
</tr>
<tr>
<td><strong>Adoption</strong></td>
<td>Used in a large number of companies</td>
<td>Used in several companies</td>
<td>Used in several companies</td>
<td>Usage has started</td>
<td>Usage has started</td>
</tr>
<tr>
<td><strong>Scaling</strong></td>
<td>Flexible, simple and suitable to different settings</td>
<td>Targets large companies, but perceived as heavy</td>
<td>Can be adapted to different settings</td>
<td>Can be adapted to different settings</td>
<td>Can be adapted to different settings</td>
</tr>
<tr>
<td><strong>Complexity</strong></td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Global teams</strong></td>
<td>Feasible</td>
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</table>
ACE: Agile for Critical Engineering

Vector Benchmark: Infrastructure

Scaling agile

Global engineering teams close to local markets
Risk reduction prior market introduction
Reduced engineering cost with short time to market
Quality focus: Cybersecurity, performance, safety

Agile

- Global setup
- Time-boxed
- Reduce waste
- Agile feature teams
- DevOps

Systems

- Model-based simulations
- Architecture and integration
- Reuse / PLE

Model-based Systems Engineering (MBSE)

- System Architecture
- Modelling
  - Platform and reuse
  - Requirements-centered
  - Viewpoints
- Continuous Integration
- Internal DevOps

Agile Teams

- Incremental, distributed evolution of architecture in scrum teams
- Architectural level orchestration of feature teams
- Component level requirements for
  - Integration
  - Test
  - Reuse
- Fast feedback cycles with led rework
ACE: Agile for Critical Engineering

Vector Benchmark: Mobility

**Business needs**
- Time-to-market below 2 years
- Globally distributed engineering teams
- High quality, specifically safety and security
- Integration of strategic Tier-1s
- Compliance with standards

**Scaling agile**
- Focus: Avoid effect of failures
- Concepts and implementation of dependability
- Continuous Integration

**Agile for critical systems**
- Test-Driven Req. Eng.
- Design for dependability
- Reusable platform and modeling

**Actual results**
- Virtual distributed teams keep commitments
- Reduced rework with agile RE
- Faster cycle time for changes from weeks to days
- Ensuring safety and security together
- Integrity with sustainable modelling

**Continuous Everything**
- Requirements
- Design for dependability
- Reusable platform and modeling
- Test-Driven Req. Eng.
Case Study: Agile Transformation

Case Study: Test-Driven Requirements Engineering (TDRE)

Case Study: Agile Scaling with Distributed Competence Management

Satellite approach:
- Push/Pull Mode in Projects
- Basic security engineering know-how in each team
- Checklists for consistency and auditable records

Legend
- Cybersecurity Manager
- Chief Technical Lead
- Software Lead Team 1
- Software Lead Team 2
- Hardware Lead
- Operations Lead (SUMS, PKI etc.)
- Testing Lead
- Team Member

Industrialization
Cybersecurity Core Team
SW Team 1
SW Team 2
HW Team
Testing Team

Kanban Board
Agile and Critical Systems

- Assurance of proven methods (RE, System Engineering, Architecture, Safety/Security) is core contribution to project success.
- The right balance of orientation towards proven methods and delivery orientation needs to be adjusted for your team.

Agile transformation

- Consolidation and anchoring of improvements are biggest challenges for many companies.
- Transparency on status of transformation is key.
- An enhanced retrospective provides necessary guidance.

<table>
<thead>
<tr>
<th>Transformation Retrospective</th>
<th>Rating</th>
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<tbody>
<tr>
<td>Create a sense of urgency</td>
<td>🌟</td>
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<tr>
<td>Create a guiding coalition</td>
<td>🌟</td>
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<tr>
<td>Create a vision for change</td>
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<tr>
<td>Communicate the vision</td>
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<tr>
<td>Remove obstacles</td>
<td>🌟</td>
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<tr>
<td>Create short term wins</td>
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<tr>
<td>Consolidate improvements</td>
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<tr>
<td>Anchor the changes</td>
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Conclusion: Agile Scaling is Necessary – But Far From Easy

- More than half of agile transformations fail: Need for professional change management

More than half of agile transformations fail: Need for professional change management
The New Normal: #StayCompetitive

Learning from the Best

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[www.vector.com/forum](http://www.vector.com/forum)

**White Paper** with many case studies from Vector Forum 2020:


Recommended event for those interested in quality talks and contacts with the relevant experts.

Lorenz Slansky, Mercedes Benz
Thank you for your attention. For more information please contact us.


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