



# **PMP® EXAM PREP**

## PMI Authorized Training Partner

# **BOOTCAMP**

## **Session 3**

**Attendance Alert**

**Percipio Users:** Name is based  
on your information in  
**Percipio**

**Using Zoom:** Enter your first  
and last name

- **PMP® Exam Prep**
- This course will assist learners in preparing for PMI's PMP Exam (2021 Update)

# Scheduled Breaks



<b>Part 1</b>	<b>Periodic breaks</b>
<b>1 –hour break</b>	<b>At the 3.5 Hour Mark</b>
<b>Part 2</b>	<b>Periodic breaks</b>

**For attendance purposes, please stay logged in during all breaks.**



# House Keeping

- If you haven't attended the first or second session, please do the following.
- Please use the Q&A **only** to get help with technical issues, to locate your resources or recordings for the sessions, to ask about attendance requirements and how to get the PMP Learner Kit, to ask questions about the content, or for any other questions. As the session comes to an end the survey link can be provided in the Q&A.
- Use the chat before the session starts for salutations. Once the session begins the chat may be closed throughout the session to minimize disruptions and to provide important information. The chat will be opened periodically to respond to the instructor's questions. As the session comes to an end the survey link can be provided in the chat. The chat may be opened to allow for goodbyes.

# IS LIVE ATTENDANCE REQUIRED?

- **YES**, if you are taking this training to register for the PMP exam, live attendance is required.
- However, this is the exception rule for the 5 Day Bootcamp – **You are allowed to miss one session if you make up the session by watching the replay.**
- **A missed session means** you are logged out of a session for **more than 15mins**.
- If you miss more than 15 mins at any time during any additional sessions (including during breaks) beyond the one session allowed, you will need to make it/them up by attending the live session(s) in a different 5-day cohort\*.

\*Please see the Bootcamp calendar  
<http://calendar.skillsoft.com/>  
for information about upcoming sessions.



# IN CASE OF ABSENCE

You can access a replay online for a previous session by following these steps 24 to 48 hours after the session ends.

Step 1. Go to: <https://github.com/Skillsoft-Content/PMPReplay>

Step 2. Click on the PMP Replay Zoom Links file for the year you attended the Bootcamp. And then click the Download option.

Step 3. When the file opens, and you are prompted enter the following password. Those are zero's not the letter O. The password is case sensitive.

pmpB00tcampReplay!

Step 4. Locate the worksheet that corresponds with the Cohort you attended and use the provided link and passcode on the worksheet to access the Replay through your browser.

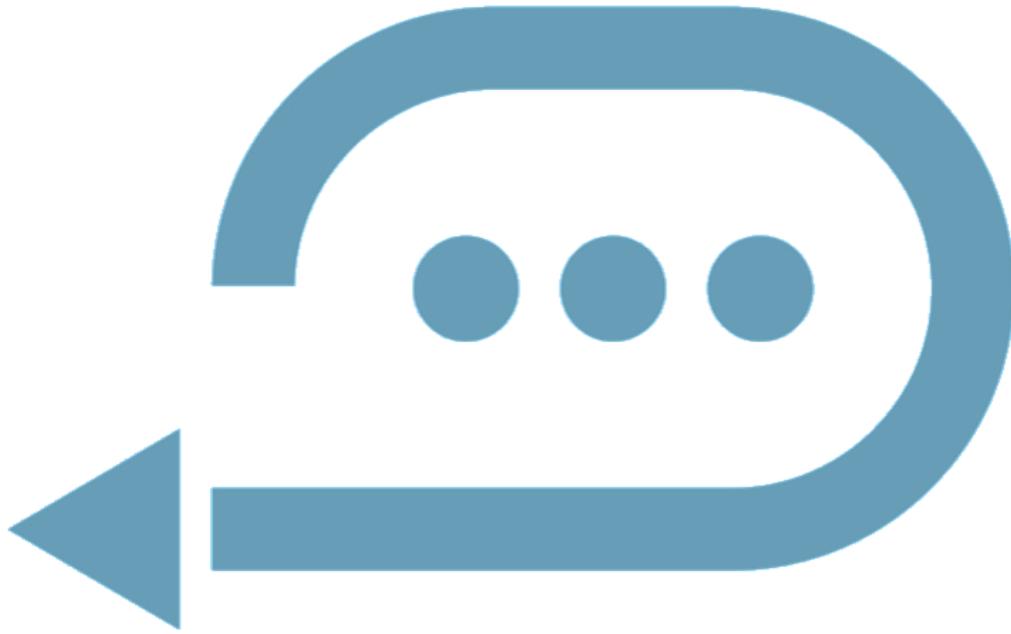
Note: The password to open the Excel file is NOT the passcode to access the replay.

**\*Replays will be available for 1 year. They are not available for download.**

## NO LIMIT FOR REPLAYS:

For the Bootcamp you are attending, there is no limit on accessing the replays for study purposes.

## Recap Session 2



# Mapping this course to the Student Workbook

Business Environment Lesson 1	Start the Project Lesson 2	Plan the Project Lesson 3	Lead the Project Team Lesson 4	Support Project Team Performance Lesson 5	Close the Project/Phase Lesson 6
Topic A	(1A) Foundation	(2A) Identify and Engage Stakeholders	(3A) Planning Projects	(4A) Craft Your Leadership Skills	(5A) Implement Ongoing Improvements
Topic B	(1B) Strategic Alignment	(2B) Form the Team	(3B) Scope	(4B) Create a Collaborative Project Team Environment	(5B) Support Performance
Topic C	(1C) Project Benefits and Value	(2C) Build Shared Understanding	(3C) Schedule	(4C) Empower the Team	(5C) Evaluate Project Progress
Topic D	(1D) Organizational Culture and Change Management	(2D) Project Approach	(3D) Resources	(4D) Support Team Member Performance	(5D) Manage Project Issues and Impediments
Topic E	(1E) Project Governance		(3E) Budget	(4E) Communicate and Collaborate with Stakeholders	(5E) Manage Project Changes
Topic F	(1F) Project Compliance		(3F) Risks	(4F) Training, Coaching and Mentoring	
Topic G			(3G) Quality	(4G) Manage Conflict	
Topic H			(3H) Integrate Plans		

LESSON 3

# PLAN THE PROJECT

- Planning Projects
- Scope
- Schedule
- Resources
- Budget
- Risks
- Quality
- Integrate Plans



# Learning Objectives

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- Explain the importance of a project management plan.
- **Provide an overview of scope planning in both predictive and adaptive projects.**
- **Provide an overview of schedule planning in both predictive and adaptive projects.**
- **Discuss resource planning for a project, including human and physical resources and the role of procurement.**
- **Determine the budgeting structure/method for a project**
- **Explain the importance of tailoring a budget.**
- Identify strategies for dealing with risks and risk planning.
- Assemble a toolkit of possible responses to risks.
- Define quality and how it relates to the outcomes and deliveries for a project.
- Discuss the importance of integrating project management plans and tailoring a change management process.

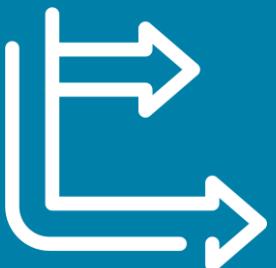


# Scope

## TOPIC B

# Requirements Management Plan

## Plan, Track and Report on Requirements Activities

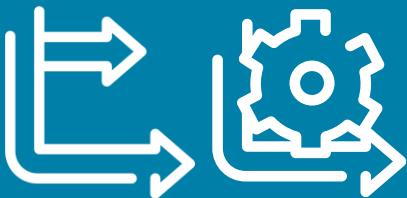


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- Configuration management activities:
    - Version control rules
    - Impact analysis - tracing, tracking and reporting
  - Required authorization levels for change approval
  - Prioritization criteria/process
  - Product metrics and accompanying rationale
  - Traceability structure, including requirement attributes

# Types of Requirements

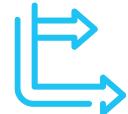
Type	Describes the...
<b>Project</b>	Actions, processes and conditions the project must meet
<b>Product</b>	Features and characteristics of the product, service or result that will meet the business and stakeholder requirements <ul style="list-style-type: none"><li>• Functional – Product features</li><li>• Nonfunctional - Supplemental environmental conditions/qualities that make the product effective</li></ul>
<b>Quality</b>	Conditions or criteria needed to validate the successful completion of a project deliverable or fulfilment of other project requirements
<b>Business</b>	Higher-level organizational needs, reasons for the project
<b>Stakeholder</b>	Stakeholder (or stakeholder group) needs —aka “Reporting requirements”
<b>Transition/ Readiness</b>	Temporary capabilities needed to transition successfully to the desired future state

# Collect Requirements Process



- Expert Judgment
- Interpersonal/Team Skills
  - Nominal group technique
  - Observation
  - Facilitation
- Data Gathering
  - Brainstorming
  - Interviews
  - Focus groups
  - Questionnaires and surveys
  - Benchmarking
- Data Analysis
  - Document analysis
  - Alternatives analysis
  - Product analysis (if deliverable is a product)
- Decision-Making Techniques
  - Voting
  - Multi-criteria decision analysis
- Data Representation
  - Mind mapping
  - Affinity diagram
  - Context or use case diagram
- Prototyping — e.g., storyboarding

# Scope Planning: How to Collect Requirements



	Interviews	Questionnaires/Surveys	Observations	Focus Groups	Facilitated Workshops
Characteristics	<ul style="list-style-type: none"><li>Identify/define features and functions of deliverables</li><li>Can be structured, unstructured or asynchronous</li></ul>	<ul style="list-style-type: none"><li>Written format</li><li>Captures information from large groups</li><li>Yields quantitative data</li></ul>	<ul style="list-style-type: none"><li>Physical technique used learn about a specific job role, task or function</li></ul>	<ul style="list-style-type: none"><li>Casual/interactive information-sharing</li><li>Moderator-guided</li><li>Includes stakeholders and SMEs</li><li>Yields qualitative data</li></ul>	<ul style="list-style-type: none"><li>Sessions organized by project managers to determine requirements and enable stakeholder agreement on project outcomes</li></ul>
Advantages	<ul style="list-style-type: none"><li>Handles sensitive/confidential information</li><li>Helps identify stakeholder requirements, goals or expectations</li></ul>	<ul style="list-style-type: none"><li>Quick turnaround</li><li>Effective with varied and geographically dispersed respondents</li><li>Yields quantifiable data for statistical analysis</li></ul>	<ul style="list-style-type: none"><li>Team can understand where changes might be beneficial</li></ul>	<ul style="list-style-type: none"><li>Pre-selected participants for varied opinions</li><li>Small group for focused approach and gathering specific information</li></ul>	<ul style="list-style-type: none"><li>Team can capture requirements</li><li>Stakeholders can understand the concerns and requirements of others</li></ul>
Considerations (potential drawbacks)	<ul style="list-style-type: none"><li>Captures only a single point of view</li></ul>	<ul style="list-style-type: none"><li>Time consuming</li><li>Answer/ data quality depends on question quality</li></ul>		<ul style="list-style-type: none"><li>Must prequalify stakeholders</li><li>SMEs and facilitation are essential</li></ul>	<ul style="list-style-type: none"><li>Facilitation is essential</li></ul>

# Data Gathering



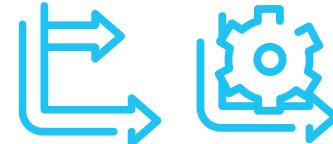
Use **Benchmarks** to generate product requirements

- Requires best practices to make comparisons
- Evaluates and compares an organization's or project's practices with others
- Identifies best practices in order to meet or exceed them



- *Can you remember the other methods for data gathering?*
- *Why do you think benchmarking is effective in gathering data for scope planning?*
- *Why would you choose it instead of the other methods?*

# Scope Planning – Requirements Prioritization

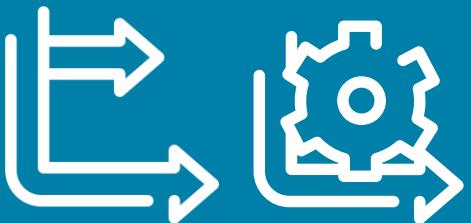


Tool or Technique	Description	Benefits
<b>MoSCoW Analysis</b> <i>(developed by Dai Clegg)</i>	<p>Used to reach a common understanding with stakeholders on the importance of each requirement. They indicate:</p> <ul style="list-style-type: none"> <li>• M - Must have</li> <li>• S - Should have</li> <li>• C - Could have</li> <li>• W - Won't have (for now)</li> </ul>	<ul style="list-style-type: none"> <li>• Compares several points of view</li> <li>• Used with timeboxing to focus on the most important requirements</li> <li>• Common in agile software development, Scrum, RAD and DSDM</li> </ul>
<b>Kano Model</b> <i>(Product management technique)</i> <i>(developed by Noriaki Kano)</i>	<p>Understand and classify all potential customer requirements or features into four categories of need:</p> <ul style="list-style-type: none"> <li>• Delighters/exciters</li> <li>• Satisfiers</li> <li>• Dissatisfiers</li> <li>• Indifferent</li> </ul>	<ul style="list-style-type: none"> <li>• Development efforts can then be prioritized by the things that most influence customer satisfaction and loyalty.</li> </ul>
<b>Paired Comparison Analysis</b> <i>(developed by LL Thurston)</i>	<p>Rate and rank alternatives by comparing one against the other</p>	<ul style="list-style-type: none"> <li>• Good for small range of subjective requirements</li> </ul>
<b>100 Points Method</b> <i>(aka fixed sum or fixed allocation method)</i> <i>(developed by Dean Leffingwell and Don Widrig)</i>	<p>Vote for importance of requirements in a list; stakeholders distribute 100 points in any way they wish (Like “Monopoly money” method)</p>	<ul style="list-style-type: none"> <li>• Good for any size group, even large ones</li> <li>• Gives priority to stakeholder decision-making because they must exercise depth of thought</li> </ul>

# Represent Data



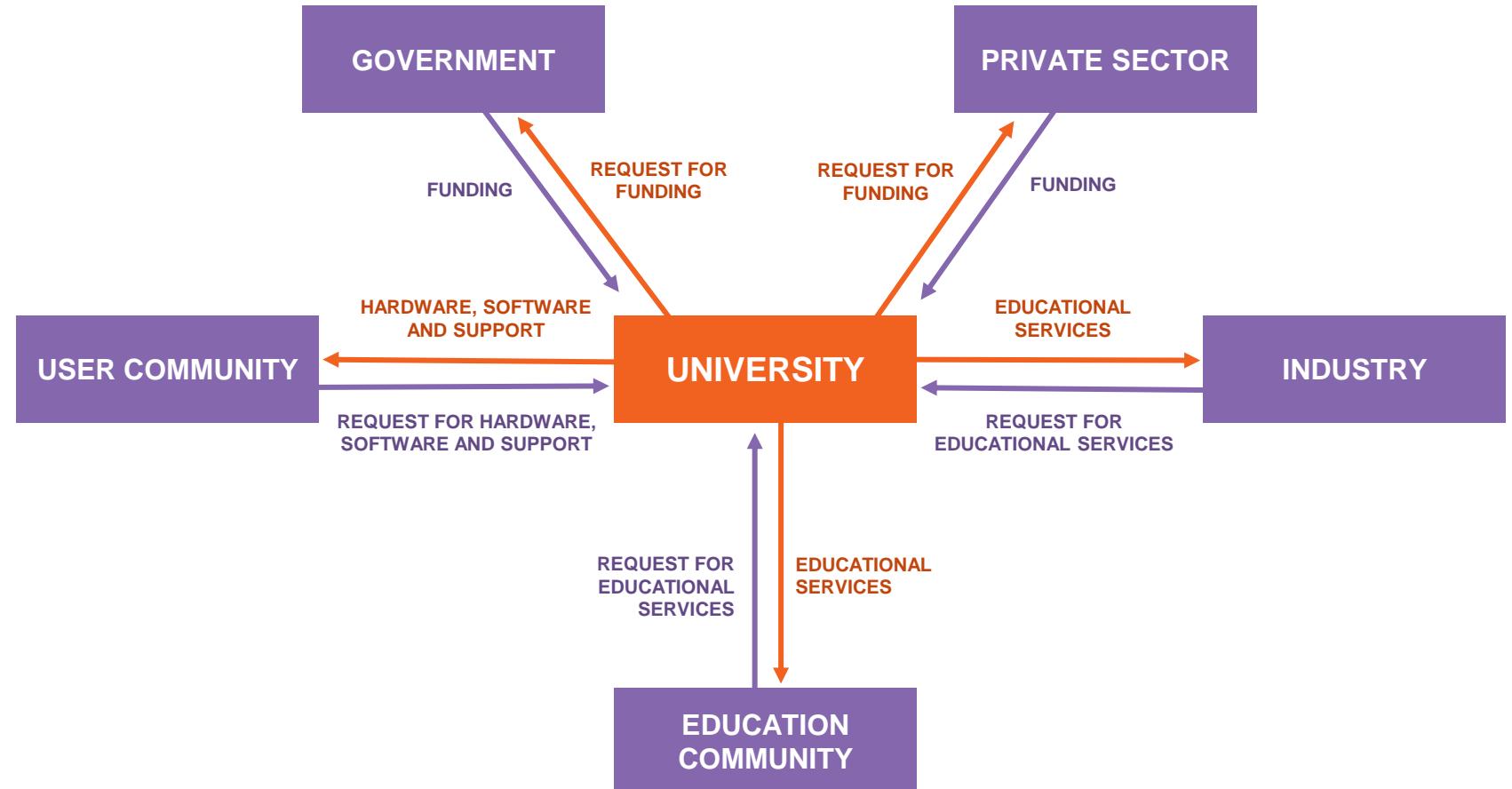
- **Mind Mapping** – Consolidate ideas created through individual brainstorming sessions into a single map to reflect commonality and differences in understanding and to generate new ideas
- **Affinity Diagram** – Allows large numbers of ideas to be classified for review and analysis



# Context Diagrams\*



Business Context Diagram Example



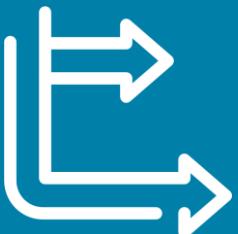
# Prototyping

- Evaluation and experimentation tool
- Enables early feedback for further development and **to develop a detailed list of project requirements**
- **Storyboarding** is a type of **prototyping** that uses visuals or images to illustrate a process or represent a project outcome.



# Scope Management Plan\*

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- Review of the scope activities for the project and how that work will be done
- Should include processes to prepare a project scope statement
- Enables the creation of the WBS from the detailed project scope statement
- Establishes how the **scope baseline** will be approved and maintained
- Specifies how **formal acceptance** of the completed project deliverables will be obtained
- Can be formal or informal, broadly framed or highly detailed

# Project Scope Statement

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Includes –

- Scope description - project and product
- Acceptance criteria
- Any required deliverables
- Any out-of-scope items needed for clarification
- Constraints and assumptions



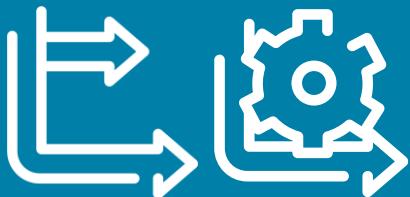
*Once it has been approved and baselined, changes are only permitted in accordance with the change management plan.*

# Scope Planning

## Tools and Techniques for Analysis



*Match the requirements analysis tool/technique with the correct description.*



**Document analysis**

Used to consider possible potential options or approaches to execute and perform project work

**Alternatives analysis**

Analyze the information needed to develop the project scope statement or any technical detail

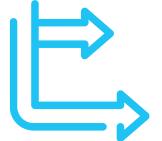
**Product analysis**

Derive new project requirements from existing documents

**Expert judgment**

Ask questions about a product and form answers to describe use, characteristics, and other relevant aspects

# Product Analysis Methods



## PRODUCT BREAKDOWN

Splits a product and its requirements into components to achieve a clear understanding of work

## SYSTEMS ENGINEERING

Approaches design, integration, and management, and the life cycle of complex systems in a multi-disciplinary way

## SYSTEMS ANALYSIS

Studies a product /service to identify its goals and purposes and create systems/ procedures to achieve them efficiently

## REQUIREMENTS ANALYSIS

Identifies, validates and documents specifications for projects

## VALUE ENGINEERING

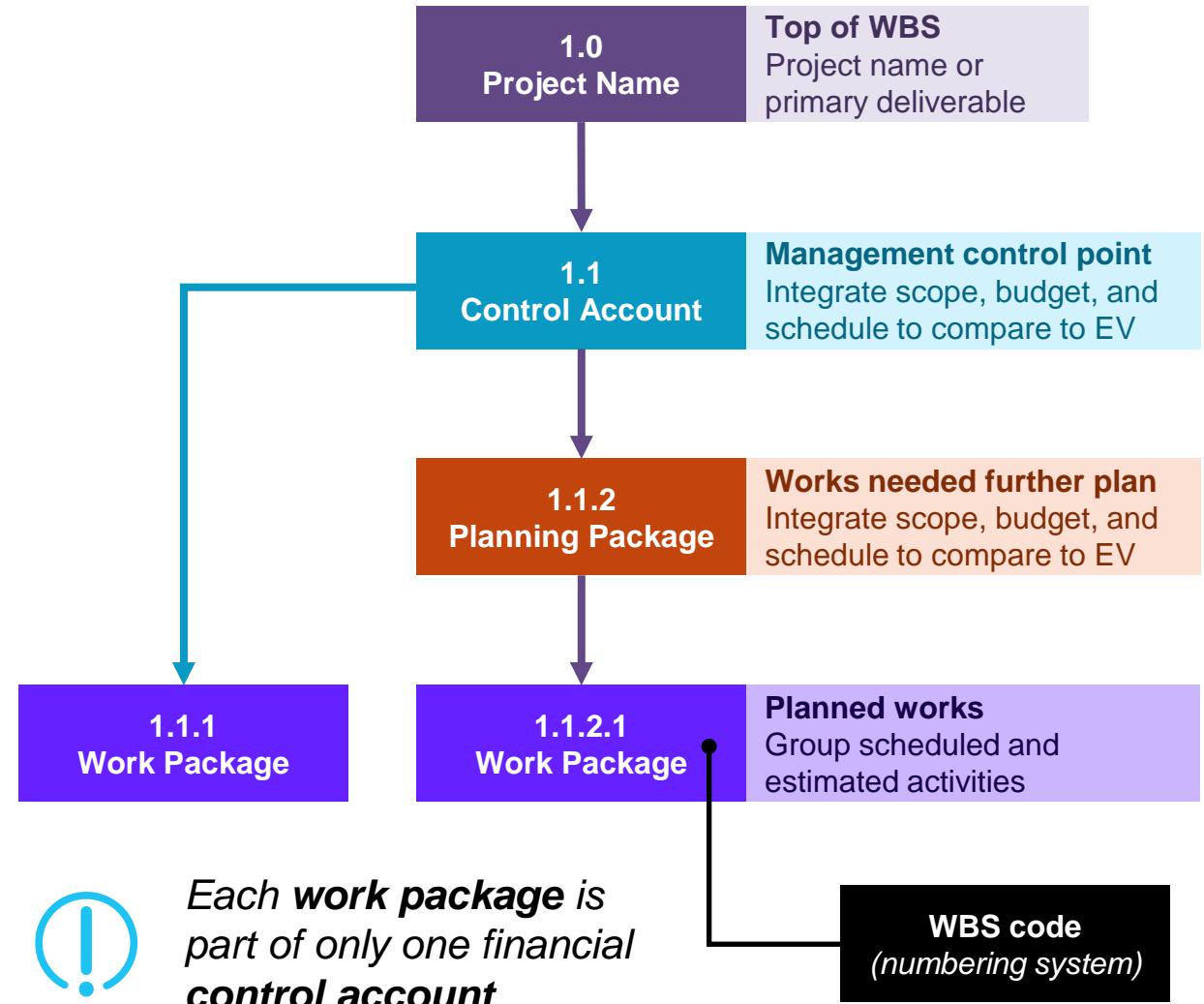
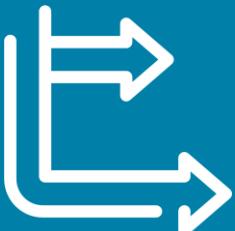
Optimizes value in a structured way

## VALUE ANALYSIS

Examines factors affecting product/service cost in a systematic, interdisciplinary way towards success with the lowest cost and required quality and reliability standards

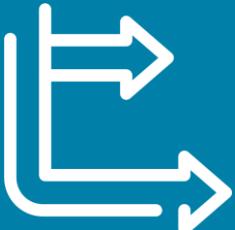
# Create the Work Breakdown Structure (WBS)\*

- Follow the 100% rule!
  - Include every aspect – nothing extra, nothing missing
- Include project and product components
- Use hierarchical structure
  - Highest – project
  - Next – deliverables
  - Lowest – work package



# Decompose Work in the WBS

*Divide and subdivide the project scope and deliverables into smaller, more manageable parts*



## Steps:

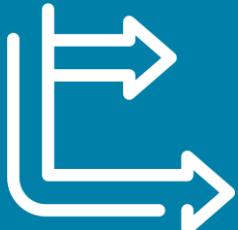
1. Identify deliverables and the work/tasks needed to accomplish them
2. Structure and organize the WBS
3. Decompose high-level WBS scope components into low-level components
4. Develop and assign a unique identification code to each component from the **code of accounts**
5. Review the decomposition of work packages and verify that they align with the project requirements

*Tailor the level of decomposition to specific project needs and the level of granularity needed to manage the project effectively.*

# WBS Dictionary



Provides detailed deliverable, activity and scheduling information about each component in the WBS

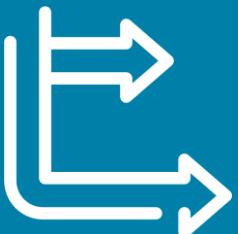


Decompose work and include:

- WBS code identifier
- Description of work
- Assumptions and constraints
- Responsible organization
- Schedule **milestones**
- Associated schedule activities

- Resources required to complete the work
- Cost estimations
- Quality requirements
- **Acceptance criteria**
- Technical references
- Agreement information

# Scope Baseline



- Approved version of a scope statement, WBS and its associated WBS dictionary, that can be changed only using formal change control procedures
- Used as a basis for comparison to actual results

Components include:

- Project scope statement
- WBS
- Work packages
- Planning package
- WBS dictionary

# Don't Forget to Plan for Transitions / Handovers!



Questions to consider:

- Will the work be new, or an update in the business environment?
- How best to transition the product into a live environment?
- What about decommissioning or removing old systems, processes or materials?
- Did you ensure training and knowledge transfer are complete/satisfactory?



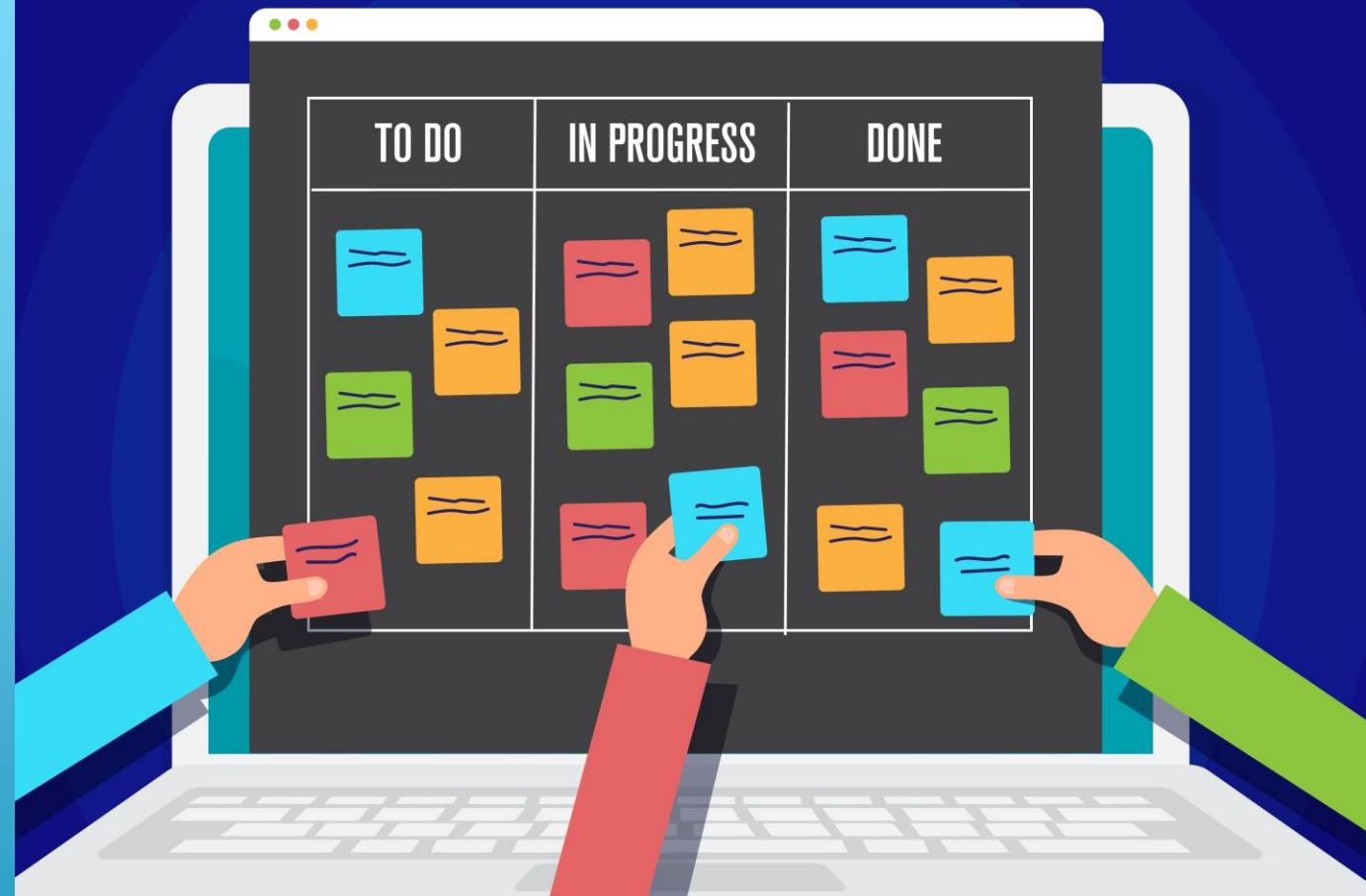
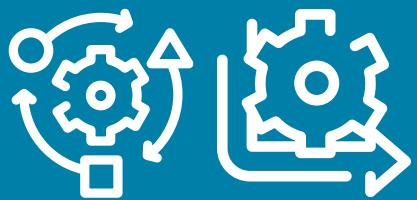
*These can be delivered throughout the project, not just at the end!*

Include activities to fulfill transition/implementation in the scope of work

- Consider all stakeholders, schedules, risks, budgets, and quality standards.
- Identify deliverables/outputs

# Scope Planning in Adaptive Environments

- Incremental or iterative development
- User stories propose an alternative way of viewing the requirements process



# Release and Iteration Planning



*Planning also takes place at the standup meeting when teams discuss details of work in progress.*



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Collaborative planning meetings that break scope into larger releases and then iterations/sprints

At **release planning** (or Agile release planning), decide:

- Number of iterations or sprints needed to complete each release
- Features contained in the release
- Goal dates of each release

At **iteration planning** (or sprint planning):

- Review the highest prioritized user stories or key outcomes
- Ask questions
- Agree on effort required to complete the user story in the current iteration
- Determine the activities required to deliver iteration objectives

# Backlogs

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- Prioritized list of the **known scope of work**
- Information presented in **story form**
- Continually updated by the **product owner** in **collaboration with teams**



Example:

A **product owner** creates a **product backlog** and identifies and adds stories in collaboration with the team and stakeholders. Work items describe desired product functionality through user stories.

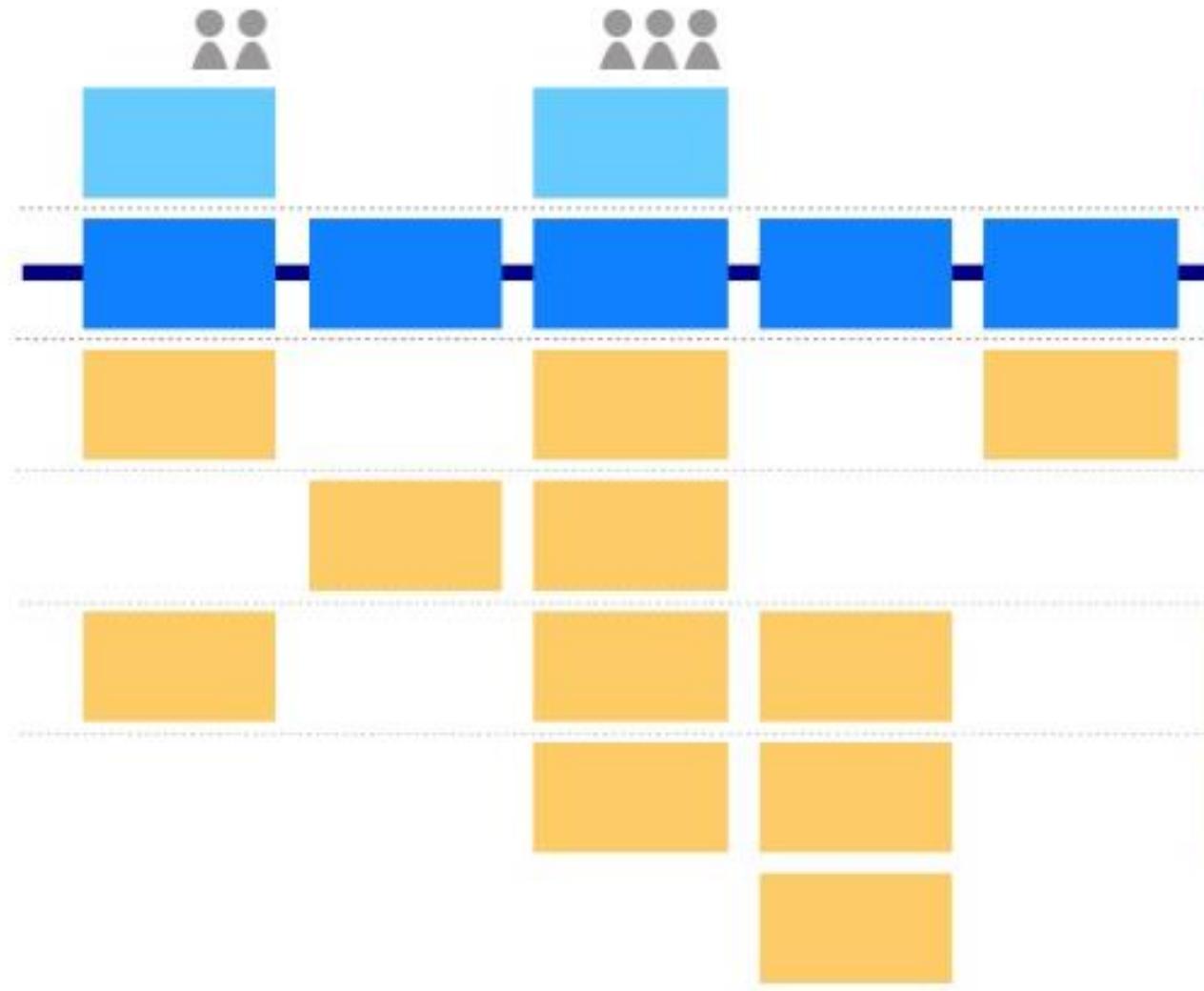
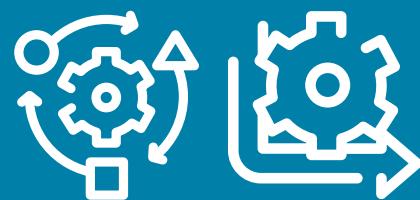
- The product owner is responsible for prioritizing work according to value.
- The product owner and team collaborate to move work items to the **iteration/sprint backlog**.



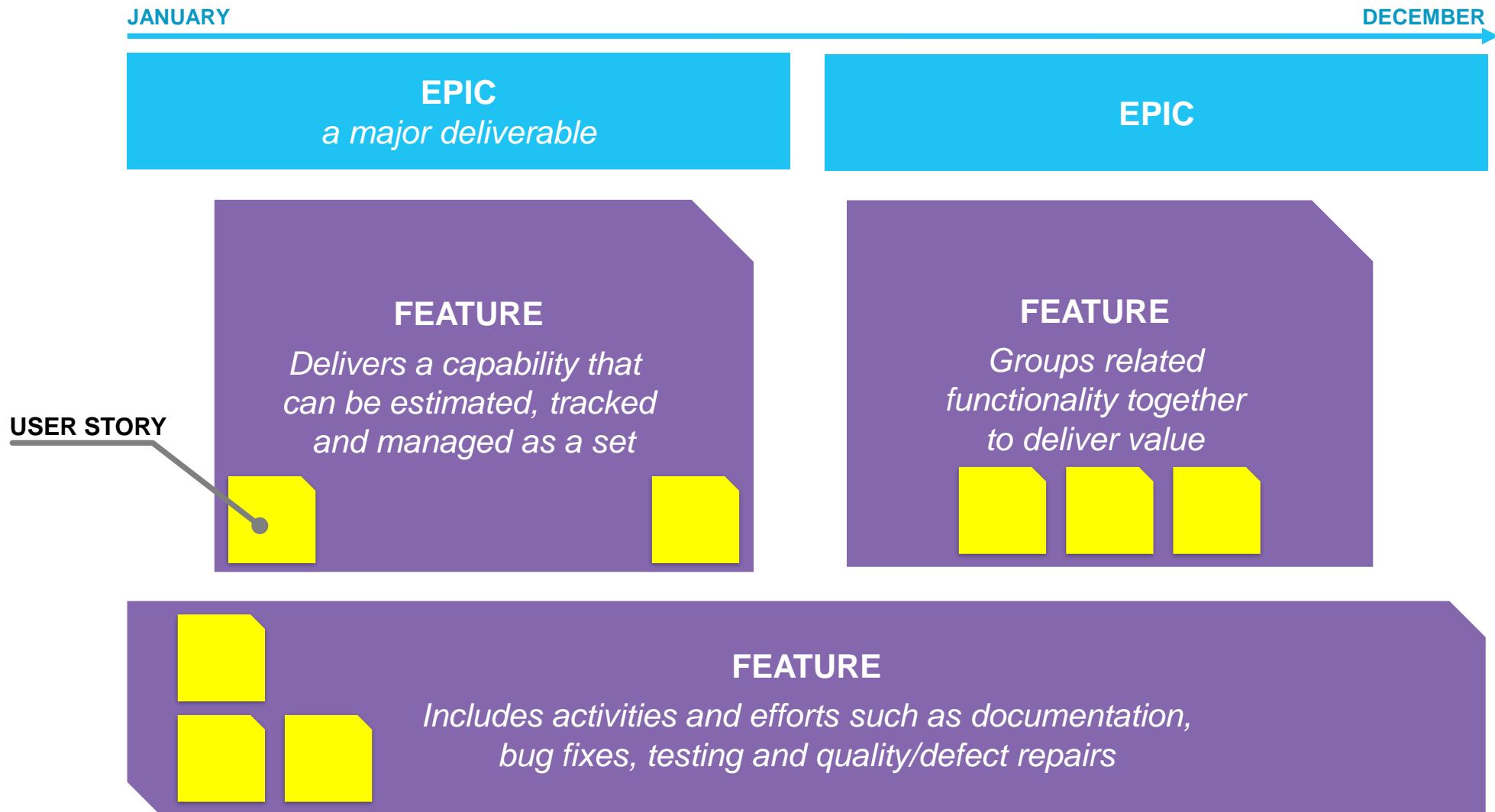
*Backlogs may be known by slightly different names on your team or project, but the names are generally descriptive — e.g., requirements backlog, sprint backlog, lean backlog.*

# User Stories, Story Maps, Roadmaps

- A **story map** organizes **user stories** into functional groups and within a narrative flow (“the big picture”) of the **product roadmap**.
- Helpful for discovering, envisioning and prioritizing the product and a way ahead!
- *Story map technique developed by Jeff Patton*

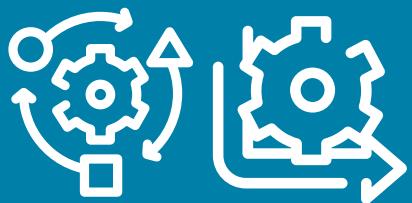


# Epics > Features > User Stories



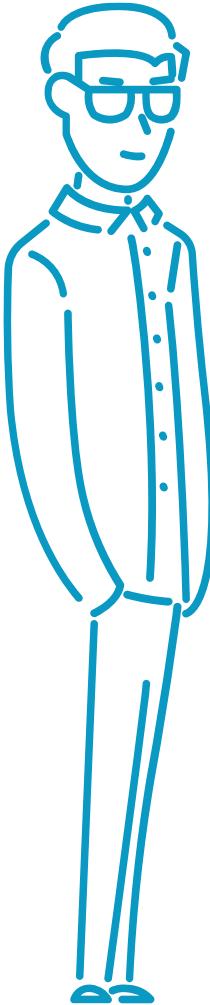
# Prioritize and Refine the Backlog

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- Continual refinement done by product owner/customer prior to iteration planning
- Additional refinement can be done jointly by the team and product owner during the sprint/iteration
- Allows reorganization and reprioritization of work to complete higher-priority items that deliver value first
- Split epics into user stories

# Plan Scope: Quiz



Which two stakeholders perform project scope planning? (*Choose two*)

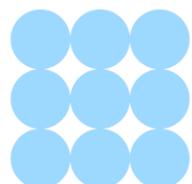
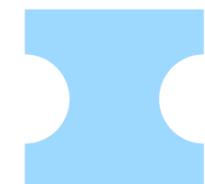
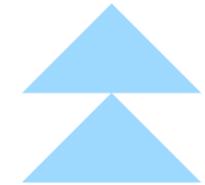
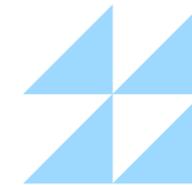
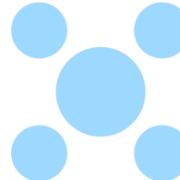
- a. Ang Fen, project manager
  - b. Helen Grey, product owner
  - c. Eugene Lowe, project sponsor
  - d. Project team
- 

Ang Fen wants to give the executive team an overview of the work ahead at the next strategy meeting. Which artifact should he show them?

- a. Scope management plan
- b. Product roadmap
- c. Scope statement
- d. Work breakdown structure



# ECO Coverage



## 2.1 Execute project with the urgency required to deliver business value

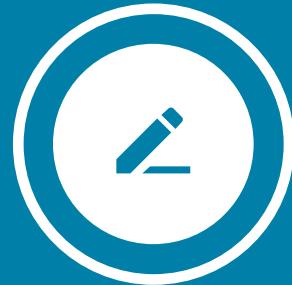
- Support the team to subdivide Project tasks as necessary to find the minimum viable product (2.1.3)

## 2.8 Plan and manage scope

- Predictive vs Adaptive approach for scope
- Determine and prioritize requirements (2.8.1)
- Break down scope (e.g., WBS, backlog) (2.8.2)

## 2.17 Plan and manage project/phase closure or transitions

- Determine criteria to successfully close the project or phase (2.17.1)

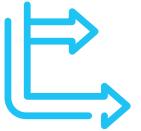


# Schedule

## TOPIC C

# Get from “A” to “B”

## Overview of Schedule Planning Processes



The project manager ensures that:

- Work package is broken down into required activities
- Dependencies and precedence relationships are determined
- Activity durations are estimated based on average resources
- Critical path is determined
- Resource overallocations are resolved
- Schedule is compressed to meet any constraints



The project team:

- Uses either a time boxed (cadences) or continuous flow method
- Adopts release time frames
- Plans each iteration with work
- Prioritizes, estimates and decomposes user stories into tasks and determines iteration velocity
- *Works with product owner* to refine the backlog after each iteration and plan the next

# Schedule Management Plan\*



*In hybrid approaches, a schedule management plan can help by placing management controls on the project time line.*

- Describes how activities will be defined and progressively elaborated
- Identifies scheduling method and scheduling tool used
- Determines schedule format
- Establishes criteria for developing and controlling the schedule
- May be tailored for use in any type of project
- Defines the maintenance process for updating status and records project progress in the schedule model during execution

# Schedule Management Plan Components



*Discuss how the schedule management plan can be a beneficial tool in hybrid projects. Who would it benefit?*

<b>Project schedule model</b>	<ul style="list-style-type: none"><li>Methodology/tool for schedule development</li><li>Includes maintenance planning, including status updates and progress during execution</li></ul>
<b>Accuracy</b>	<ul style="list-style-type: none"><li>Acceptable range used to determine realistic activity duration estimates</li><li>May include risk contingency</li></ul>
<b>Units of measure</b>	Defined for each resource – e.g., staff hours, days and weeks
<b>Organizational procedural links</b>	Use of WBS to ensure consistency with estimates and schedules
<b>Control thresholds</b>	<ul style="list-style-type: none"><li>For monitoring schedule performance before taking action – e.g., escalation/reviews</li><li>Expressed as percentage deviations from the baseline — e.g., percent ahead or behind schedule</li></ul>
<b>Rules</b>	Performance measurement — e.g., earned value management (EVM) rules
<b>Reporting</b>	Frequency and formats for schedule-related reports
<b>Process descriptions</b>	Describes how schedule management processes are documented

# Start with Benchmarks and Historical Data

## Benchmarking

- Compares current project schedule with a similar product/service schedule
- Provides a good “starting point” for estimation before detailed analysis
- Assesses feasibility in the initial stage of scheduling

## Historical data

Learn lessons from completed projects in the organization

# Hybrid Schedules

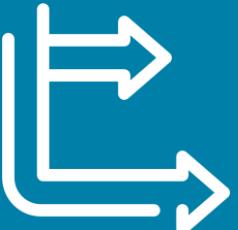
## Example Characteristics and Benefits



- 
- Tailored plans to combine consistency and management oversight with flexible scheduling of work
  - Better product/deliverable quality with incremental or short-term value delivery and change (improvements, fixes) incorporated at intervals
  - Product delivery can be divided into subsets according to a plan (milestone or cadence)

# Predictive Schedule Planning

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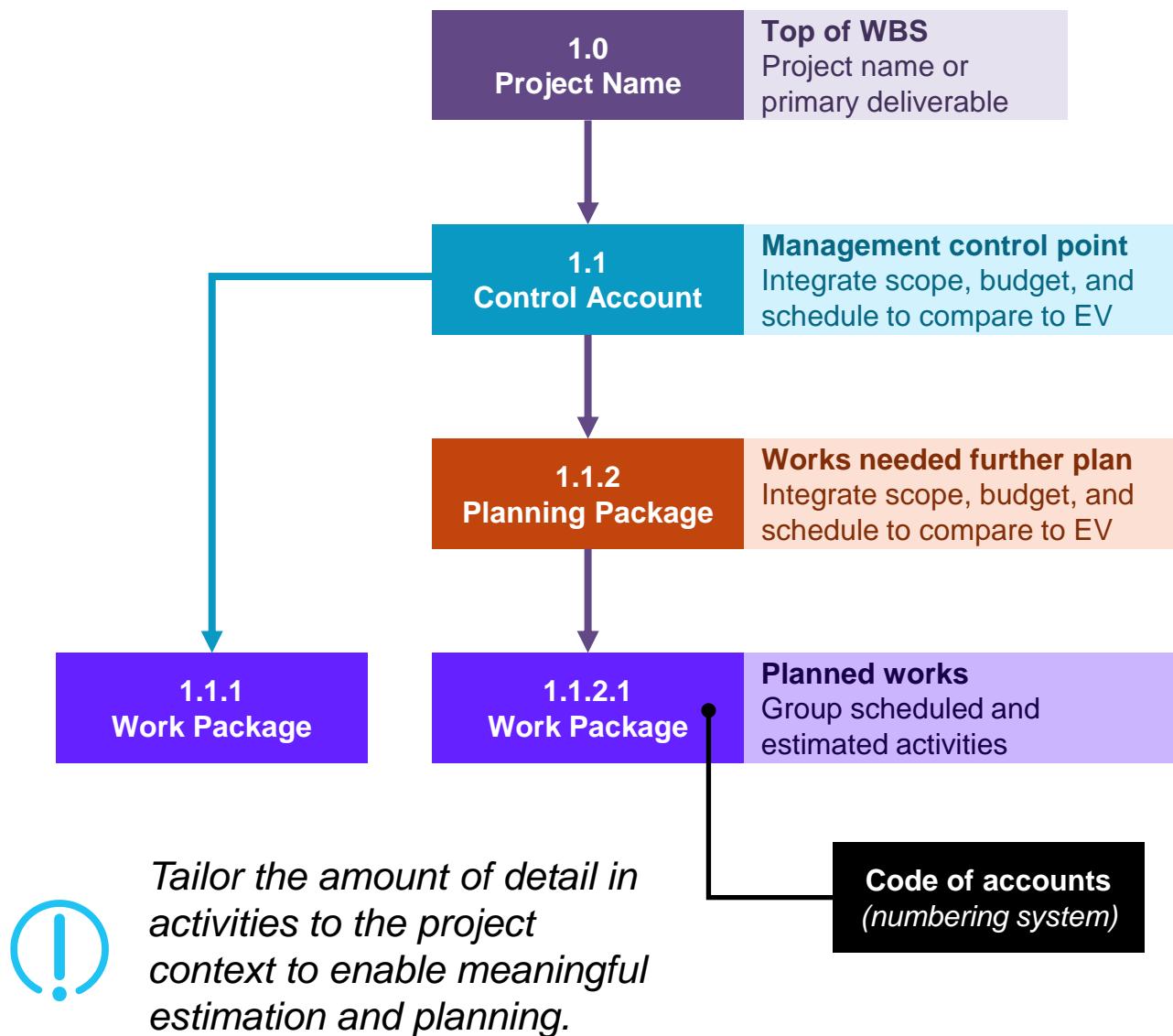
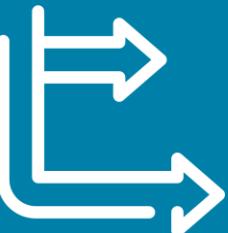


The project manager:

- Breaks down a **work package** into the required activities
- Determines **dependencies** and **precedence relationships**
- Estimates the duration of activities based on average resources
- Determines the **critical path**
- Resolves resource overallocations
- Compresses the schedule, if needed, to meet constraints

# Break Down Project Activities\*

- Break down project work packages into activities (noun)
- Enter activities into the **activity list** using a verb statement
- Use the **activity list** to develop the project schedule
- Include duration (start and end day) for every activity



# Activity Dependency Types

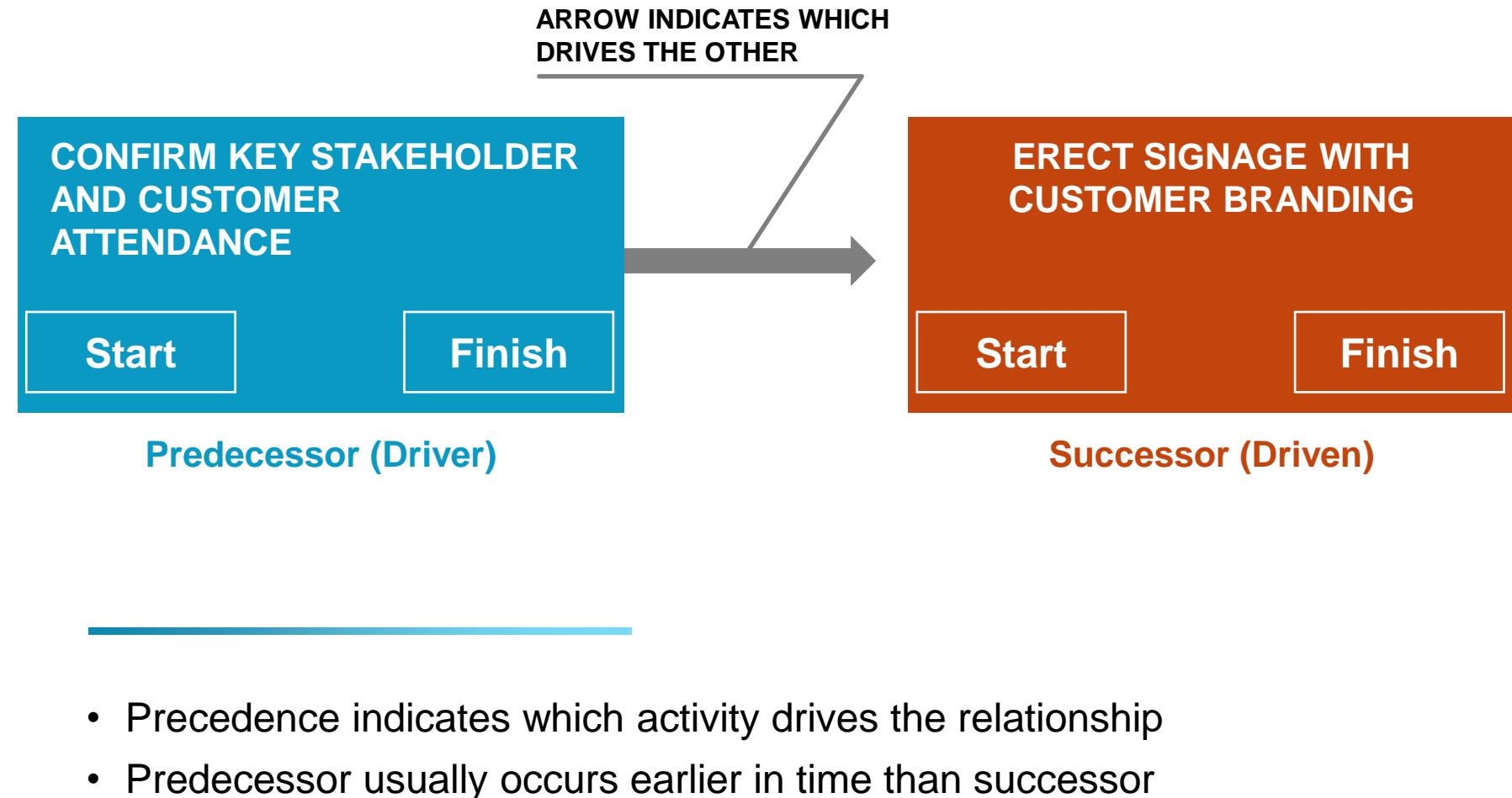


## DEPENDENCY TYPES

	Meaning	Action by Project Manager
<b>Mandatory</b>	Contractually required or inherent in the nature of the work	Must schedule it — No way around this sequence
<b>Discretionary</b>	Established because of best practices or a specific sequence is desired	Can be modified as needed, if replaceable with a better sequence, or if schedule compression is required
<b>External</b>	Activities performed outside the project team's work	Limited or no control
<b>Internal</b>	In project work, contingent on inputs	Has control

# Precedence Relationships

- Activity dependencies determine precedence relationships (aka logical relationships) and the order in which activities are performed
- Show these using the **precedence diagramming method** (PDM)



# Types of Precedence Relationships

- A. Obtain occupancy permit from Oasestown building department
- B. Confirm tour guide
- C. Confirm key stakeholder and customer attendance
- D. Complete landscaping and decoration
- E. Identify finished spaces for the tour
- F. Erect signage with customer branding



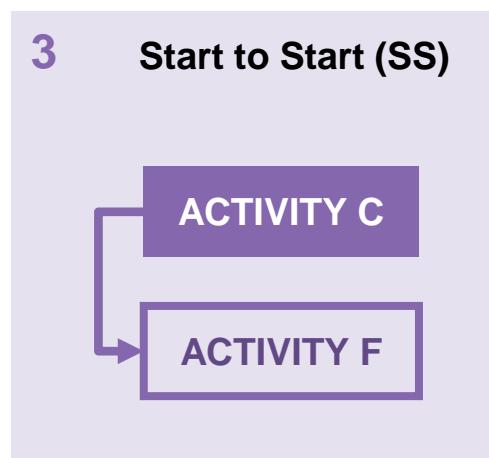
# Lags and Leads in Precedence Relationships

Add **lead** and **lag** times of up to 2 weeks to activities

Document activities and related assumptions

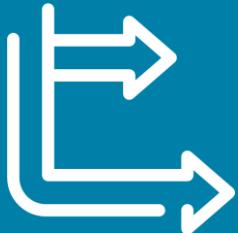


*Leads and lags do not have a value, so do not include them in duration estimates.*



- A. Obtain occupancy permit from Oasestown building department
- B. Confirm tour guide
- C. Confirm key stakeholder and customer attendance
- D. Complete landscaping and decoration
- E. Identify finished spaces for the tour
- F. Erect signage with customer branding

# Activity Duration Estimate Terminology



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## Activity Duration Estimate

- The quantitative assessment of the likely number of time periods required to complete an activity

## Elapsed time

- The actual calendar time required for an activity from start to finish

## Effort

- The number of labor units required to complete a scheduled activity or WBS component, often expressed in hours, days, or weeks; contrast with duration

# Estimating Techniques



Analogous	<ul style="list-style-type: none"><li>Uses <b>historical data</b> from a similar activity or project to estimate duration (or cost)</li><li>aka “top-down estimating.”</li></ul>	<ul style="list-style-type: none"><li>Less costly and time consuming</li><li>Used when project information is limited</li></ul>	<ul style="list-style-type: none"><li>May be inaccurate, depending on quality of historical information</li></ul>
Parametric	<ul style="list-style-type: none"><li>Uses an <b>algorithm</b> to calculate duration (or cost) based on historical data and project parameters.</li><li>Durations can be <b>quantitatively determined</b> — multiply quantity of work to be performed by the number of labor hours per unit of work</li></ul>	<ul style="list-style-type: none"><li>Can produce higher levels of accuracy depending on sophistication of data from model</li><li>Scalable and linear</li></ul>	<ul style="list-style-type: none"><li>Does not account for a learning curve — i.e., work gets easier as team becomes more expert</li><li>Uniform units of work are not typical in projects</li></ul>
Three-Point	<ul style="list-style-type: none"><li>Defines an <b>approximate range</b> of an activity’s duration, using <b>most likely, optimistic, and pessimistic</b> estimates</li><li>Used when historical data is insufficient, or subjective</li></ul>	<ul style="list-style-type: none"><li>May improve accuracy of single-point estimations by including risk and uncertainty factors</li></ul>	<ul style="list-style-type: none"><li>Requires detailed resource information</li><li>Requires expert knowledge to estimate tasks</li></ul>
Bottom-up	<ul style="list-style-type: none"><li>Uses <b>aggregates</b> of the estimates of the <b>lower level components of the WBS</b></li></ul>	<ul style="list-style-type: none"><li>Very accurate and gives lower-level managers more responsibility</li></ul>	<ul style="list-style-type: none"><li>May be very time consuming</li><li>Can be used only after the WBS has been well defined</li></ul>

# Three-Point Estimation

## Examples



*PERT is based on a probability distribution; therefore, we can calculate a standard deviation:*

$$(P - O) / 6 = \text{PERT Standard Deviation}$$

### Triangular Distribution (average)

#### FORMULA

$$E = (O + M + P) / 3$$

- Optimistic = 3 weeks
- Most Likely = 5 weeks
- Pessimistic = 10 weeks

#### EQUATION

$$(3 + 5 + 10) / 3 = 6 \text{ weeks}$$

### Beta Distribution (PERT average)

#### FORMULA

$$E = (O + 4M + P) / 6$$

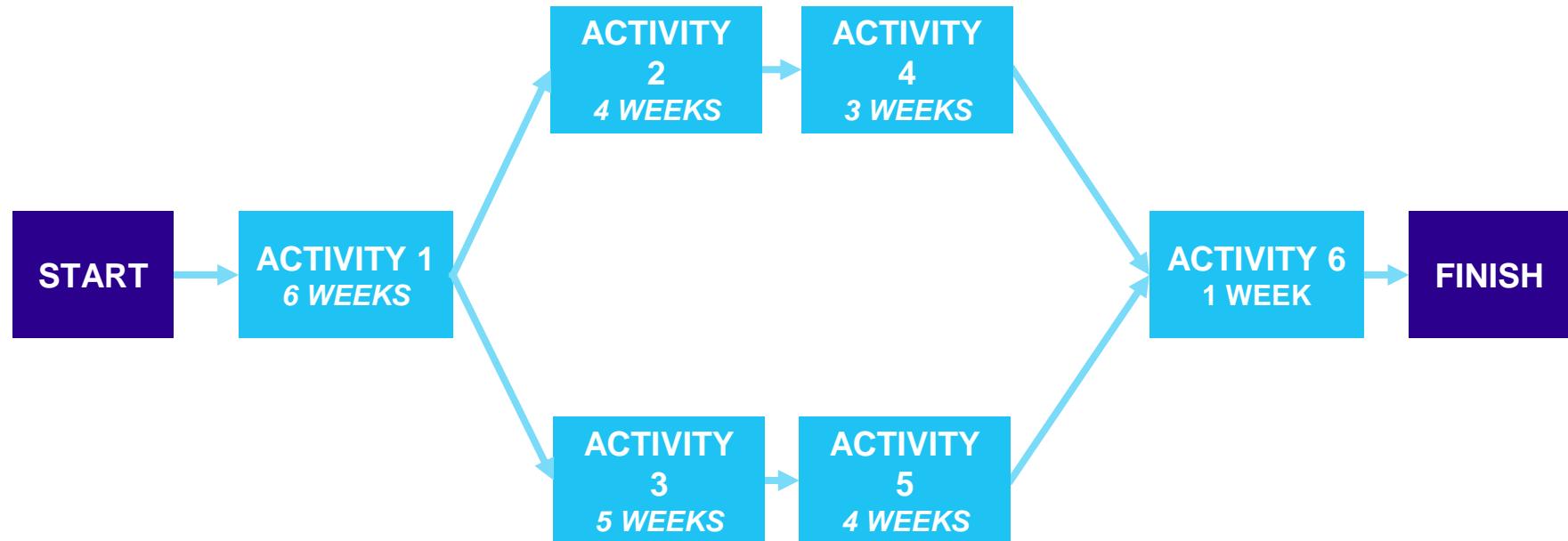
- Optimistic estimate = 3 weeks
- **Weighted** most likely estimate = 5 weeks
- Pessimistic estimate = 10 weeks

#### EQUATION

$$[3 + 4 (5) + 10] / 6 = 5.5 \text{ weeks}$$

# Critical Path\* Method

Sequence mandatory **critical path activities** to find the longest path through a project and to determine the **shortest possible project duration** and the amount of **flexibility** in the schedule



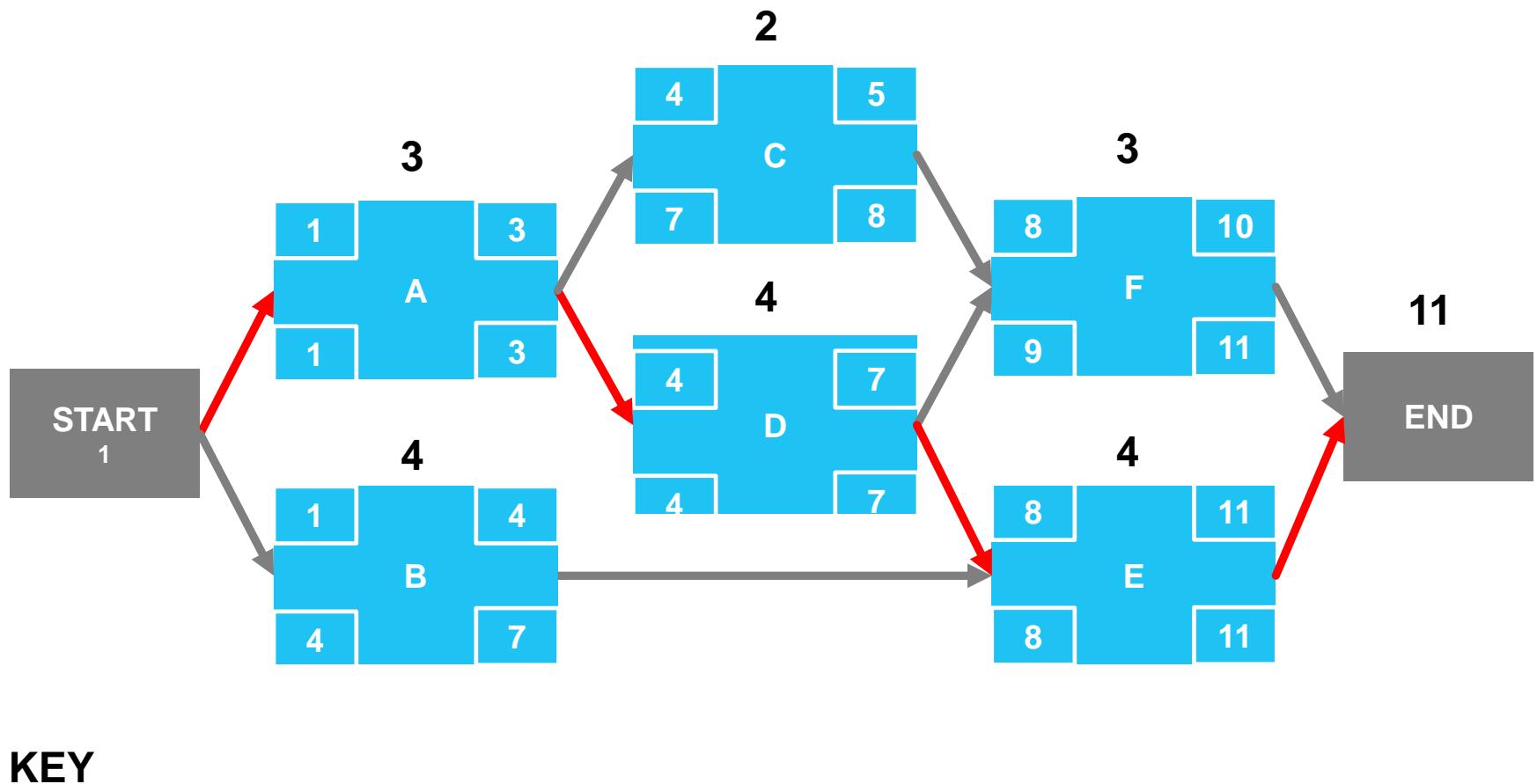
$$1[6w] + 2[4w] + 4[3w] + 6[1w] = 14\text{-weeks}$$

$$1[6w] + 3[5w] + 5[4w] + 6[1w] = 16\text{-week critical path}$$

# Network Diagram with Date and Dependencies

Calculate:

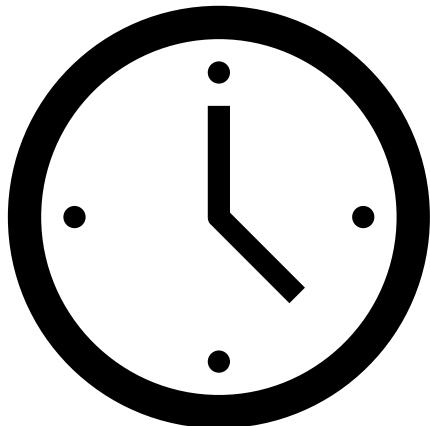
- Critical path
- Forward pass
- Backward pass
- Float



## KEY

ACTIVITY	ES	DUR	EF
	LS	FLT	LF

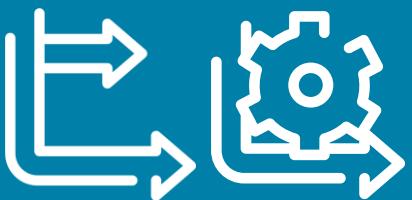
# 1-Hour Break!



**See you back after one  
hour!**

# The Project Schedule

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- Includes start and finish activities
- Uses specific dates and in a certain sequence
- Sets dates for project milestones
- Coordinates activities to ensure on-time project completion
- Tracks project progress based on schedule performance and provides visibility of project status to upper management and project stakeholders

# Schedule Presentation Formats

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Select the type of schedule to suit your project!

- Roadmap
- Gantt Chart
- Milestone Chart
- Project Schedule Network Diagram



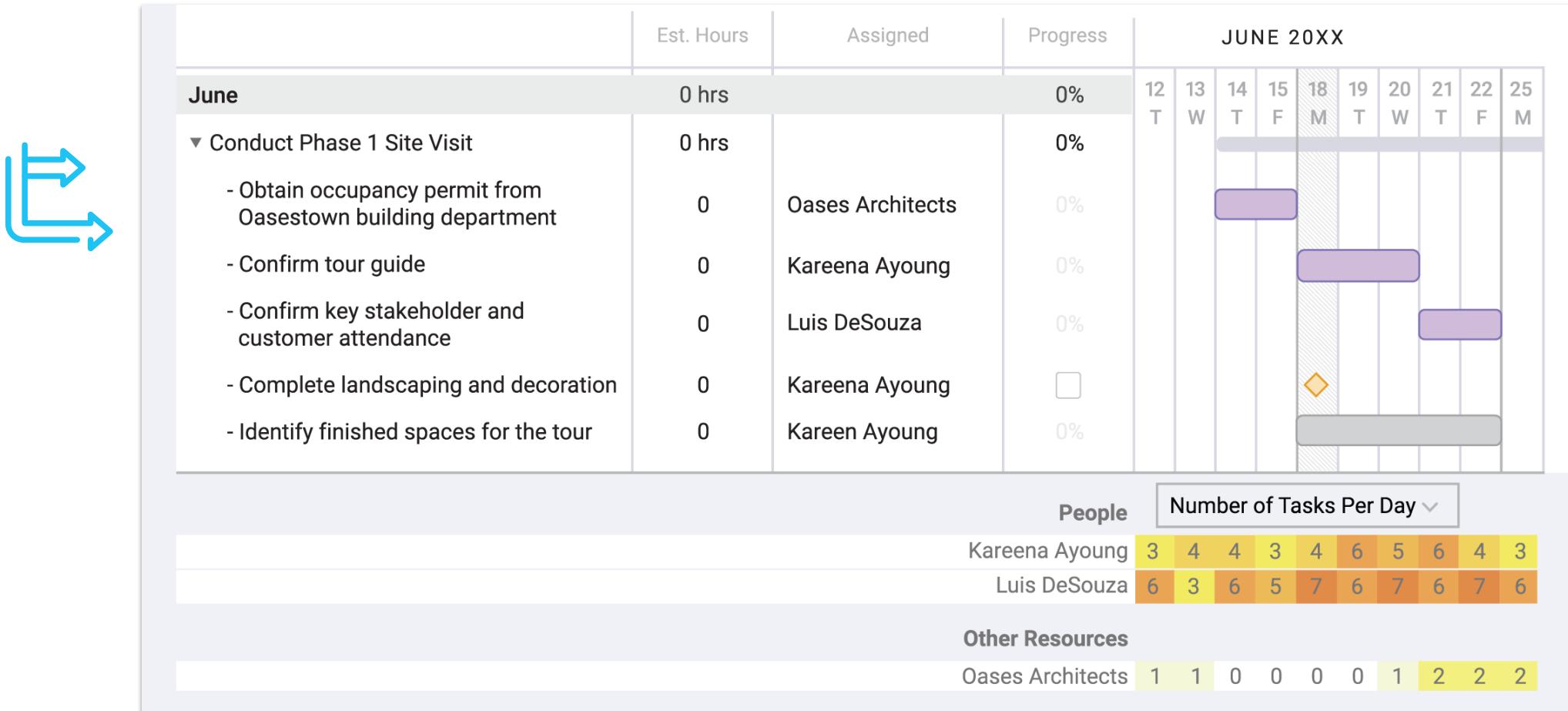
*Do you remember the name of the tool we used for scheduling activities in a project plan?*

***Hint:*** *The output is a project schedule network diagram.*

# Gantt Chart

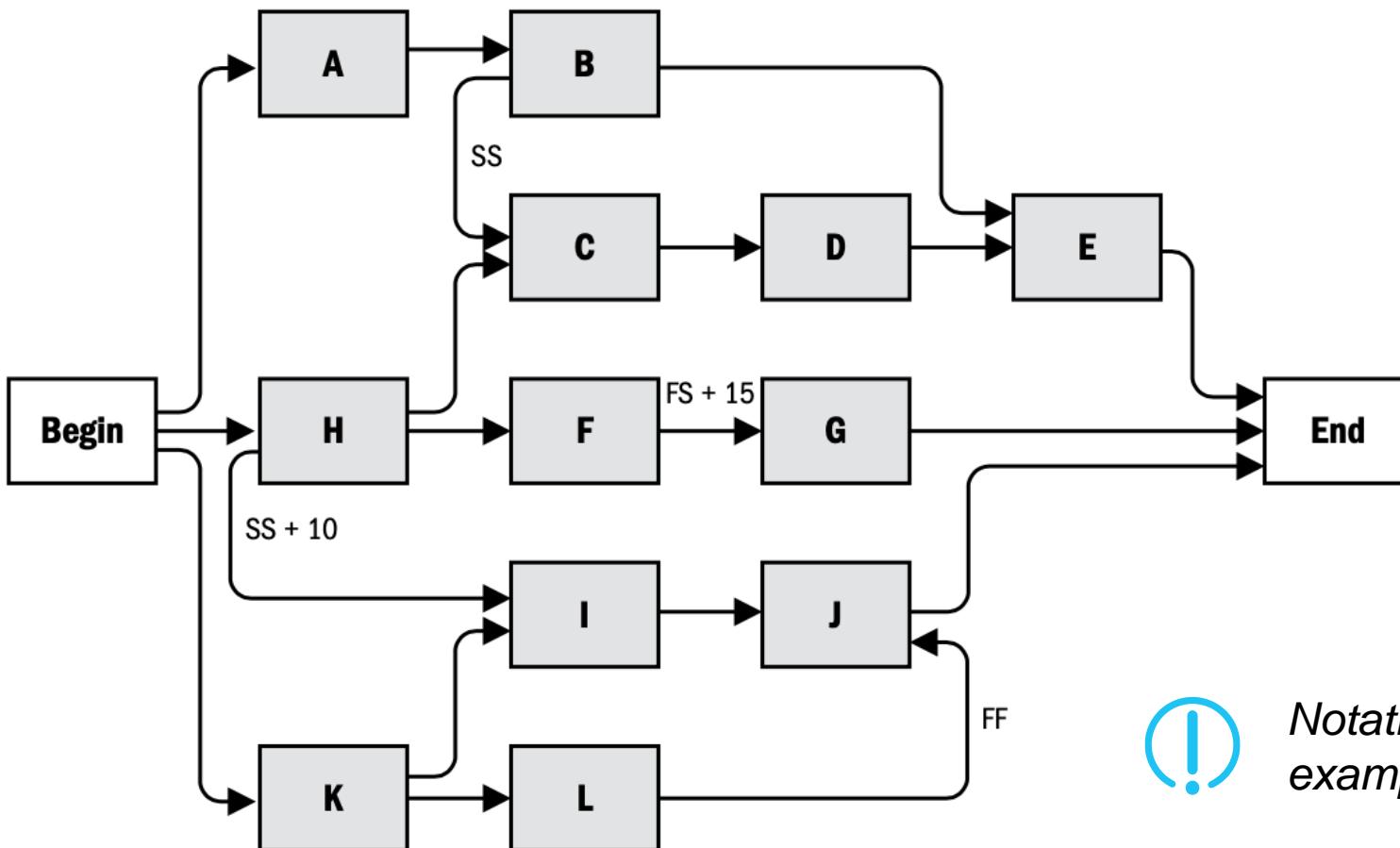


## Visualize and Track the Project Over a Time Line



# Project Schedule Network Diagram

## Visualize Interrelationships of Activities



*Notations are for graphical example only!*

# Milestone Schedule



# Present Milestones with Planned Dates

The Gantt chart illustrates the project timeline across four months. The tasks and their scheduled start dates are:

- Task 30: Begin Phase 1 (3/14)
- Task 31: Deliverable A (4/4)
- Task 32: Deliverable B (4/11)
- Task 33: Phase Gate Review (4/18)
- Task 34: Begin Phase 2 (4/25)
- Task 35: Deliverable C (5/2)
- Task 36: Deliverable D (5/9)
- Task 37: Phase Gate Review (5/16)
- Task 38: (5/23)
- Task 39: (5/30)
- Task 40: (6/6)
- Task 41: (6/13)
- Task 42: (6/14)
- Task 43: (6/20)
- Task 44: (6/27)
- Task 45: (7/4)
- Task 46: (7/11)
- Task 47: (7/18)
- Task 48: (7/25)

Deliverables A and B are sequential tasks starting on April 4th. Deliverable C follows on April 25th. Deliverable D starts on May 2nd. Phase Gate Reviews are conducted on April 18th and May 16th. Phase 2 begins on April 25th and ends on June 6th. Deliverables C and D are completed by June 6th. The project concludes with Phase Gate Reviews on July 18th and 25th.



*Remember that milestones have zero duration*

# Resource Optimization



## Smoothing

- Adjusts the activities within predefined resource limits and within free and total floats
- Does not change the critical path nor delay the completion date
- Method may not be able to optimize all resources

## Levelling

- Adjusts start and finish dates based on resource constraints
- Goal is to balance demand for resources with available supply
- Use when shared or critically required resources have limited availability or are over-allocated
- Can change the critical path

# Schedule Compression Techniques

## Fast tracking

- Perform activities in parallel to reduce time
- May result in rework, increased risk and increased cost

## Crashing

- Shortens schedule duration for the least incremental cost by adding resources – e.g., overtime, additional resources
- Works only for activities on the critical path
- Does not always produce a viable alternative and may result in increased risk and/or cost



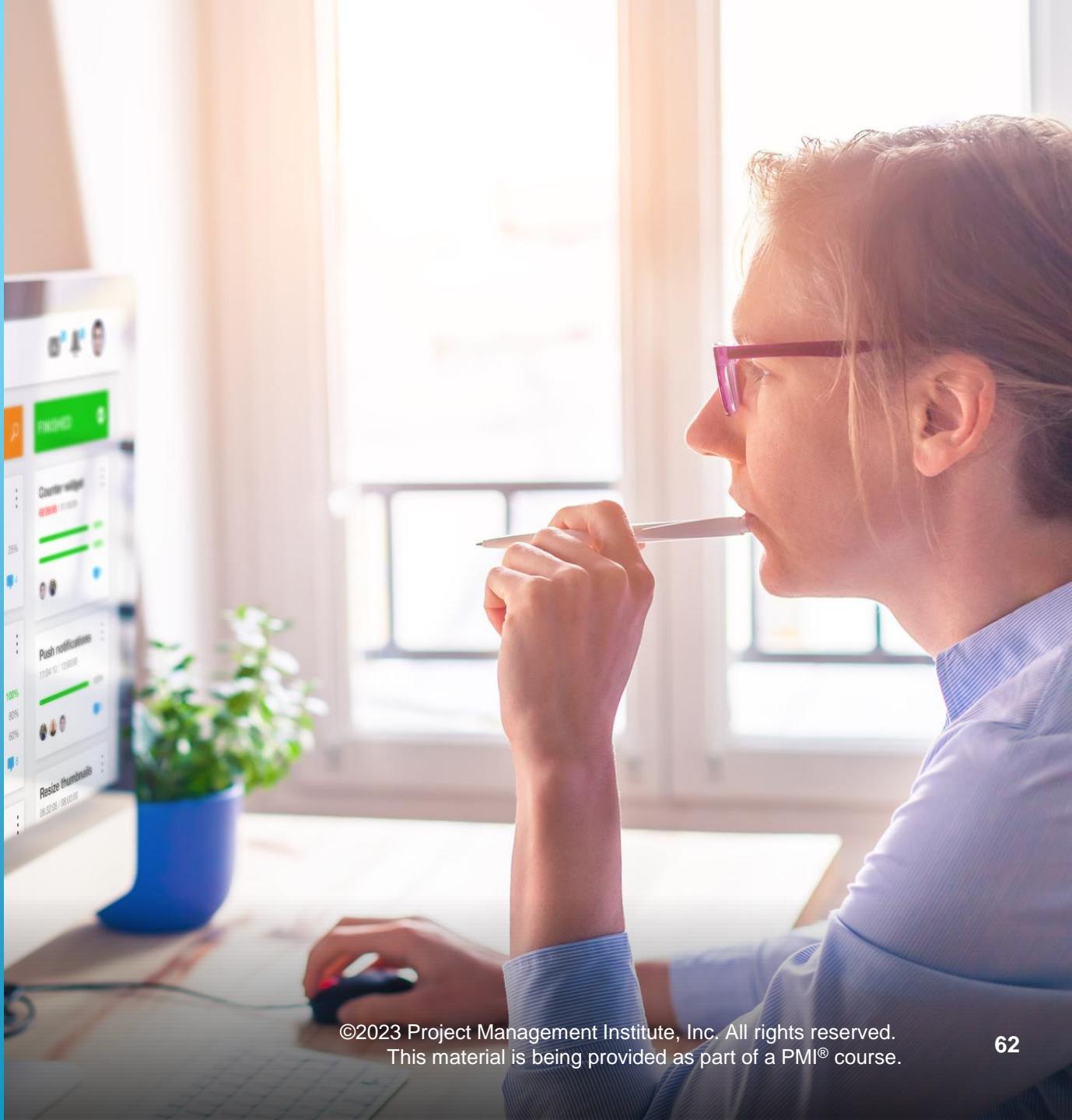
# Schedule Baseline\*

- Complete schedule planning activities
- Add the schedule baseline to the **project management plan**



*Ideally, this happens before the project starts.*

- Compare actual progress to the baseline while the team works
- Use the formal change control process to make changes to the baseline



# Special Intervals

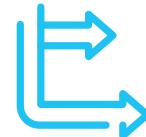


*What are special intervals known as in your projects?*



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**Negotiate** how and when required scheduled “down” time intervals will take place



**Black-out times** - deliverables are handed over for implementation:

- Suspends changes
- Reduces risks as the solution is released to customers

“**Go Live**” - at the end of the project timeline

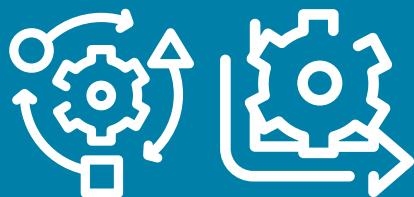


Negotiate black-out times as project approaches release

**Iteration H or hardening sprint** – conducted prior to final release

# Schedule Management in Adaptive Environments

## Guidelines



- 
- Depends on team composition and life cycle
  - Project team works with the product owner to decide
  - Develop the roadmap to show release functionality and timeframes
  - Choose an approach:
    - Timeboxed scheduling with backlog
    - On-demand, continuous scheduling
  - Project team selects activities for delivery within an iteration (or sprint)
  - Teams produce increments of value for delivery and feedback

# Adaptive Scheduling Approaches

## Comparative View

### On-Demand (Kanban/Lean-based)

- Allows individual requests to be addressed
- Levels out work of team members
- Best when activities are divided equally



*Does not work well in projects with complex dependency relationships*

Prioritize requests to determine start sequence then sequence stories individually through completion

Team pulls work from queue

Provides incremental business value

### Timeboxed/Iterative

- Uses progressive elaboration (rolling wave) to schedule activities
- Uses a specific work interval — e.g., two weeks
- Allows changes at any time during project

Define requirements with user stories then prioritize stories

Select work based on priority and time box; add remaining stories to backlog; reintroduce stories later, based on priority

Delivers business value early and incrementally

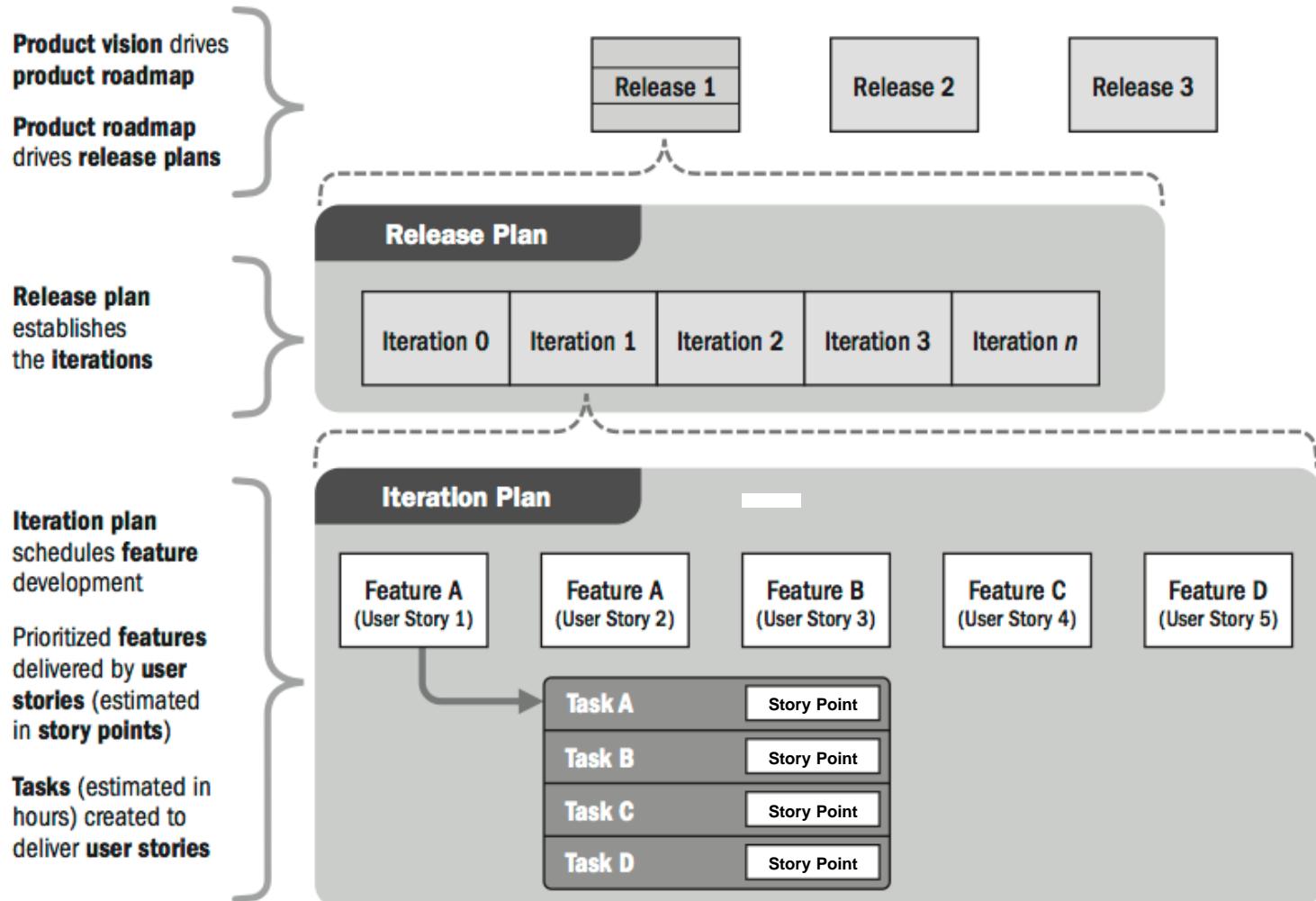
# Adaptive Planning Overview

A release schedule usually lasts from 3-6 months.

Timeboxed iterations or sprints typically last 1 - 4 weeks.

Assign story points to tasks to determine the amount of work

**Velocity** – the capacity of the team to complete work



# Working with Features

Scheduling aligned to features ensures associated work is coordinated.

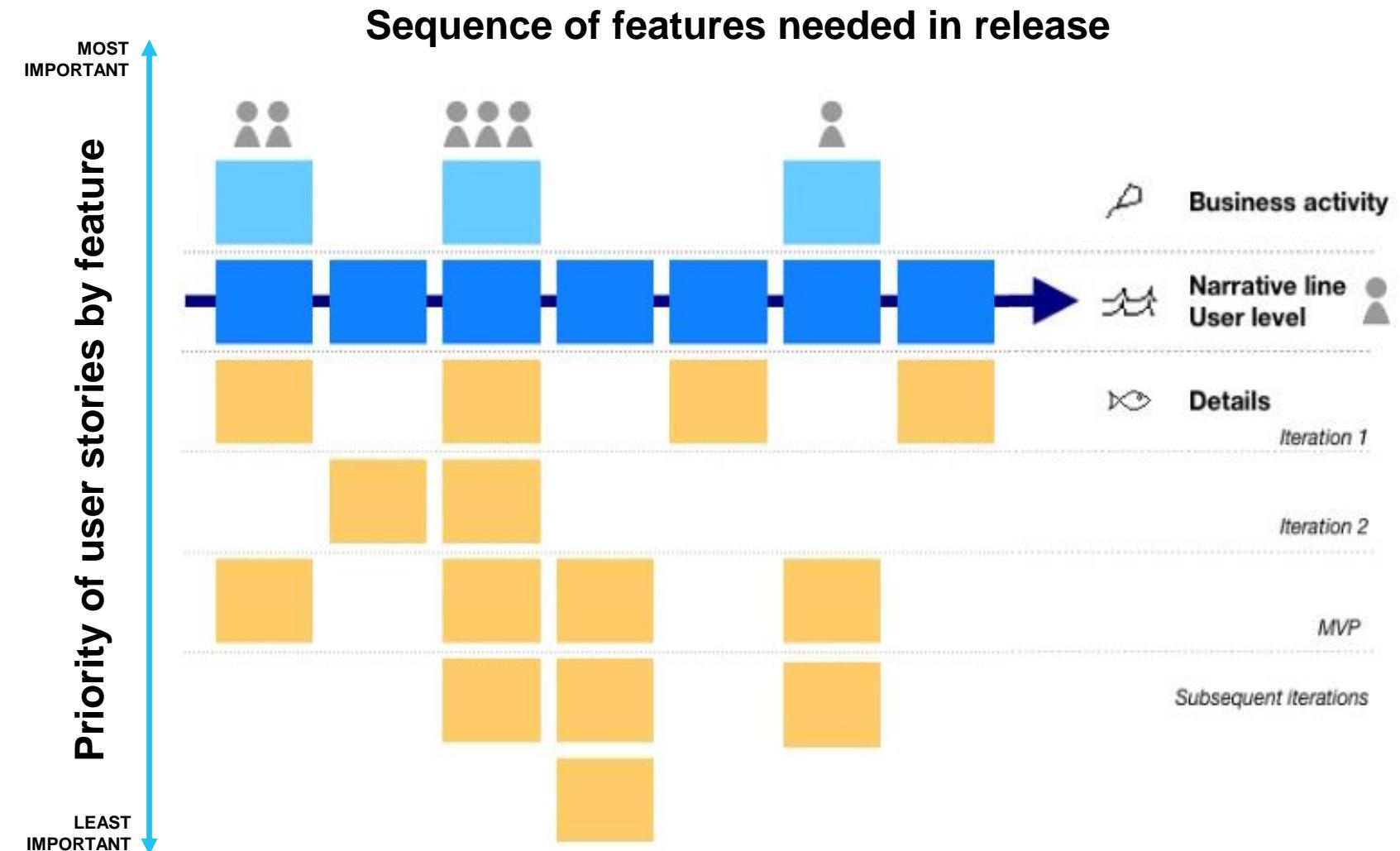
Associating features with the **product roadmap** offers visibility of when blocks of functionality can be released to the business and end users.



# Agile Release Planning

## Story Mapping

- Group stories by **sequence** and **priority**
- Sequence **features** and functions for the release
- Prioritize user stories in the **release backlog** and associate them with features and functions



# Measure Effort, Not Time

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## Relative sizing

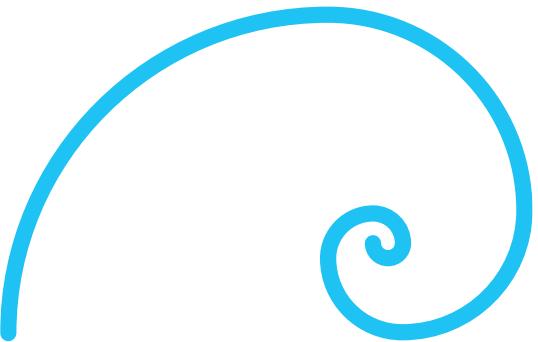
- Compares effort of multiple user stories through assignment of values (XS, S, M, L, XL)



*Use common **t-shirt sizes** to assign values to user stories.*

## Story points

- Uses a relative measure – e.g., numbers in the **Fibonacci sequence** – to identify the level of difficulty or complexity of a user story or task



## Planning poker

- Estimates effort or relative size of development effort
- Uses a deck of cards with modified Fibonacci numbers to vote on user stories

# Definition of Ready (DoR)\* and Definition of Done (DoD)\*



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Agile teams need to know when they can be “ready” to do the work and when that work is “done.”

**DoR** - What needs to be in place so the team can begin work?

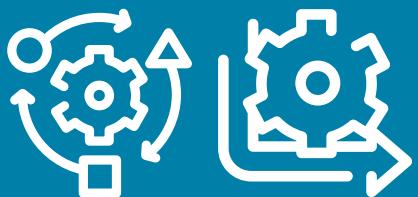
- Depends on the environment’s complexity and lessons learned from past iterations.
- Use DoR checklist to communicate and collaborate with stakeholders about readiness for work or progress.

**DoD** describes the goal or desired state. It must be informed by the DoR.



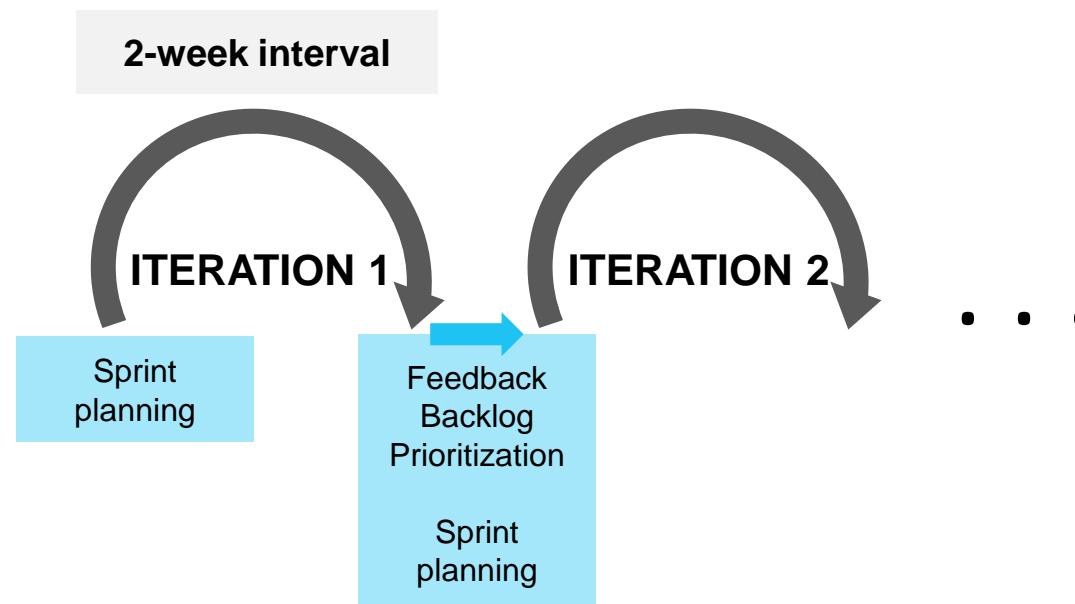
*DoD is similar to **acceptance criteria** in predictive projects.*

# Reprioritize Sprint / Iteration Backlog\*



The product owner and team collaborate to move work items from a release backlog to an **iteration/sprint backlog** for the upcoming sprint.

Team holds a sprint planning meeting before each sprint, which typically lasts 2 weeks.



# Hybrid Scheduling Models

## Example



*Can you identify which aspects of this scheduling model are predictive and which are adaptive?*

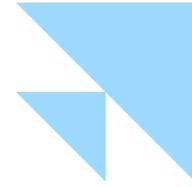
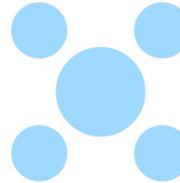
*Can you identify who does each of the tasks listed?*

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Project manager plans high-level project phases and milestones; scrum master runs sprints using agile processes

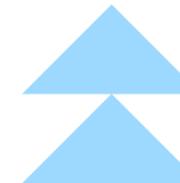
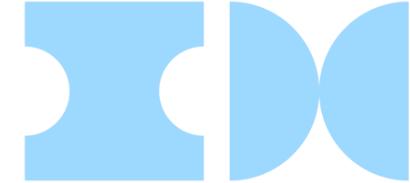
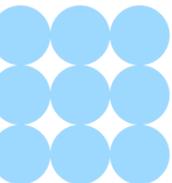
- Identify project work types and try to break them down
- Create a prioritized work backlog which fulfils project phase or achieves milestone
- Work in iterations/sprints of 2 - 4 weeks (use shorter sprints for less experienced team to facilitate alignment)
- Plan work before every iteration using prioritized backlog items
- Estimate every task to decide how many can fit in a single sprint
- Hold a retrospective at the end of every sprint; capture metrics to adjust timing and task estimate for next sprint

# ECO Coverage



## 2.6 Plan and manage schedule

- Predictive vs adaptive approach for schedule
- Estimate project tasks (milestones, dependencies, story points) (2.6.1)
- Utilize benchmarks and historical data (2.6.2)
- Prepare schedule based on methodology (2.6.3)





# Resources

## TOPIC D

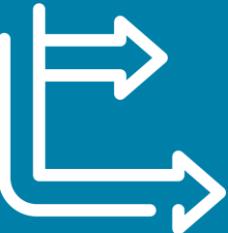
# Resources

## People and Equipment

- Value and empower internal human resources, yet
- Leverage external sources to ensure you have the best team and equipment possible!



# Resource Management Plan\*



- **Identify resources** - People and equipment
- **How to acquire them**
- **Peoples' roles and responsibilities**
  - Role – A person's function in a project
  - Authority - Rights to use resources, make decisions, accept deliverables.
  - Responsibility - Assigned duty
  - Competencies and skills required
- **Project Organization Chart** – (Visual with resource categories and reporting relationships)
- **Project team resource management** – Guidance on how to define, select, manage and release resources
- **Training** - Strategies and requirements
- **Team development methods**
- **Resource controls** - Methods for ensuring non-human-resources are available as needed
- **Recognition plan**

# Assign Resources and Allocate Responsibilities



*Project schedules, resource assignments and budgets are all interrelated and can be created at the same time.*

- Assign team members to project
  - Decide roles and responsibilities
  - Create team directory, organization chart and the schedule
- 
- Tailor responsibilities according to team, needs and project approach
  - Consider technical and “soft” skills:
    - Experience, knowledge, skills
    - Attitude
    - Global/regional factors

# Use Resource Calendars\*



- Document resource availability (people, equipment, material, etc.) during a planned activity period.
- Use when estimating project activities and understanding dependencies
- Specifies when, and for how long, identified team and physical resources will be available during the project
- Progressively elaborate and update it throughout the project



*Resource calendars can be used in any kind of project!*

# Responsibility Assignment Tools



Responsibility assignment matrix (RAM) or **RACI**

**chart:**

- Designates types of accountabilities assigned to resources or stakeholders
- Keeps information visible



## RESPONSIBLE

*A team member*

- Performs work to complete the task or create the deliverable
- Every task has at least one responsible person

## ACCOUNTABLE

*On the team  
(leadership/  
management)*

- Delegates and reviews the work involved in a project
- Ensures the responsible person/team knows project expectations and completes work on time
- Each task has only one accountable person

## CONSULTED

*Stakeholders*



*Consider all stakeholders, but invite only necessary input*

- Not every task or milestone needs a consulted party
- Provides input and feedback on project work
- Each task has only one accountable person

## INFORMED

*Usually not project decision makers*

- Needs to be informed of project progress because their work might be affected, but don't need details

# Adaptive Resource Planning

## Quiz



*Which of these are true? (Choose several)*

- 
- Teams self-organize to distribute work. **TRUE**
  - Adaptive teams never have a leader. **FALSE**
  - Team members are a mix of generalists and specialists. **TRUE**
  - Team members should be T-shaped. **TRUE**

# Filling Resource Needs

## Make or Buy? Borrow?



External sourcing considerations:

- What is the impact on cost, time or quality?
- Is there an ongoing need for the specific skill set?
- How steep is the learning curve?
- Are required resources available within the organization?
- Would outsourcing allow the team to focus?

Use a **make-or-buy analysis** to make the best decision for your team.

**Make-or-buy decisions** are part of a procurement strategy.

# Plan the Procurement Strategy

- Prerequisite OPAs
- Acquisition method
- Contract types
- Procurement phases

- 
- Work with organization's finance or procurement department
  - Use pre-approved vendors before requesting a new vendor
  - Observe purchase amount limits per signatory — i.e. contracts valued over a certain threshold must be co-signed
  - Use defined bidding process and templates
  - Require RFPs for contracts valued over a certain threshold
  - Follow escalation procedures for approval of spending limits
  - Pay contracts at a defined time – e.g., upon completion of work or at the end of a project, with net payment terms

# Procurement Management Plan\*

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- Specifies the types of contracts that will be used
  - Describes the process for obtaining and evaluating bids
  - Mandates standardized **procurement documents**
  - Describes how providers will be managed
- Your organization's procurement function will be involved in developing this plan. Work with them closely and use the correct procurement documents to avoid problems.*

# Procurement Documents

## Bid and Proposal Activities



- **Statement of Work (SOW):** Details of work required
- **Request for quotation (RFQ):** Bid/tender or quotation, including only cost
- **Invitation for Bid (IFB):** Buyer requests expressions of interest in work
- **Request for information (RFI):** Buyer requests more information from seller
- **Request for proposal (RFP):** Buyer-issued statement of work required
- **Expression of Interest (EOI):** Seller-issued expression of interest in work

# Formal Procurement Processes

## RFPs, Bidder Conferences

Organizations in highly regulated industries or government

Or, if a project needs specialist work or wants to find the best quality available.

Use RFPs, **bidder conferences**, and formal processes to ensure **all prospective vendors have a clear and common understanding of the procurement**

Work closely with the procurement officer or department



# Source Selection Criteria\*

Work with external resources whose values, skills and attributes are aligned with your project's.



- Overall or life-cycle cost
- Understanding of need
- Technical capability
- Management approach
- Technical approach
- Warranty
- Financial capacity
- Production capacity and interest
- Business size and type
- Past performance of sellers
- References
- Intellectual property rights
- Proprietary rights

# Qualified Vendors

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- Are pre-approved by the organization
- Have a history of work with the organization
- Are often “preferred” because they are proven, and their accounts are already set up



*Look in the lessons learned repository to find historical data about vendors.*

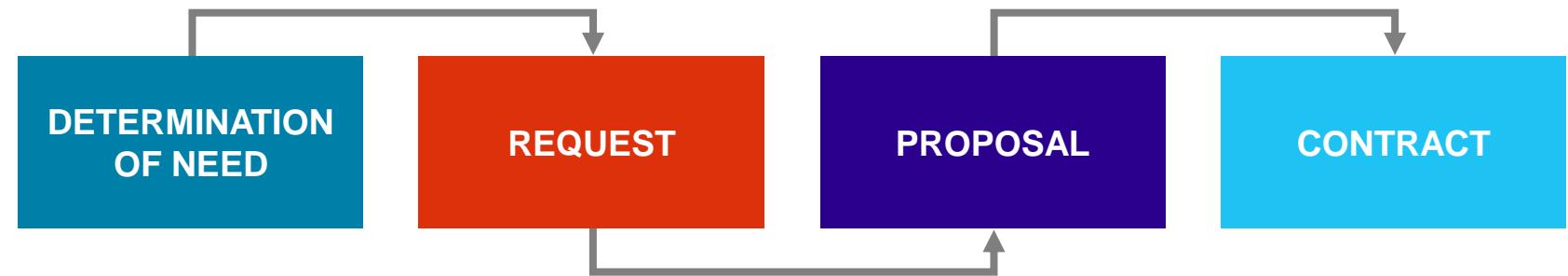
# Contracts\*

Negotiate  
Productive  
Relationships



## Contracts:

- Legalize working agreements
- Give structure to working relationships
- Further collaboration with partners
- Consider risks associated with contract types
- Deliver benefits to the buyer - different benefits by type
- Can be tailored for the partnership



# Contract Types (1 of 3)

**Cost-reimbursable contracts** - *For projects with expected, significant scope changes*

Involves payments (cost reimbursements) to the seller for all legitimate actual costs incurred for completed work, plus a fee (seller profit)

## **Cost plus fixed fee (CPFF)**

- Reimburses seller for all allowable costs for performing contract work; fixed-fee payment calculated as a percentage of the initial estimated project costs.
- Fee amounts do not change unless the project scope changes.

## **Cost plus incentive fee (CPIF)**

- Reimburses seller for all allowable costs for performing contract work; predetermined incentive fee based for achieving contract-specified performance objectives.
- Shares costs between buyer and seller if final costs are less or greater than the original estimated costs
- Bases cost sharing on a pre-negotiated cost-sharing formula — e.g., an 80/20 split over/under goal costs

## **Cost plus award fee (CPAF)**

- Reimburses seller for all legitimate costs
- Bases majority of fee on satisfying subjective performance criteria defined and incorporated into the contract
- Determines fee based on buyer's assessment of seller performance and not subject to appeals

# Contract Types (2 of 3)

**Fixed-price contracts** – sets a fixed total price for a defined product, service, or result; used when requirements are well defined and no significant scope changes are expected.

<b>Firm fixed price (FFP)</b>	Price of goods set at beginning; won't change unless scope changes
<b>Fixed price incentive fee (FPIF)</b>	<ul style="list-style-type: none"><li>Gives buyer and seller flexibility</li><li>Allows for deviation from performance — i.e., financial incentives tied to achieving agreed-upon metrics (cost, schedule, awesomeness)</li><li>Sets price ceiling; any further costs charged to seller</li></ul>
<b>Fixed price with economic price adjustments (FPEPA)</b>	
<b>Pre-approved vendors or international payments</b>	<ul style="list-style-type: none"><li>Allows for special provisions for predefined final adjustments to the contract price — e.g., inflation, cost increases (or decreases) for specific commodities</li></ul>

# Contract Types (3 of 3)

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## Time and materials contracts

- Also called “time and means”
- Combine aspects of both cost-reimbursable and fixed-price contracts
- Used when a precise scope or statement of work is unavailable
- Used often for augmenting staff, acquiring experts or gaining external support

# “Agile” Contract Types

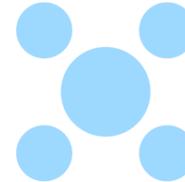
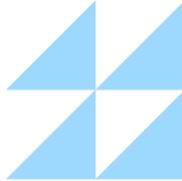
<b>Multi-tiered structure</b>	<ul style="list-style-type: none"><li>• Create a master service agreement to capture fixed items - e.g., warranties, arbitration</li><li>• List variable items in a schedule of services - e.g., service rates, product descriptions</li><li>• Use a SOW to itemize dynamic items - e.g., scope, schedule, budget</li></ul>
<b>Emphasize value delivered</b>	<ul style="list-style-type: none"><li>• Structure milestone and payment terms based on value derived at milestones</li><li>• Focus on the value of feedback in product development</li></ul>
<b>Fixed-price increments</b>	Decompose scope into smaller, fixed-price micro-deliverables (user stories), giving customer more control over how the money is spent and limiting the supplier's financial risk.
<b>Not-to-exceed time and materials</b>	<ul style="list-style-type: none"><li>• Limit budget to fixed amount, allowing customer to add ideas by removing existing ones</li><li>• Monitor work to avoid overage (or add contingency hours)</li></ul>
<b>Graduated time and materials</b>	<ul style="list-style-type: none"><li>• Connect quality and timely delivery of work (use DoD) to financial award – reward for early and reduce for late delivery</li></ul>
<b>Early cancellation option</b>	<ul style="list-style-type: none"><li>• Enable flexible delivery of scope, using DoD - e.g., if partial scope delivery satisfies customer, contract can be cancelled for a fee</li></ul>
<b>Dynamic scope option</b>	<ul style="list-style-type: none"><li>• Gives option to vary scope and fund innovation at specific points while limiting supplier risk</li><li>• Vary scope at specific points to adjust features and innovate</li></ul>
<b>Team augmentation</b>	<ul style="list-style-type: none"><li>• Embed supplier's services directly into the customer organization; fund team instead of scope</li></ul>

# Components of Contracts

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- Description of work - deliverables and scope
- Delivery date and schedule information
- Identification of authority, where appropriate
- Responsibilities of both parties
- Management of technical and business aspects
- Price and payment terms
- Provisions for termination
- Applicable guarantees and warranties
- Intellectual property
- Security, confidentiality, data privacy

# ECO Coverage

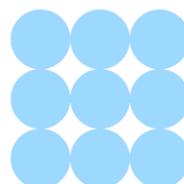
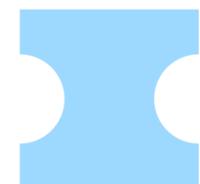
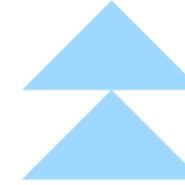
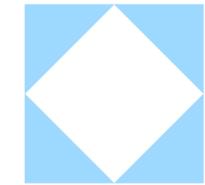
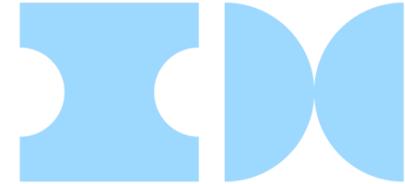
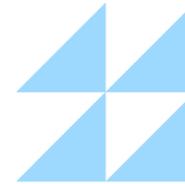


## 1.6 Build a team

- Deduce project resource requirements (1.6.2)

## 2.11 Plan and manage procurement (resources)

- Define resource requirements and needs (2.11.1)
- Communicate resource requirements (2.11.2)
- Manage suppliers/contracts (2.11.3)
- Plan and manage procurement strategy (2.11.4)
- Develop a delivery solution (2.11.5)





# Budget

TOPIC E

# Budget Planning Overview

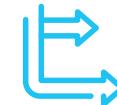
Consider:

- Cost as well as value
- Organization and stakeholder attitudes towards budget and costs



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Create budget in accordance with project life cycles:



Begin with fixed budget and amend with change control process



Hybrid approaches add adaptability around surety

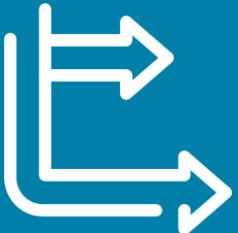


Use **burn rate**



Agile teams collaborate with stakeholder partners and finance stakeholders to suggest incremental budgeting approaches (agile mindset)

# Predictive Budget Planning



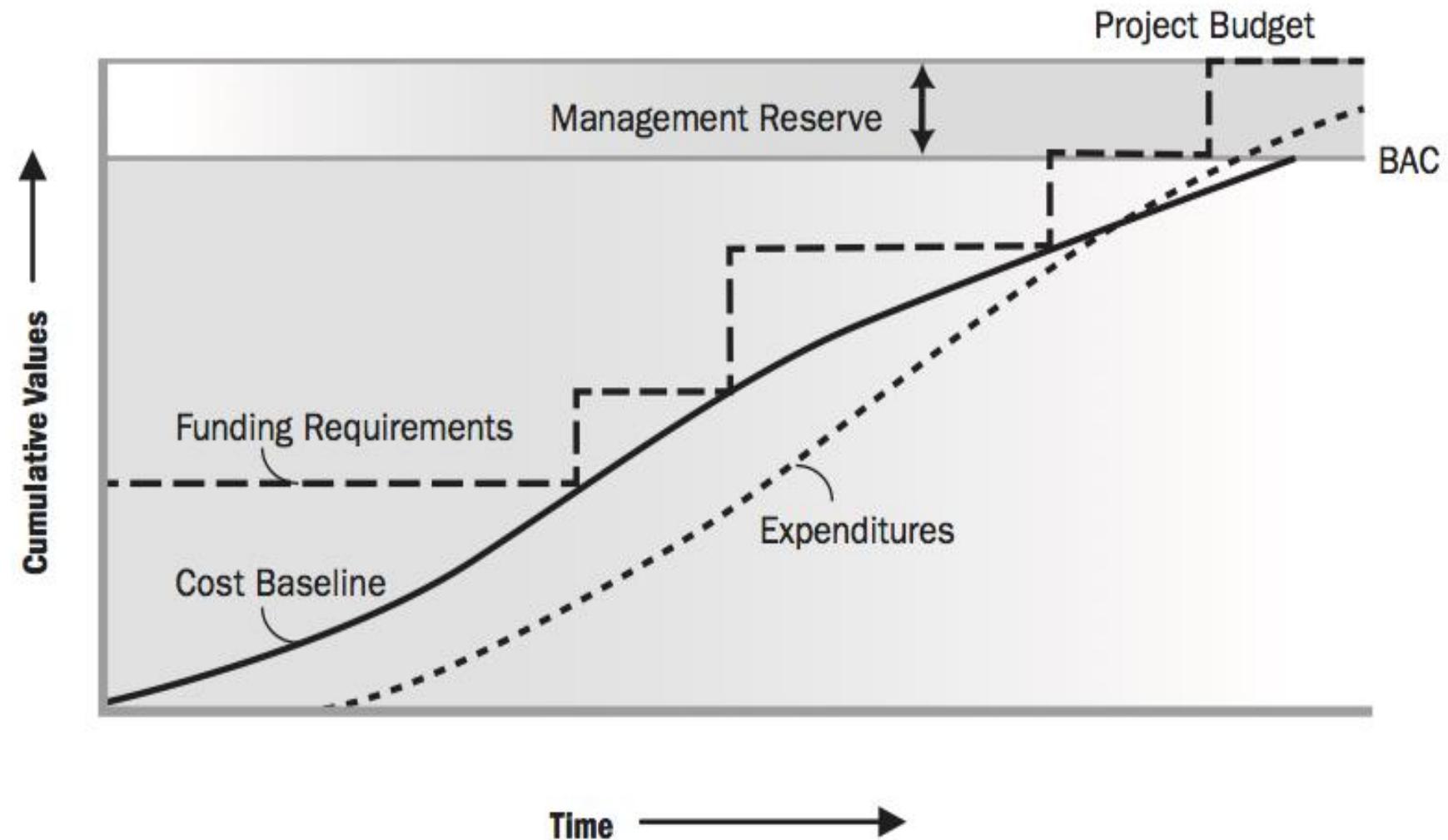
- 
- Create a **cost management plan**
  - Employ **estimating techniques** to assign costs to activities
  - Tailor a **cost baseline**
    - Is used to monitor and measure cost performance throughout the project (compares with actual results)
    - Includes budget contingencies to address identified risks
    - Can be changed only through formal change control procedures

The **budget at completion (BAC)** is the highest point on the cost baseline. The BAC is the sum of all budgets established, or the value of total planned work.

# Check with Organization

## Funding Limit Reconciliation

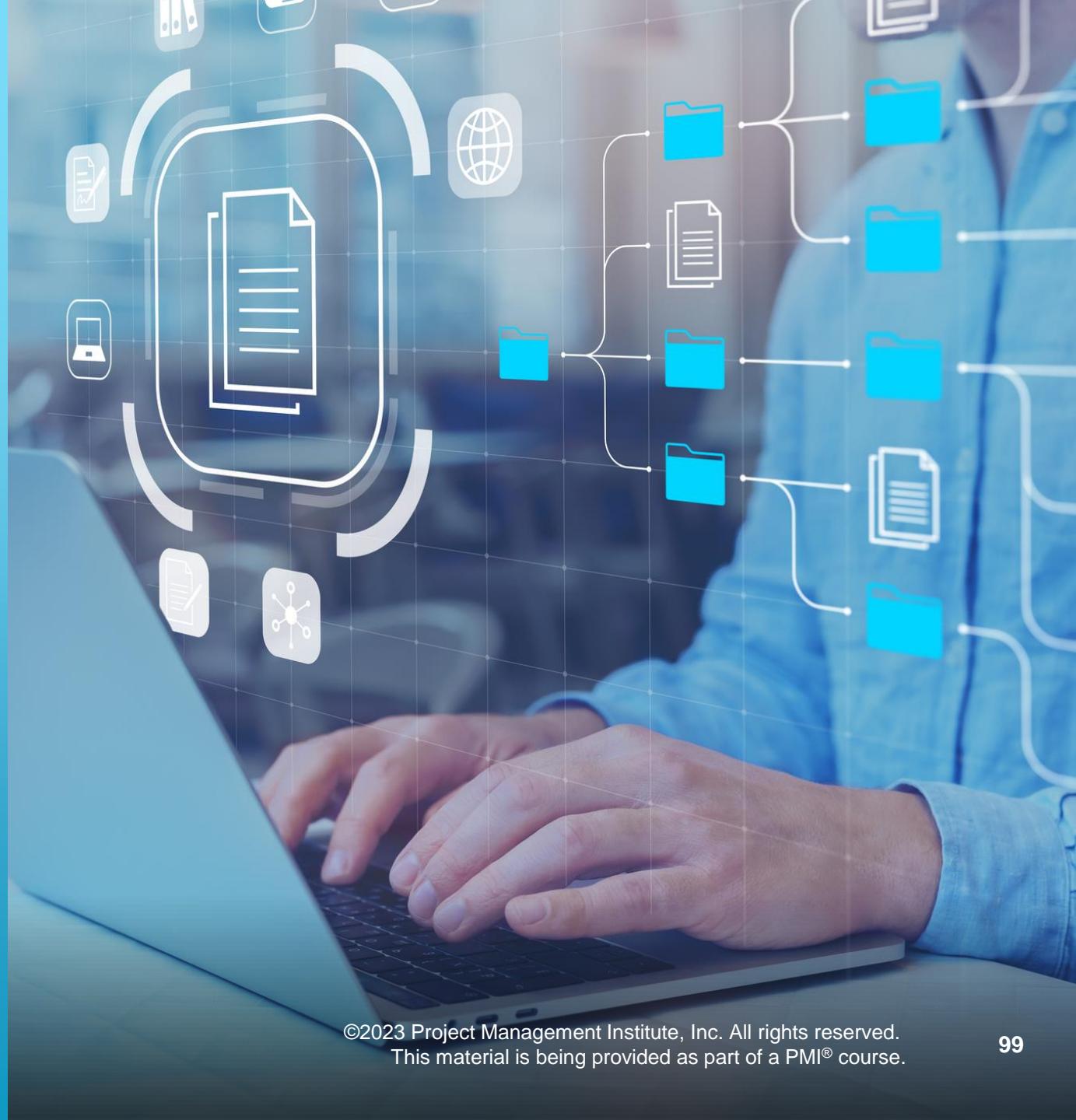
- Compare planned project expenditure against funding limits
- Align work/expenditures on the schedule to level the rate of expenditures



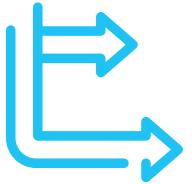
# Historical Data

## Start with What's Known

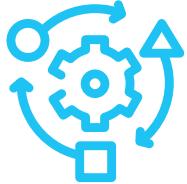
- Check lessons learned repository for budgets, estimates from previous, similar projects or data from the last iteration
- Look for valuable cost-estimating information - both successes and shortcomings
- Use analogous and estimating techniques, based on similar situations



# Resource Costs

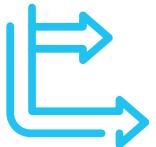


- Match project need to resource attributes (availability, experience, knowledge/skills, attitude)
- Create initial estimate based on average rate
- Modify as needed



- Assign a blended rate
- Estimate points (effort) using planning poker or affinity diagram to find the number of user stories that can be completed based on team velocity
- Use a simple formula to estimate the cost per point:
  - $\Sigma (\text{loaded team salaries for period } n) / \text{points completed in interval } n$
- Use a formula to estimate budget:
  - $(\text{Cost per point} * \text{total point value of items to be completed}) + \text{other expenses} = \text{forecast budget}$

# Estimate Costs



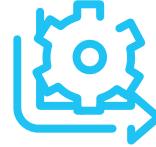
Estimate the cost for each activity or work package in a project.

Cost estimates should include:

- Direct labor
- Materials
- Equipment
- Facilities
- Services
- Information technology
- **Contingency reserves**

Use:

- Rough order of magnitude (-25 to +75%)
- Definitive Estimate (-5 to +10%)
- Phased estimate



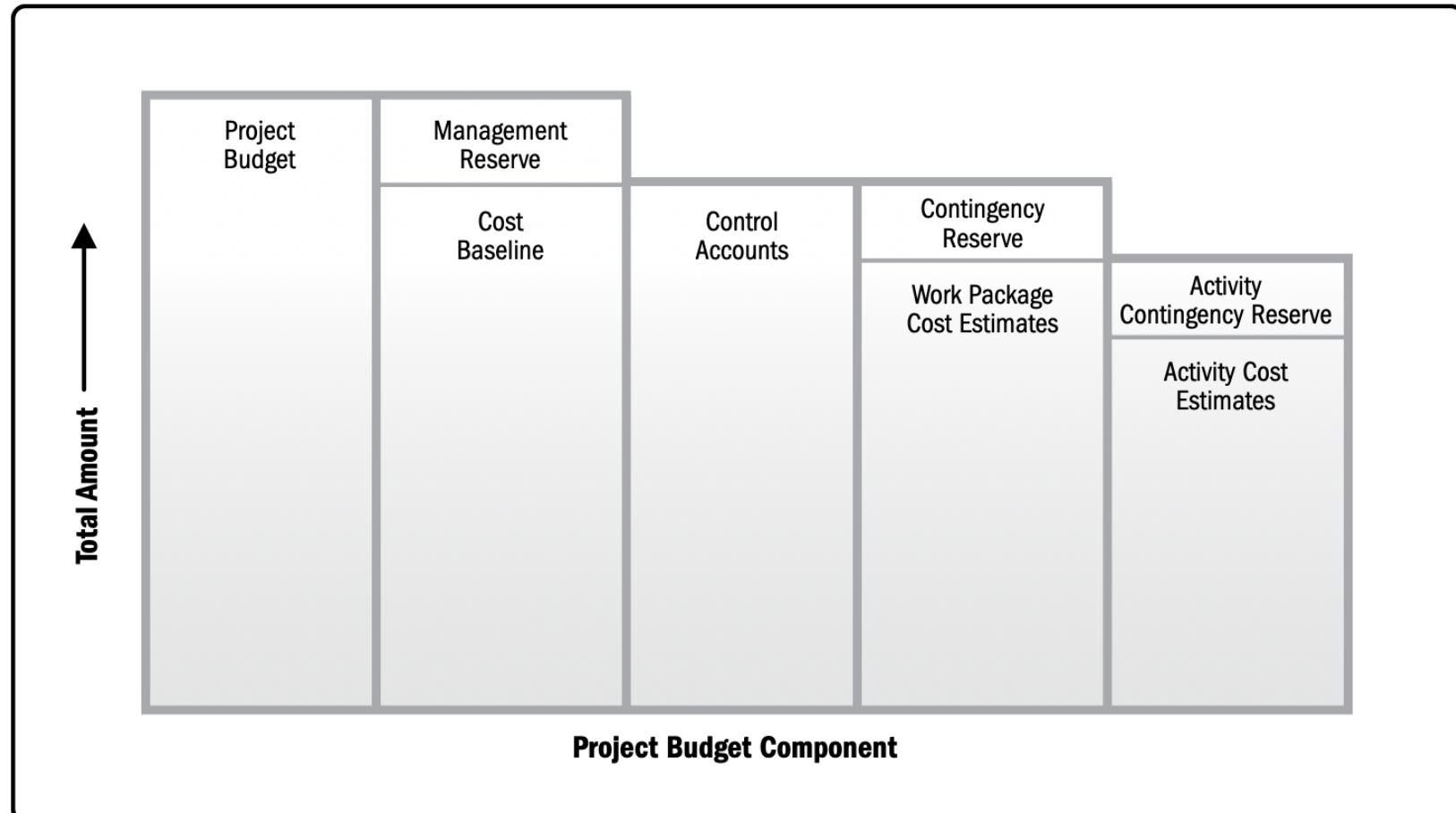
Expecting the scope to change?

Use lightweight estimation methods for high-level estimating.



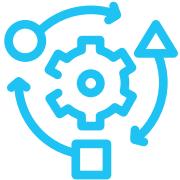
# Project Budget

- Use the bottom-up approach to aggregate activity costs, work package costs and cost baseline
- Include **contingencies** to support risk management

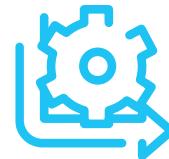


# Adaptive and Hybrid Budget Planning

## Guidelines/Example



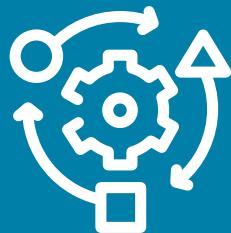
- Focus on short-term budgeting and metrics versus long-term
- Set time periods for work and prioritize work within those time periods.
- Base cost on the resources used for that time period



### Examples

- Estimate budget based on current data, plus a forecast algorithm that is based on historic data or expert guidance — e.g., lean or Kanban
- Use a “top-down” approach, using gross-level estimation techniques such as planning poker and affinity grouping on feature sets, then employing progressive elaboration and rolling-wave planning methods to drill down to the task level on a just-in-time basis (iteratively)
- Revise budget at sprint planning intervals

# Budget Considerations

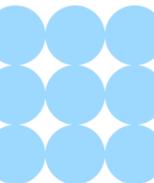
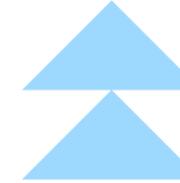
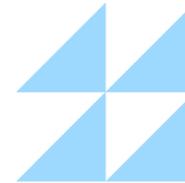
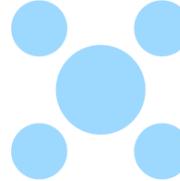


- Estimate budget based on the length of time of the project
- Burn rate includes:
  - Number of team members
  - Blended or actual team member rates
  - Time of involvement
- Assumption of full-time team involvement
- If additional equipment or supplies are required, add them to the estimated cost



*Product owner may control the budget, depending on team composition.*

# ECO Coverage



# DAILY PMP BOOTCAMP SURVEY



LOOK FOR THE SURVEY LINK IN THE CHAT

**Our goal** is to provide the best possible Bootcamp experience for a live streaming webinar, with hundreds of participants.

For each Bootcamp session,

- Let us know **what you liked** about the experience – your comments really matter.
  - Please include a thank you **to the mentor(s)** working off camera.
- If you have **recommendations**, share those too!

**We sincerely value your opinion!**

# Survey Scale

This Scale: 0 not at all likely- 10 extremely likely



On a scale of 0-10, how likely are you to recommend this bootcamp to someone else?

This Scale: 0 not at all likely - 10 extremely likely

# NOMINAL GROUP TECHNIQUE

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## NOMINAL GROUP TECHNIQUE

A technique that enhances brainstorming with a voting process used to rank the most useful ideas for further brainstorming or for prioritization.

# MULTI-CRITERIA DECISION ANALYSIS

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## MULTI-CRITERIA DECISION ANALYSIS

A technique that utilizes a decision matrix to provide a systematic, analytical approach for establishing criteria, such as risk levels, uncertainty, and valuation, to evaluate and rank many ideas.

# BENCHMARKING

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## BENCHMARKING

The comparison of actual or planned products, processes, and practices to those of comparable organizations to identify best practices, generate ideas for improvement, and provide a basis for measuring performance.

# CONTEXT DIAGRAM



## CONTEXT DIAGRAM

Visual depiction of product scope, showing a business system (process, equipment, computer system, etc.) and how people and other systems interact with it.

# STORYBOARDING

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## STORYBOARDING

The prototyping method that uses visuals or images to illustrate a process or represent a project outcome. Storyboards are useful to illustrate how a product, service, or application will function or operate when it is complete.

# PROTOTYPES

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## PROTOTYPES

A method of obtaining early feedback on user requirements by building a working model of the expected product. Prototypes can be used to solicit aesthetics, functionalities etc. Several iterations maybe displayed.

# SCOPE MANAGEMEN T PLAN

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## SCOPE MANAGEMENT PLAN

A component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and validated.

# WORK BREAKDOWN STRUCTURE (WBS)



## WORK BREAKDOWN STRUCTURE (WBS)

A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.



## EPIC

A large body of work that can be broken down into smaller pieces—features and user stories. Epics can take months to complete.

# FEATURE

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## FEATURE

A set of related requirements that allows the user to satisfy a business objective or need.

# SCHEDULE MANAGEMEN T PLAN

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## SCHEDULE MANAGEMENT PLAN

A component of the project or program management plan that establishes the criteria and activities for developing, monitoring, and controlling the schedule.

# WORK PACKAGE



## WORK PACKAGE

The work defined at the lowest level of the work breakdown structure (WBS) for which cost and duration are estimated and managed.

# DEPENDENCY

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## DEPENDENCY

A relationship between one or more tasks/activities. A dependency may be mandatory or discretionary, internal or external. See also “start-to-start”; “start-to-finish”; “finish-to-start”; and “finish-to-finish”.

# PRECEDENCE RELATIONSHIP



## PRECEDENCE RELATIONSHIP

A logical dependency used in the precedence diagramming methods.

# CRITICAL PATH

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## CRITICAL PATH

The sequence of activities that represents the longest path through a project, which determines the shortest possible duration.

# PROJECT ACTIVITY

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## PROJECT ACTIVITY

A distinct, scheduled portion of work performed during a project.

# ACTIVITY LIST

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## ACTIVITY LIST

A documented tabulation of schedule activities that shows the activity description, activity identifier, and a sufficiently detailed scope-of-work description so project team members understand what work is to be performed.

# ACTIVITY DEPENDENCY

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## ACTIVITY DEPENDENCY

A logical relationship between two project activities.

# PRECEDENCE DIAGRAMMIN G METHOD

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## PRECEDENCE DIAGRAMMING METHOD

A technique used to create the network diagram. It constructs a schedule model in which activities are represented by nodes and are graphically linked by one or more logical relationships to show the sequence in which the activities are to be performed.



## LEAD

The amount of time a successor activity can be advanced with respect to a predecessor activity.



## LAG

The amount of time a successor activity will be delayed with respect to a predecessor activity.

# CRITICAL PATH METHOD

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## CRITICAL PATH METHOD

A technique of schedule analysis in which the schedule activities are evaluated to determine the float or slack for each activity and the overall schedule. To calculate critical path, use the forward and backward pass along with float analysis to identify all network paths, including critical.

# FLOAT

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## FLOAT

The difference between the early and late dates.

# TOTAL FLOAT

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## TOTAL FLOAT

The amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project finish date or violating a schedule constraint.

# FREE FLOAT

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## FREE FLOAT

The amount of time that a scheduled activity can be delayed without impacting the early start date of any subsequent scheduled activity

# EARLY FINISH DATE (EF)

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## EARLY FINISH DATE (EF)

The earliest possible point in time when the uncompleted portions of a schedule activity can finish based on the schedule network logic, the data date, and any schedule constraints.

# EARLY START DATE (ES)

---



## EARLY START DATE (ES)

The earliest possible point in time when the uncompleted portions of a schedule activity can start based on the schedule network logic, the data date, and any schedule constraints.

# LATE FINISH DATE (LF)

---



## LATE FINISH DATE (LF)

The latest possible point in time when the uncompleted portions of a schedule activity can finish based on the schedule network logic, the project completion date, and any schedule constraints.

# LATE START DATE (LS)

---



## LATE START DATE (LS)

The latest possible point in time when the uncompleted portions of a schedule activity can start based on the schedule network logic, the project completion date, and any schedule constraints.

# RESOURCE SMOOTHING

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## RESOURCE SMOOTHING

A resource optimization technique in which free and total float are used without affecting the critical path. See also “Resource Levelling” and “Resource Optimization Technique”.

# RESOURCE LEVELLING

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## RESOURCE LEVELLING

A resource optimization technique in which adjustments are made to the project schedule to optimize the allocation of resources and which may affect the critical path.

# FAST TRACKING

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## FAST TRACKING

A schedule compression technique in which activities or phases normally done in sequence are performed in parallel for at least a portion of their duration.

# CRASHING

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## CRASHING

Applying additional resources to one or more tasks/activities to complete the work more quickly. Crashing usually increases costs more than risks. In comparison, fast-tracking increases risks.

# SCHEDULE BASELINE

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## SCHEDULE BASELINE

The approved version of a schedule model that can be changed using formal change control procedures and is used as the basis of comparison to actual results. It is one of the main project documents that should be created before the project starts.

# HARDENING ITERATION / ITERATION H

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## HARDENING ITERATION / ITERATION H

Specialized increment/ iteration/sprint dedicated to stabilizing the code base so that it is robust enough for release. No new functionality is added. Primarily used for refactoring and/or technical debt.

# SPRINT VELOCITY

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## SPRINT VELOCITY

A descriptive metric used by agile and hybrid teams. It describes the volume of work that a team performs during a sprint. Use this metric to understand the rate of your team's work during an average sprint.

# DEFINITION OF READY (DOR)

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## DEFINITION OF READY (DOR)

A team's checklist for a user-centric requirement that has all the information the team needs to be able to begin working on it.

# DEFINITION OF DONE (DOD)

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## DEFINITION OF DONE (DOD)

A team's checklist of all the criteria required to be met so that a deliverable can be considered ready for customer use.

# ITERATION BACKLOG

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## ITERATION BACKLOG

The work that is committed to be performed during a given iteration.

# RESOURCE MANAGEMEN T PLAN

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## RESOURCE MANAGEMENT PLAN

A component of the project management plan that describes how project resources are acquired, allocated, monitored, and controlled.

# RESOURCE CALENDAR

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## RESOURCE CALENDAR

A calendar that identifies the working days and shifts for which each specific resource is available.

# RACI CHART

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## RACI CHART

Stands for Responsible, Accountable, Consult, and Inform. A common type of responsibility assignment matrix (RAM) that uses responsible, accountable, consult, and inform statuses to define the involvement of stakeholders in project activities.

# MAKE-OR-BUY ANALYSIS

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## MAKE-OR-BUY ANALYSIS

The process of gathering and organizing data about product/service requirements and analyzing data against available alternatives including the purchase or internal manufacture of the project.

# MAKE-OR-BUY DECISIONS

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## MAKE-OR-BUY DECISIONS

Decisions made regarding the external purchase versus internal manufacture of a product.

# PROCUREMENT MANAGEMENT PLAN

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## PROCUREMENT MANAGEMENT PLAN

A component of the project or program management plan that describes how a project team will acquire goods and services from outside the executing organization.

# PROCUREMENT DOCUMENTS

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## PROCUREMENT DOCUMENTS

Documents used in bid and proposal activities, which include the buyer's invitation for bid, expression of interest (EOI); invitation for negotiations; request for information (RFI); request for quotation (RFQ); request for proposal (RFP); and seller's responses.

# STATEMENT OF WORK (SOW)

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## STATEMENT OF WORK (SOW)

A narrative description of products, services, or results to be delivered.

# REQUEST FOR PROPOSAL (RFP)

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## REQUEST FOR PROPOSAL (RFP)

A type of procurement document used to request proposals from prospective sellers of products or services. In some application areas, it may have a narrower or more specific meaning.

# BIDDER CONFERENCES

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## BIDDER CONFERENCES

The meetings with prospective sellers prior to the preparation of a bid or proposal to ensure all prospective vendors have a clear and common understanding of the procurement. Also called vendor conferences, pre-bid conferences, or contractor conferences.

# SOURCE SELECTION CRITERIA



## SOURCE SELECTION CRITERIA

A set of attributes, desired by the buyer, which a seller is required to meet or exceed to be selected for a contract.

# CONTRACT

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## CONTRACT

A mutually binding agreement that obligates the seller (supplier) to provide the specified project or service or result and obligates the buyer to pay for it.

# BURN RATE

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## BURN RATE

The rate at which the project consumes financial resources, representing negative cash flow. Burn rates are often used by agile projects to budget costs for planned iterations / sprints / increments.

# COST MANAGEMEN T PLAN



## COST MANAGEMENT PLAN

A component of a project or program management plan that describes how costs will be planned, structured, and controlled.

# COST BASELINE

---



## COST BASELINE

The approved version of the time-phased project budget, excluding any management reserves, which can be changed only through formal change control procedures and is used as a basis for comparison to actual results.

# BUDGET AT COMPLETION (BAC)

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## BUDGET AT COMPLETION (BAC)

The sum of all budgets established to provide financial support for the work to be performed.

# CONTINGENCY RESERVE

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## CONTINGENCY RESERVE

Time or money allocated in the schedule or cost baseline for known risks with active response strategies.