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Grandma's Secret Hotdish Recipe for SW Planning: SAFe and Analytics

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co-presented by: COBEC CONSULTING & EVANS CONSULTING | ICEAA

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Presentation Roadmap

- The Situation
- Some Background
- Solutions
- Results and What We Found & Did
- Where We're Going

III

The Situation: Change

OVER COST AND SCHEDULE

- Programs struggle to manage within cost and schedule baselines, but especially when held to standards of long planning and implementation lifecycles.
- Legacy requirem ents and changing priorities make it hard to commit to a solution years before implementation and service delivery.
- Developing detailed requirements years before development and execution provides little room for pivoting away from well -intended baselines at the discovery of new information.
- Replacing home grown tools and processes with modern COTS solutions usually results in growing pains.
- Loss of trust between users, developers, the Agency and Stakeholders leads to finger pointing, animosity, and extra scrutiny.
- A changing landscape requires changes in analysis, requirements models, and an understanding of Agency needs.

Program Background

The FAA Logistics Center is an ISO 9001:2015 certified organization providing consulting, engineering, repair, distribution and technical support for air traffic control services in the United States and internationally.

We are a government business operating in a revolving fund environment and a recognized leader in delivering customer satisfaction through quality products and services.

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MISSION:

- Replace legacy logistics support system with COTS ERP
- Baselines: 2012, 2014 – Go-live 2016
- Final rebaseline planned for 2019 to ensure decommission Jan 2022
- Align software, business and policy
- Agile in a waterfall funding cycle

SURFACE FIXES: IGNORING THE UNDERLYING ISSUES:

- Development in line with legacy business processes
- Reactionary development after go -live based on User Feedback
- Business Processes not developed in line with Software
- Workarounds and “Hacking the Tool”

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Program Background

Aging Requirements / Competing Priorities:

- Missing traceability between baselines
- Unclear definition of done
  - Work tickets captured problems, not requirements
  - Unclear priorities driving work
  - Unclear what value looks like to user

Team

- Staffing variance and loss of tribal knowledge
- Immature documentation
- Maturing processes growing with teams

Data

- Accessible but quality and meaning uncertain
- Inconsistent User Acceptance Tests
- Disparate sources: Issue tracking tool, spreadsheets, official documentation

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Solutions

Exploit the Process (SAFe)

Upset the Setup (Organizational Change Mgmt)

Engagement (User/Business Proxies)

Novel Estimation Methodologies (Machine Learning)

VII

Exploit the Process

SAFe Principles

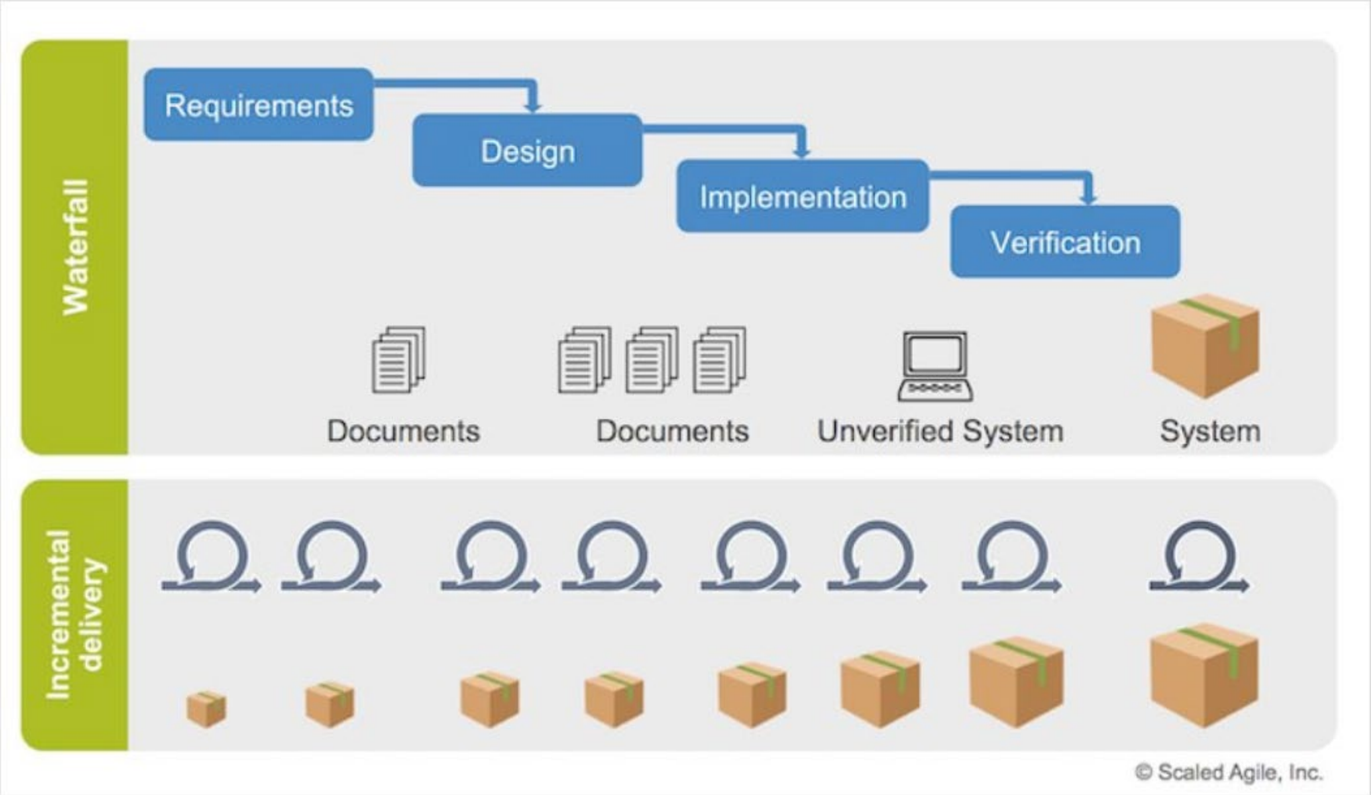
- Deliver Early and Often
- Build Incrementally with Learning Cycles
- Objective Evaluation of Systems
- Cross-Domain Planning
- Intrinsic Motivation of Knowledge Workers
- Decentralized Decision Making
- Organize Around Value

Applications

- Prioritize work on perceived value
- Business owners assign planned value to deliverables and actual value upon delivery
- Early and often user involvement
- Priorities aligned with agency goals, not outdated requirements
- Intentional Data
- Data to support work/priorities
- Measure business outcomes

Scaled Agile Framework

VIII



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Incremental Everything

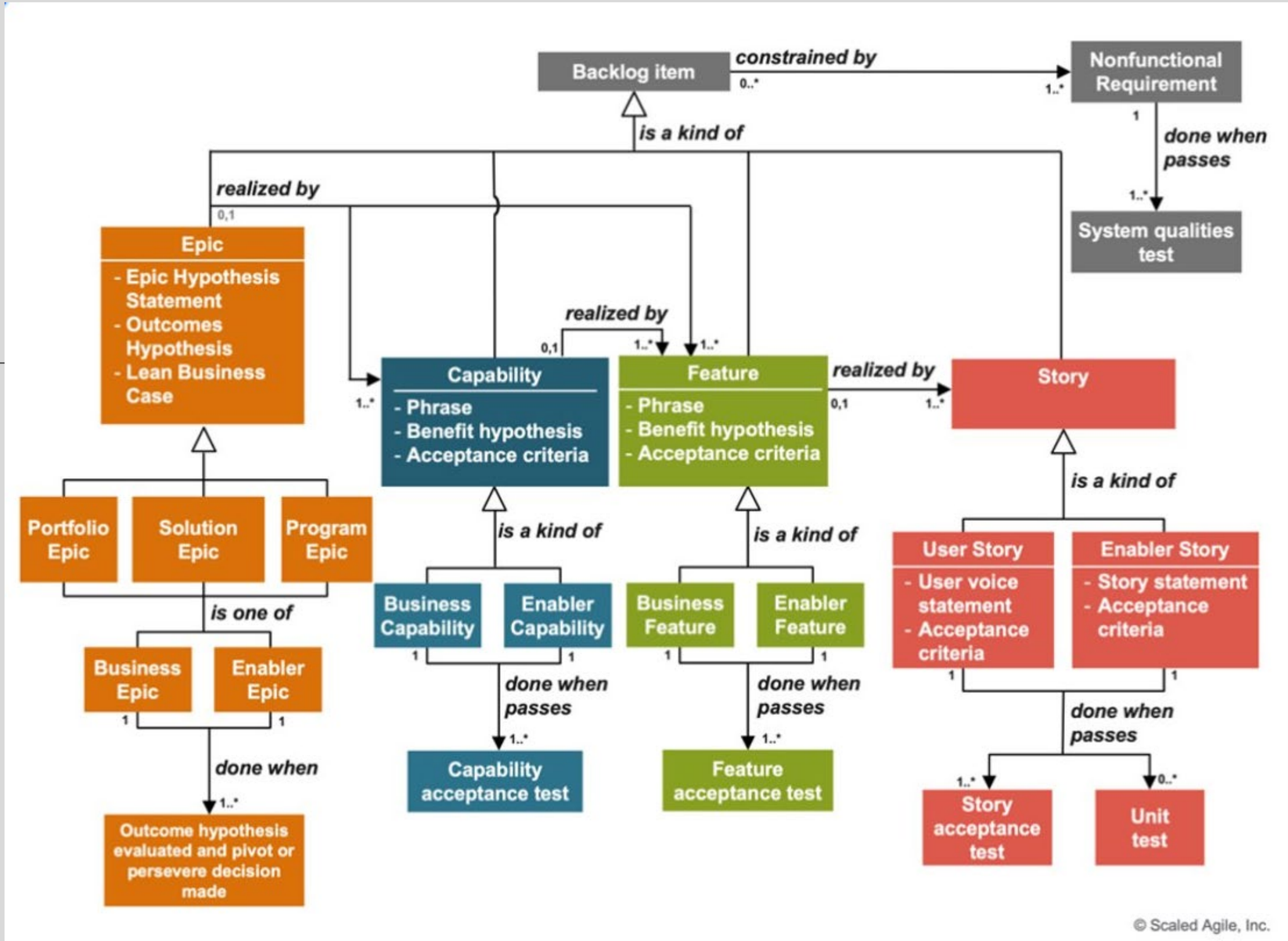
Right Size Scope

- Five-year plans fail
- Replace legacy requirements model
  - Avoid solutioning or designing too early, leaving room for new understanding
  - Benefits hypothesis
  - Focus on capability, need, acceptance criteria

Application

- Roadmap outlining 3-12 month increments of work
  - Rolling wave planning
  - Progressive definitions
- Team velocity governs work in progress
- Regularly cadenced reviews
  - Backlog refinement
  - Roadmap prioritization

Scaled Agile Framework



Upset the Setup

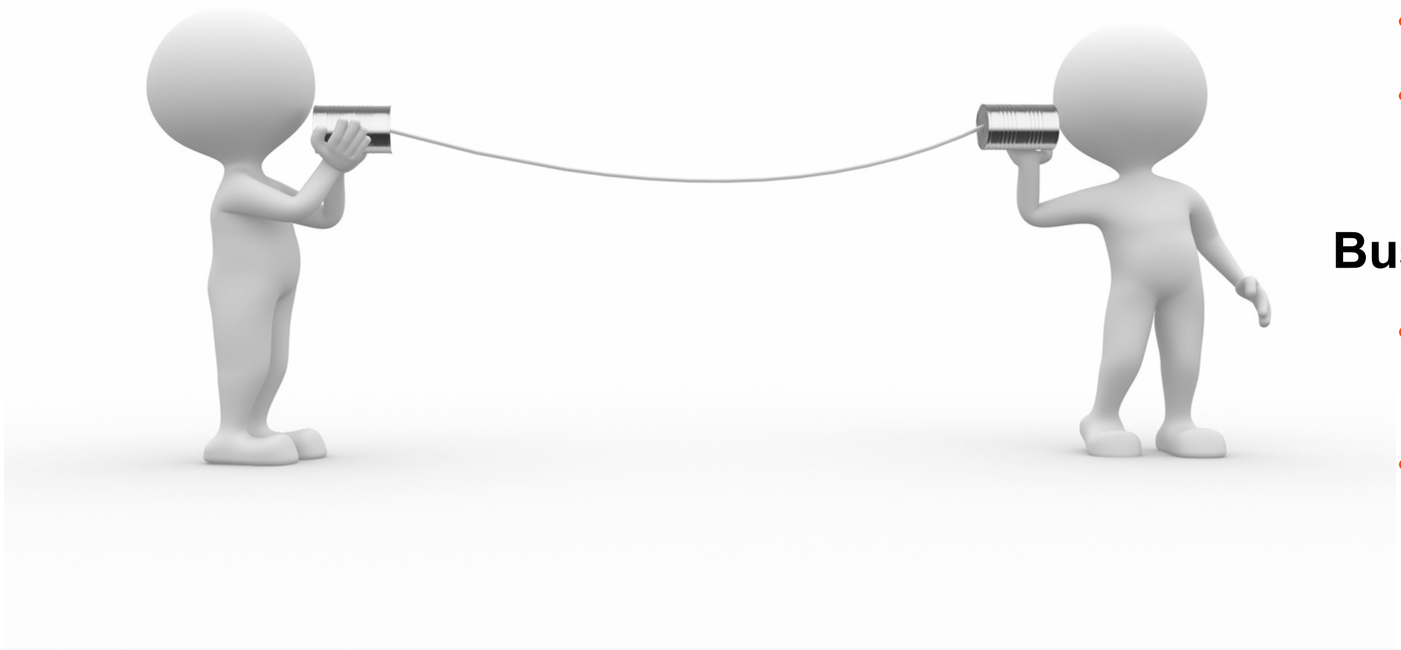
Value of Organizational Change Management

- Consistent user engagement
  - Empathy Mapping, Voice of the Customer
- Effectively drive meaningful change
  - Psychological safety and scientific means of change

Understand the Teams and Users

- What do teams need to make good products
- What do users need to know to use the products?

Engagement



Stakeholders

- Stakeholder Board represented all users in the agency
- Worked in the interest of the agency as a whole
- Enterprise thinking
- Team Building
- Prioritization

Business and Systems Architects

- Respond to Stakeholder and user engagement to determine best solution
- Intentional data

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Machine Learning

Function Point Analysis

Assessed the functionality delivered to its users, based on the user's external view of the functional requirements. Input to SEER-SEM to produce estimated durations

Attribute Model

Several machine learning models which extracted attributes (or features) and predicted the duration of an atomic piece of work

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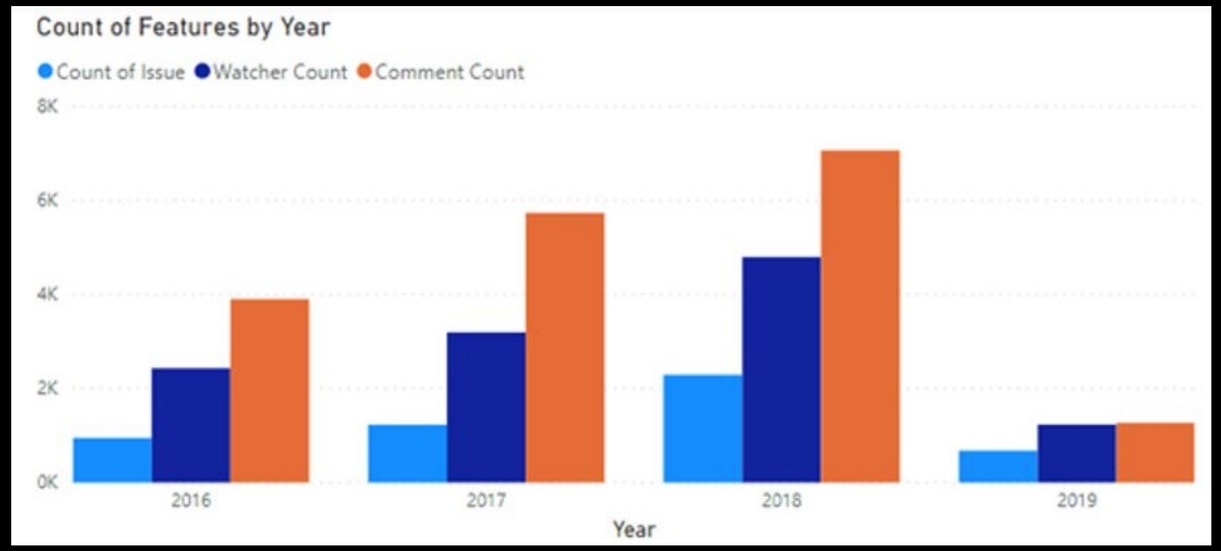
ML Processes



Issue Tracking System Export

- Features
  - Description
  - Comments
  - Personnel Assigned
  - Attachments
- Common States
  - Creation
  - Resolution

Data Processing

- Data was split into two csv and was massaged into one
- Files did not align
- Varying number of columns due to the counts of features (max number of feature instances)
- Excel workbook with macros and formulas combined the two files into one
- Additional data was calculated and derived from the original files such as character counts, word counts, and other calculations.
- Data was cleaned to include only necessary columns for the database

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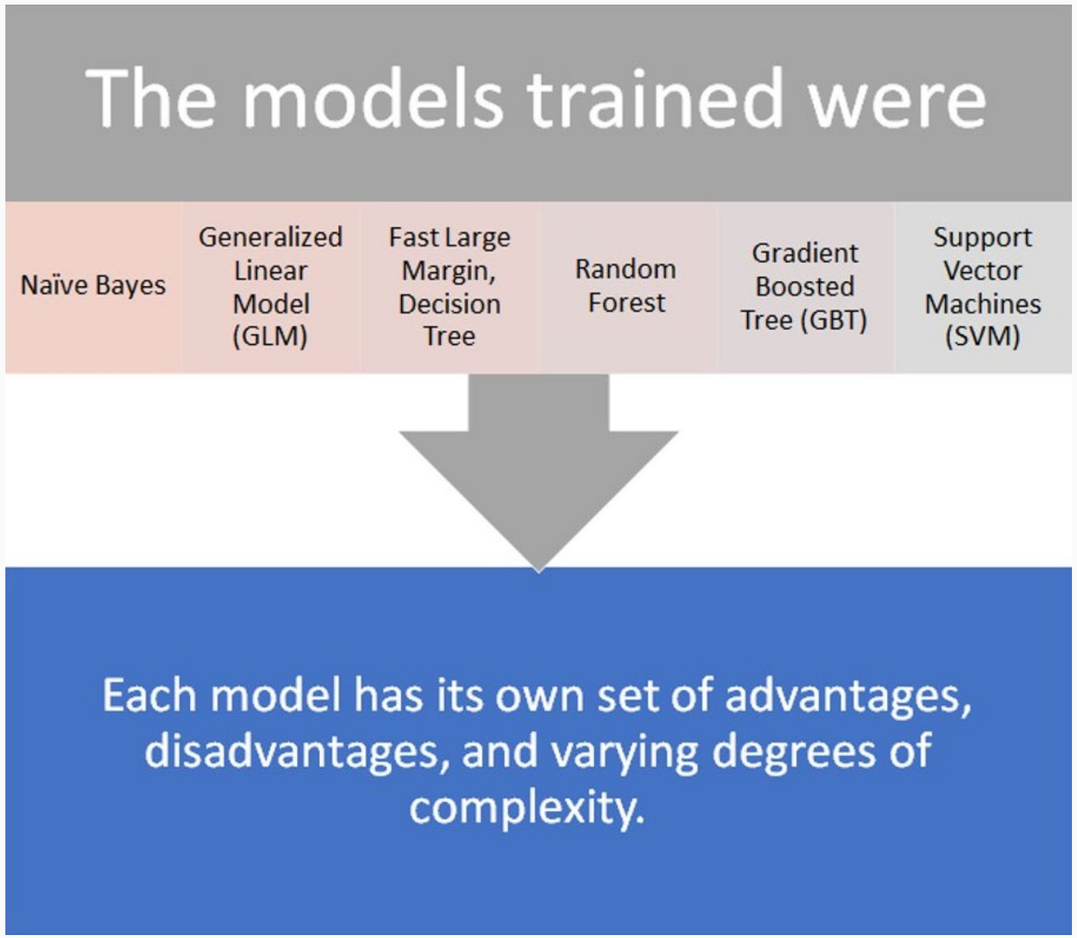
ML Results



- Results: binning group of 12 -week intervals
- Flexible planning
- Include resource constraints to limit WIP
- GBT turned out to be the most accurate trained model for all 3 data groups
- While it appears counter intuitive that greatest age makes for less accuracy in this case, the observed nature of this entire exercise is that intuition is not always helpful because deeper patterns and influences can be at play that are not read ily obvi ous

Incorporating Results

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ESTIMATION OUTPUTS

- SEER-SEM duration (FPA)
- Issue Tracking System ticket durations (AttM)
  - Team velocity stabilizing
  - Historical tickets not representative of current processes resulting in longer durations
- Combined with functional requirement outputs from SEER to form data driven schedule estimates for pieces of work (tickets)

SCHEDULING HEURISTICS

- If the AttM was reporting a unit of work duration less than or equal to SEER, then it was assumed correct
- If the AttM was reporting a unit of work duration longer than SEER and half or more of the tickets comprising that unit of work were a presumed 1 quarter, the lower duration was assumed
- If the AttM was reporting a duration longer than SEER and half or more of the tickets were 6 quarters, then the longer duration was assumed

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What We Found & Did

WORK

- Work batched into independent capabilities and Team velocities and ML outputs used to create flexible realistic schedule
- Processes established
  - Work intake
  - Backlog refinement and prioritization
- Pivot without guilt or mercy
  - Identify the Value
  - Measure the Value received
- Assumptions about old versus new tickets were correct and both the AttM and SEER could be used

SCOPE

- Business process analysis and re-engineering removed most of the software development scope
- Room for other priorities

POLICY

- Commitment to align re-engineer business processes to align with COTS tool
- No more workarounds and no more "hacking"

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Future Plans?

Continuously updating the AttM based on new data and learning a lot

Continued SAFe advancement

- Bringing more organizations into the fold
- Devoting teams to value stream mapping and Business process re-engineering

Today's Presenters

LEAH WALKER, SPC

Product Owner

Cobec Consulting, Inc.

lwalker@cobec.com

BRYAN ANDERSON

Senior Consultant

Cobec Consulting, Inc.

banderson@cobec.com

MELANIE MELANCON, SPC

Principal

Evans Consulting

mmelancon@evansconsulting.com