

# Transitioning from Project to Product Thinking

## GLOBAL PRODUCT DATA INTEROPERABILITY **SUMMIT** 2016



ELYSIUM

Parker Aerospace

NORTHROP GRUMMAN

BOEING



**Name:** Mike Zakrzewski

**Title:** Cyber Architect

**Relevant Certs:** PMP, CSM, SAFe Agilist

## Background:

- ~12 projects producing 15+ distinct business applications and systems
- Roles include Program Manager, Product Owner, ScrumMaster, Tech Lead, Developer, Tester and Systems Engineer
- Currently Cyber Architect / Lead Engineer on CDM Program
- Previously Systems Engineer within Public Safety OU (~10 months):
  - ScrumMaster / Tech Lead for TIMS
  - ScrumMaster / SE Lead for CommandPoint Mobile
- Interests: Lean processes/ relentless improvement, SAFe / Scrum, Developing high performing teams

# Objectives

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## Objectives

- Introduce 'Product Thinking'
- Share some requirements management, value estimation, and lean startup processes intended to drive Product Thinking within NGC's Public Safety organization.

# Product Thinking

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Product Thinking: Develop solutions that solve our existing and target customers real world problems while maximizing our ability to adjust in the future.

We must maximize the 'ilities' in our designs: flexibility, maintainability, extensibility, reusability, scalability, and testability.

64% of features built are 'rarely or never used'.

Why?

Questions to drive product thinking:

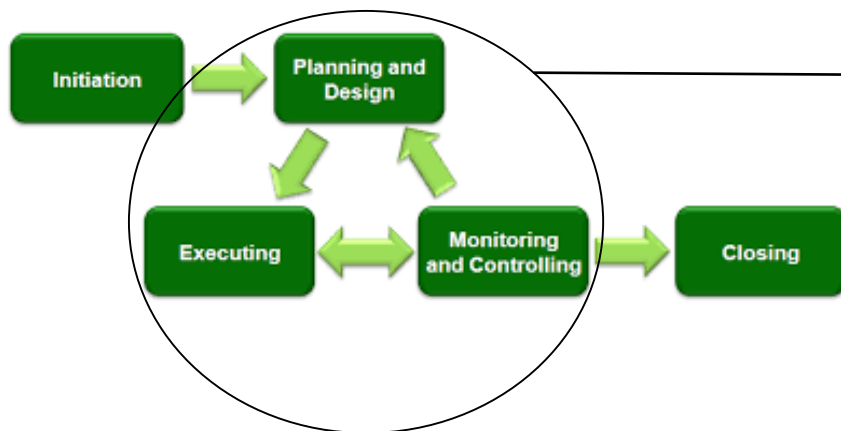
1. '5 why' analysis of requirements.... What problem are we or our customer trying to solve?
2. What audience are we solving the problem for?
3. Does this support our product vision?
4. What economic value does this bring to our product/organization?
5. How can we implement this that keeps our product the most agile?

# Why do we care?

- Projects are: “A temporary endeavor undertaken to create a unique product, service or result...” (PMBOK – 5th Edition)
- “At their core, products are the sum of benefits that satisfy a customer’s need or desire....” (ProdBOK – 1<sup>st</sup> Edition)

The product’s life cycle exists beyond the project.

- NGC is (mostly) a project organization but we have/do develop some products / product lines.
- The project solutions we develop may be reusable in part or in whole or we may be supporting project solutions for YEARS through O&M contracts.
  - **Project Managers and Product Owners have different and sometimes conflicting goals.**



## Product Life Cycle:

- Generating Ideas
- Screening the Idea
- Test the Concept
- Business Analytics
- Beta / Marketability Tests
- Product Development
- Commercialization
- Repeat

# 'Product Thinking' Topics NOT Covered (but critically important)

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1. Contracting / T&Cs
2. Building in quality
3. Organizational structure - creating the right roles
4. Customer stakeholder management
5. Source code management

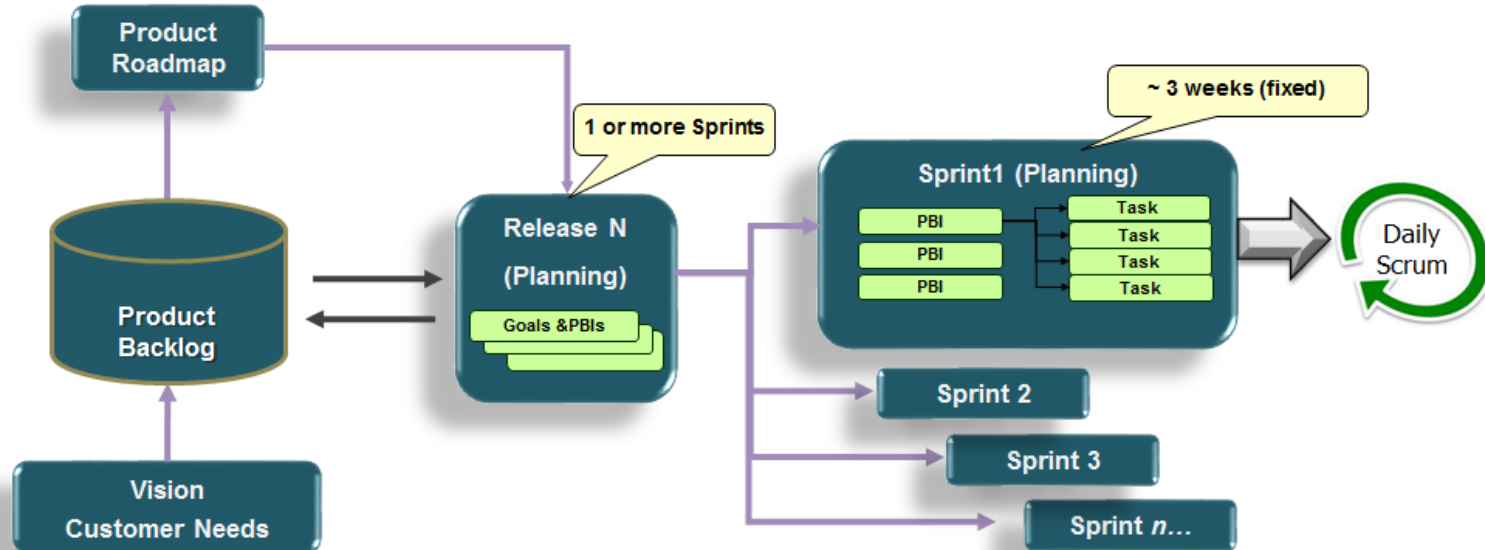
Plenty more...



# Use Case Context: Public Safety Product Line

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- Software product line with multiple products and numerous customers. Funding through projects: Implementation/O&M.
  - Much work done to standardize customer product versions and reduce/eliminate 'one-off' implementations.
  - Use Agile Scrum methodology with teams organized by product.
  - Multiple Project Managers supporting customers for each product.
  - Varying product maturity (startup – 20+ years).
- Use of Microsoft Team Foundation Server (TFS) as ALM solution, requirements/defect management solution, and source control (TFSVC).



# Challenge #1 – Organize Requirements around Value

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- We're working off a lot of stories but we're having difficulty expressing the value we're adding to the product.
- It's unclear if/how requested changes support a cohesive product vision.





# Product Requirements Management

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## **VISION:**

Describe who your product is for, what it does, and what you do differently than other products

## **EPIC:**

How you implement your vision. Epics span several releases. \*\*Ours were static 'categories of service' or 'buckets' of functionality.

## **FEATURE:**

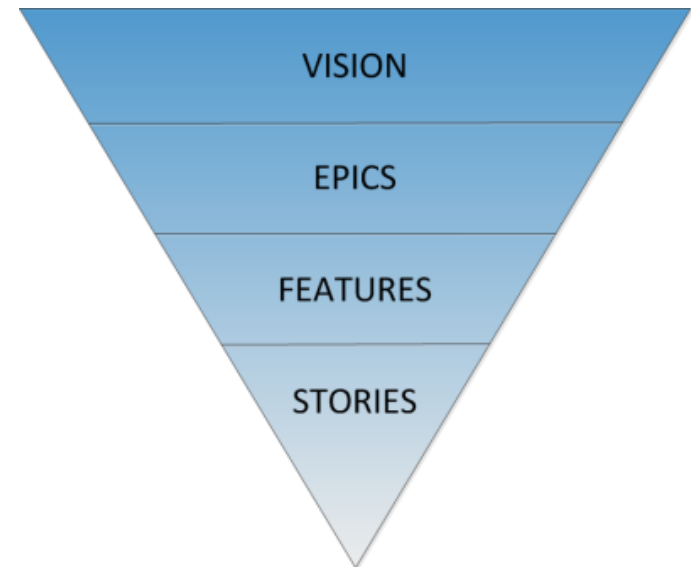
How you implement your Epic. Features are implemented within a single release. \*\* We estimated value here.

## **STORY:**

How you implement your feature. Stories are implemented within an iteration.

## **Good practices:**

- Avoid design commitments. Make requirements about what not how.
- Emphasize common PBI structure and enforce value statements (the why).
- Use relative estimation techniques for sizing stories and features



# Tactical Incident Management System (TIMS) Example

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## **VISION:**

For Incident Commanders

Who must manage incidents and events using the FEMA NIMS ICS framework

The Tactical Incident Management System is an incident management solution

That enables end to end planning and management of an incident from EAP/IAP plan creation, Approval of plans and Notification to participants, Check-in/check-out of resources, Situational Awareness, and Financial Reporting

Unlike competitors that offer parts of this process, our product will provide the full end-to-end set of capabilities in one product

## **EPIC:** *(implemented over several releases):*

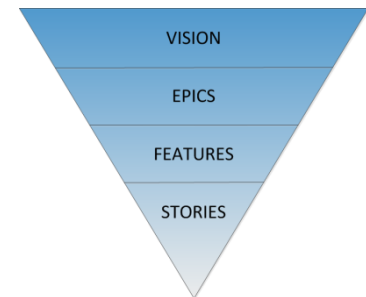
Check-in personnel to an incident

## **FEATURE:** *(implemented within a single release):*

Check-in LAPD officers through ID card scanning

## **STORY:** *(implemented within an iteration):*

As an LAPD staging officer IWT scan an LAPD officers ID card and be provided with key attributes of the person so that I can determine which team may best utilize him/her if they are currently unassigned to a team.

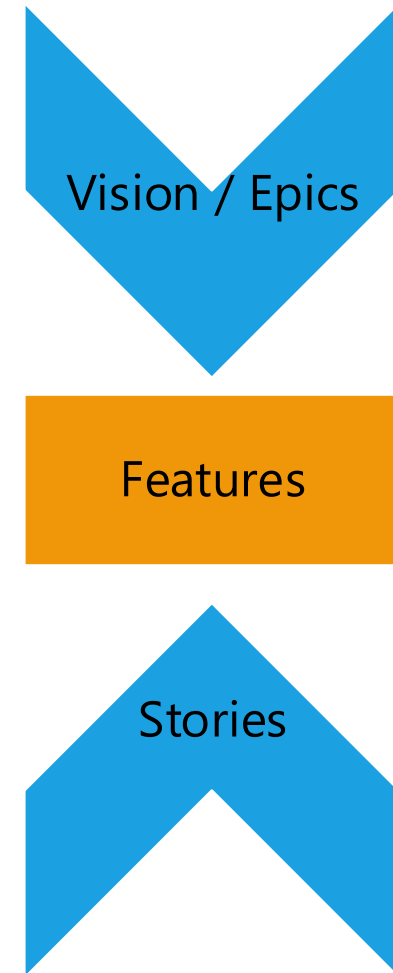


# Methodology - Existing Backlog Refinement

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## “Meet in the middle” approach:

1. Develop or refine vision statements and epics to a common format.
2. Analyze the backlog and group stories into features. Include qualitative value statements when writing features.
  - \* Scrutinize stories that cannot be mapped to features. What value is the story providing?
3. Map features to epics
  - \* Scrutinize features that cannot map to Epics. Does this feature support our product vision?



# Lessons Learned – Requirements Around Value

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1. When requirements written about ‘how’....  
The ‘why’ and ‘what’ are difficult to discern later and require deep domain knowledge if not knowledge of the previously envisioned design.
2. Don’t be afraid to discard items where value wasn’t captured and can’t be determined in the refinement process.
3. Helpful to organize bugs around value.
4. Don’t limit organizing around value to development teams. Other teams can coordinate themselves around value too. (SE team example).

# Requirements - Desired State

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Order	Work Item Type	Title	State	Effort	Story Points	Value Area
2	Epic	Secure Communications	New			Business
	Feature	IOC Communication Setup / Framework	Active	8		Architectural
	User Story	As any mobile user I want to send data to CAD and handle a ...	Active		8	Architectural
	User Story	As any mobile user I want to establish a connection to the CA...	Closed		3	Architectural
	User Story	As any user I want improved communication between my ph...	Active		8	Business
	User Story	As a first responder I need my incoming messages decrypt...	New		2	Architectural
	User Story	Presentation of security module - As a mobile team member ...	Active		2	Business
	User Story	As a potential mobile user IWT be informed when the middle...	New			Business
	Feature	Handle application not in foreground	Active	3		Business
	Feature	Handle disconnected operations	New	1		Business
3	Epic	User Login and Session Handling	New			Business
	Feature	IOC User Login	Active	2		Business
	User Story	As a potential mobile user I want to be informed when my de...	Active		5	Business
	User Story	As a user I want to view a splash screen so that I have some...	Closed		5	Business
	User Story	As a potential mobile user I want to be informed by device is...	Closed		1	Business
	User Story	As a user entering incomplete information on the login page ...	Active		5	Business
	User Story	As any mobile user I want to be prompted for login credentia...	New		3	Business
	User Story	As a user entering invalid information on the login page IWT ...	New		5	Business
	User Story	WireFrame - As a Mobile user I want to be prompted for logi...	Closed		2	Business

Qualitative Value

## IOC Communication Setup / Framework

DETAILS IMPLEMENTATION (6) ALL LINKS (7) ATTACHMENTS HISTORY

Value: Establish a communication stack that will be used by the mobile application so communications can be extracted away from individual processes for consistency, re-use, and maintainability.

This feature is complete when the communication stack is implemented from mobile to middle tier to CAD (and back).

Includes:

1. Connection establishment
2. Message formatting from mobile
3. Read-in / parse data
4. Encryption
5. Steps to maintain connection
6. Retry method / error handling for connection failure

Estimated Features  
Estimated Stories

Now what do we do?  
Prioritize

# Challenge #2 – Aligning Stakeholders on Prioritization

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- The Product Owner must ensure that the most valuable work is selected for implementation (and it helps to prove it).
  - He/she must seek what is best for the economics of the product and avoid catering to the loudest customer, most influential PM, the latest BD idea, etc.
  - How do we look at value objectively?

# Methodology – Weighted Shortest Job First (WSJF)

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- WSJF is a work prioritization model
  - Prioritize work “based on the economics of product development flow” & “It is job sequencing rather than just theoretical individual job ROI that drives the best economic result”
- WSJF described by Don Reinertsen in ‘Principals of Product Development Flow’
  - Adopted by SAFe (Scaled Agile Framework)
  - Described in Continuous Delivery model... Scrum = Kanban with fixed timeboxes
- With WSJF jobs that deliver the most value and are the shortest duration are prioritized for implementation.
- Value is estimated by business owners. Duration by the teams.

Example 1: 2, 4-week jobs

Job 1:



Job 2:



Example 2: 2 jobs worth \$200k

Job 1:



Job 2:



$$\text{Weighted Shortest Job First (WSJF)} = \frac{CoD}{Duration}$$

\* Cost of Delay: the difference in the value of doing something sooner vs. doing it later

# Business Owner Organization

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- Establish a Functional Review Board (FRB)
- FRB Charter:
  - Review, evaluate, and aid in the prioritization of requests for new capabilities or changes to existing capabilities / business processes.
  - The target planning horizon is 6 – 9 months. At a minimum the current and next release, for each product.
  - Each product has its own FRB, coordinated by the Product Owner
- FRB Members are at the Product Owners discretion and might include:
  - Program Managers
  - Strategy Representatives
  - Mission Assurance
  - Systems Engineering
  - Business Development
  - Technical Leads
  - Product Owners of other dependent products





# Implementation of our CoD Estimation

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- Done by business owners at the feature level
- Relative estimation so we don't have to worry about absolute numbers
- Use planning poker
- CoD estimate based on 3 elements:
  - User-Business Value: What is the impact on revenue? Do users have a strong preference for something vs. something else? *Are we already committed to doing this??*
  - Time Criticality: How quickly does the user/business value erode? Is there a fixed deadline? Will they wait for us or move to another solution? What is current effect on customer satisfaction? *Are we already committed to a delivery date??*
  - Risk Reduction-Opportunity Enablement Value: Does this reduce the risk of this or future deliveries? Are we learning something that will help us in the future? Will this PBI enable new business opportunities?

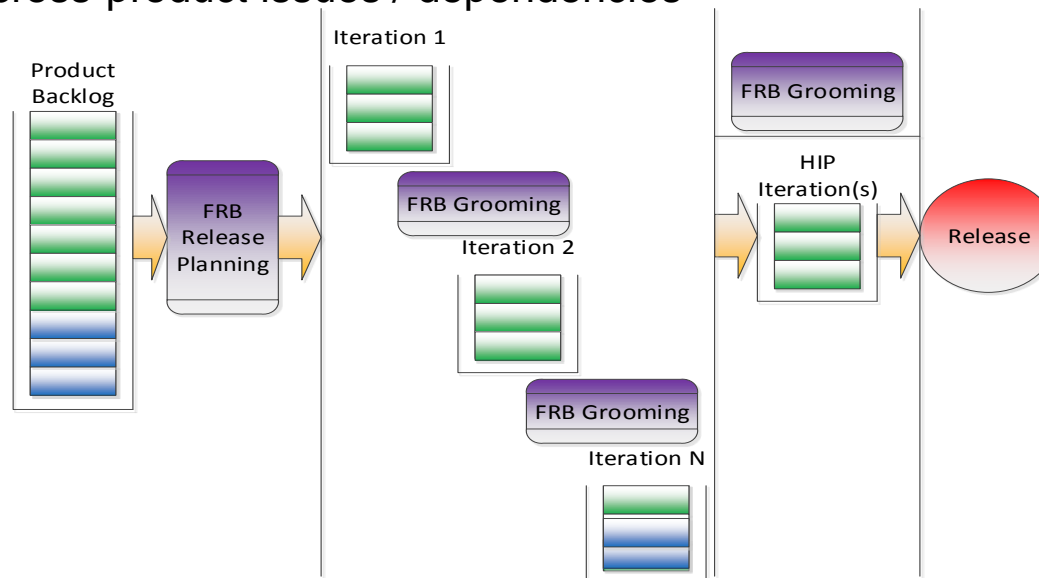
$$WSJF = \frac{CoD}{Duration} = \frac{User\ Business\ Value + Time\ Criticality + RR\ OE\ Value}{Duration}$$

Feature	User/Business Value	Time Criticality	RR/OE Value	Duration	WSJF
A	1	5	5	3	3.67 (priority 1)
B	5	2	1	3	2.67 (priority 3)
C	3	1	13	5	3.4 (priority 2)

# FRB Mechanics / Agenda

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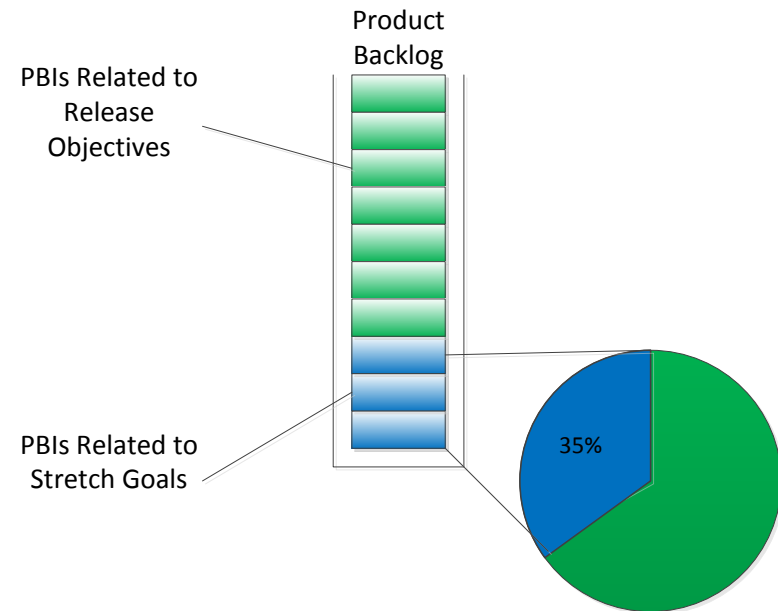
- **Meeting Frequency:** Once per iteration plus as needed by the Product Owner to maintain feature level grooming.
- **Release Planning:** (1-4 weeks prior to next release):
  - Upcoming release objectives are set
  - Team capacity communicated
  - Members prepare for release planning briefings
  - \*\* Capacity planning (next slide)
- **All Meetings:**
  - Refine feature definitions, value statements and acceptance criteria
  - Estimate the CoD of features / WSJF calculations
  - Identify cross-product issues / dependencies



# Capacity Allocation

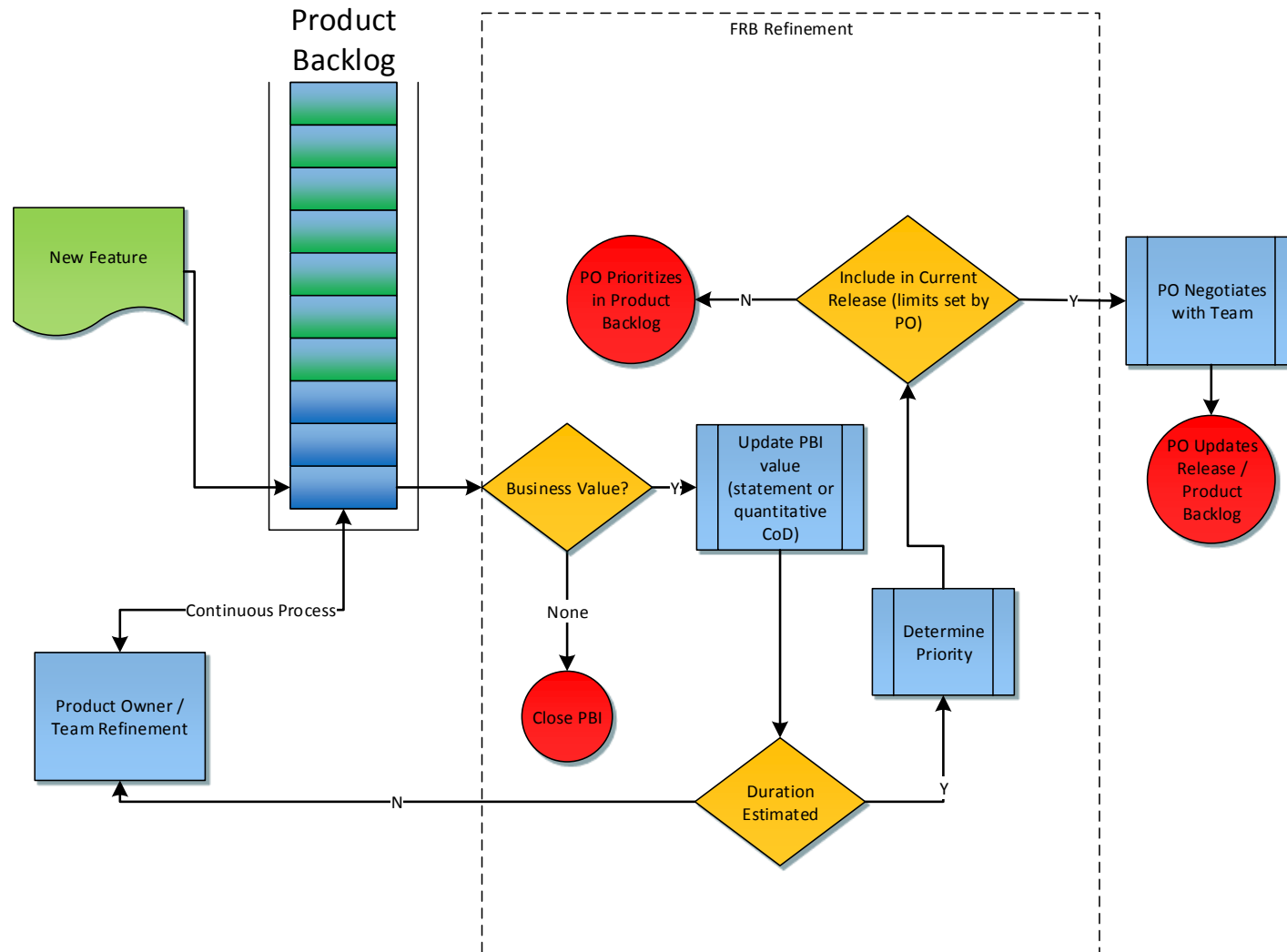
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- Capacity allocation is a policy decision as to how much of the development teams total effort will be spent on a PBI type or class of service for a release.
- Can be used to set 'what we can change (agility)' within a release or meet other goals; % of technical debt burn down, % of architectural improvement, new features, etc.



# Workflow

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# Lessons Learned – Value Estimation / Prioritization

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1. Small / well defined features win!
  - Ways to shorten duration:
    - Decomposition. Drives out less valuable ‘parts’ of features.
    - Improving scope clarity to drive out risk
2. Don’t commit until you’re ready to do the work or you’ll miss out on better opportunities.
3. Get upper management buy-in early and use them as advocates.

# Challenge #3 – Start Delivering and Testing Value... Now

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## Background:

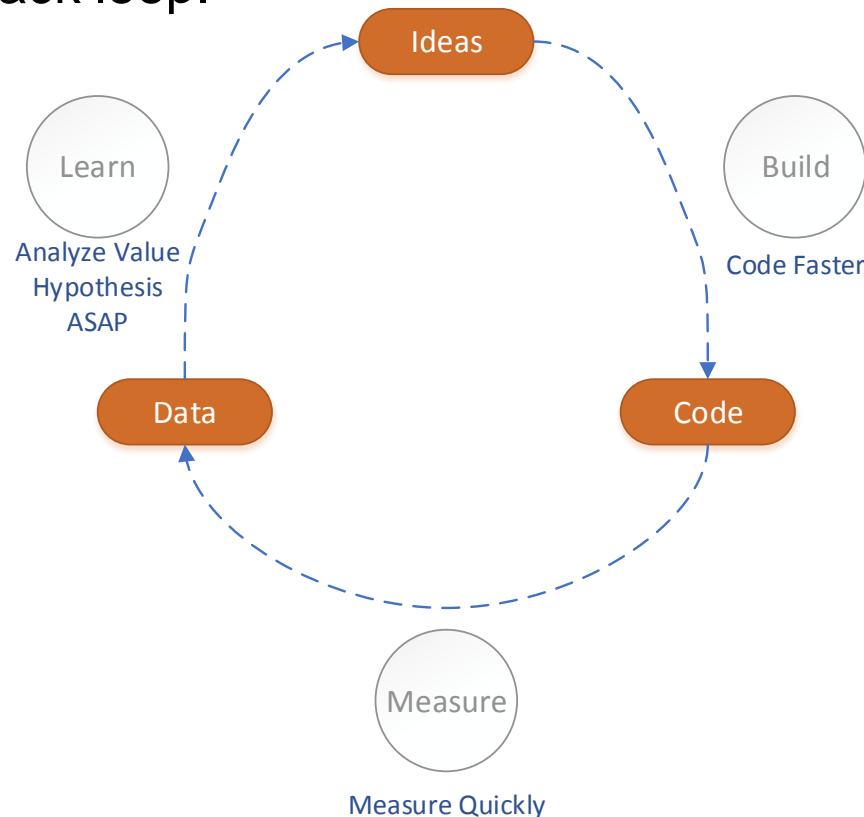
- Create a mobile phone app for receiving 911 dispatches with a specific target first customer (existing customer).
- A previous Android phone app had been developed for this customer which they piloted. The customer then standardized on Windows phone.
- New development team formed to produce the app.
- 3.1 – Answer budget/schedule questions.
  - How long will this take you?
  - How much will it cost us?

**\*\*Our standard BOE process takes too long.**
- 3.2 – New product for a specific customer: Balance time/scope constraints while maintaining product thinking.

# Lean Startup

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Lean Startup: Measure value hypothesizes ASAP by delivering a minimal viable product (MVP) and utilizing the build, measure, learn feedback loop.



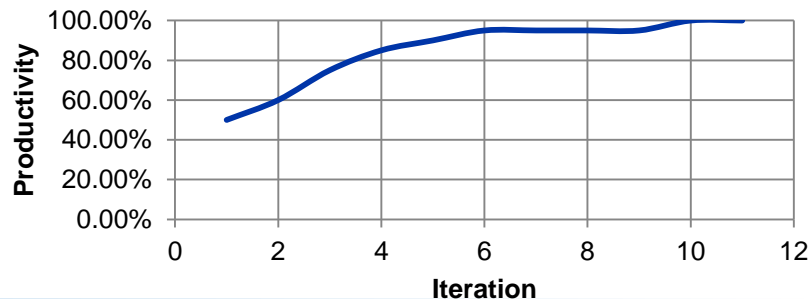
# Lean Startup – Move from Ideas to Coding

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1. WBS for the MVP created by PO / Mobile Developer (MDT/Android Pilot) ~8 hrs
2. WBS refined by team: features created, Architectural / 'framework' features emerged. Relative estimation performed by team ~90 hrs.
3. No past team velocity. Team decomposed 7 features and estimated hours. Determine Hours/Feature Point. ~14 hrs
4. SE Develop Risk/Opportunity register ~ 6hrs
5. SE Developed schedule estimate based on features, applied learning curve, applied factored risks and opportunities. ~ 6 hours

Done in 124 man hours.

## Applied Learning Curve



Mobile Estimation							
	.5	1	2	3	5	8	13
Phase	I use MEID or MAC address to match up with CAD	Unit Exchange	Incoming Event	Session Handling (32)	User Login/Logout	Dispatch Change (80)	UI design (look/feel, layout)
		Reconnection/synchronization	Configuration of response popup	Native application functionality not reliant on wireless connectivity	Display Events	CAD Message	Application Framework - command maker in xml string
		ONS	ENR (16)	Background Communications Service	Deployment to production / setup instructions / MDM setup		
		AOR, AID, ATP, AVAIL	Status Times: My Events	Event Function: Loc Info	Method/Strategy for reading from configuration		
		Cancellation forced	Status Times: Other Units on My Current Event	Event Function: Loc History	Error handling (user display / logging) (80)		
			Setup/configure CAD test server and DB	Transport Command (TOH, TRN, ATH)	Reconnect on Demand		
			Setup/configure test devices (phones, surface pros)	Cancellation / Preempt	Implement Socket Connection Approach / Establish Connection		
			Status Workflow rules engine (16)	Rest Break	Test Reformatting GPS		
			Send GPS	Establish repo w/ Tagging / Versioning	Setup local storage DB / connectivity		
				Navigation Menu	If status changes while dialing is displayed, adjust status on device and take user to screen screen based on new status		
				Read-in data / parsing	DB on mobile user to capture log (80)		
				User feedback (popups, alerts, audio, etc.) (40)			
				Data formatting			
				Setup UWP IDE for each team member			



# Build Fast with Product/Quality Focus

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Emphasize Efficiencies & Maximize the Work NOT Done.  
Maintain product focus.

1. Balance maximizing the work NOT done with long term 'Product Thinking'
  - Universal Windows Platform
  - Internationalization
  - Xamarin
2. Leverage existing solutions / reuse what you can
  - 'Template 10'
  - Android pilot middleware
3. Automate where-ever possible.
  - Automated builds / notifications
  - Coded unit tests
4. Get to Learning
  - Create fast feedback loops / demos



# Lessons Learned – Lean Startup

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1. Provide visibility to estimation process to gain buy-in
2. Coach stakeholders on MVP / gain upper management understanding
3. Coach stakeholders on value of direct feedback loops

# Questions / Comments

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For more information or further discussion:  
[Michael.Zakrzewski@ngc.com](mailto:Michael.Zakrzewski@ngc.com)