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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**Process Models Comparison**

**Waterfall / V-Model**

- **Req**
- **Design**
- **Code**
- **Test**
- **Deploy**

- **Phase**

**Iterative and Incremental**

- **Req**
- **D_1**
- **D_n**
- **Code_1**
- **Test_1**
- **Code_2**
- **T_2**
- **...**
- **Code_n**
- **T_n**
- **System Test**
- **Deploy**

- **Increment**
- **Increment**
- **Increment**
- **Phase**

**Agile (think design, code and deliver application)**

- **R**
- **D**
- **C & T**
- **...**
- **Deploy**
- **...**

- **Sprint**
- **Release**

**DevOps (think infrastructure as code – design then maintain)**

- **Design**
- **Code & Test, Integration & Test**

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

- **Design**
- **...**

*Notional timeline*

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

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

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

- **Scrum**
  - Large Scale Scrum (LeSS)
- **Crystal Clear**
- **Lean**
  - Dynamic Systems Development Method
- **Extreme Programming (XP)**
- **Kanban**
  - Feature Driven Development (FDD)
- **Scaled Agile Framework (SAFe)**
- **Nexus**
- **DevOps**

[State of Agile Survey Report, VersionOne, 2016]
0. Program Backlog

Features weighted by story points and sorted by prioritization level

1. 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.

2. Monthly feedback with Sprint Reviews

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

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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• **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?

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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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