



## **Hardened Agility: Deploying Agile at a Defense Contractor**

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# My Background

- Education

- BS, Computer Science and Math, University of Arizona
- MBA, Arizona State University



- 14 years at General Dynamics (GD)

- Software developer, team lead
- Company agile champion/coach
- IT project manager

- 10 years using/promoting agile at GD

- Used agile for developing gov't encryptors
- Architected company agile framework
- Leading agile initiative within IT

**GENERAL DYNAMICS**  
Mission Systems



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# Defense Industry Obstacles to Agile

- Realities of defense contracting:
  - Government business is highly regulated
  - Customers provide statement of work at project outset
  - Contractors must show proof of work done (e.g. traceability, earned value)
- This tends to encourage:
  - Processes and tools over individuals and interactions
  - Comprehensive documentation over working software
  - Following a plan over responding to change
- Whereas, the Agile Manifesto encourages the opposite
- It's a tough environment for agile processes



# Our Agile Framework

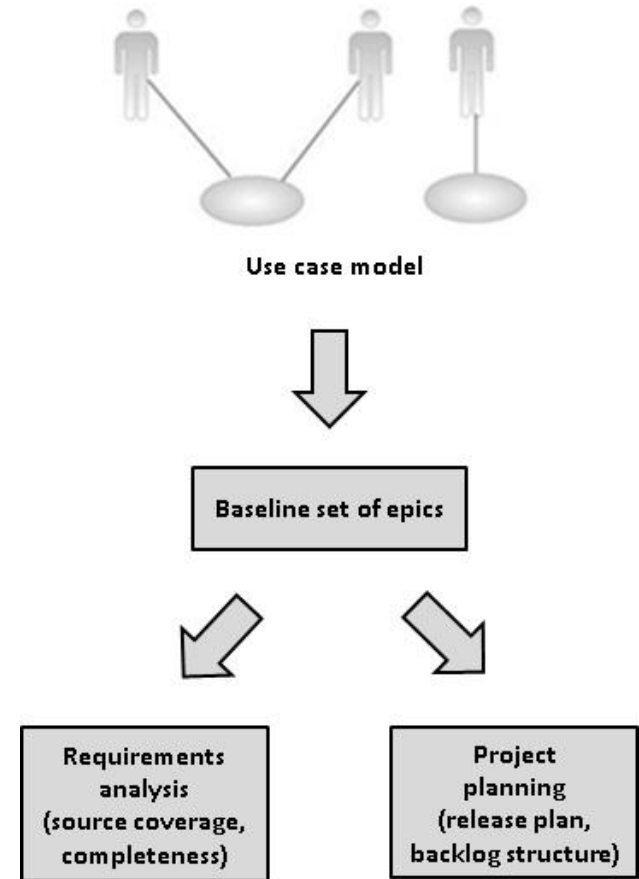
- We've evolved an agile framework over the last 10 years
- Why we value this framework:
  - Has agile principles at its core, and has been proven on real defense contracts
  - Extends the benefits of agile beyond software (e.g. systems engineering)
  - Enables formal requirements traceability in an agile friendly way
  - Enables earned value like status without traditional planning
- The framework itself is “tool agnostic”
- But we have a custom configuration of IBM's CLM suite for it
  - We do very cool stuff in the CLM tool
  - But the tool is not the focus on this presentation
- The next 4 slides summarize key methods of our framework...

IBM. **Rational.** software



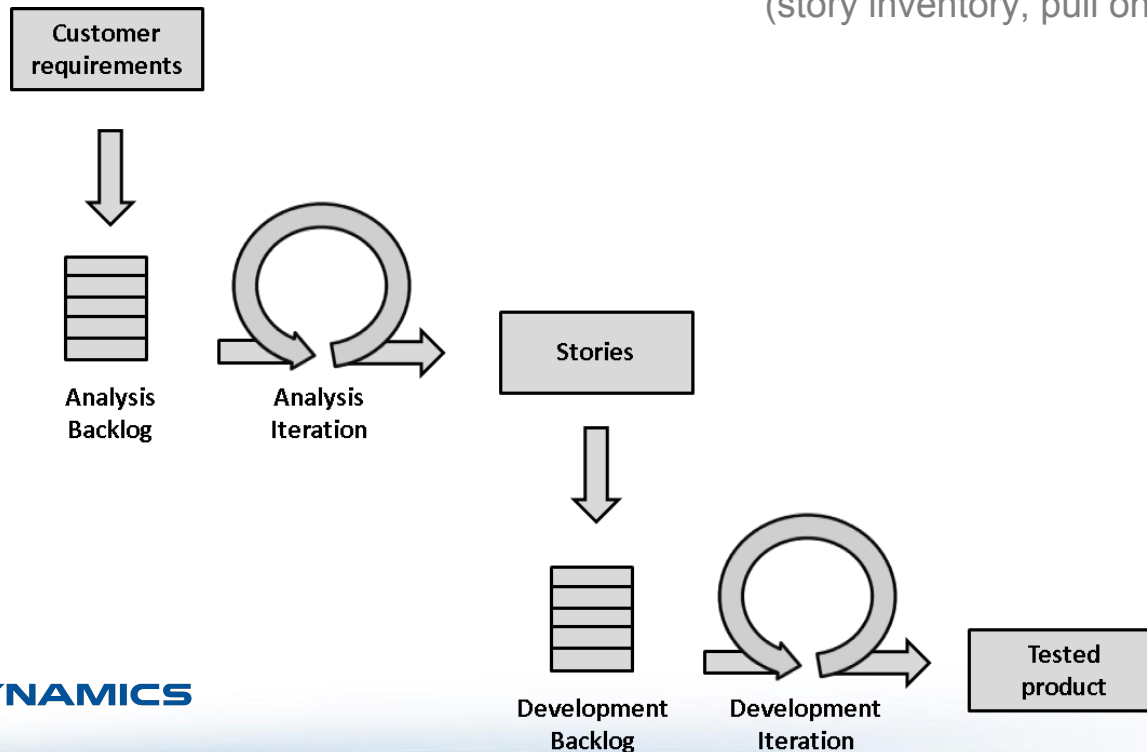
# Method 1: Upfront definition of use cases / epics

- At the project outset, the team creates a use case model for the end product
  - Serves as breadth-over-depth, shared vision for what the team is building
  - Use cases become the agile “epics”
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- Benefits of this method:
    - Systems engineers know use cases
    - Efficient way for coming up with good epics
    - Epics are useful in requirements analysis
    - Epics are useful in project planning/tracking



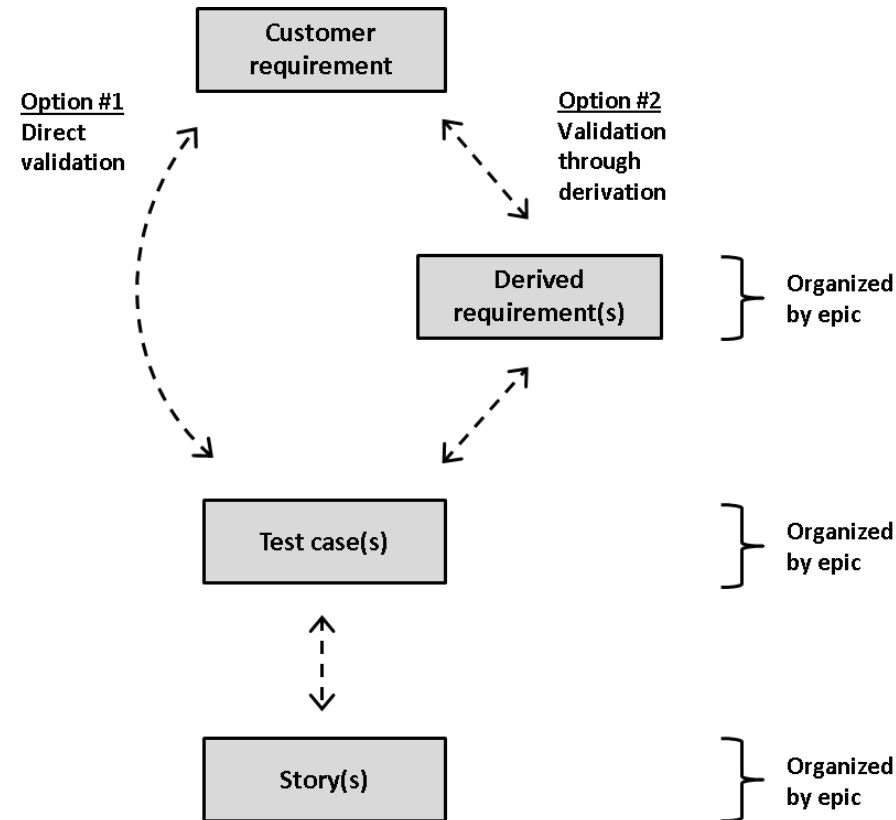
# Method 2: Iterative analysis and development

- During execution, we acknowledge analysis as distinct from development
  - The former feeds the latter
  - Both are iterative and priority driven
- Benefits of this method:
    - Supports long lead system analysis without making development wait for everything
    - Empowers both efforts with independent but complementary backlogs
    - Lends itself to lean management principles (story inventory, pull only needed analysis)



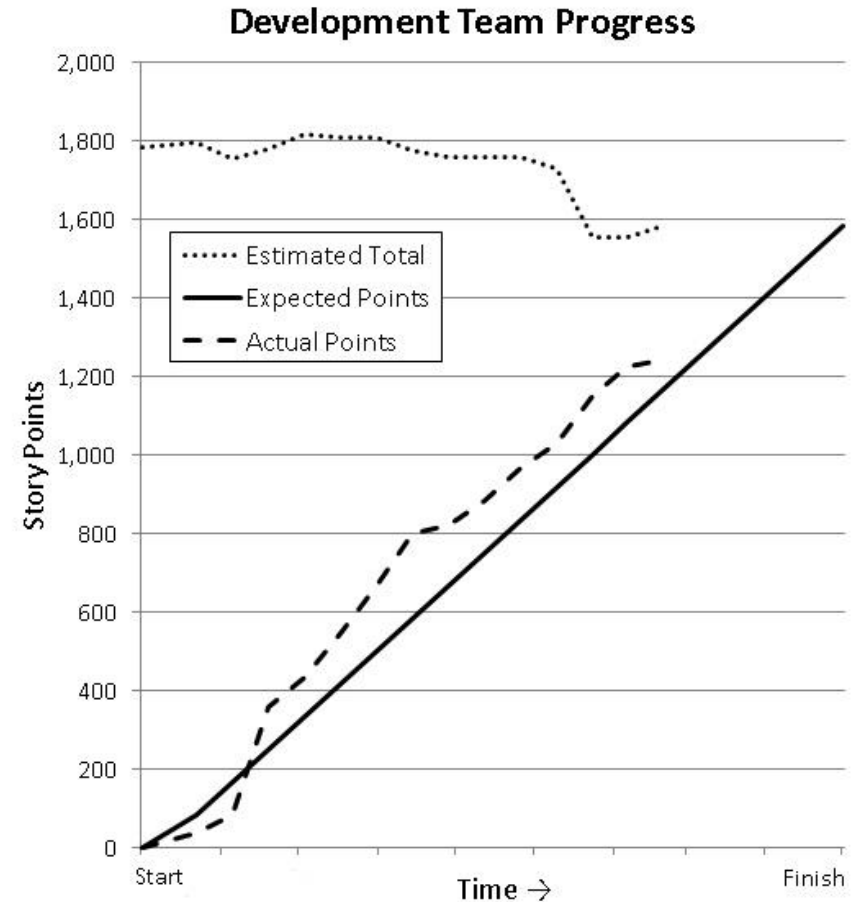
# Method 3: Story derivation via requirements analysis

- In the analysis iterations, the team derives requirements and test cases for a *subset* of customer requirements
  - Stories for the development team are derived in test driven manner
  - Derived artifacts are organized by epic
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- Benefits of this method:
    - Provides traceability needed by gov't contracts (built out over a series of iterations)
    - Creates quality stories for agile development
    - Organization by epic keeps everything grounded in the shared product vision



# Method 4: Tracking performance to an agile plan

- Use a standard agile burn-up chart to track overall progress of development
- Provide story point estimate for project by estimating size of each epic
- Roll-up actual points by epic
  
- Benefits of this method:
  - Burn up chart provides EV like % complete
  - Using epics, teams can know how far along they are without a predefined work sequence
  - Chart focused on development progress encourages leaning out of analysis “overhead”
  - Roll-up to epic made easy by methods 1 & 3





# Closing Thoughts

- Certain realities of defense contracting constrain agility
- In some areas, changing for the sake of agile may not be worth it
- But other areas are ripe for reform
- The optimal solution is probably an intelligent “hybrid-agile” technique
- Finding that optimal hybrid will require real-world practice
- Contractors and customers will need to make coordinated changes
- There will be mistakes made and lessons learned – I speak from experience!
- But we’ve proved that adopting agile methods is worth it...
- ...even in the Defense Industry