Achieving Resiliency with Agile Methods

Session 11D

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Overview

- *Agile software and system development is no longer a new topic for the Government sector.*
- *A big challenge to use Agile is in commercial software-intensive industry*
- *Additional challenge is how to balance building a system that can be delivered frequently but still robust and resilient.*
- *Discussion topics*
  - ***Agile architecture**: build "-ilities" and resiliency in*
  - ***Agile enterprise**: cultural and paradigm shift*
  - ***Agile mission assurance**: trust but real-time verify*
  - ***Agile supporting infrastructure**: required product and process resources*
- *Share your Agile adoption experiences and learn from others*
  - *Participants with all levels of Agile expertise are welcome.*

Introduce ourselves

- What is your name?
- Where are you from?
- One good thing about your experiences in Agile adoption
- One pain point about your experiences in Agile adoption
- What’s your expectation about this working group?

Schedule

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1:00 – 1:30pm	Session Overview
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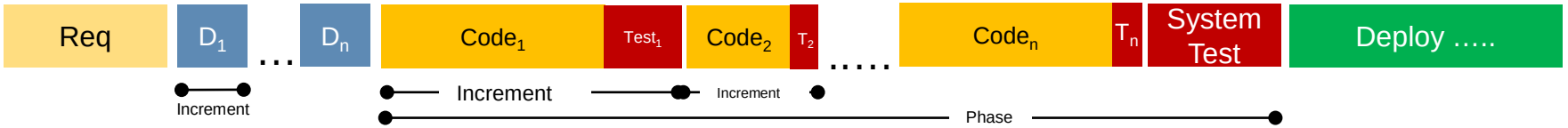
Process Models Comparison

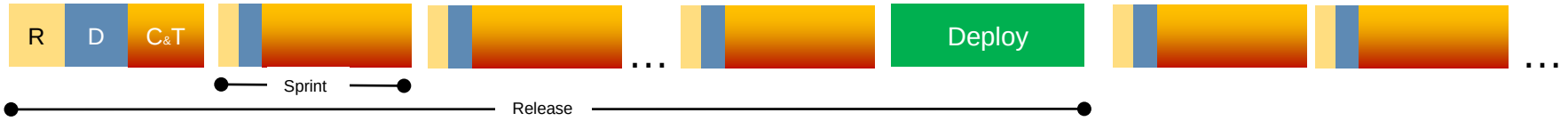
* Notional timeline

Waterfall / V-Model

Iterative and Incremental



Agile (think design, code and deliver application)



DevOps (think infrastructure as code – design then maintain)

DevOps with iterations (pathfinding solutions and new IT/software capability creation)

e.g. Daily build/ integration at CI-level; Sprint-level integration for subsystem; Release-level integration for system/segment

Manifesto for Agile Software Development

http://www.agilemanifesto.org/

"We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

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

Individuals & interactions	over	**Processes** & tools
Working **software**	over	Comprehensive **documentation**
Customer **collaboration**	over	**Contract** negotiation
Responding to **change**	over	Following a **plan**

[Ref: Agile manifesto http://www.agilemanifesto.org/]

Agile development promotes

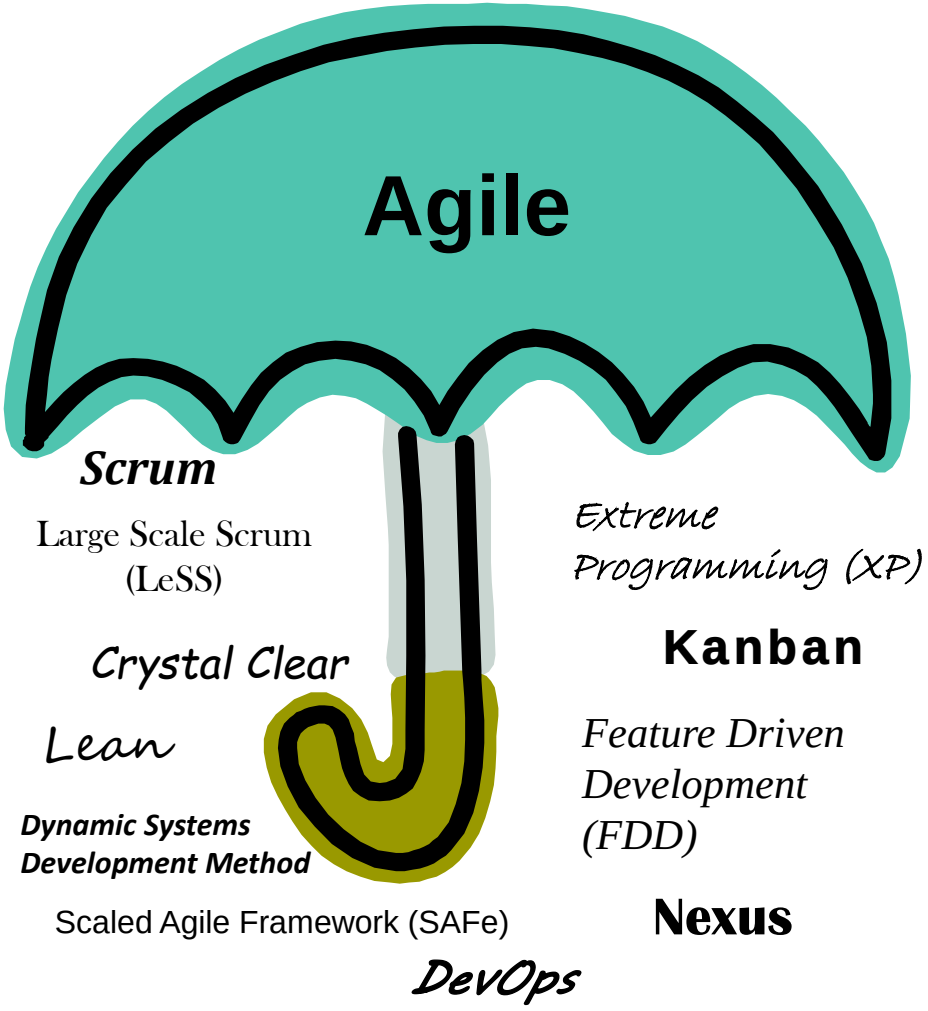
- Adaptive planning
- Evolutionary development and delivery
- Time-boxed iterative approach
- Rapid and flexible response to change

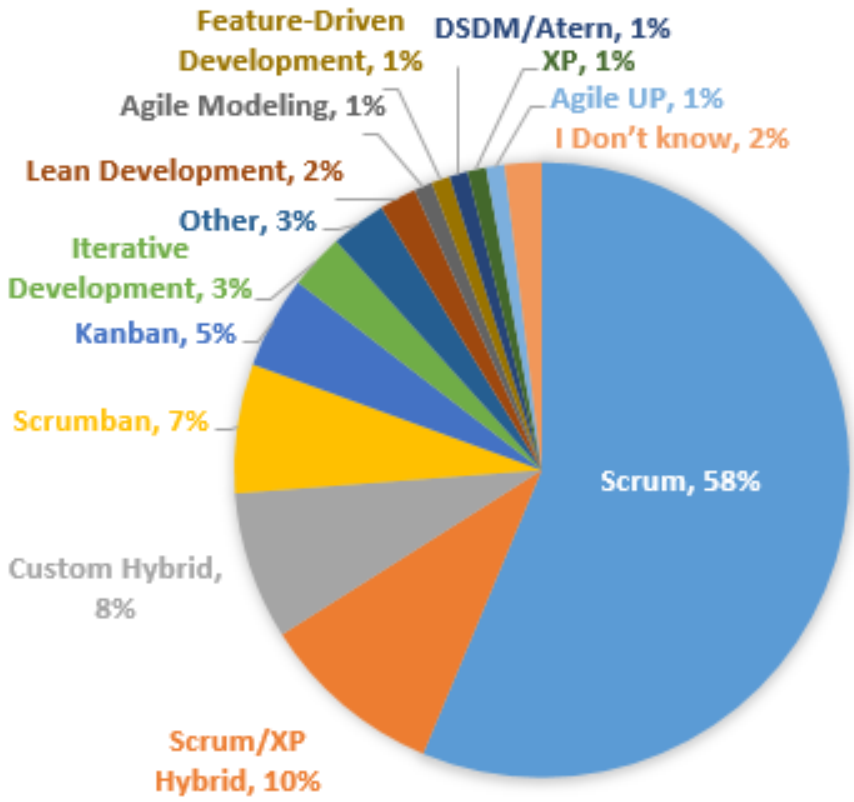
12 principles of Agile software development

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 to 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**.
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.

Agile Methodologies

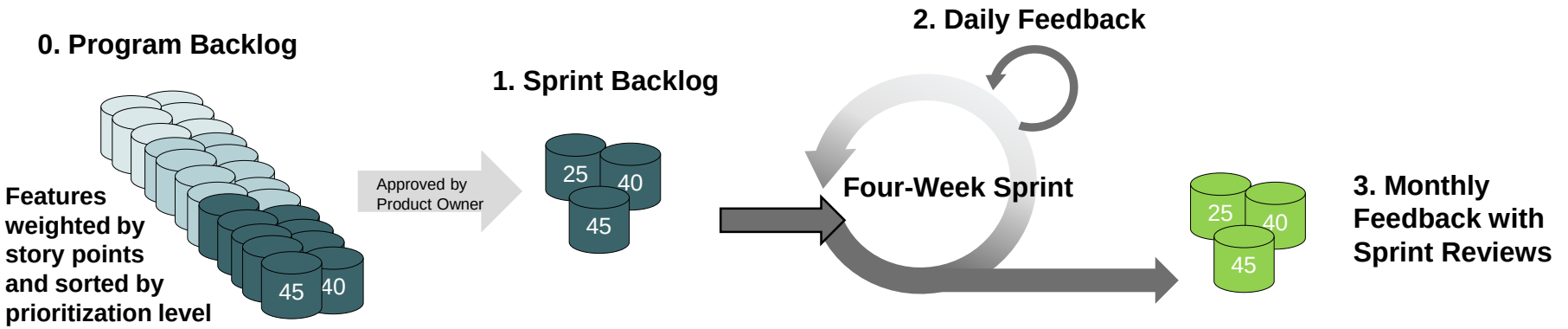
Scrum: the most popular Agile methodology in the commercial sector





[State of Agile Survey Report, VersionOne, 2016]

Agile Methodologies – Scrum



Four-Week Sprints (Time-Boxed) Used to Design, Develop, Integrate, & Test Selected Software Features

0. Requirements are used to create a **program backlog,** a prioritized list of software features.

Each **feature** gets a relative difficulty/time rating in **story points.** Each **feature** is assigned its **priority** level.

The Government team approves the size and priority of each feature.

1. Sprint Backlog for each monthly sprint, developers commit to delivering a set of features captured in a sprint backlog.

The Government team, represented by the **Product Owner**, approves the selected **sprint backlog.**

2. Daily feedback:
a. Teams get status & problem alerts via daily 10-15 minute stand-up.

b. Continuous integration and Automated testing of code means that code is checked in, built, and regression tested at least once every day

c. The Government Team has access to up-to-minute, web-based metrics, provide quick feedback

3. Monthly feedback with Sprint Review for both development team and the Government team.

Feedback on planning accuracy and progress-to-date.
Features aren't counted as **Done** until they are integrated & tested successfully.

Acceptance Testing.

The development team performs **Sprint retrospective.**

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Agile Battle Rhythm

who, what, when, where, why, how many

- **Who?**
  - ***Default:*** *Scrum Product Owner, Scrum Master, Developers and Testers*
  - *Team composition?*
  - *Any special team, such as system engineering team, integration team, program management, customer liaison, Integrated Product (Process) Team (IPT)?*
  - *Who is your Product Owner?*
  - *Required certifications for Product Owner? Scrum Master?*

Agile Battle Rhythm

who, what, when, where, why, how many

- **What?**
  - ***Default:*** *Sprint Planning, Daily Stand-up, Sprint Demo, Sprint Retro, Story Grooming?*
  - *How do collaborate across teams?*
  - *Any additional / tailored activities for the team level, system level?*
  - *Any additional / tailored activities for the new roles?*

Agile Battle Rhythm

who, what, when, where, why, how many

- **When?**
  - *Sprint length? Release length? Number of Sprint per Release?*
  - *Any empty/buffer Sprint?*
  - *Milestone reviews?*
  - *Frequency of system-level demo?*
  - *Are you using Integrated Master Schedule (IMS)? Any alternative?*

Agile Battle Rhythm

who, what, when, where, why, how many

- **Where?**
  - ***Default:*** *collocated team members*
  - *Challenges on distributed teams? Mitigations?*
  - *Do you have collocated users?*
    - If not, how do you collaborate? How often?
  - *Development environments? Demo environments? Staging or Operational-like environments?*

Agile Battle Rhythm

who, what, when, where, why, how many

- **Why?**
  - ***Default:*** *Four Manifesto Values and Twelve Principles*
  - *What works, what does not work?*
  - *Additional guidelines?*

Individuals & interactions	over	**Processes** & tools
Working **software**	over	Comprehensive **documentation**
Customer **collaboration**	over	**Contract** negotiation
Responding to **change**	over	Following a **plan**

1. Satisfy the customer
2. Welcome changing requirements
3. Deliver working software frequently
4. Stakeholders work together daily throughout the project
5. Motivated individuals
6. Face-to-face conversation
7. Working software is the primary measure of progress.
8. Sustainable development
9. Continuous attention to technical excellence
10. Simplicity
11. Self-organizing teams
12. Continuous Improvement

Agile Battle Rhythm

who, what, when, where, why, how many

- **How Many?**
  - ***Default:*** *4-9 people per team*
  - *How many teams?*
  - *Ratio between Product Owner, Scrum Master and team members?*
  - *Ratio between Product Owner and teams?*
  - *Ratio between Scrum Master and teams?*
  - *How many non-development team?*

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Agile Architecture / Architected Agile

Build “-ilities” and Resiliency in

- **Approaches:** Design-as-you-go, Emergent Design, Architecture Runway, Enterprise Architecture, Release Train
- What is your approach in developing architecture and design in Agile development?
- Do you have an Agile Architect?
- Challenges in Architecture development?
- How do you address non-functional requirements?
- How do manage dependency between components?

Agile Enterprise

Cultural and Paradigm shift

- What does it mean to have an Agile mindset?
- How to manage expectations from upper management, middle management or customers?
- How to build and motivate your Agile team?
- Challenges ?

Agile Mission Assurance

Trust but Real-Time Verify

- Did you have to tailor your process from standards?
  - *IEEE 15288.2, SMC-S012, V&V process, ITIL*
  - *Deliverables, documentations*
- What is the oversight / insight process, especially from the customers or mission assurance team?
  - *Do you provide full access to development environment?*
  - *Do you have dashboard? What's in the dashboard?*
- Useful, not-so-useful metrics?
- Frequency of the internal and external reviews

Agile Supporting Infrastructure

Required Product and Process resources

- Infrastructure / tools to support
  - *Continuous Development*
  - *Continuous Testing*
  - *Quality Assurance*
  - *Collaboration between teams*
- Resources
  - *Level of effort compared to traditional development*
  - *Training*

Agile and other disciplines

- MBSE – Model-based Systems Engineering
  - *Such as requirements, diagrams, simulations, prototype*
  - *How can we apply MBSE in an Agile program?*
  - *Any challenges?*
  - *What do you have to do differently?*
- Hardware-intensive development
  - *Do you have to complete the requirements and design before coding?*
  - *What do the milestones or synchronization points look like?*
  - *Any challenges?*
  - *What do you have to do differently?*
- Accreditation / Certification
  - *Require additional processes, documents?*
  - *Any challenges?*
  - *What do you have to do differently?*

Transparency and Openness

- What are the tools?
- What should the Government team do to get the project visibility but not to step on the Contractor's toes?
- How can Agile help in increasing transparency between the Government team and the Contractor?
- What would the Contractor expect from the Government? Conversely, what would the Government expect from the Contractor?

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