# Project Management Institute
# 1st Annual Professional Development Day

# *Schedule Risk Assessment*

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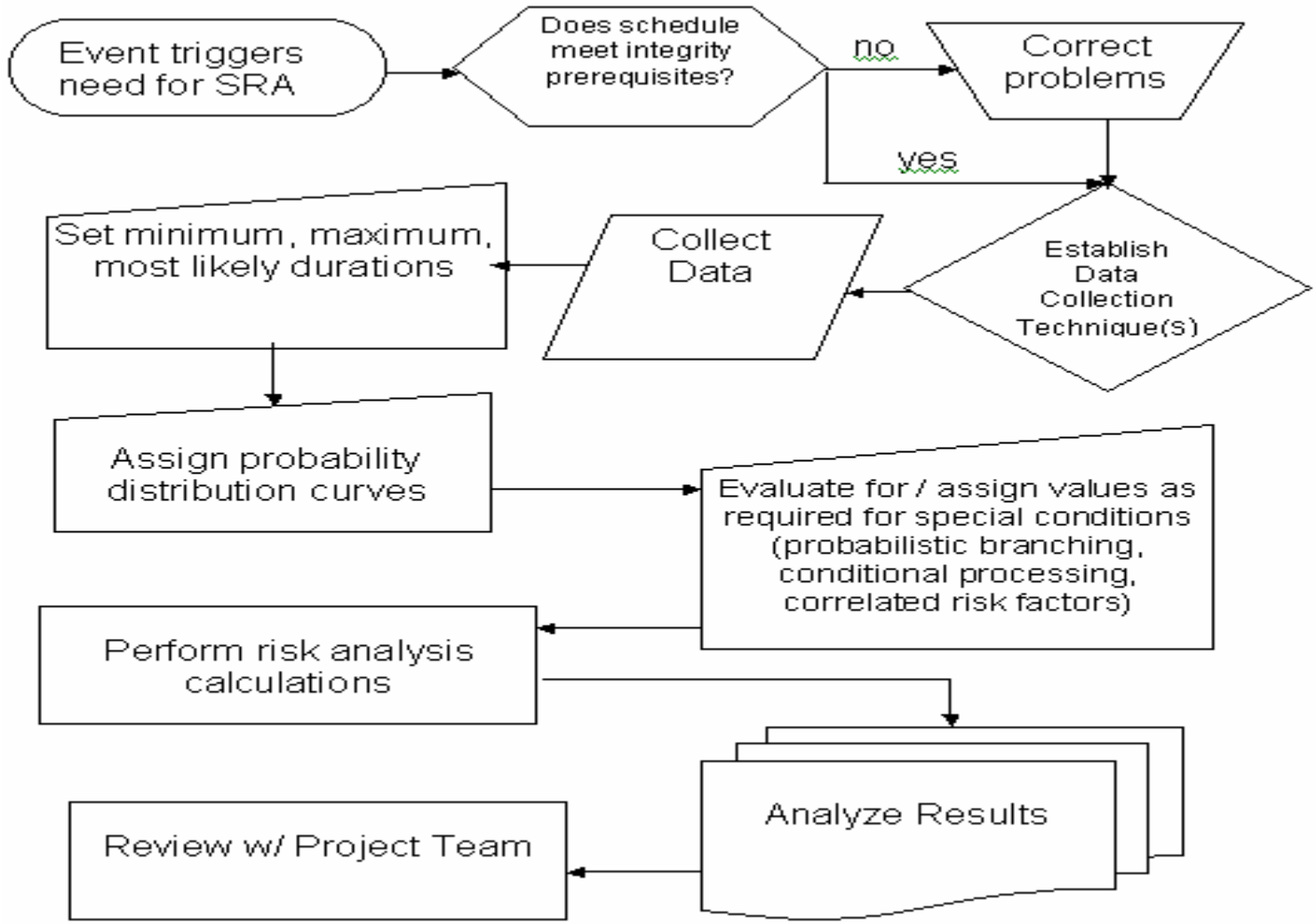
# Schedule Risk Assessment – Why Do It?

- To determine the likelihood of finishing on time
  - Tasks in a schedule typically reflect the “most likely” duration for each task
  - In reality, each task is different and has a varying degree of probability of finishing within or after the duration specified
  - Schedule risk assessment quantifies these probabilities by assigning values to each task
  - This technique bridges the gap between traditional CPM scheduling and the Project Manager’s “need to know”


# Schedule Risk Assessment – Basic Process



# Schedule Risk Assessment Prerequisites

- Constraints (artificially induced dates) affect risk calculations – takes probability out of the equation
- Incomplete logic networks (missing relationships between tasks in a schedule) lead to incorrect representations
- Missing tasks create incomplete and incorrect results
- Descriptions should be complete and clear to better enable the assignment of risk parameters
- Tasks that are too large (i.e. have large durations) lead to results with large ranges.


# Schedule Risk Assessment
# Duration Assignment

- The original duration specified in the schedule is assumed to be the “most likely”
- The minimum, or optimistic, duration is the least amount of time required or allowed to complete the task, if everything goes perfectly
- The maximum, or pessimistic, duration is the greatest amount of time required or allowed to complete the task, if everything goes wrong

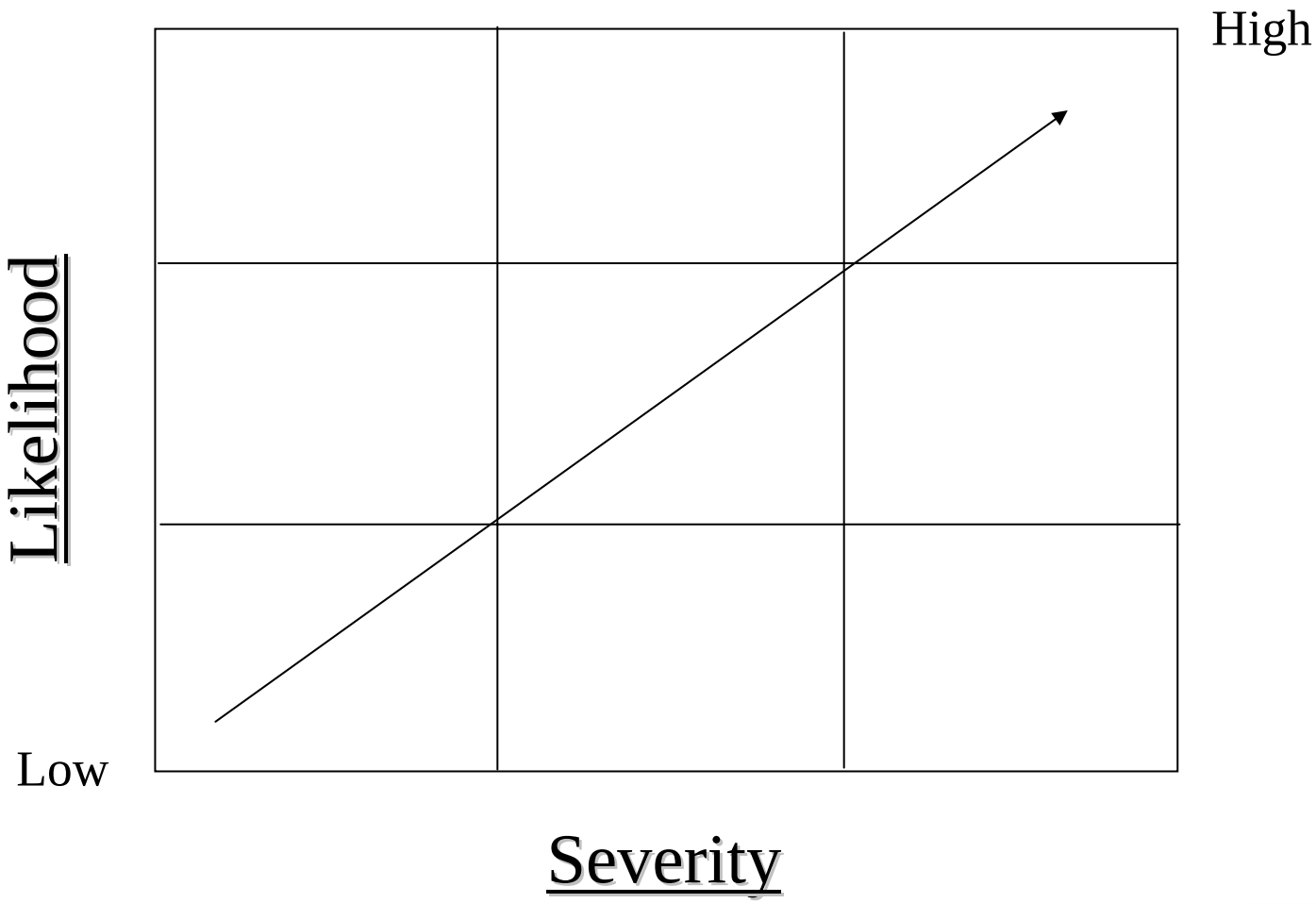

# Schedule Risk Assessment
# Duration Assignment

- Methods for making duration assignments, in order of preference:
  - *Data Interview* - Evaluate each task independently by collecting data and interviewing personnel and enter each duration manually (preferred method)
  - *Historical Data* – Collect and evaluate data for the subject project or similar projects (does not address direct & indirect performance issues)
  - *Grouping* – Assign risk parameters to tasks that share common characteristics (not as accurate, but acceptable)
  - *Blanketing* – Assign risk parameters with a parametric across the entire project (not very accurate, difficult to validate)
  - *Heuristic* – Make your best "guess" (no basis or validity)


# Schedule Risk Assessment
# Duration Assignment

- One must consider specific risks in making optimistic and pessimistic value assignments
  - Nature of the work
  - Past history
  - Technology Readiness Level (TRL)
  - “Knowns”and “Unknowns”
  - Project or Program risk evaluations


# Schedule Risk Assessment
# Sample Risk Matrix



# Schedule Risk Assessment
# Probability Distribution Curves

- The PDC is a way to indicate the likelihood of values between the optimistic and pessimistic values
- A PDC can be:
  - Uniform (flat)
  - Normal (bell shaped)
  - Beta (skinny bell shaped)
  - Triangular (pyramid shaped)
  - Customized (other user defined shapes)


# Schedule Risk Assessment
# Special Conditions

- Probabilistic branching considers the situation where the outcome of a task can result in two or more possible courses of action
- Conditional branching addresses the impact of external influences, such as weather
- Correlated risk exists when two or more tasks are affected by some other event
  - A negative correlation suggests that what happens to one will cause the opposite to happen in the other
  - A positive correlation suggests that what happens to one is likely to happen to the other

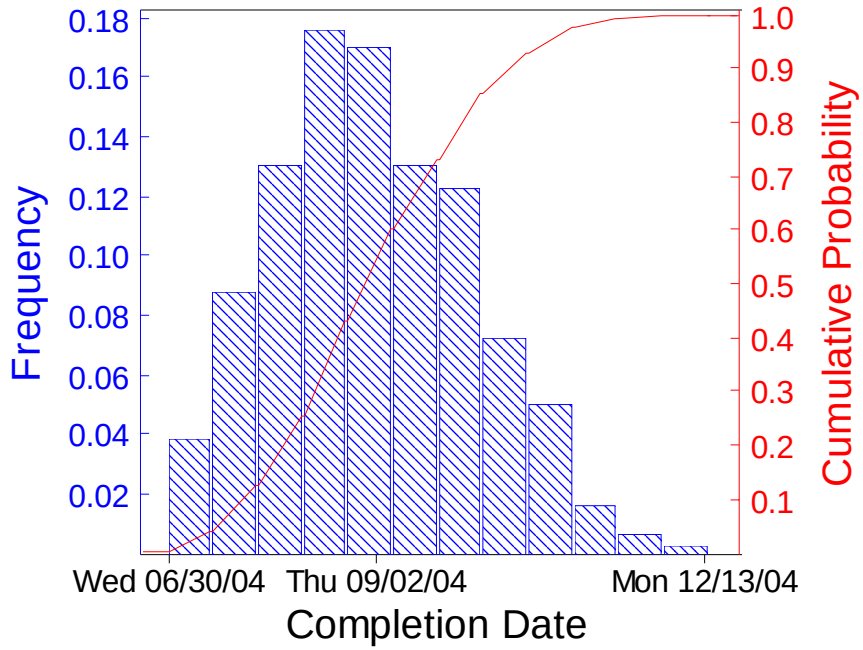

# Schedule Risk Assessment Calculations

- A random method is used for selecting possible values in a range
  - Monte Carlo – Speedier method, but has a larger possibility of sampling error
  - Latin Hypercube Sampling (LHS) – Slower method, reduces sampling error
- An iteration is selecting one sample point from each task and calculating the outcome
- These calculations are performed by software – the user specifies the number of iterations


# Schedule Risk Assessment
# Results Analysis

Date: 07/25/2002 9:58:36 AM
Samples: 500
Unique ID: 0
Name:

Completion Std Deviation: 22.09 d
95% Confidence Interval: 1.94 d
Each bar represents 10 d




Completion Probability Table

| Prob | Date | Prob | Date |
|---|---|---|---|
| 0.05 | Mon 07/19/04 | 0.55 | Fri 09/03/04 |
| 0.10 | Mon 07/26/04 | 0.60 | Wed 09/08/04 |
| 0.15 | Fri 07/30/04 | 0.65 | Tue 09/14/04 |
| 0.20 | Thu 08/05/04 | 0.70 | Fri 09/17/04 |
| 0.25 | Wed 08/11/04 | 0.75 | Fri 09/24/04 |
| 0.30 | Tue 08/17/04 | 0.80 | Wed 09/29/04 |
| 0.35 | Thu 08/19/04 | 0.85 | Wed 10/06/04 |
| 0.40 | Tue 08/24/04 | 0.90 | Thu 10/14/04 |
| 0.45 | Fri 08/27/04 | 0.95 | Wed 10/27/04 |
| 0.50 | Tue 08/31/04 | 1.00 | Mon 12/13/04 |

Initial Analysis (Duration -5% to +40%)

# Schedule Risk Assessment
# Results Analysis

- Critical Path Analysis – indicates whether or not a task is "risk critical" (i.e. during iterative calculations, whether or not it becomes a critical task)
  - If critical, indicates percentage of time during simulation
- Sensitivity Analysis – indicates the potential impact an activity has on the overall project or program completion
  - Task duration
  - Minimum and maximum durations