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International Cost Estimating
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# AGILE PRODUCT ROADMAP ESTIMATING AND PROGRESS TRACKING

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CONSULTING | ANALYTICS | DIGITAL SOLUTIONS | ENGINEERING | CYBER

# AGENDA

INTRODUCTION

CURRENT APPROACHES & CHALLENGES

A PROPOSED APPROACH
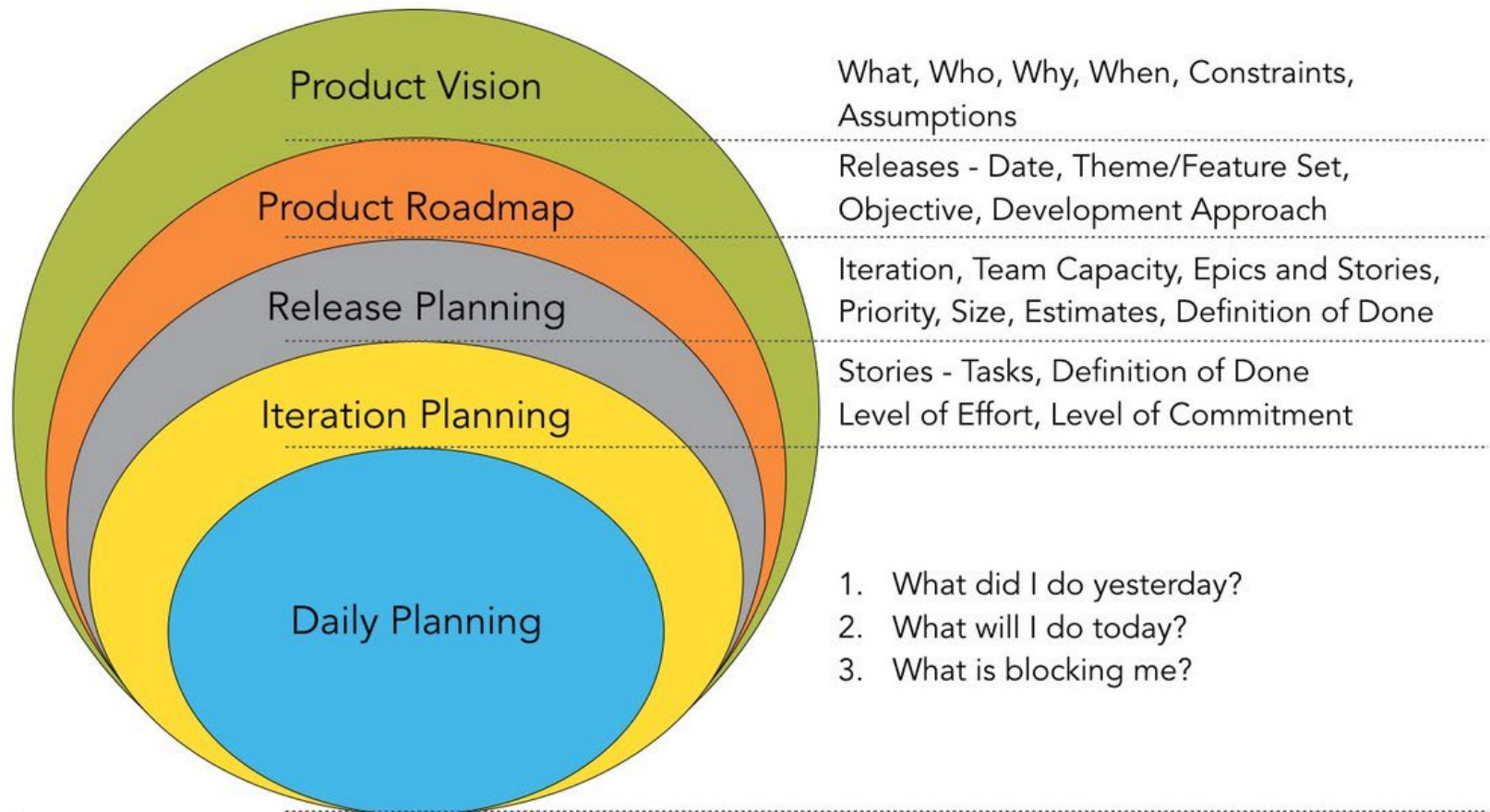
Method

Resulting Metrics

SUMMARY

# PURPOSE

- Review agile planning and product roadmap concepts for information and context

- Propose a new approach to product roadmap estimating and progress tracking for agile projects, including advantages and disadvantages

- Provide a forum for attendees to discuss experiences in product roadmap estimating for agile projects

# AGILE PLANNING

## Five Levels of Agile Planning

**Product Vision** — What, Who, Why, When, Constraints, Assumptions

**Product Roadmap** — Releases - Date, Theme/Feature Set, Objective, Development Approach

**Release Planning** — Iteration, Team Capacity, Epics and Stories, Priority, Size, Estimates, Definition of Done

**Iteration Planning** — Stories - Tasks, Definition of Done Level of Effort, Level of Commitment

**Daily Planning**
1. What did I do yesterday?
2. What will I do today?
3. What is blocking me?

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# PRODUCT ROADMAP

- High-level visual summary that maps out the vision and direction of the product over time

- Communicates the why and what behind what is being built

- Guiding strategic document as well as a plan for executing the strategy

- Typically captures high-level time-phasing of planned capability at the initiative/theme and epic level
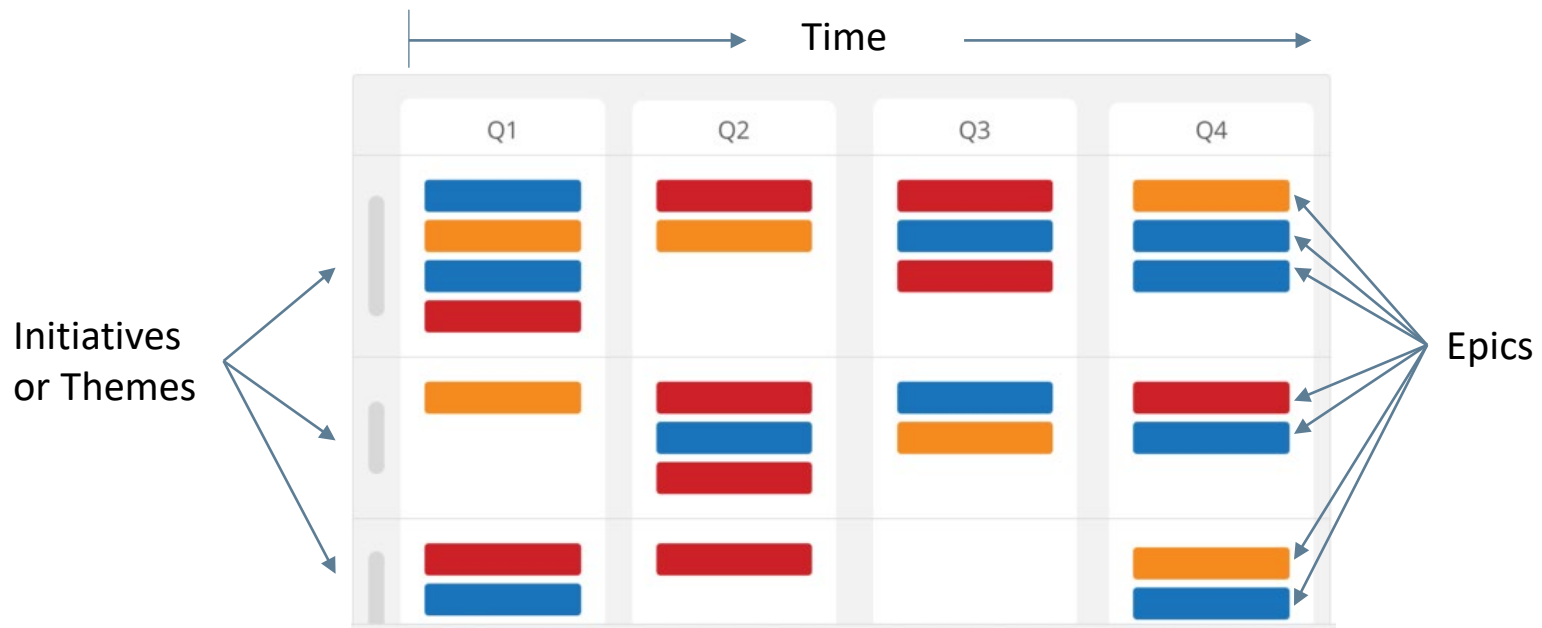
**Source:** https://www.productplan.com/what-is-a-product-roadmap/

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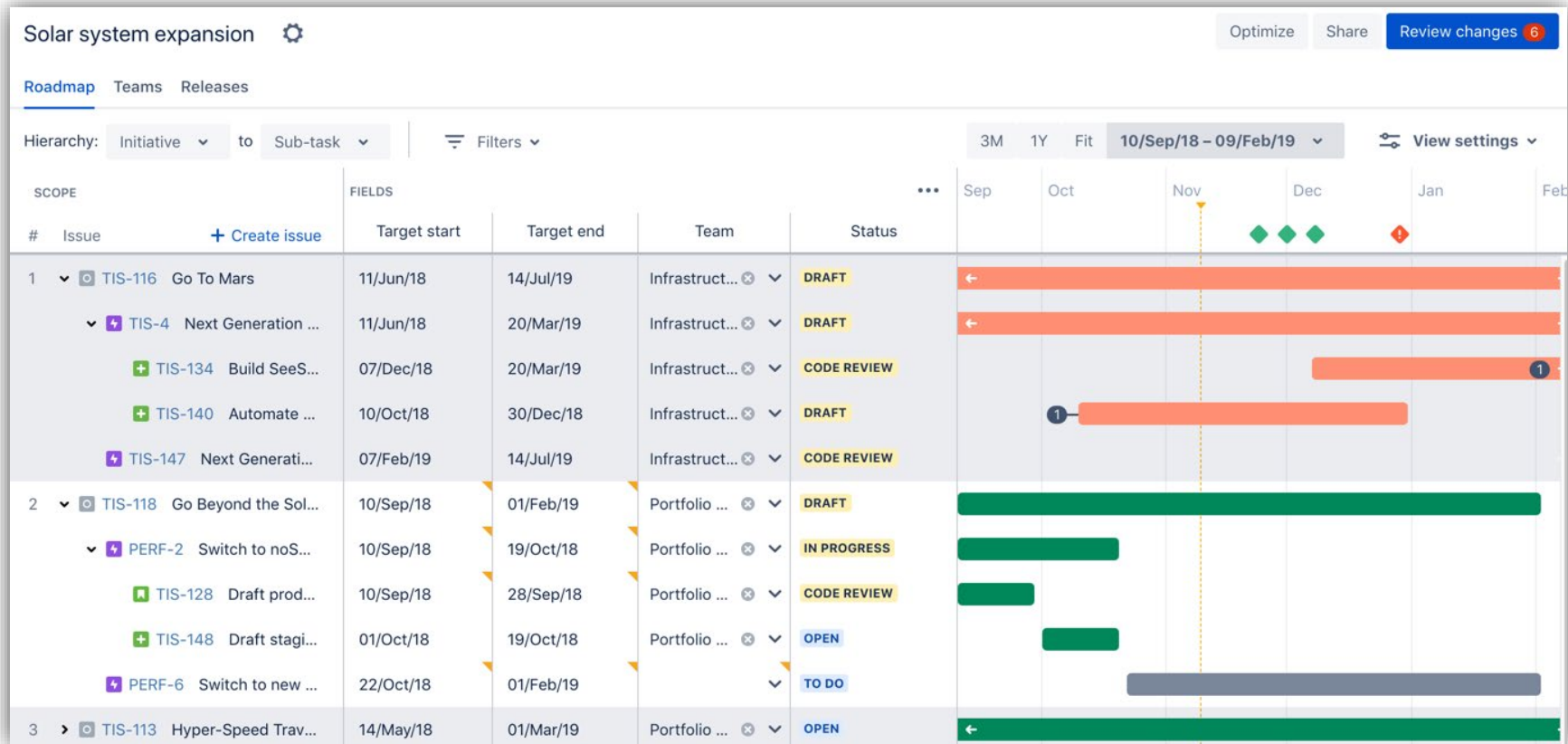
SUMMARY

# PRODUCT ROADMAP EXAMPLES: SPREADSHEET
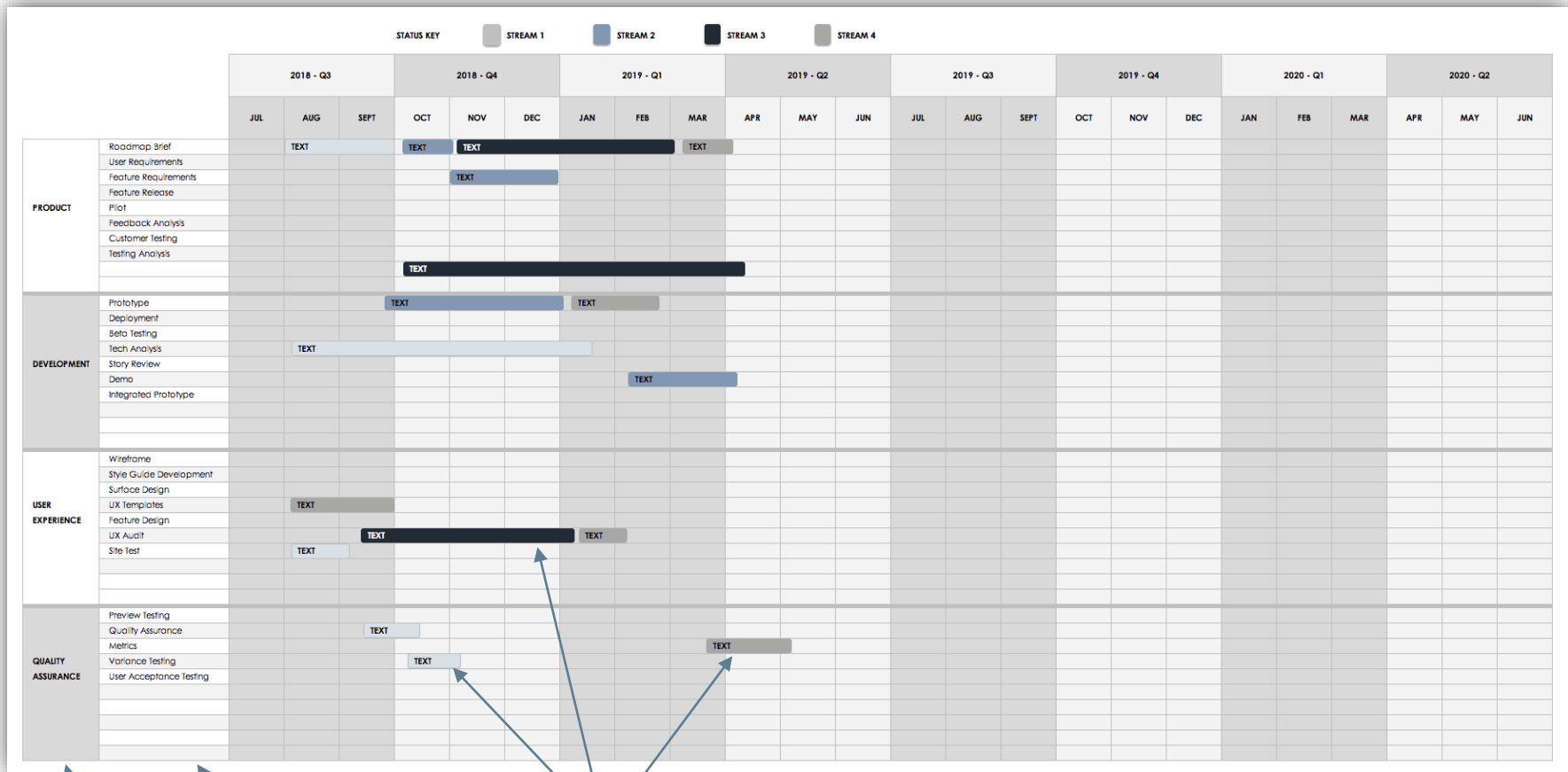


Initiatives or Themes

Epics

"Streams": Related work within epics that can be time-phased on the roadmap

# PRODUCT ROADMAP EXAMPLES:
## ADVANCED ROADMAPS FOR JIRA



- Organized by ticket hierarchy in Jira project (e.g. Initiative -> Epic -> Feature/Story)
- Integrates roadmap with tickets created on Jira boards using issue and epic linking

# CHALLENGES

- Time-consuming to initially develop and then keep up-to-date as things change through sprint cycles

- Often lack appropriate connection to sprint-level execution (depending greatly on the tool used)

- Generally lack quantitative measures to track progress against
  - If the roadmaps have size/complexity estimates, they are often difficult to keep up-to-date and informed by sprint-level work over time

***The proposed approach in this paper addresses this last challenge***

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# BACKGROUND

- Approach based on experience supporting several Navy software programs with metrics analysis

- Programs used either government-led and contracted development and integration performers

- Performers had varying approaches to planning and roadmapping
  - Most struggled with adding size/complexity estimates to their roadmap and quantitatively measuring/reporting progress over time
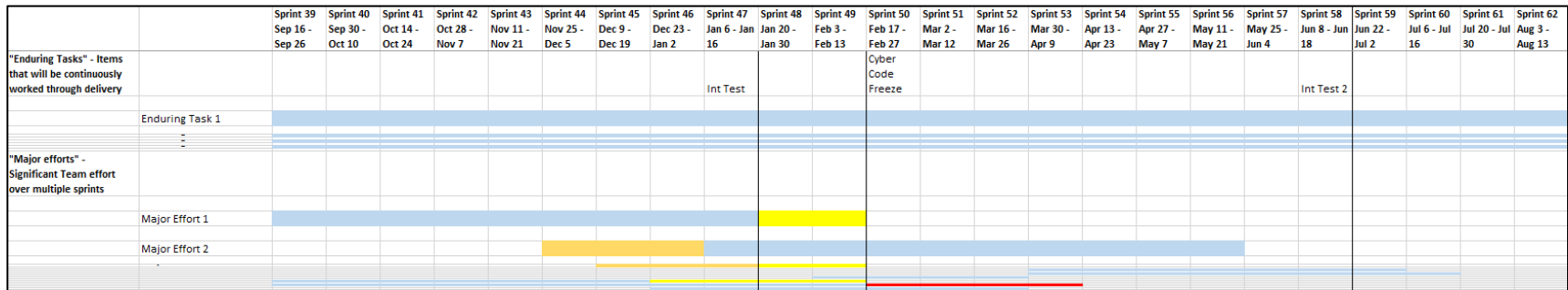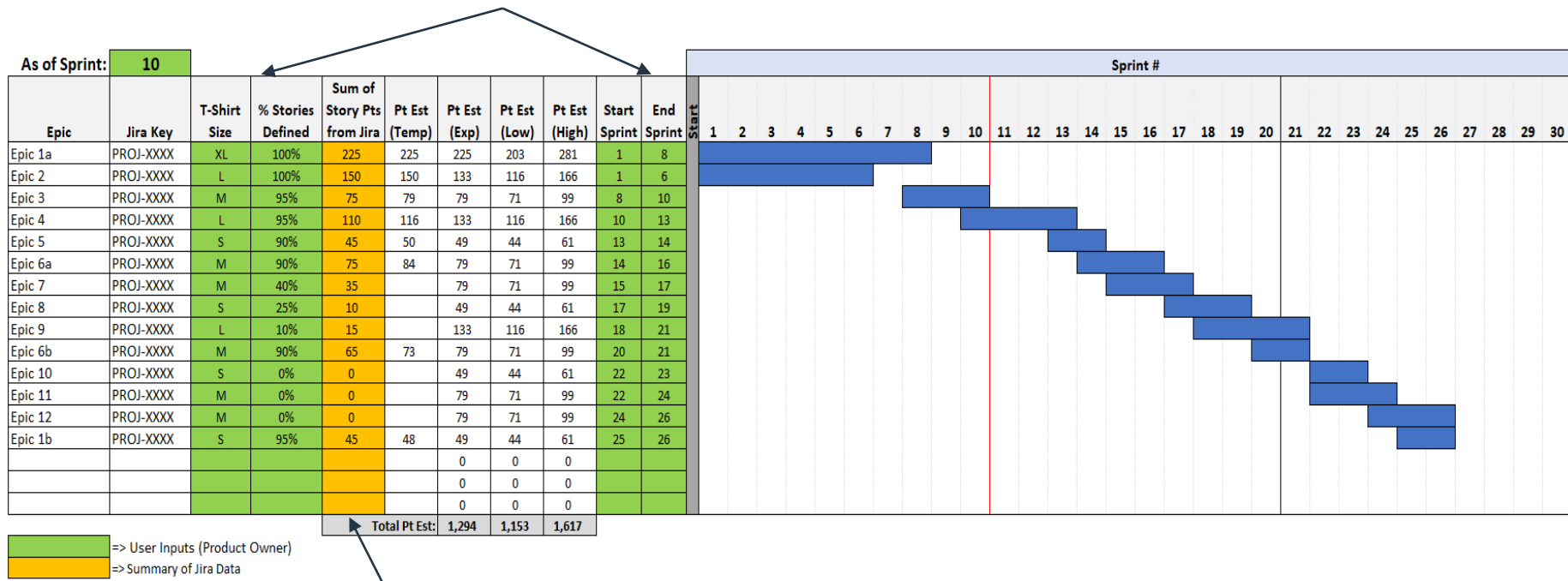


- Our proposed approach can be:
  - A recommended solution for a performer to use
  - A method for a program analyst to assess progress given existing roadmap and sprint-level artifacts

# PROPOSED APPROACH:
# PRODUCT ROADMAP WITH BUILT-IN ESTIMATING

- Prototype uses an Excel model with a light-weight, automated estimating mechanism and built-in metrics reports

PO and/or SM assign t-shirt sizes, percentages of stories defined, and start/end dates for each epic (*green cells*).

**\* The green and orange cells are main inputs for roadmap estimating model**



PO or metrics analyst inputs summary of total points for each epic from ALM tool, like Jira (*orange cells*)

**Acronyms: PO** = Product Owner; **ALM** = Application Lifecycle Management; **SM** = ScrumMaster

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# PROPOSED APPROACH: PRODUCT ROADMAP WITH BUILT-IN ESTIMATING (CONT'D)

| | |
|---|---|
| Stories Defined % Cutoff: | 50% |
| Standard Est Lower Bound (% above Exp): | 10% |
| Standard Est Upper Bound (% below Exp): | 25% |
| Proj. Velocity Lower Bound (% below Hist. Avg.): | 10% |
| Proj. Velocity Upper Bound (% above Hist. Avg.): | 10% |
| Targeted Release Sprint: | 20 |
| Initial Estimated Velocity (Pts/Sprint): | 50 |
| Roadmap End Sprint: | 26 |

In addition to the epic-level inputs, the PO/SM also provides high-level assumptions/inputs to inform estimates and uncertainty analysis

| T-Shirt | Count | Avg Tot Pt Est | Avg Tot Pt Est (from Roadmap) | Epic Size Scaling (multiple of S) | Pts per Small | From Data: Min | Max | Used for Estimates Low | High |
|---|---|---|---|---|---|---|---|---|---|
| S | 4 | 49 | 49 | 1 | 49 | 48 | 50 | 44 | 61 |
| M | 6 | 79 | 78.666667 | 3 | 26.22222 | 73 | 84 | 71 | 99 |
| L | 3 | 133 | 133 | 6 | 22.16667 | 116 | 150 | 116 | 166 |
| XL | 1 | 225 | 225 | 10 | 22.5 | 225 | 225 | 203 | 281 |

29.97222 <= Average Pts per Small

**Sprint #**

15  16  17  18  19  20  21  22  23  24  25  26  27  28  29  30

| Cum. Pts by Epic Priority (Exp) | Cum. Pts by Epic Priority (Low) | Cum. Pts by Epic Priority (High) | Epic Proj. Complete (Roadmap) | Epic Proj. Complete (Exp) | Epic Proj. Complete (Opt) | Epic Proj. Complete (Pess) |
|---|---|---|---|---|---|---|
| 225 | 203 | 281 | 1 | 1 | 1 | 1 |
| 358 | 319 | 447 | 1 | 1 | 1 | 1 |
| 437 | 390 | 546 | 1 | 1 | 1 | 1 |
| 570 | 506 | 712 | 1 | 1 | 1 | 1 |
| 619 | 550 | 773 | 1 | 1 | 1 | 1 |
| 698 | 621 | 872 | 1 | 1 | 1 | 1 |
| 777 | 692 | 971 | 1 | 1 | 1 | 0 |
| 826 | 736 | 1032 | 1 | 1 | 1 | 0 |
| 959 | 852 | 1198 | 0 | 1 | 1 | 0 |
| 1038 | 923 | 1297 | 0 | 0 | 1 | 0 |
| 1087 | 967 | 1358 | 0 | 0 | 1 | 0 |
| 1166 | 1038 | 1457 | 0 | 0 | 0 | 0 |
| 1245 | 1109 | 1556 | 0 | 0 | 0 | 0 |
| 1294 | 1153 | 1617 | 0 | 0 | 0 | 0 |
| 1294 | 1153 | 1617 | 0 | 0 | 0 | 0 |
| 1294 | 1153 | 1617 | 0 | 0 | 0 | 0 |
| 1294 | 1153 | 1617 | 0 | 0 | 0 | 0 |
| Total Proj. Epics Complete: | | | 8 | 9 | 11 | 6 |

Model uses all inputs to automatically update estimates and uncertainty scenarios at project and epic levels
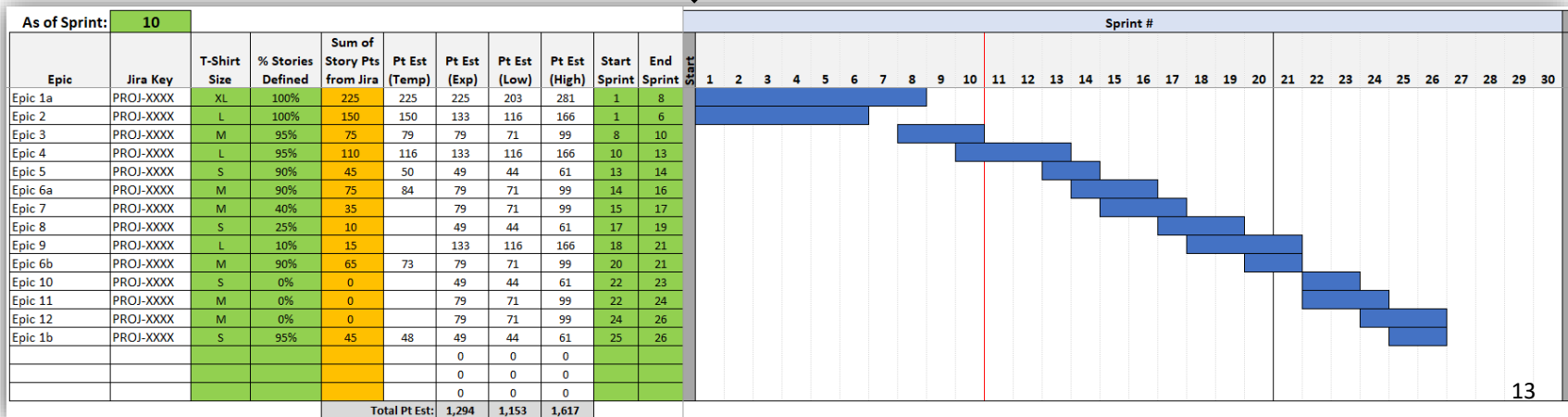
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# PRODUCT ROADMAP UPDATES OVER TIME
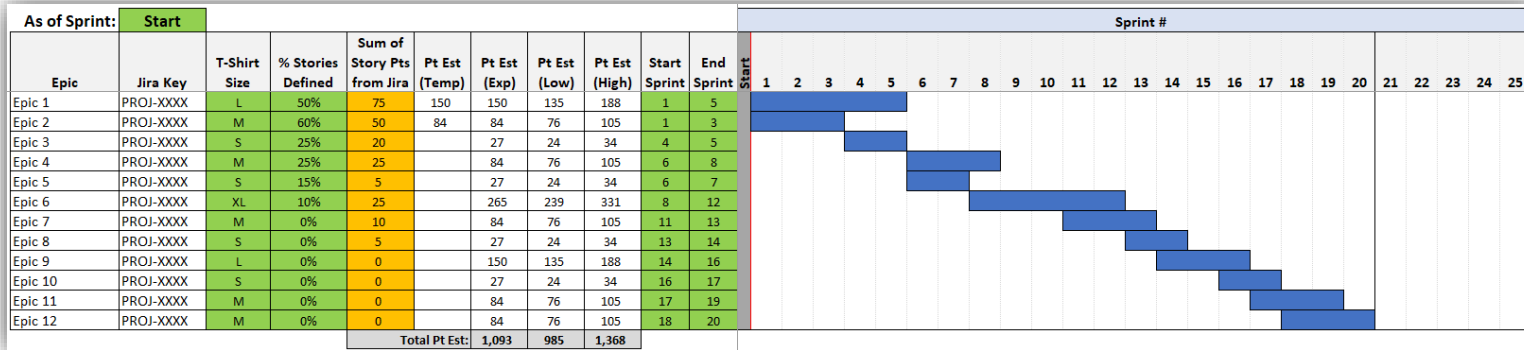


PO or SM only needs to update green and orange columns as time passes . . .
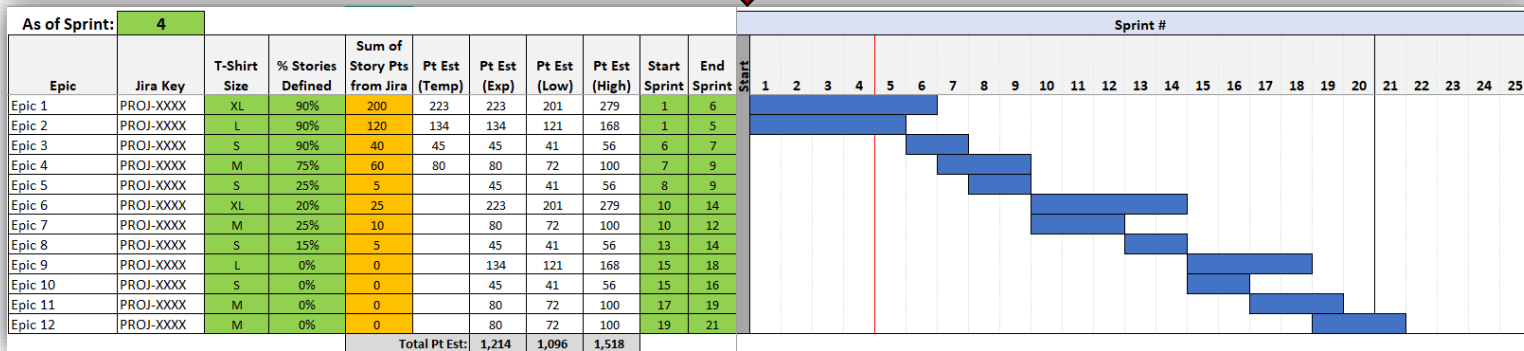
. . . the model does the rest, including updating roadmap visuals and generating progress metrics

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# AGENDA

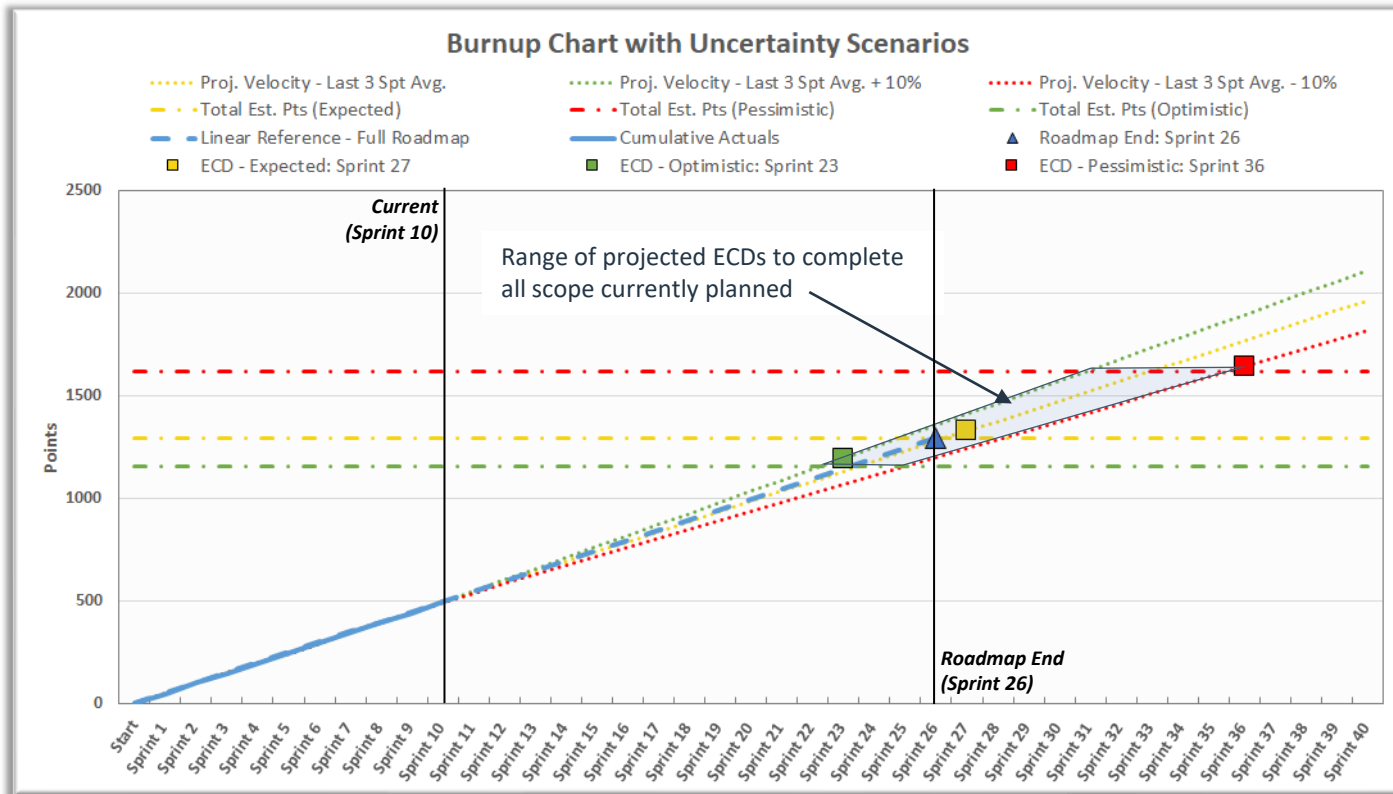INTRODUCTION

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# ROADMAP TRACKING METRICS: BURNUP CHART



Burnup Chart with Uncertainty Scenarios

| Scenario | Scope ECD (Sprint #) * | % of Points Remaining at End ** |
|---|---|---|
| Plan | ▲ 26 | 0 |
| Projection - Optimistic | ■ 23 | 0 |
| Projection - Expected | ■ 27 | ~3% |
| Projection - Pessimistic | ■ 36 | ~30% |

\* Ranges of projected ECDs derived from assumed uncertainty ranges around development team projections for velocity and total point estimates:

- Velocity Range: Sprints 1-10 Average +10% / -10%
- Total Estimate Range: Team est. +25% / -10%

\*\* More details regarding potential scope impacts in each scenario captured on next slide

**ECD** = Estimated Completion Date

# ROADMAP TRACKING METRICS: EPICS AT RISK

- Estimating approach with uncertainty analysis enables a more agile progress assessment, where scope is the primary variable, answering the question: "Which capabilities can we reasonably expect to be complete by our release date?"

| As of Sprint: | 10 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Epic | Jira Key | T-Shirt Size | % Stories Defined | Sum of Story Pts from Jira | Pt Est (Temp) | Pt Est (Exp) | Pt Est (Low) | Pt Est (High) | Start Sprint | End Sprint |
| Epic 1a | PROJ-XXXX | XL | 100% | 225 | 225 | 225 | 203 | 281 | 1 | 8 |
| Epic 2 | PROJ-XXXX | L | 100% | 150 | 150 | 133 | 116 | 166 | 1 | 6 |
| Epic 3 | PROJ-XXXX | M | 95% | 75 | 79 | 79 | 71 | 99 | 8 | 10 |
| Epic 4 | PROJ-XXXX | L | 95% | 110 | 116 | 133 | 116 | 166 | 10 | 13 |
| Epic 5 | PROJ-XXXX | S | 90% | 45 | 50 | 49 | 44 | 61 | 13 | 14 |
| Epic 6a | PROJ-XXXX | M | 90% | 75 | 84 | 79 | 71 | 99 | 14 | 16 |
| Epic 7 | PROJ-XXXX | M | 40% | 35 | | 79 | 71 | 99 | 15 | 17 |
| Epic 8 | PROJ-XXXX | S | 25% | 10 | | 49 | 44 | 61 | 17 | 19 |
| Epic 9 | PROJ-XXXX | L | 10% | 15 | | 133 | 116 | 166 | 18 | 21 |
| Epic 6b | PROJ-XXXX | M | 90% | 65 | 73 | 79 | 71 | 99 | 20 | 21 |
| Epic 10 | PROJ-XXXX | S | 0% | 0 | | 49 | 44 | 61 | 22 | 23 |
| Epic 11 | PROJ-XXXX | M | 0% | 0 | | 79 | 71 | 99 | 22 | 24 |
| Epic 12 | PROJ-XXXX | M | 0% | 0 | | 79 | 71 | 99 | 24 | 26 |
| Epic 1b | PROJ-XXXX | S | 95% | 45 | 48 | 49 | 44 | 61 | 25 | 26 |
| | | | | | | 0 | 0 | 0 | | |
| | | | | | | 0 | 0 | 0 | | |
| | | | | | | 0 | 0 | 0 | | |
| | | | | | Total Pt Est: | 1,294 | 1,153 | 1,617 | | |

| Scenario | % of Points Remaining at End |
|---|---|
| LSI Team Plan | 0 |
| Projection - Optimistic | 0 |
| Projection - Expected | ~3% |
| Projection - Pessimistic | ~30% |

Yellow box outlines an epic that would be at risk of not being complete by the project end under the "Expected" projection scenario

Red box outlines additional epics that would be at risk of not being complete by the project end under the "Pessimistic" projection scenario

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# ROADMAP TRACKING METRICS: FINANCIAL BURNUP



ECD = Estimated Completion Date

EAC = Estimate at Completion
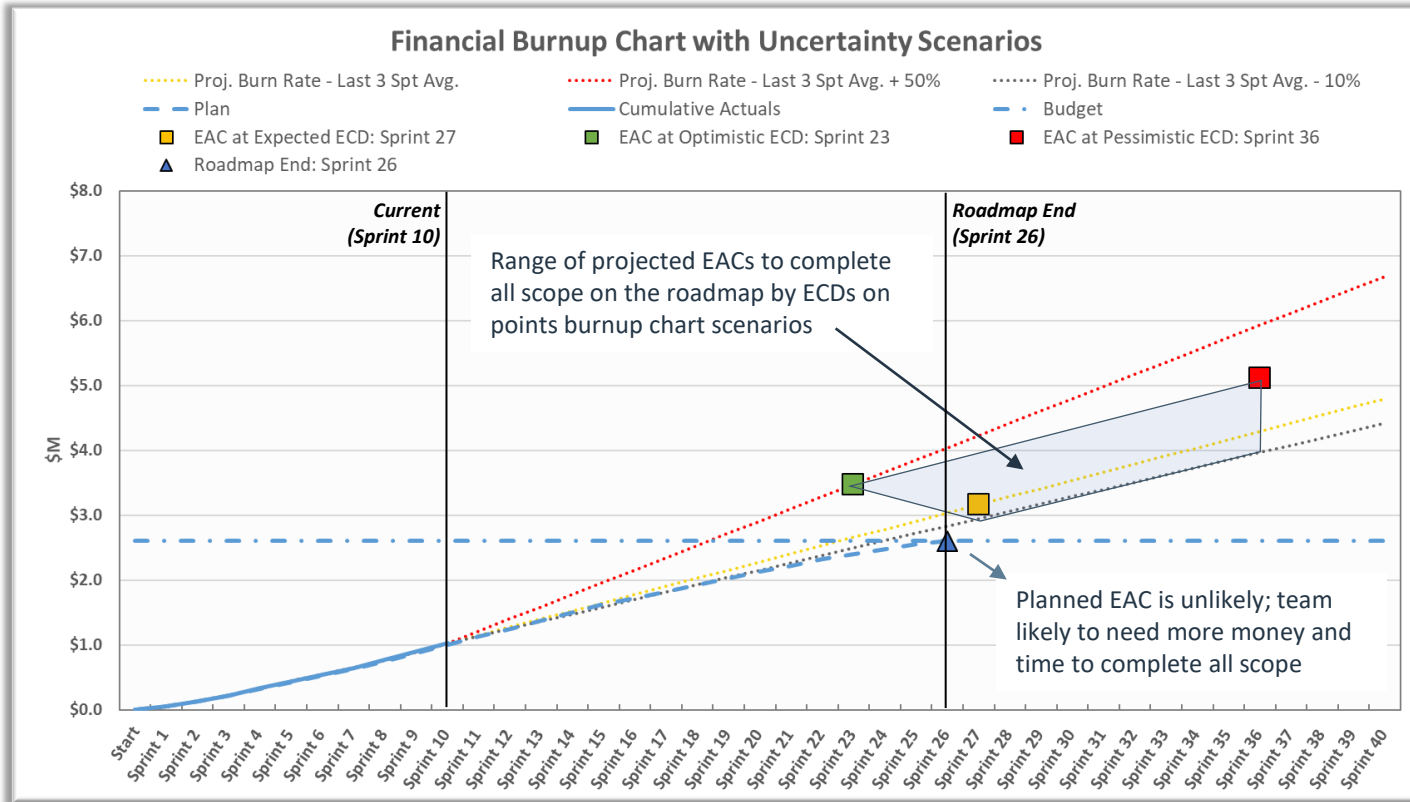
| Scenario | Scope ECD (Sprint #) | EAC |
|---|---|---|
| Plan | ▲ 26 | ▲ $2.6M |
| Optimistic ECD | 🟩 23 | 🟩 $3.5M |
| Expected ECD | 🟨 27 | 🟨 $3.2M |
| Pessimistic ECD | 🟥 36 | 🟥 $5.2M |

Assumes team increases burn rate by 50% to increase velocity by 10% and finish three sprints early

Assumes burn rate stays consistent with last 3-sprint avg.

Assumes team would increase burn rate by 25% and decrease velocity by 10% and finish 10 sprints late
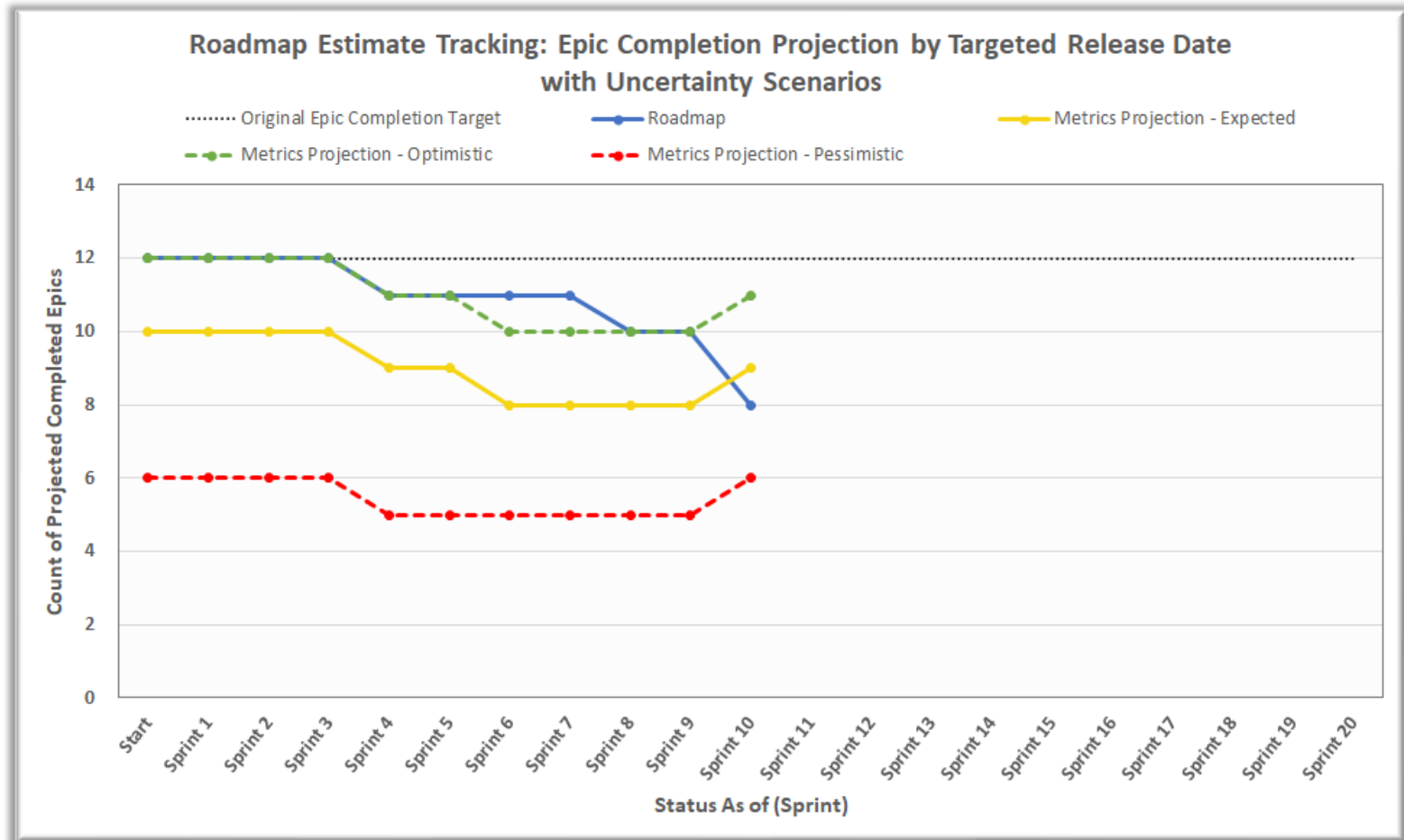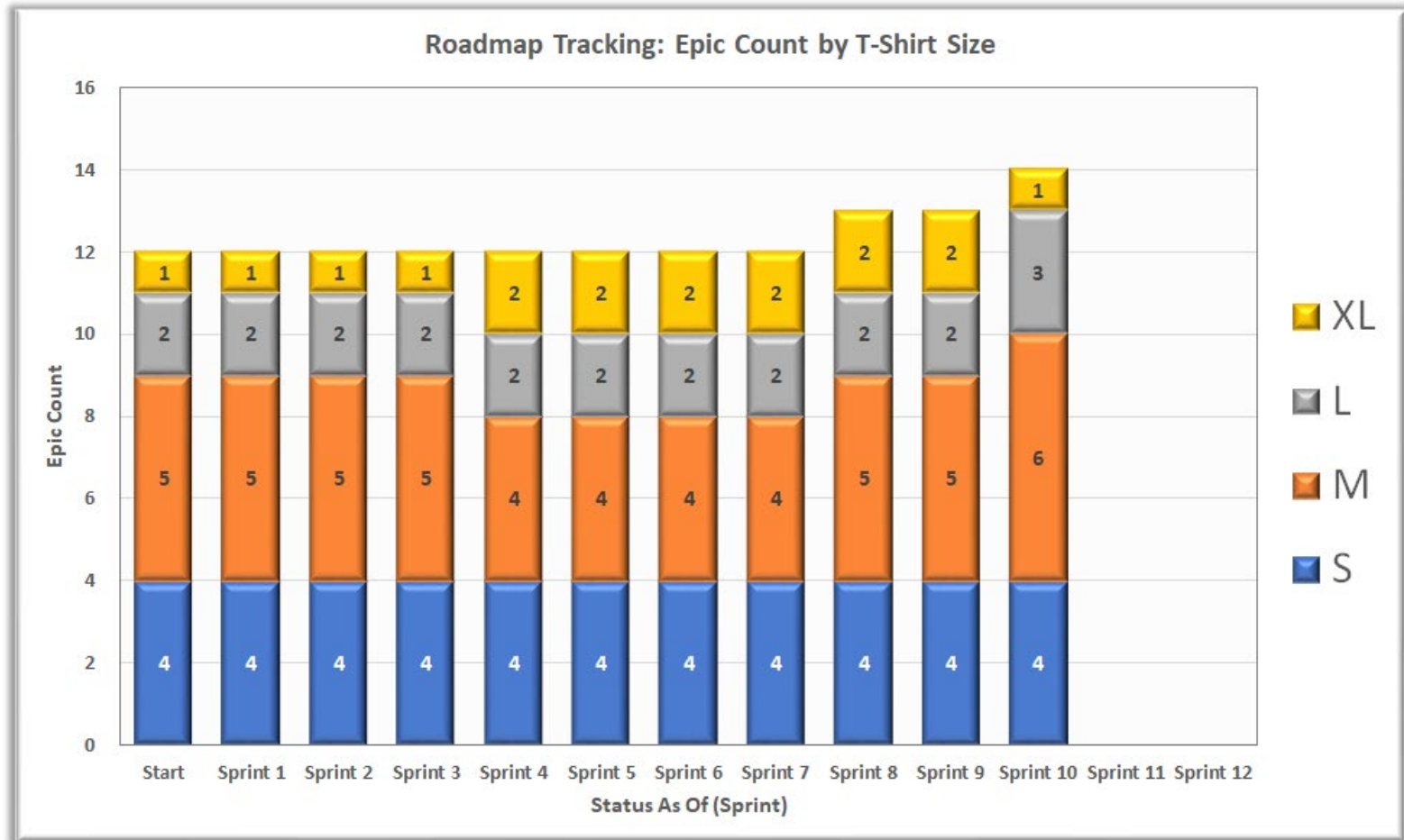
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# ROADMAP TRACKING METRICS: FULL SCOPE ECD
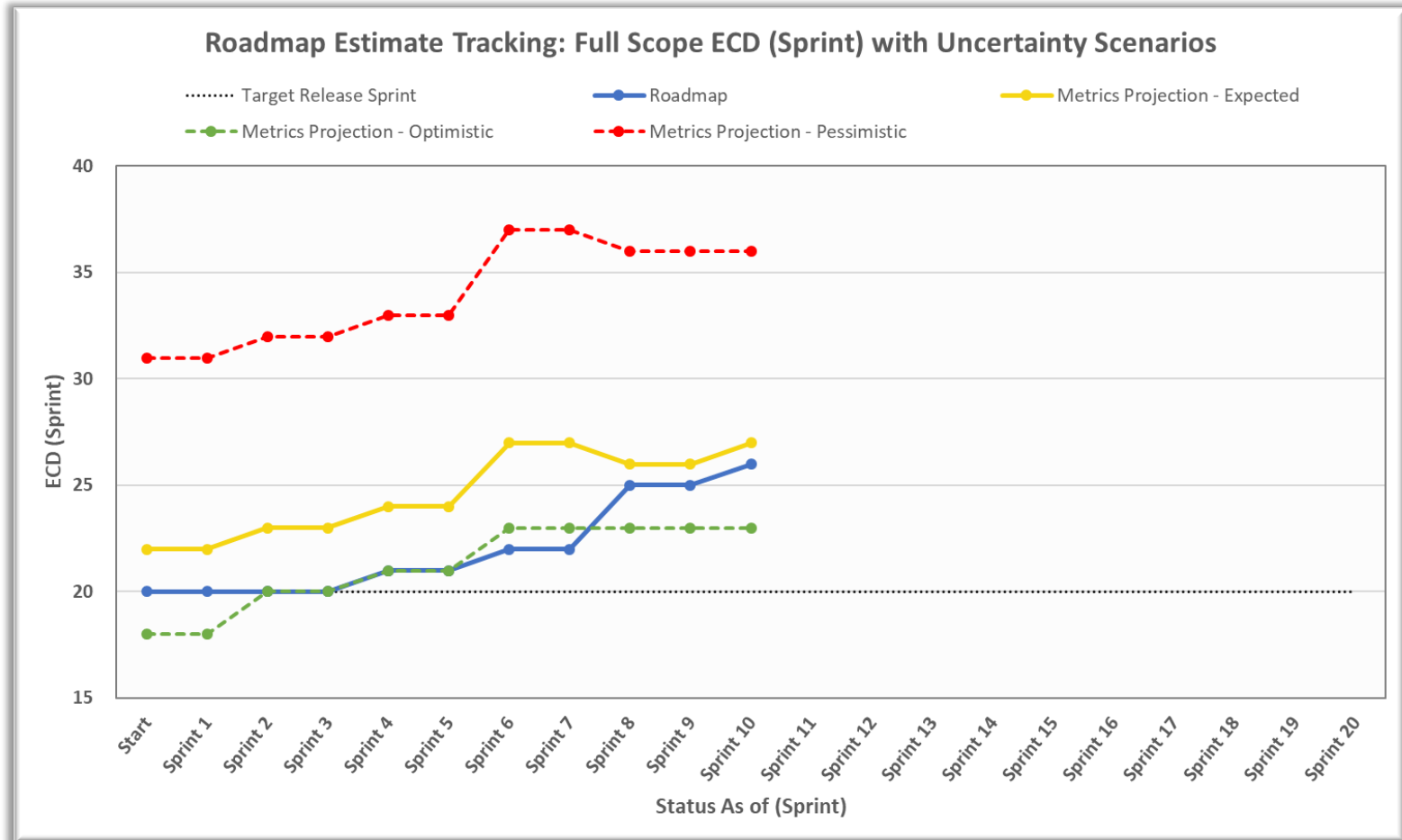
# ROADMAP TRACKING METRICS: TOTAL POINTS
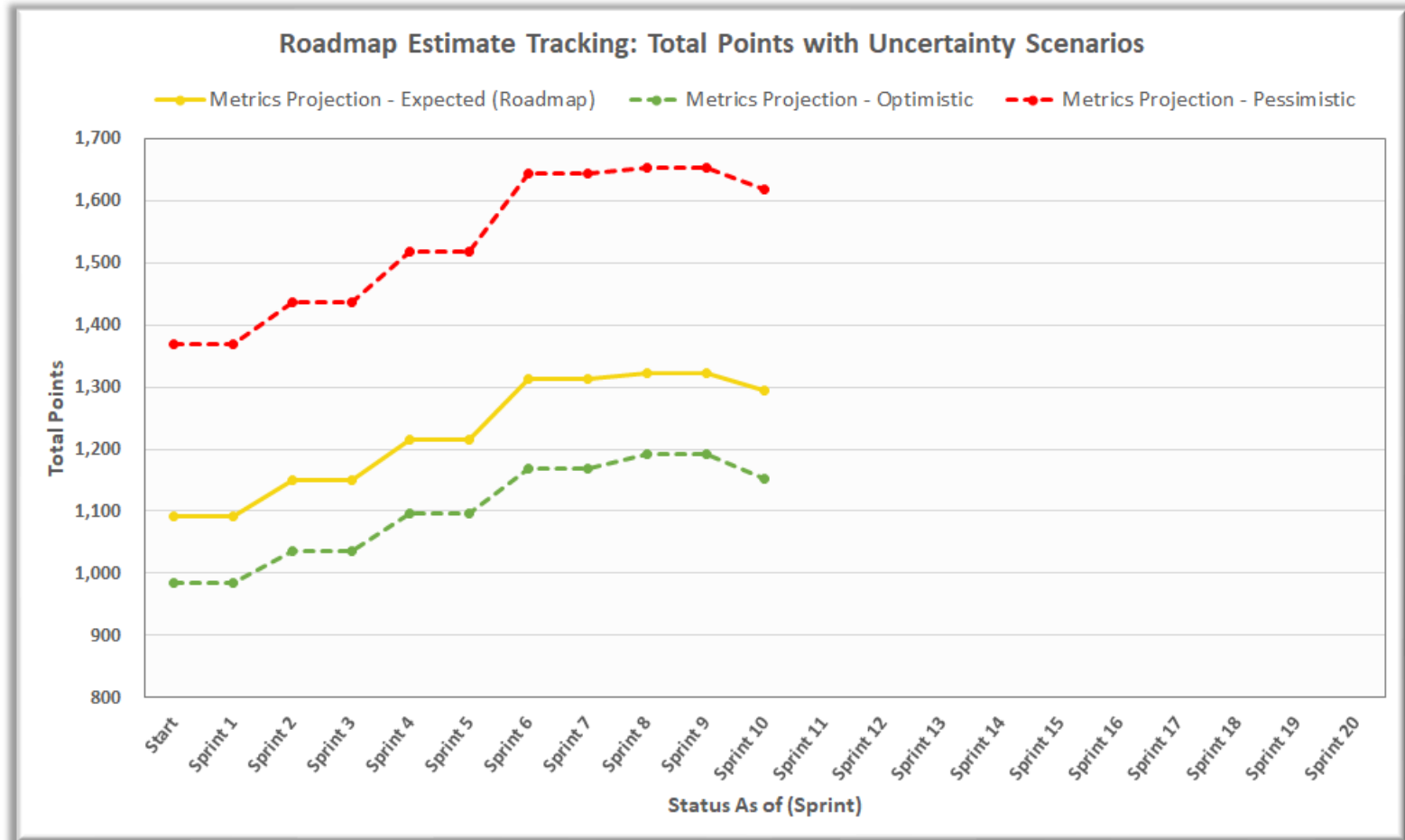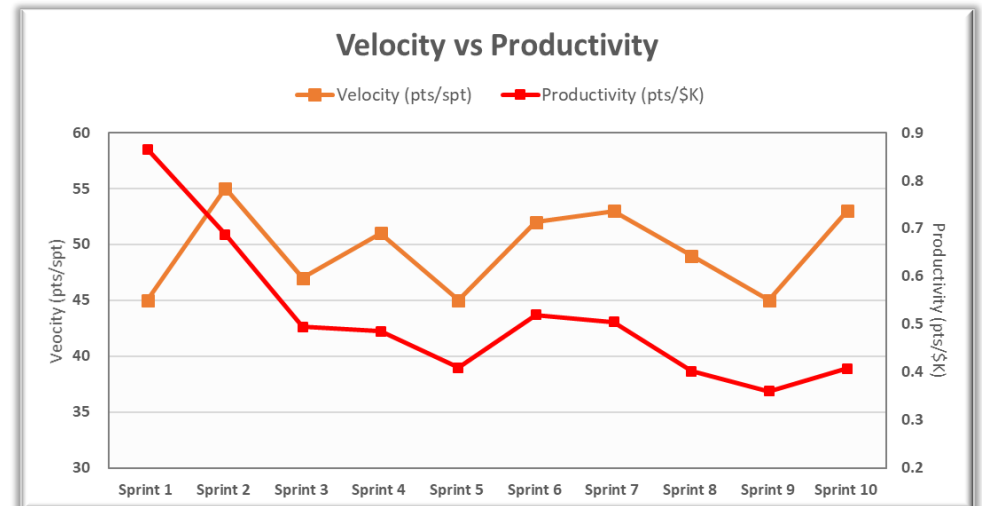
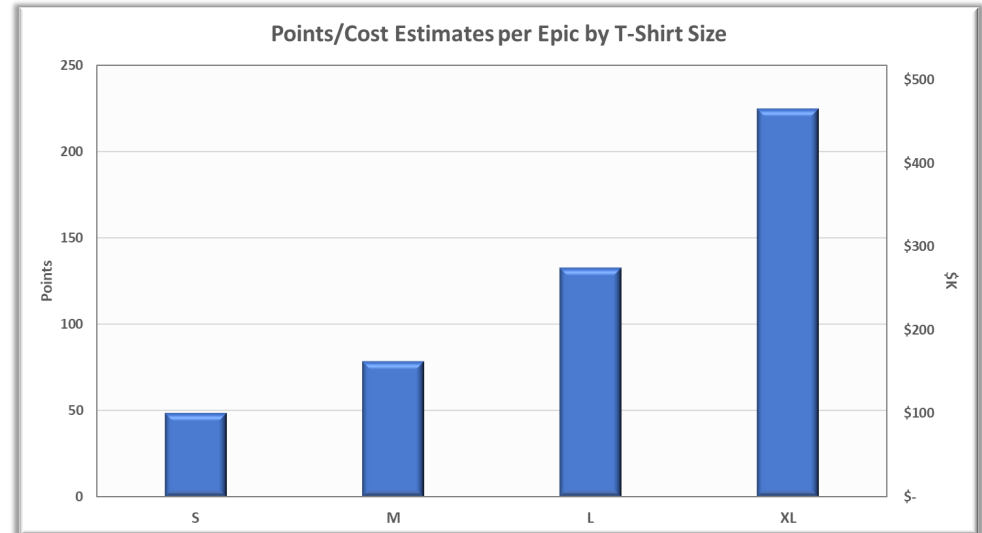# ROADMAP TRACKING METRICS: EPIC COMPLETION

# ROADMAP TRACKING METRICS: EPIC COUNT

# COST-RELATED METRICS

- Size/cost per epic by t-shirt size

- Velocity and productivity (points per $K spent)

- Cost/schedule growth
  - Total project
  - By each epic

- Trends in roadmap changes during a project (how epics/estimates change)

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# PROS & CONS OF PROPOSED APPROACH

| Pros | Cons |
|---|---|
| No specific tool required; can be done in highly available tools, like MS Excel, Python, R, and Tableau | Not integrated with specific Roadmap and/or ALM tools (e.g. Jira/Portfolio); requires analysis outside of those tools |
| Built-in metrics visualizations that automatically update when model inputs are updated | Model requires:<br>• Manual data input<br>• Related training for a Product Owner or ScrumMaster<br>• (Or) an additional metrics analyst resource |
| Yields impactful metrics that project outcomes for cost, schedule, and scope, including uncertainty ranges | May still focus too much on waterfall-style metrics, like ECD and EAC |

# SUMMARY

- Most agile roadmaps do not inherently include information that enables quantitative analysis on project progress

- Our proposed roadmap estimating approach provides a mechanism to quantitively assess the status/progress of the project on a regular basis

- More work is needed to pilot it on actual programs and refine over time

  - Automation opportunities exist and will be explored

# THANK YOU

For more information, contact . . .

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