



Process Innovation for the Smart Grid Evolution

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Presentation Overview

- The Electric Grid is rapidly changing as are the related regulations and standards
- This presentation will discuss:
 - The issues with the As Is State of Product Development
 - How process innovation will lead to solutions that are:
 - more rapidly released to the market place,
 - meet customer needs and
 - comply with emerging standards.

The As Is State

- The market, customers, standards and regulatory environments are changing
 - Rapidly in some cases
 - Very slowly in others
- Development processes are largely sequential or waterfall in nature
- Silo's of hardware, firmware and software
- Customer and market needs are defined well in advance of a product deliverable – sometimes a year or more

Challenges with the As Is State

- Traditional Waterfall approach



- **Issues:**

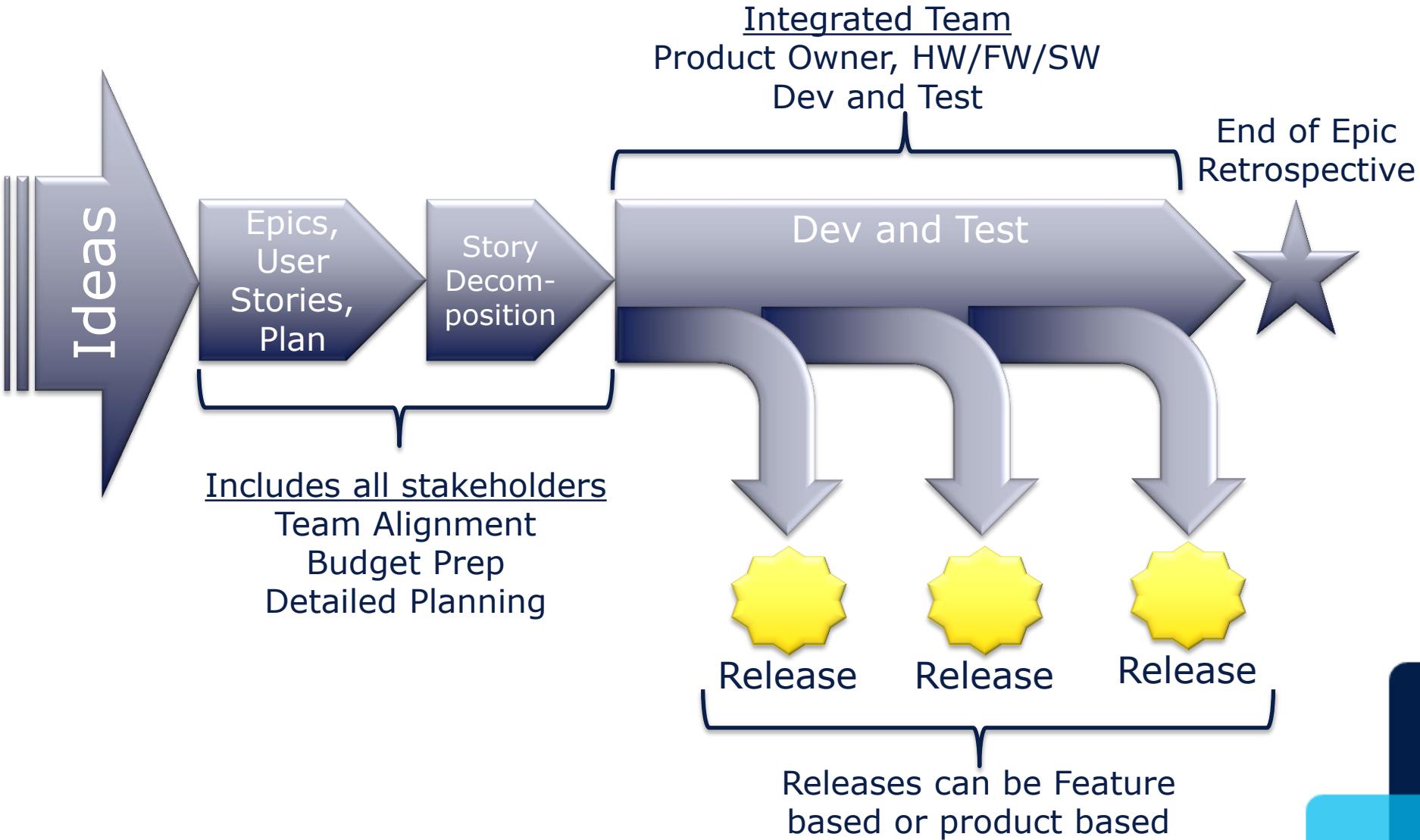
- Time from Start to Release
 - The Market Factor – IOU, Muni, Co Op
 - Utility adoption cycle – early adopters, mainstream, followers
 - Standards evolution
 - Regulatory changes
- Development silos rather than integrated solution
 - Hardware – Firmware – Software silos = integration risk
 - Many problems not discovered until systems integration test or regression = delays
- Quality can be sacrificed in order to meet release date



The Proposed To Be State

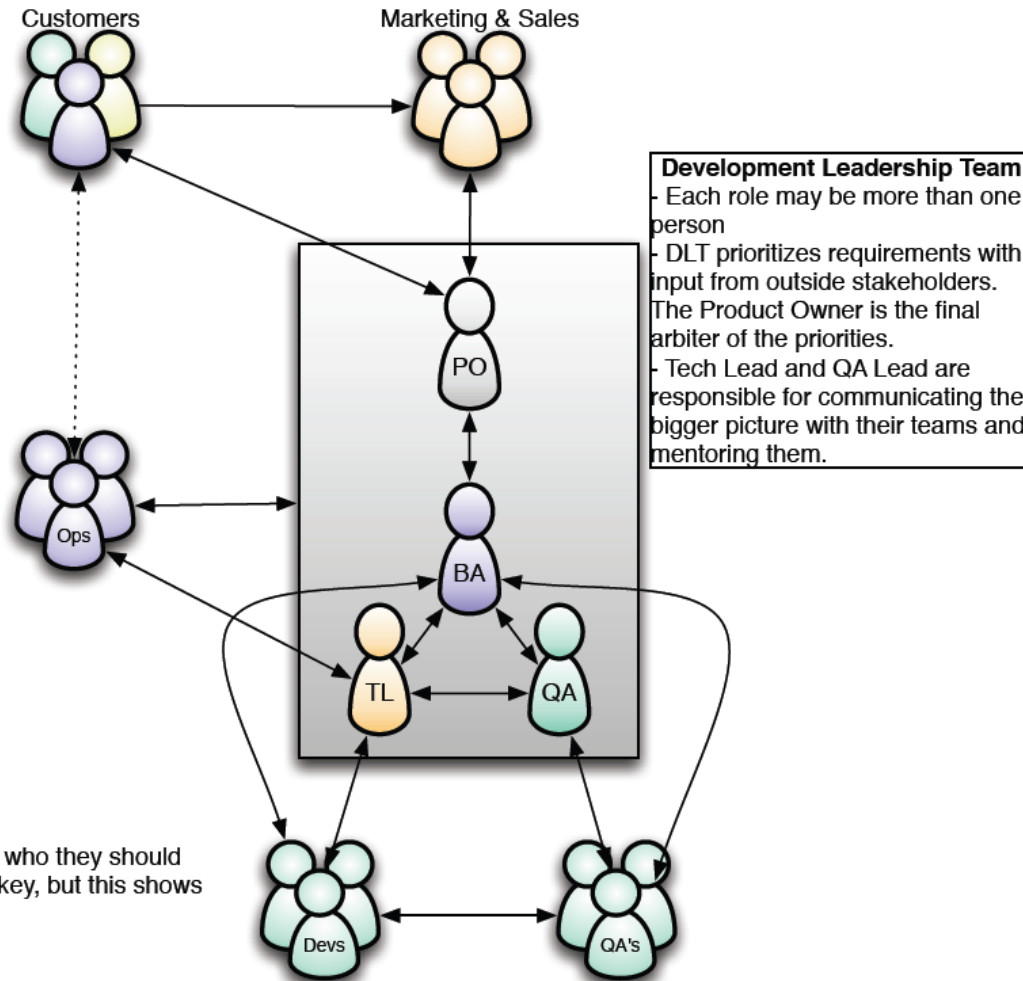
- Agile/Continuous Delivery/Test Driven Development
- Individuals and interactions
 - Self-organization and motivation
 - Interactions built on co-location and paired development
- Working products with each iteration
 - Working products are more useful and welcome than just presenting documents to customers in meetings
- Customer collaboration
 - Requirements cannot be fully collected at the beginning of the development cycle, therefore continuous customer or stakeholder involvement is critical
- Expect and respond to change
 - Focused on quick responses to change and continuous development

The Proposed To Be State



Team Roles and Interactions

Team Interactions



NOTE: People are not limited to who they should interact with. Communication is key, but this shows the expected responsibilities.



Benefits of Process Change

- **Alignment with Market and Customers**
 - The voice of the customer is always available
 - Adaptable to emerging standards and regulations
- **Address the Market Factor - Continuous Delivery**
 - Small releases that are fully integrated solutions
 - Rapid delivery of specific features
 - Unified work flow including HW/FW/SW and voice of customer
- **Improve Quality - Test Driven Development**
 - We don't test in Quality – Quality is developed from start to finish
 - Dev, Test and Product Owner work simultaneously in the same team
 - Understand Acceptance Criteria - before development starts!
 - Dev and Test work simultaneously
 - All code MUST have Unit Tests as part of code base
 - Acceptance tests are run at the end of each Sprint