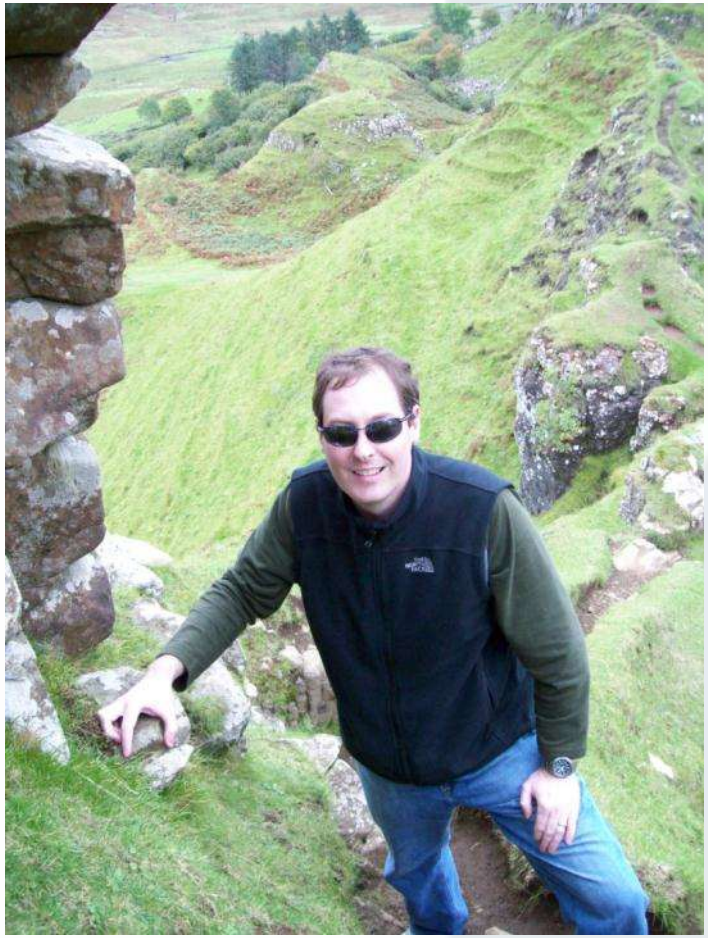
Agile and the Nature of Decision Making

Risk Management

for Agile in the Enterprise



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What we're going to talk about

Why we need to figure out risk management in large agile projects

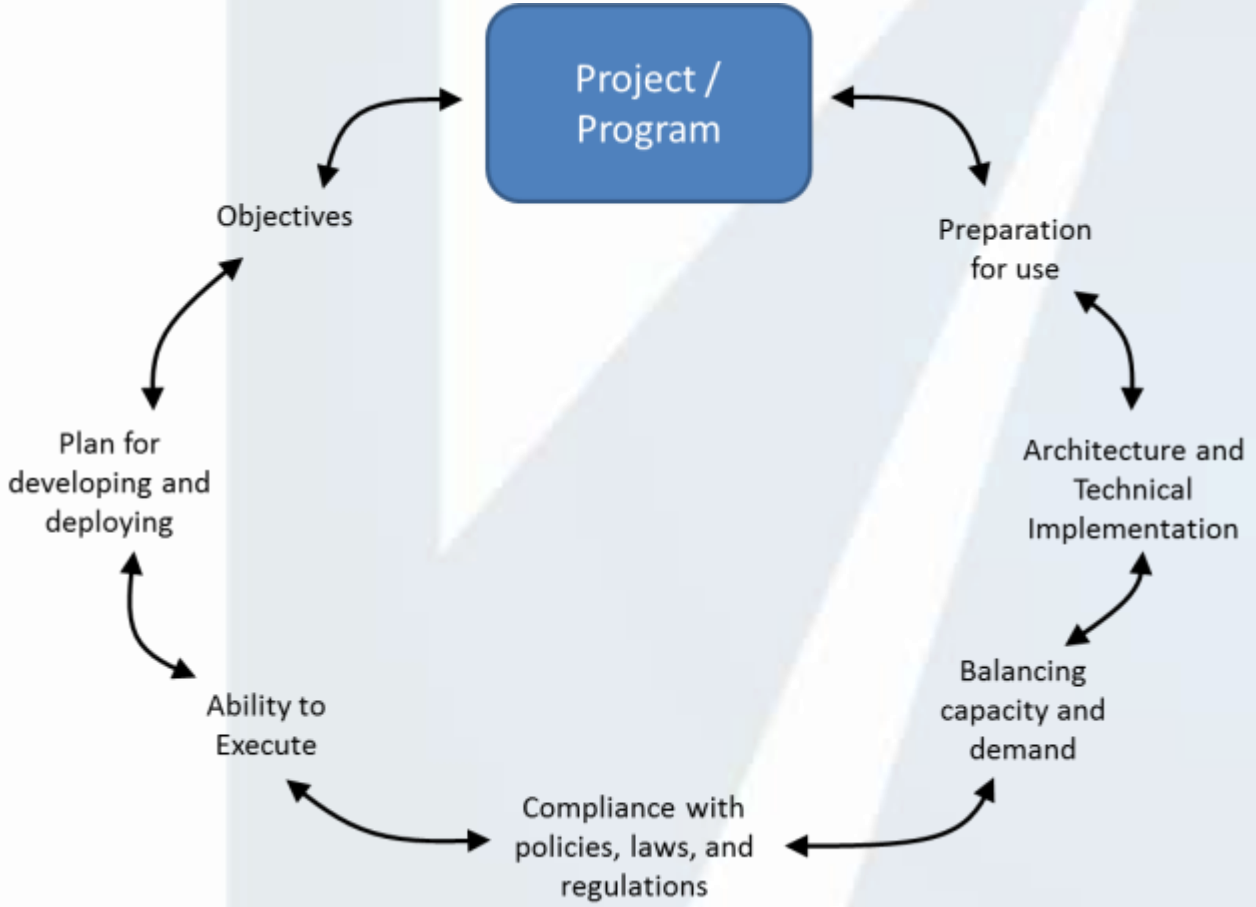
Practice a proven approach

- Define Risk Drivers
- Agile Risk Assessment
- Integrate Risk Management

Explore Quantitative approach

- Nature and shape of risk impact
- Simulating impact of cost of delay and risks

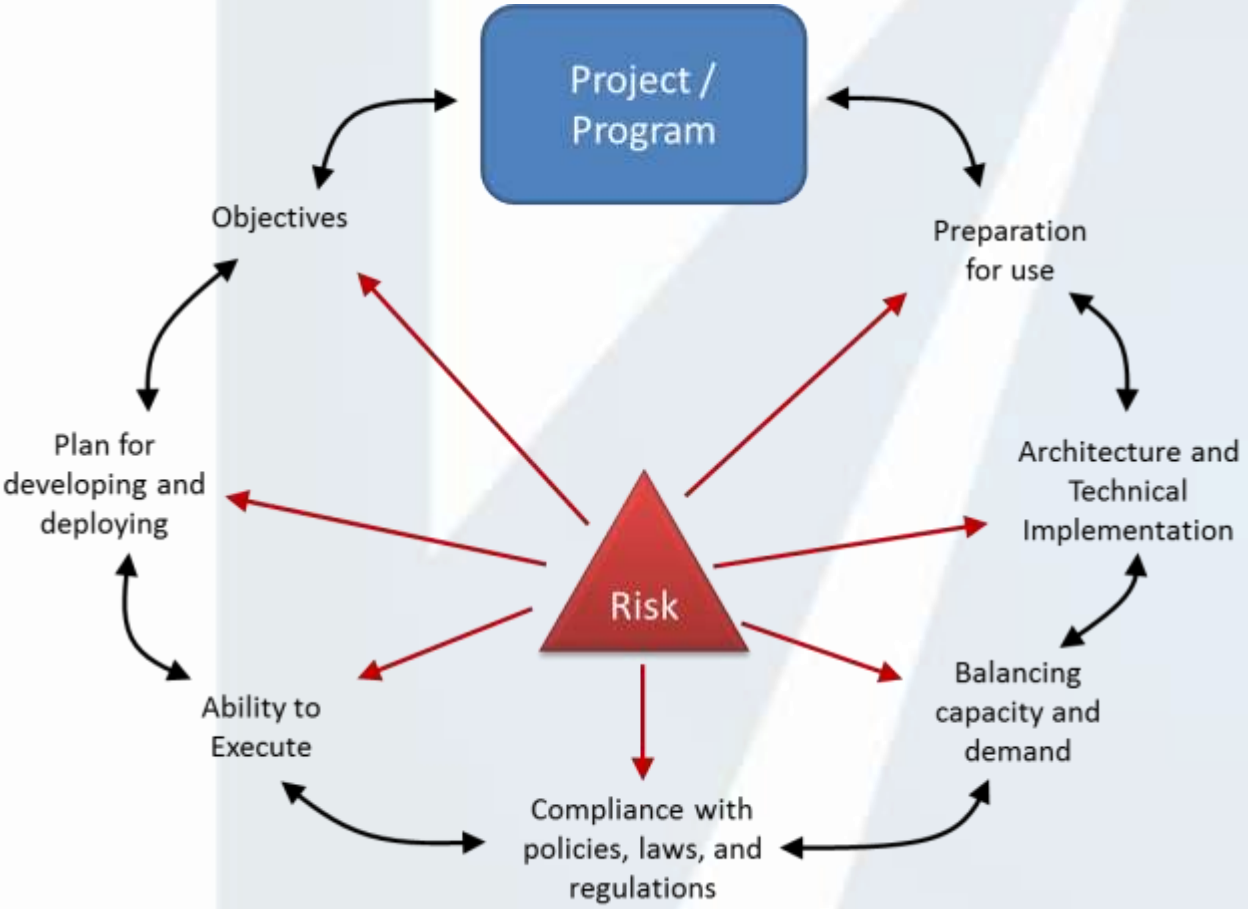
Decisions are made throughout a project



Decision making is impacted by many factors

- Available **I**nformation
- Uncertainty about **C**onsequences
- Awareness of Alternatives
- What **C**ontext we are paying attention to
- When the decision is made and how much **T**ime we have to make the decision
- **U**ncertainty about the desired outcomes
- Conflicting concerns among **S**takeholders

Decisions are interdependent



A decision in one area may reveal or create other problems in other areas.

Risk Management

Risk

The likelihood of suffering a loss or missing an opportunity

Risk Management

How decisions are made under uncertainty during the project to:

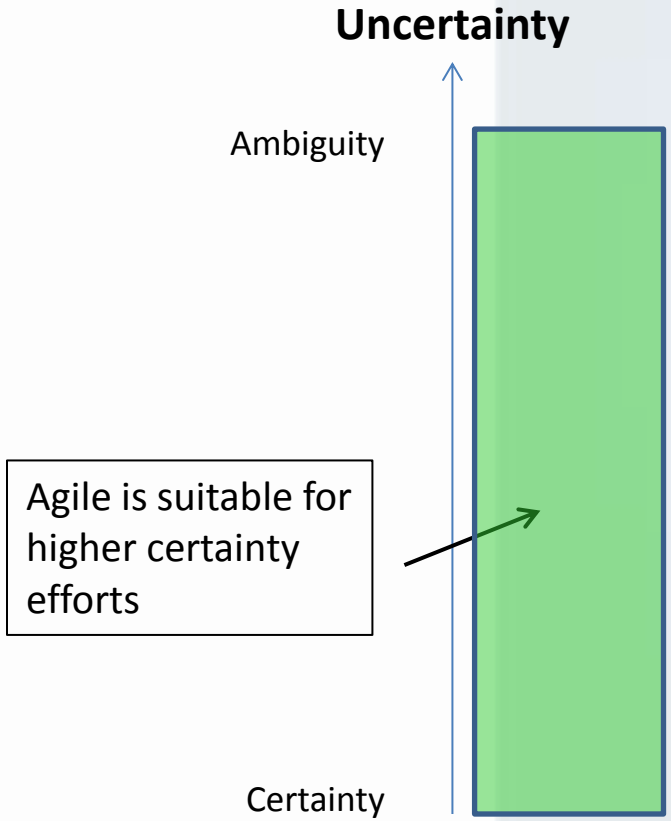
- avoid losses on the project that are avoidable, and
- benefit from opportunities that arise during the project

Risk Management in Agile

Agile has risk management implicitly built in

- Feedback cycles (Product, Progress, Process, and Capability) are built in throughout the agile cadence
- Co-located teams (individuals and interactions) facilitate shared understanding
- Agile teams may explore alternatives through spikes and dialog
- Continuous delivery of working-tested software

Agile Implicit (built-in) Risk Management



When practiced by mature agile practitioners in a co-located environment on relatively small projects –implicit risk management may be appropriate

Limits of Agile Risk Management

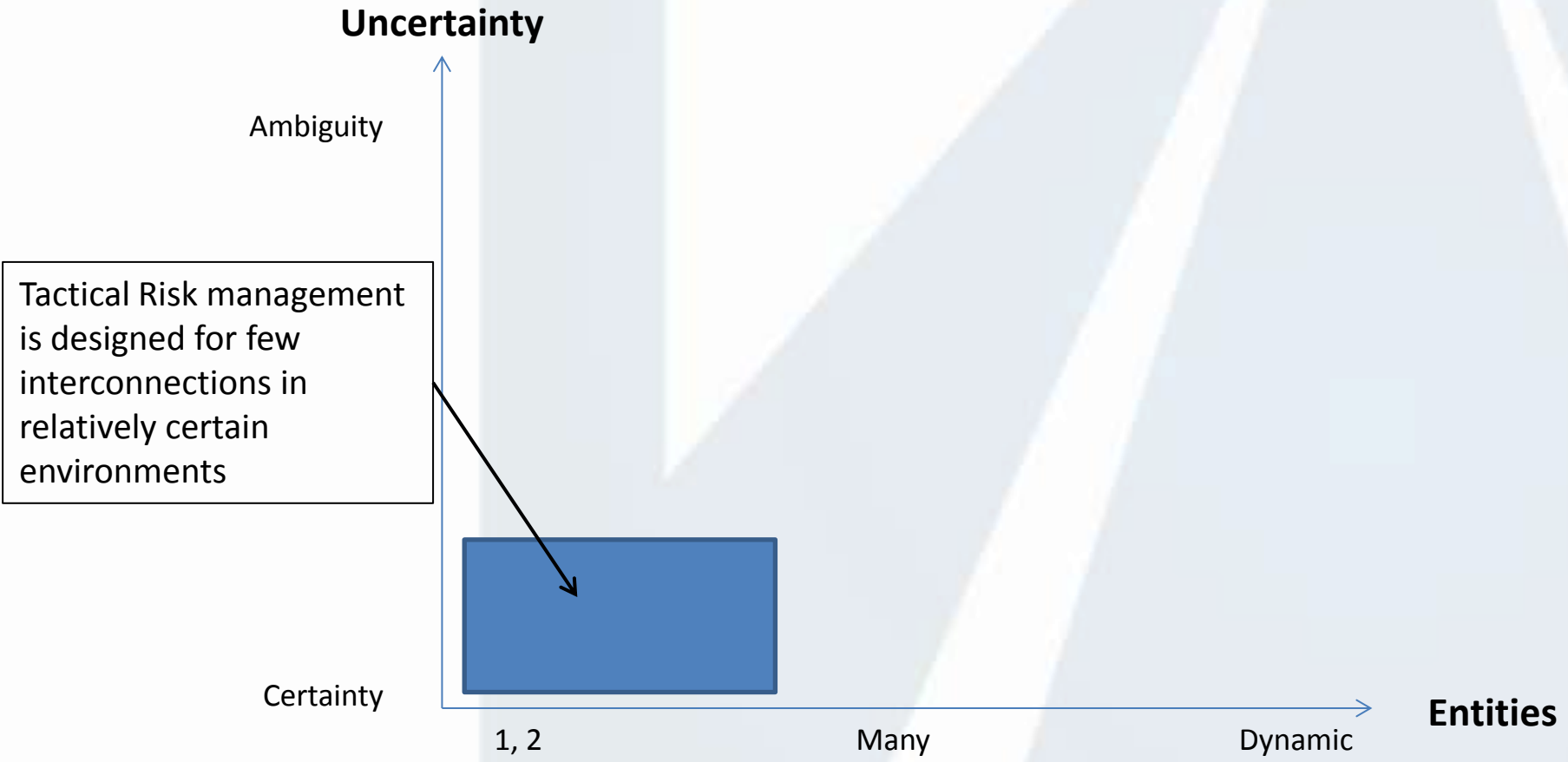
- Can miss important aspects of the program outcomes that are outside the teams line of sight
- Makes is difficult to measure the risk impact
- Can encourage pushing risky things off so we can maintain an optimistic burn-up
- Often is tactical in nature – focusing on a local effect without a clear connection to the outcomes

“Traditional” Risk Management

Risk Management in Many Organizations

- Tactical in nature
- Focuses on threats and the direct consequences of the threat
- Driven by bottom up analysis
- Often identified, assessed and managed independently of the teams executing the work

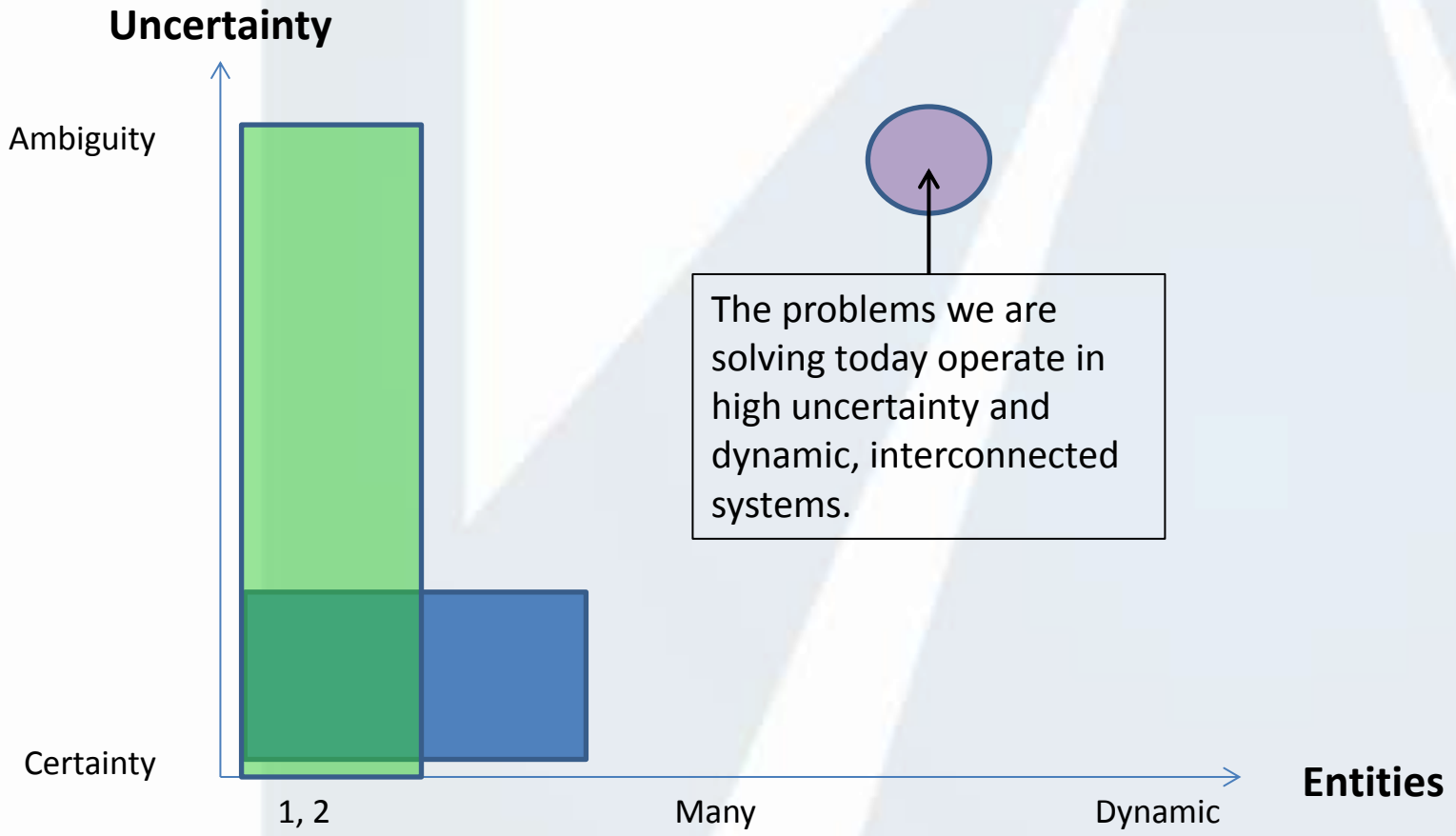
Tactical approach to risk management



Limits of Traditional Risk Management

- Creates bureaucratic overhead
- Managing point solutions mean that the risk impact may not be closely connected to objectives
- Significant gaps in ability to handle ambiguity and emergence
- Ineffective integration of risk-management
- Often ignores opportunities

Insufficient approaches to risk management



What is needed

To handle scale

- Explicit risk management
- Systemic view of risk

To handle ambiguity

- Continuous risk management
- Integrated with the work and the team
- Exploits opportunity as well as avoids threats

What I've drawn on for this approach

Significant Experience with Agile in the Enterprise

SEI-CMM research into Systemic Risk Management (MOSIAC)

Lean-Startup, particularly validated learning, scientific experimentation, and iterative product releases

Modeling and Forecasting using Monte Carlo techniques

Risk Management for Agile in the Enterprise

- Identify Risk Drivers
  - Identify objectives
  - Determine risk drivers
- Agile Risk Assessment
  - Assess against risk drivers (Threats and Opportunities)
  - Risk profile / burn-down
- Integrate Risk Management
  - Plan responses
  - Risk board
  - Acceptance criteria

How to simulate , measure and understand how risk impacts delivery

SHAPE OF RISKS TO COME

Risks and Shape

- Simple Model
- Base Scope of 50 stories – Always Normal
- 5 Risks, each with
  - 25% Likelihood
  - 10 Stories (same as 20% scope increase each)

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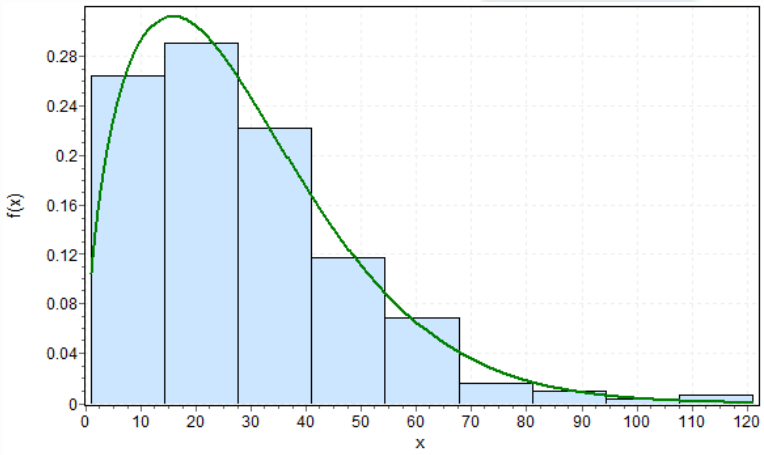
Historical Story Lead Time Trend



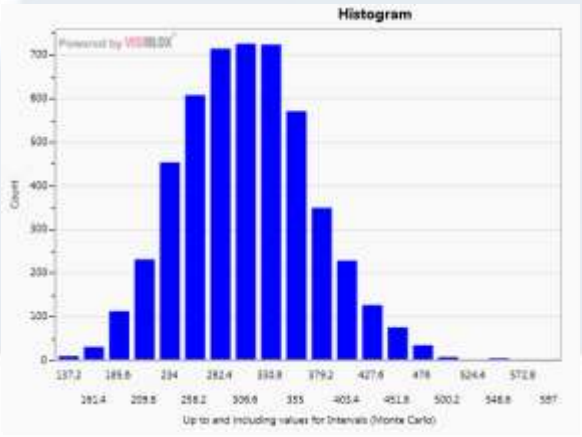
Sum Random Numbers

25	31				19
11	43				12
29	65				24
43	45				27
34	8				21
26	7				3
31	34				9
45	73	.....			20
22	54				23
27	48				29
Sum:	295		410		187

Basic Lean Forecast Monte Carlo Process

1. Gather historical story lead-times
2. Build a set of random numbers based on pattern
3. Sum a random number for each remaining story to build a single outcome
4. Repeat many times to find the likelihood (odds) to build a pattern of likelihood outcomes

$$Total\ Days = \frac{Sum\ (\ Story_n\ \times\ Random_n\ )}{Effort}$$



Days To Complete

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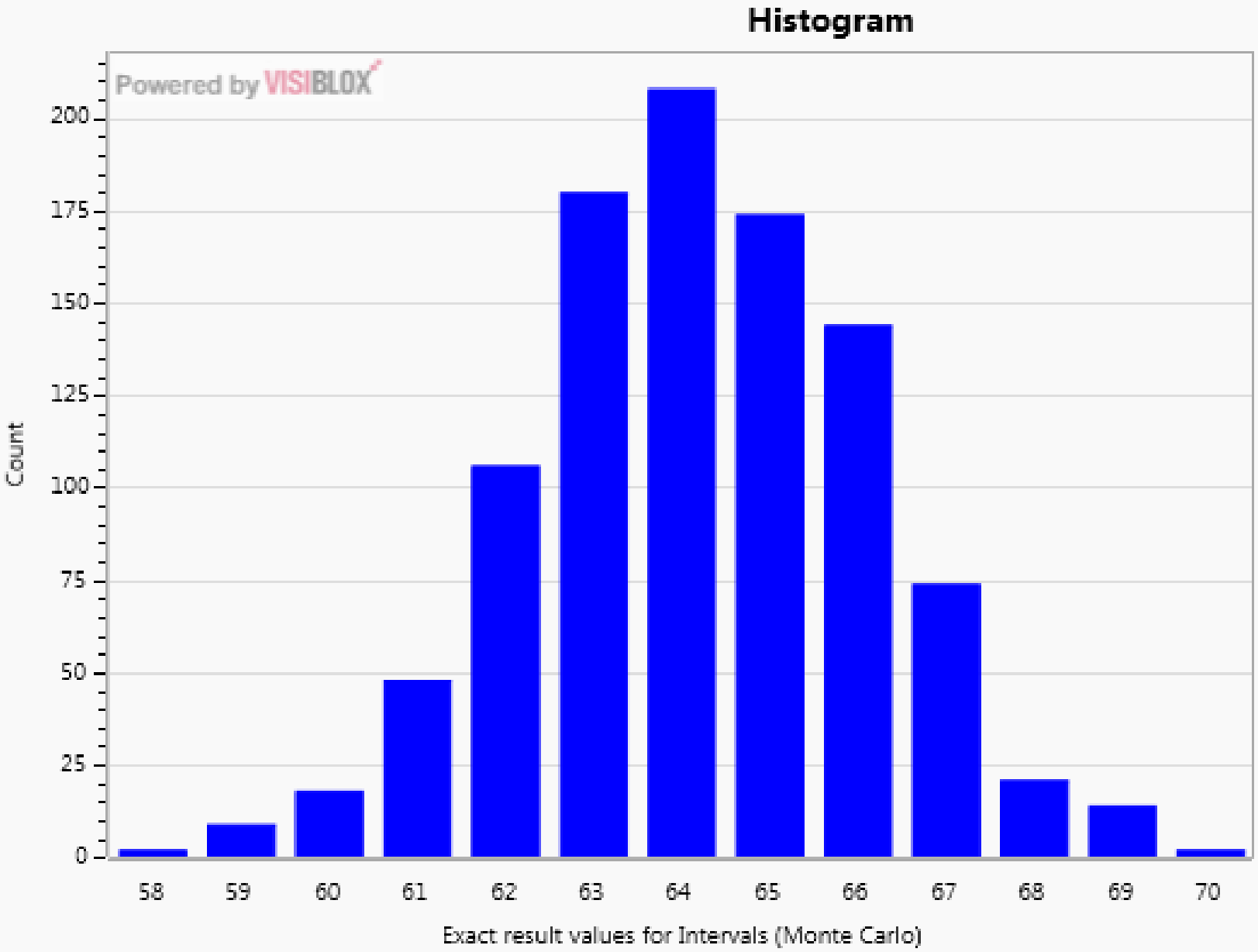
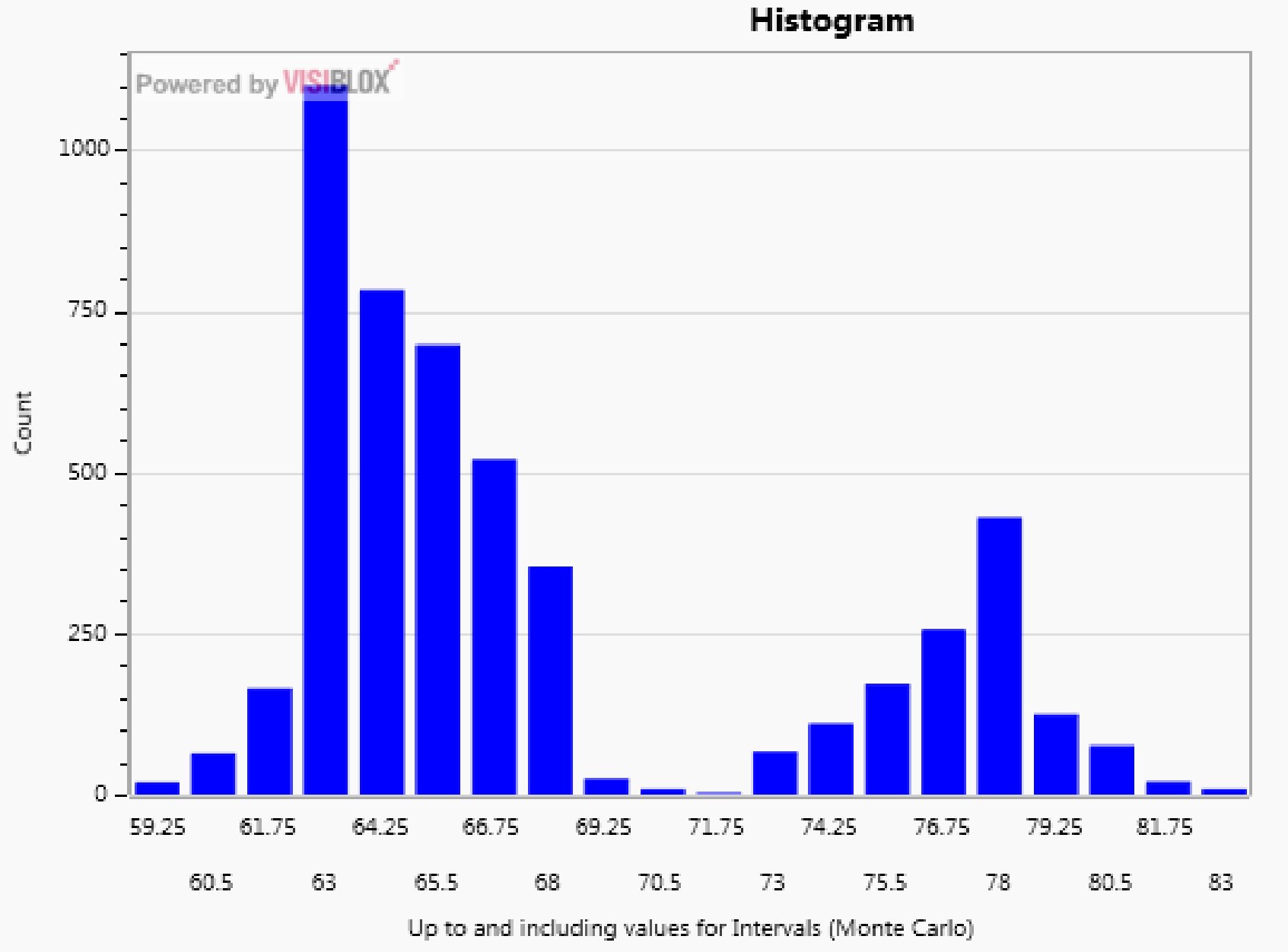
Sample Count: 1000 **Min:** 58 **Avg:** 64.185 **Median:** 64 **Max:** 70 **Standard Dev:** 1.94

5th %: 61 **25th%:** 63 **75th%:** 66 **95th%:** 67



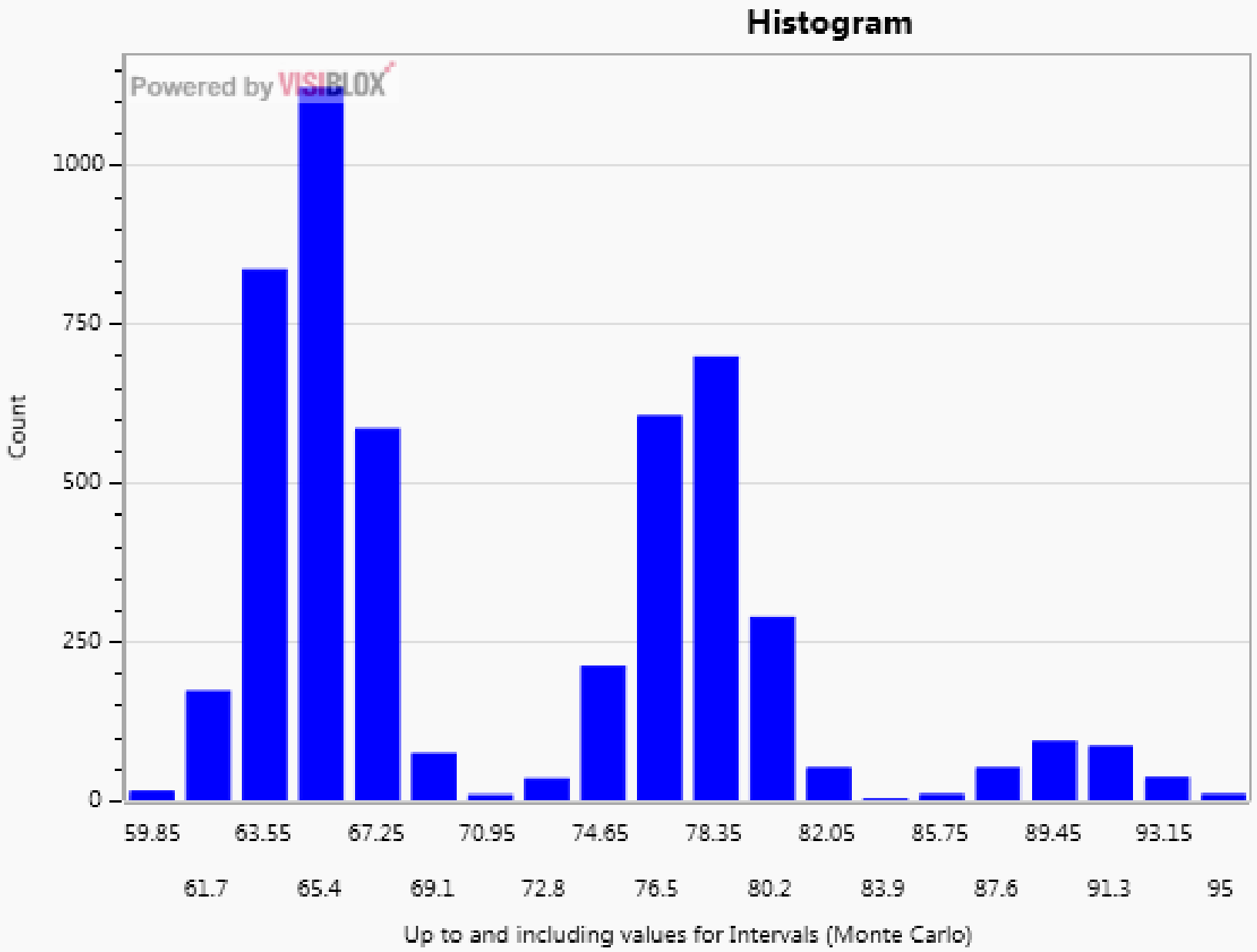
Sample Count: 5000 **Min:** 58 **Avg:** 67.344 **Median:** 65 **Max:** 83 **Standard Dev:** 5.747

5th %: 62 **25th%:** 63 **75th%:** 72 **95th%:** 78



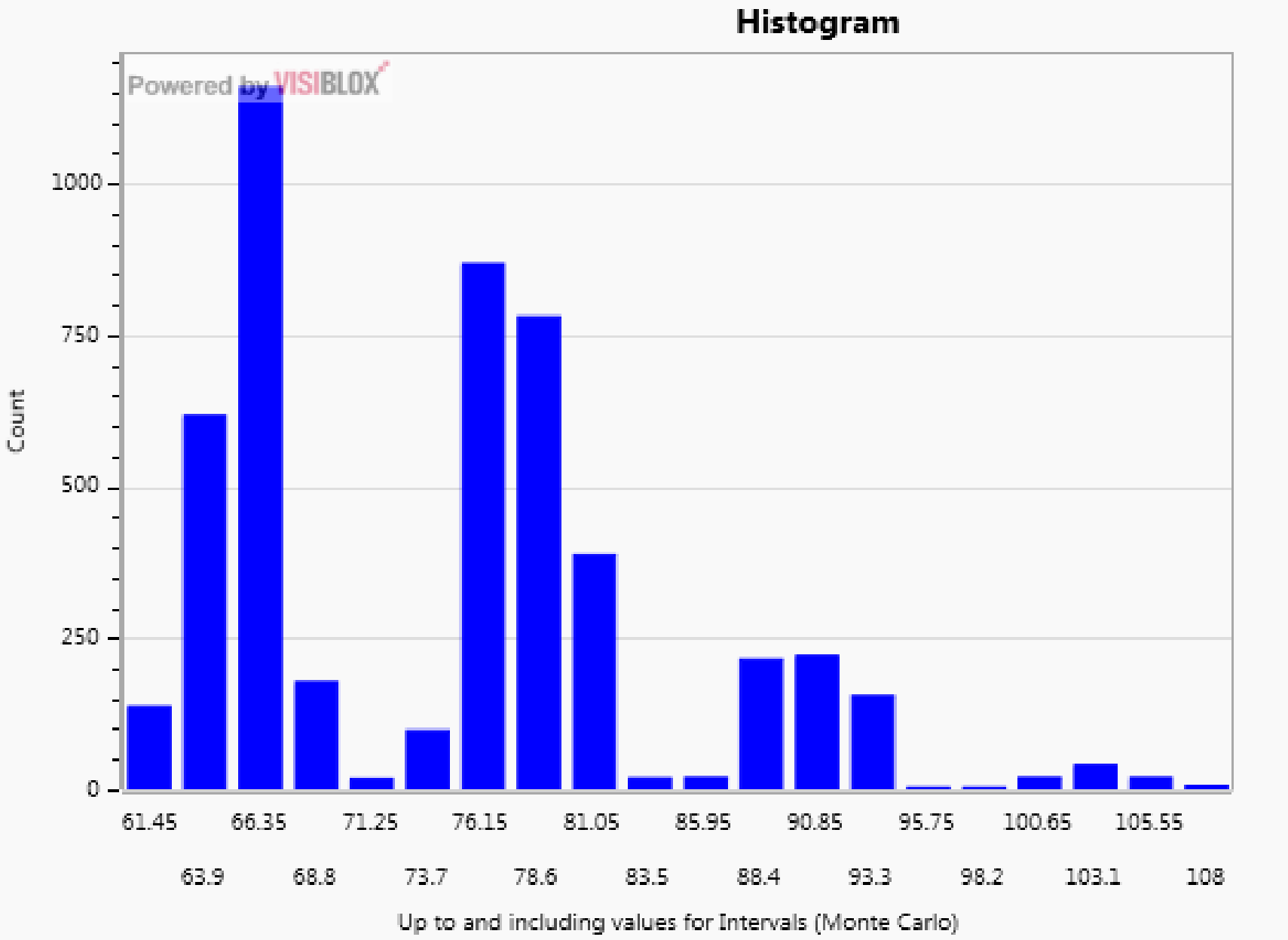
Sample Count: 5000 **Min:** 58 **Avg:** 70.376 **Median:** 66 **Max:** 95 **Standard Dev:** 7.836

5th %: 62 **25th%:** 64 **75th%:** 77 **95th%:** 87



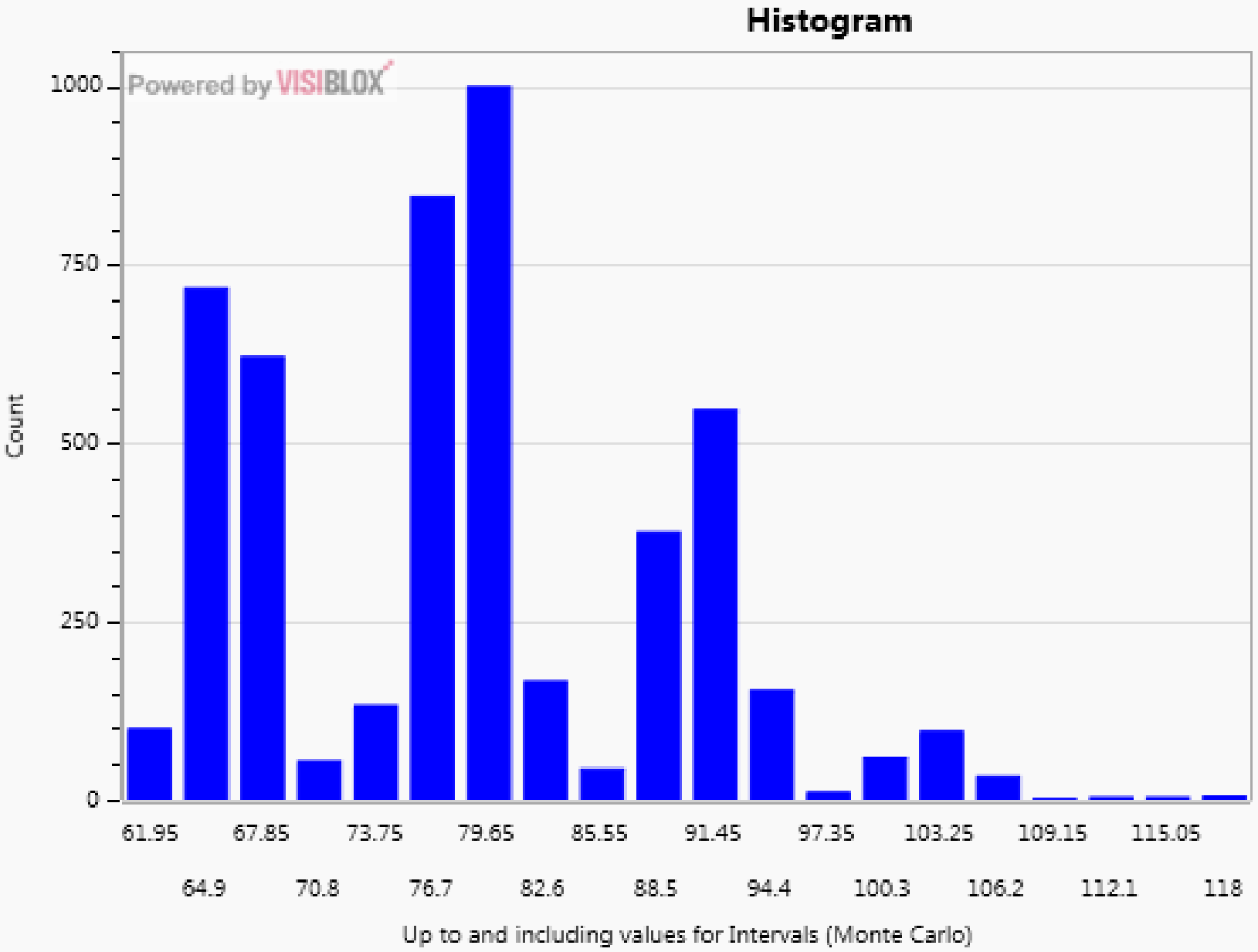
Sample Count: 5000 **Min:** 59 **Avg:** 73.491 **Median:** 75 **Max:** 108 **Standard Dev:** 9.592

5th %: 62 **25th%:** 65 **75th%:** 78 **95th%:** 91



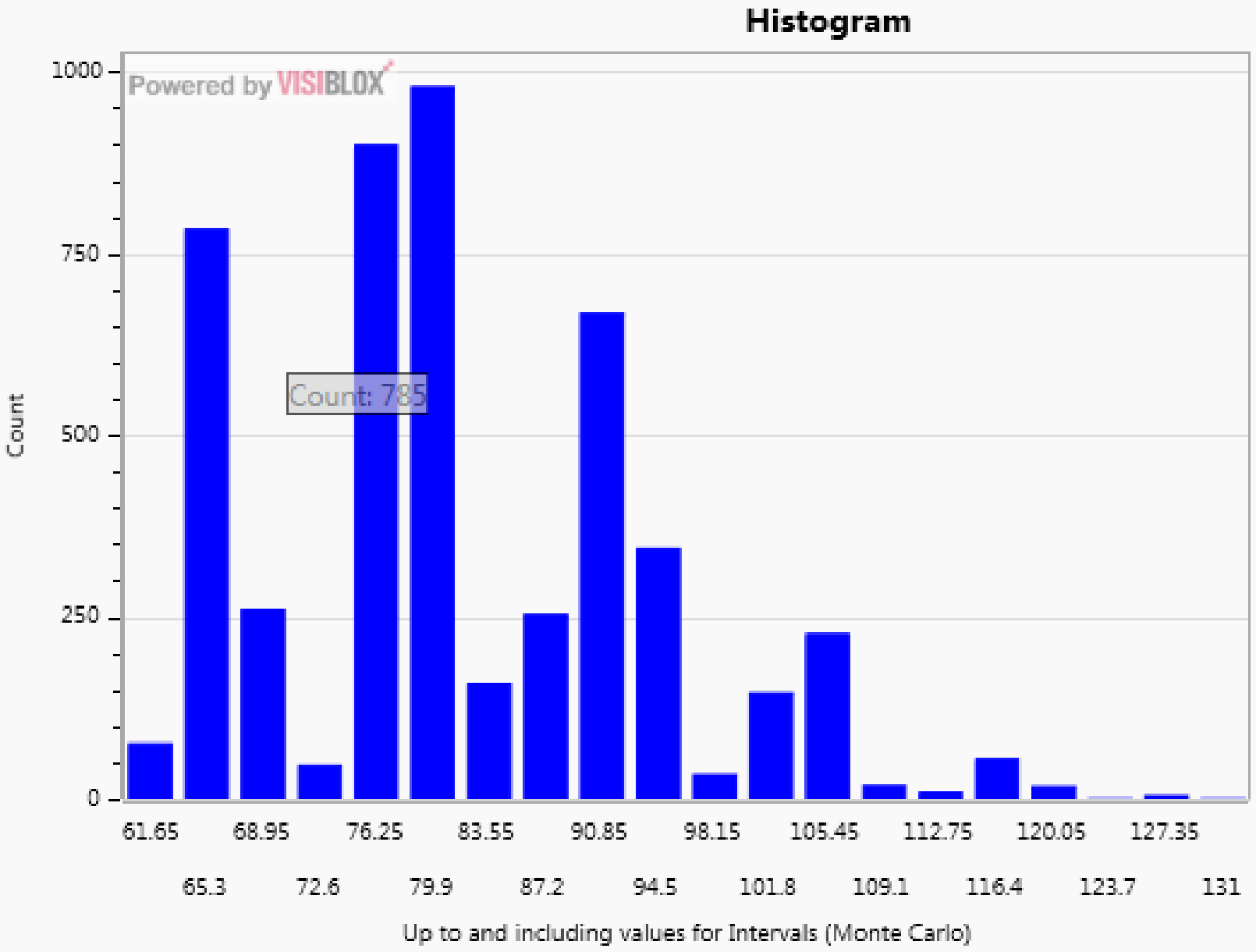
Sample Count: 5000 **Min:** 59 **Avg:** 76.941 **Median:** 77 **Max:** 118 **Standard Dev:** 10.766

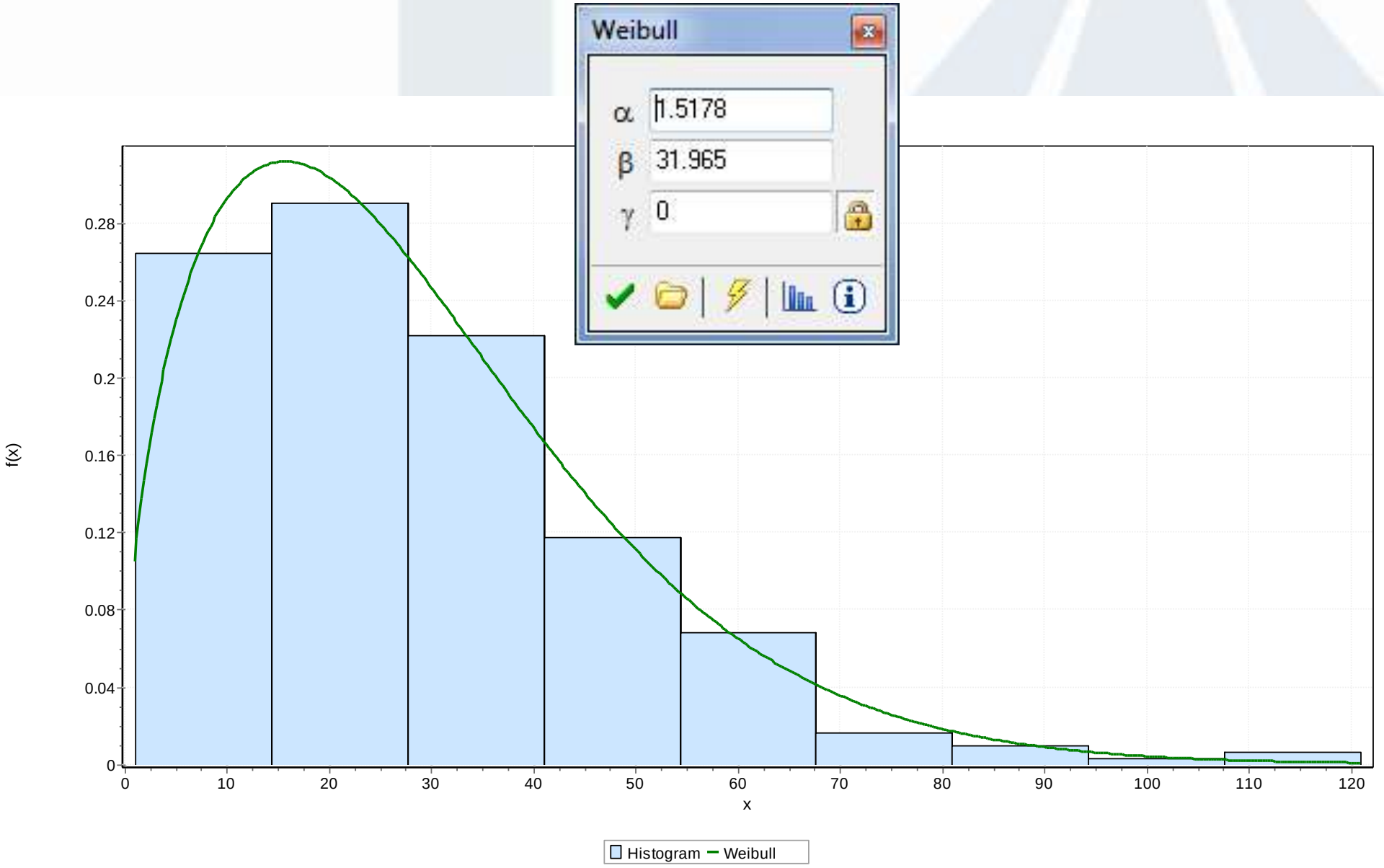
5th %: 62 **25th%:** 66 **75th%:** 86 **95th%:** 93



Sample Count: 5000 **Min:** 58 **Avg:** 79.931 **Median:** 78 **Max:** 131 **Standard Dev:** 12.247

5th %: 63 **25th%:** 74 **75th%:** 89 **95th%:** 103





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Risk Impact in Work Days

Risks in play	Work Days to 85% +	Additional Work Days
None	65	0
1	78	13 (+20%)
2	91	26 (+40%)
3	103	39 (+60%)
4	116	52 (+80%)
5	129	65 (+100%)

IDENTIFY RISK DRIVERS

Define the Objectives

Product

- Functional, Performance, Operations, Usage, Maintainability, Deployment, Transition

Business

- Financial, Market, Adoption, Satisfaction

Constraints

- Cost Constraint, Schedule Constraint

Risk Drivers

- A driver is a factor that has a strong influence on the eventual outcome or result
- Drivers enable a continuous systemic approach to risk management
- Effects of conditions and potential events can be aggregated across a program

Risk Drivers

Risk drivers are stated from a success state and a failure state.

Success State

Our processes are sufficient for delivering this product

Failure State

Our processes are inadequate to deliver this product

Risk Driver Starter

- Mosaic defines 20 drivers in 6 categories
  - Seems like a lot from an Agile standpoint
- I have used two – internal to team external to team
  - Has proven to be too light
- I am currently using five
  - Business
  - Technical
  - Feedback
  - Organizational
  - Dependency

Identify Risk Drivers

- Do this with the same group who is doing Release and/or Program Planning
- Tailor the drivers to your effort
  - Remove extraneous drivers, add missing drivers to the list, combine or decompose drivers so they make sense to the team
  - Write a success condition statement and a failure condition statement
  - Adjust the wording in each driver to be consistent with the programs language

Business Risk Drivers

Consider

- Clear Objectives
- Customer / End-User Understanding
- Appropriate Requirements
- Plan and Constraints
- Adoption Barriers
- Trimming the Tail
- Pivoting
- Operational Preparedness

Business Driver

Customer Understanding

Success State:

The product is appealing to consumers and increases customers using automated systems for bank deposits

Failure State:

The product is viewed as threatening or unreliable to customers and more customers use the bank and drive through for deposits

Technical

Consider

- Development Tools and Technologies
- Technical Execution Ability
- Design and Architecture
- Delivery Process (Design, Develop, and Deploy)

Technical Driver

Development Tools and Technologies

Success State:

The tools and technologies are sufficient to support the delivery of the solution

Failure State:

The tools and technologies hinder the delivery of the solution

Feedback

Consider

- Technical Performance
- Fit to Need
- Compliance Testing
- System Capability
- System Integration
- Operational Support
- Certification and Accreditation

Feedback Driver

Technical Performance

Success State:

Our test environments, test data management, and test deployment are suitable to gathering rapid feedback to ensure technical excellence is delivered

Failure State:

Test environments, test data management, and test deployment contribute to delays that cause the program to fail.

Organization and Environment

Consider

- Staffing and Team Stability
- Coordination
- Project Management
- Facilities and Equipment
- Organizational Conditions
- Political Concerns

Organization and Environment Driver

Staffing and Team Stability

Success State:

Our teams are fully staffed with analysts, testers, and engineers so they become high performing teams

Failure State:

Testers are pulled onto many projects and there is significant churn on the project from holding completed code that can't be tested when completed

Dependency

- Suppliers, Partners or Collaborators
- Applications
- Software
- Systems or Sub-systems
- Hardware
- Legal, Compliance, etc

Dependency Driver

Hardware

Success State

The scanners in the ATM machines consistently produce a high quality of input

Failure State

Scanners in ATM machines are not calibrated sufficiently to balance between fraudulent deposits and satisfactory scans

ASSESS RISKS

Identify Events for each Category

- Working with the whole team – identify events that could influence the success state or the failure state

- This can look like story mapping

Hardware

Failed Implementation: We invest in the product and we can't implement it in the field because the scanners are bad.

Reduce Time: We may be able to reuse the Image Interpretation software from SOG to overcome deficiencies in the scanners.

Risk Management in Release Planning

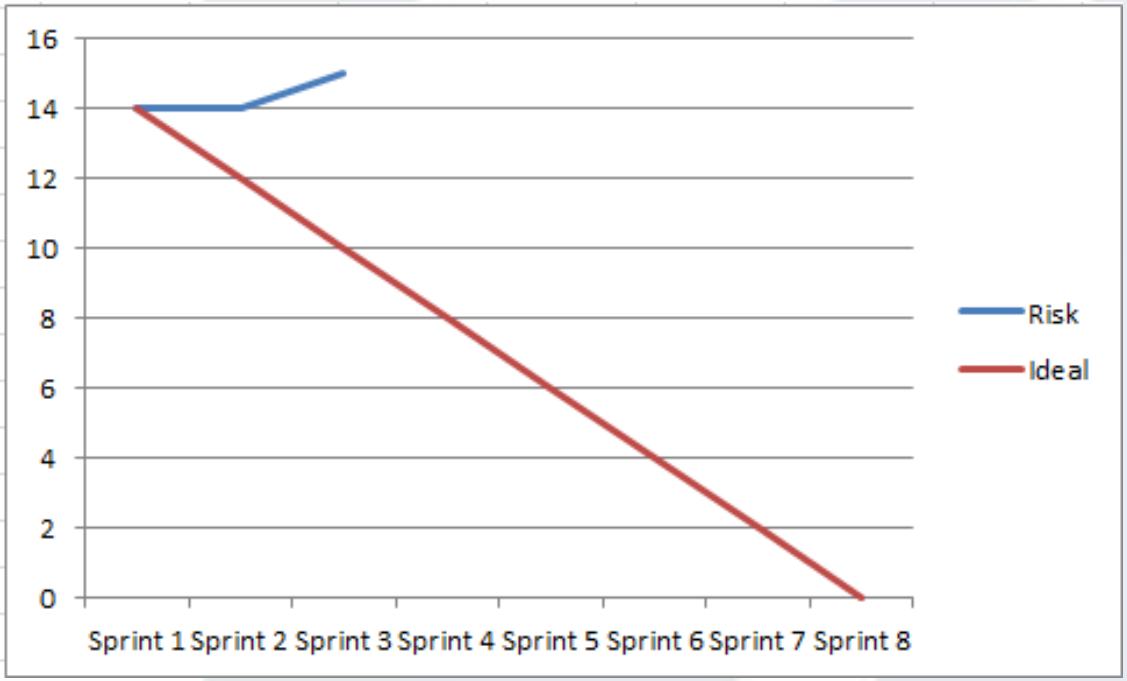
Evaluate Risk Events

Impact

Likelihood	Small-1	Medium-3	Big-5
Low-1	1	3	5
Medium-3	3	9	15
High-5	5	15	25

Risk	Likelihood	Impact	Risk Score
Failed Implementation: We invest in the product and we can't implement it in the field because the scanners are bad.	3	5	15
Reduce Time: We may be able to reuse the Image Interpretation software from SOG to overcome deficiencies in the scanners.	3	3	9

Risk Burn-Down

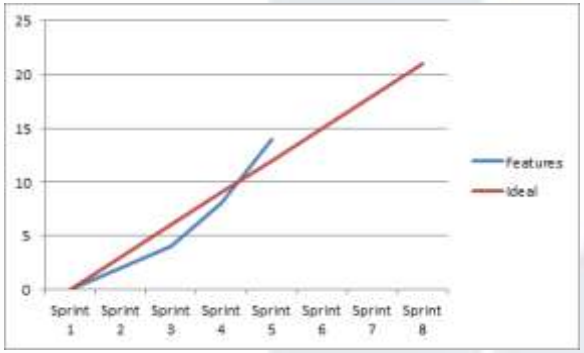


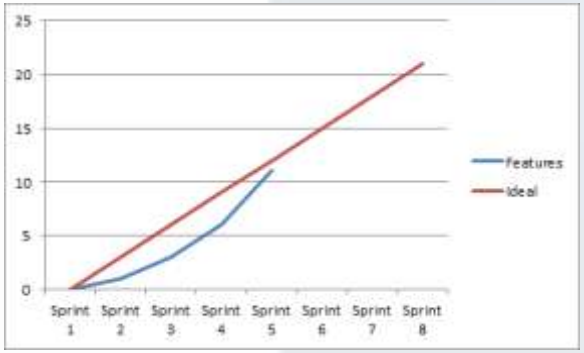
The risk burn-down measures the rate we are reducing the total risk score for a project.
You probably want to burn down risk faster than your features are burning up

Workshop #2 discussion

Based on the Feature Burn-up, which project is in better shape?

Feature Burn-up

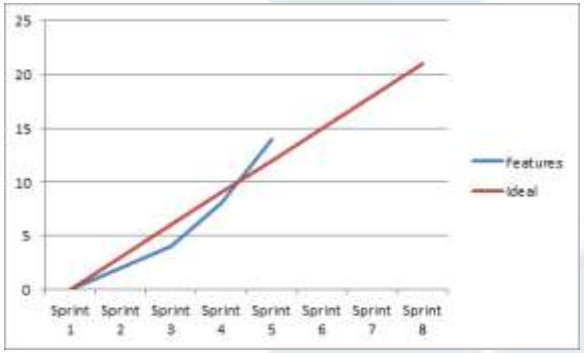


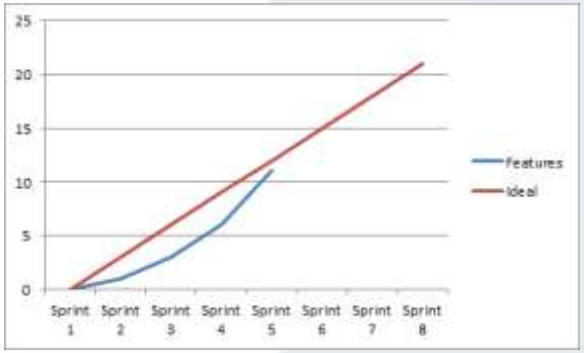


Workshop #2 discussion

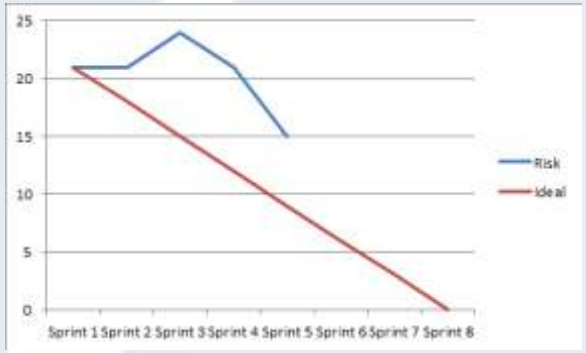
With the Risk information incorporated, which project is in better shape?

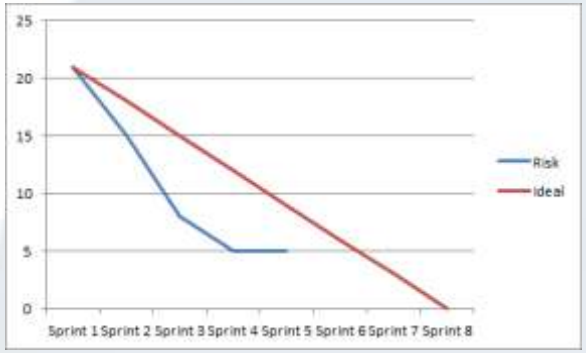
Feature Burn-up





Risk Burn-down





Assessing the Risk Profile

- Driver State
  - Driver is almost certainly in its success state
  - The driver is most likely in its success state
  - The driver is equally likely in its success and failure state
  - The driver is most likely in its failure state
  - The driver is almost certainly in its failure state

Risk Profile

Status	Business	Technical	Feedback	Organization and Environment	Dependency
Driver is almost certainly in its success state					X
The driver is most likely in its success state	X	X			
The driver is equally likely in its success and failure state			X		
The driver is most likely in its failure state				X	
The driver is almost certainly in its failure state					

10%

50%

90%

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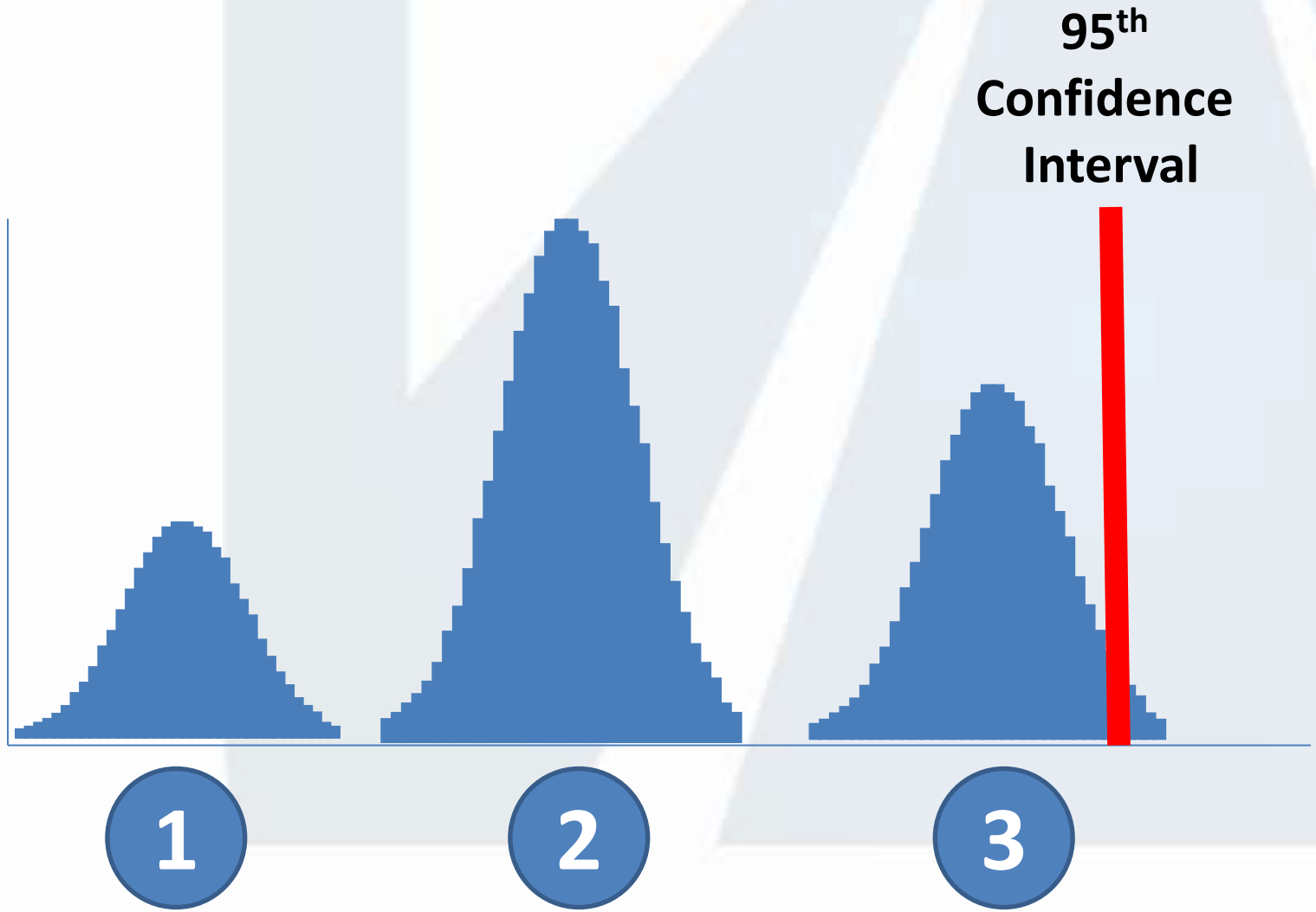
Each Risk Driver is modeled separately and quantified as to delay if realized

Each Risk Driver likelihood is modeled based on profile score

Risks Consolidated into Forecast



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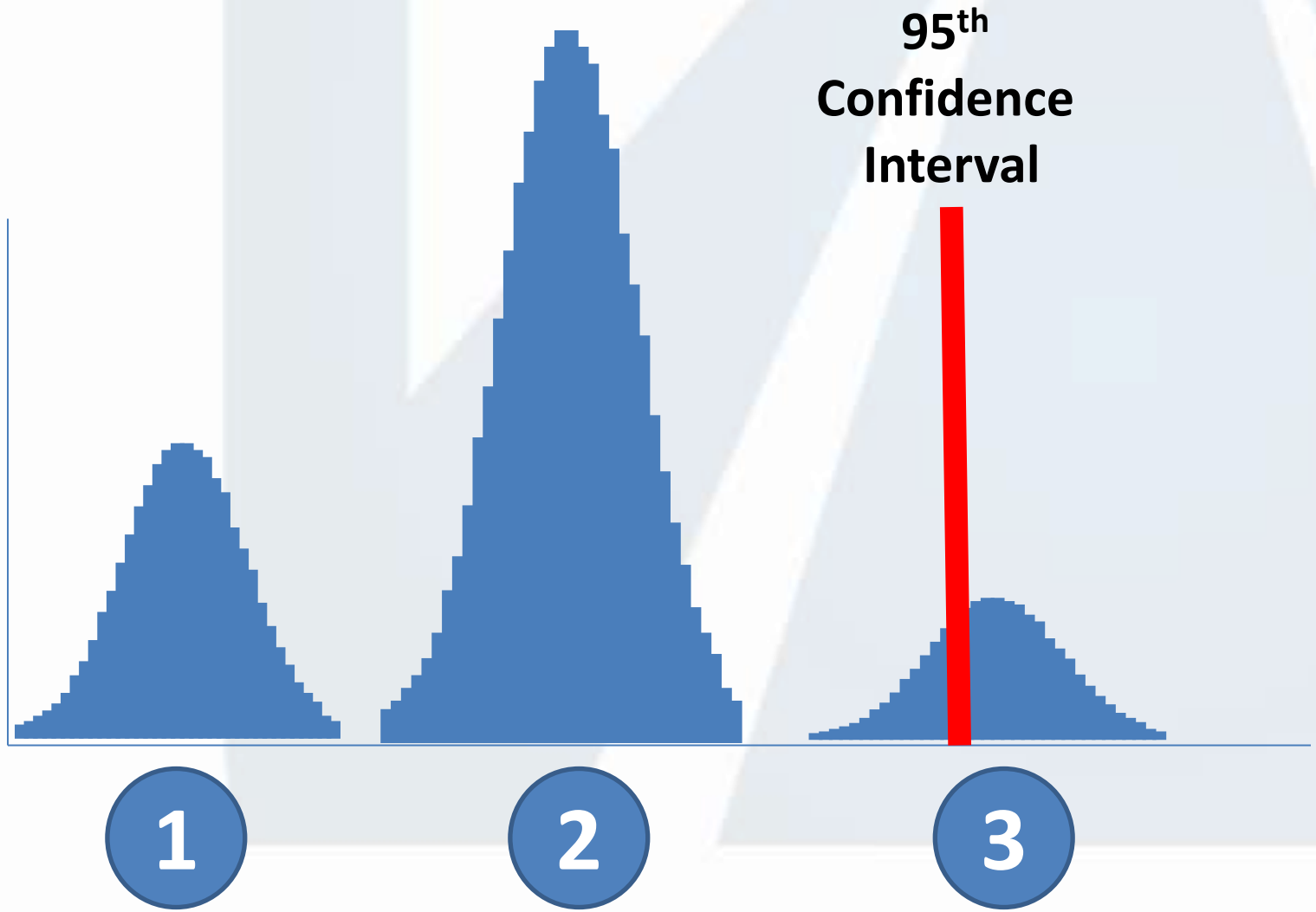

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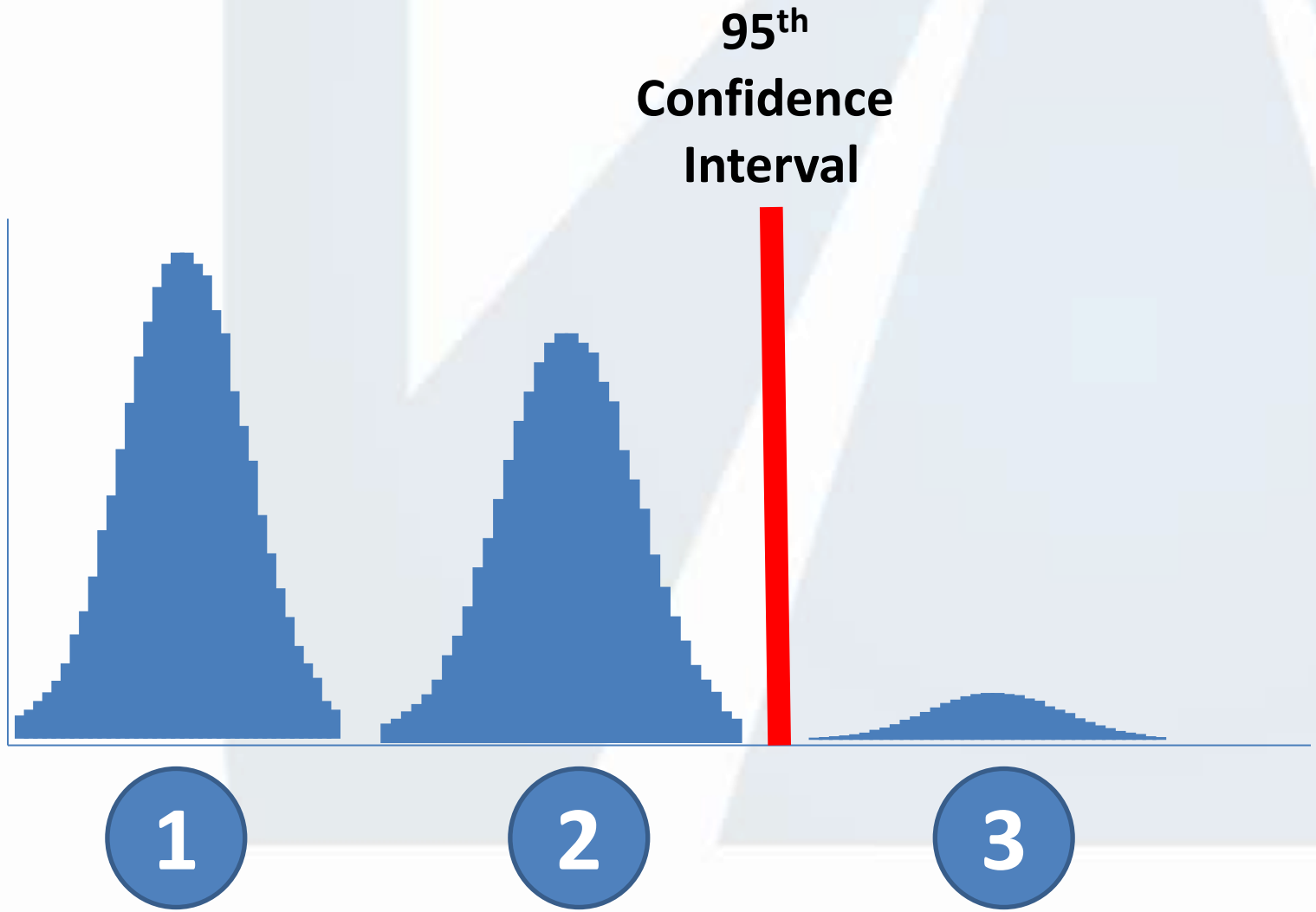

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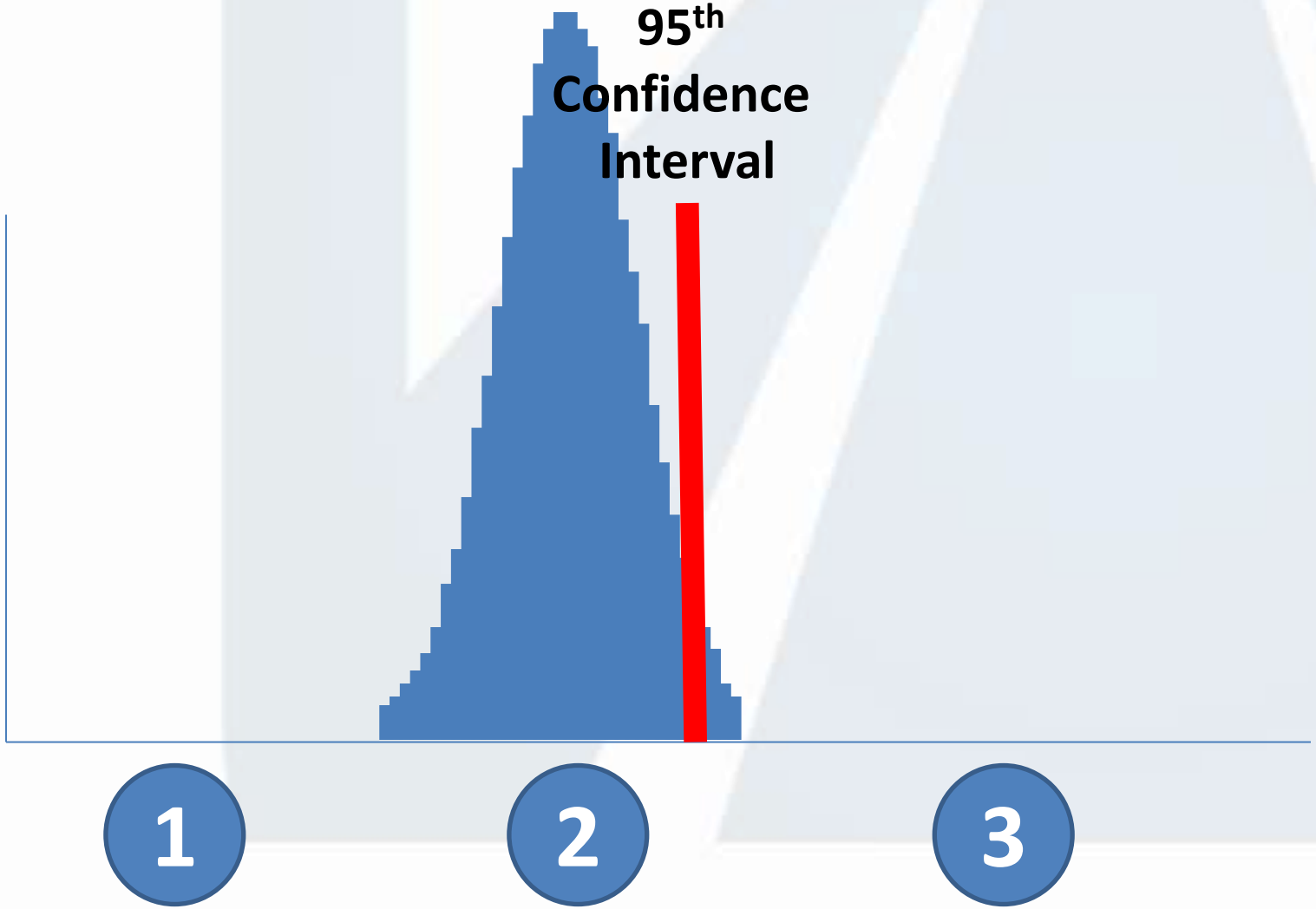

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Speaking Risk To Executives

- Buy them a copy of “Flaw of Averages”
- Show them you are tracking & managing risk
- Do
  - “We are 95% certain of hitting date x”
  - “With 1 week of analysis, that may drop to date y”
  - “We identified risk x, y & z that we will track weekly”
- Don’t
  - Give them a date without likelihood
    - “February 29th 2013”
  - Give them a date without risk factors considered
    - “To do the backlog of features, February 29th, 2013”

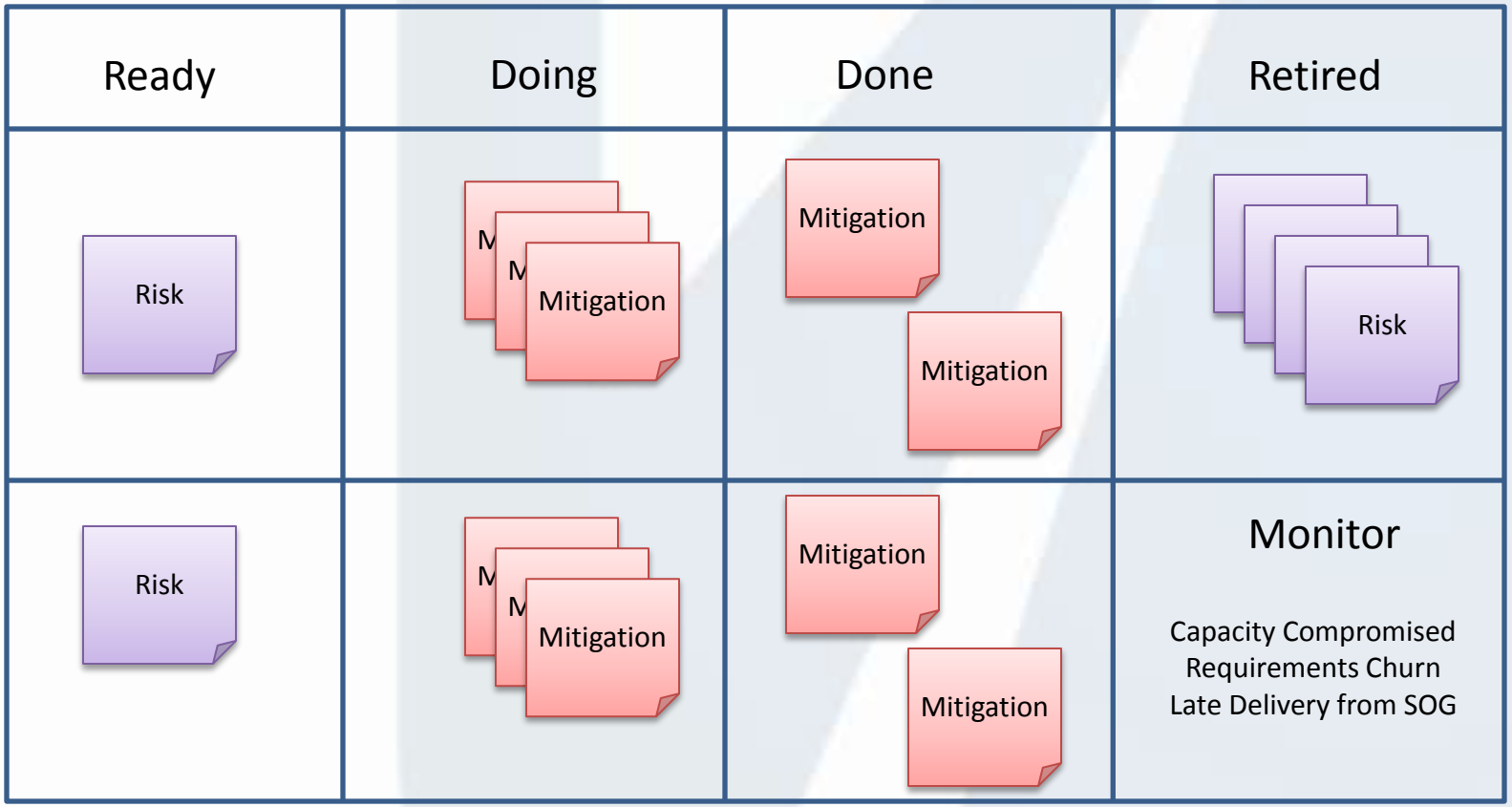
INTEGRATED RISK MANAGEMENT

Integrated Risk Management

Identify, Assess, Create Response, Apply Response, Risk Retired, and Monitor

- Risk Stories Integrated into Backlog
- Risk Management Board
- Track Items to Monitor
- Integrate Review of Risk Drivers into Ceremonies
- Acceptance Criteria

Risk Board


Ready
Doing
Done
Retired
Risk
Mitigation
Mitigation
Mitigation
Risk
Risk
Mitigation
Mitigation
Mitigation
Monitor
Capacity Compromised
Requirements Churn
Late Delivery from SOG

Questions and Discussion

Risk Management for Agile Projects

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  - Identify objectives
  - Determine risk drivers
- Agile Risk Assessment
  - Assess against risk drivers (Threats and Opportunities)
  - Risk profile / burn-down
- Integrate Risk Management
  - Plan responses
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Thank You

For additional questions or information contact me at dennis@leadingagile.com

Difficult conversations about risks to non technical people

TALKING RISK TO EXECUTIVES

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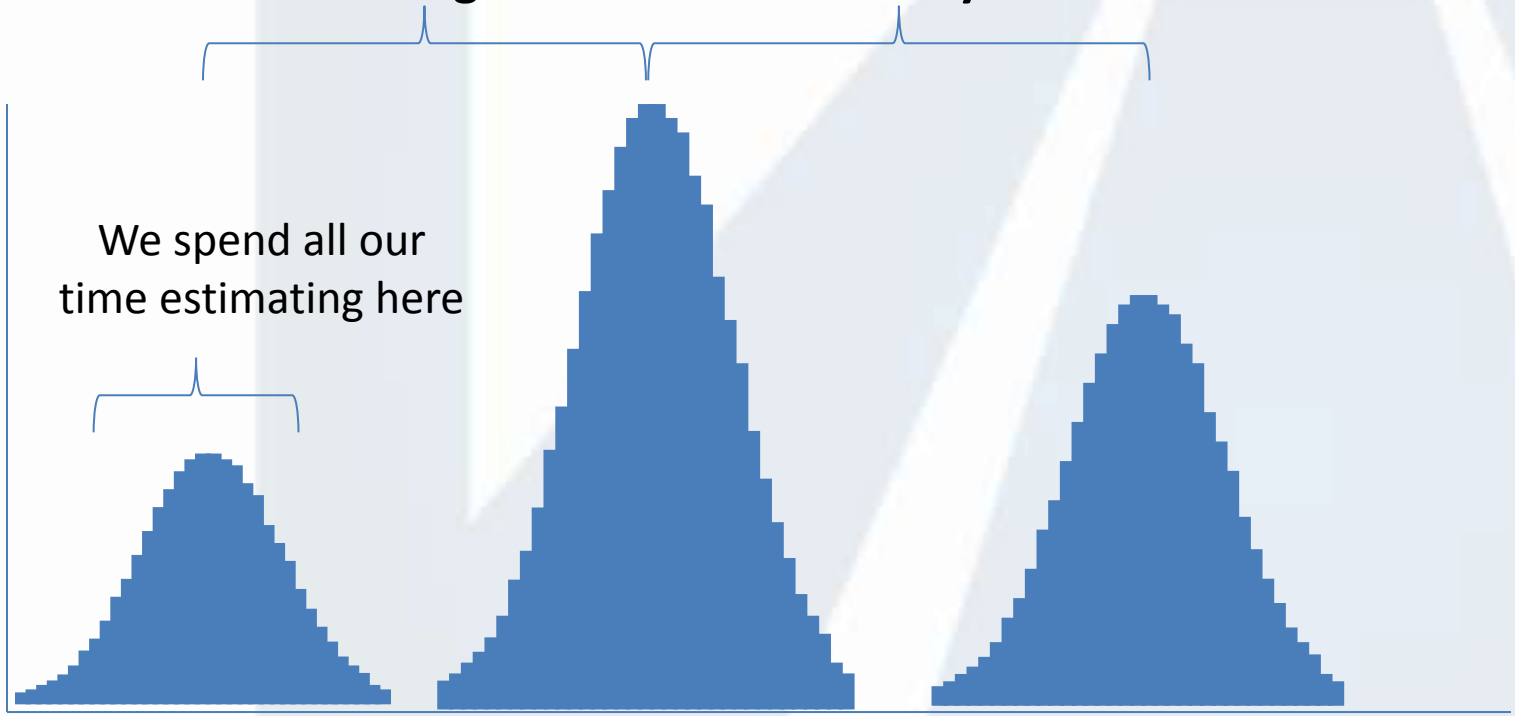
- Don’t
  - Give them a date without likelihood
    - “February 29th 2013”
  - Give them a date without risk factors considered
    - “To do the backlog of features, February 29th, 2013”

**Major risk events have the predominate role in deciding where deliver actually occurs **



Plan

Performance Issues

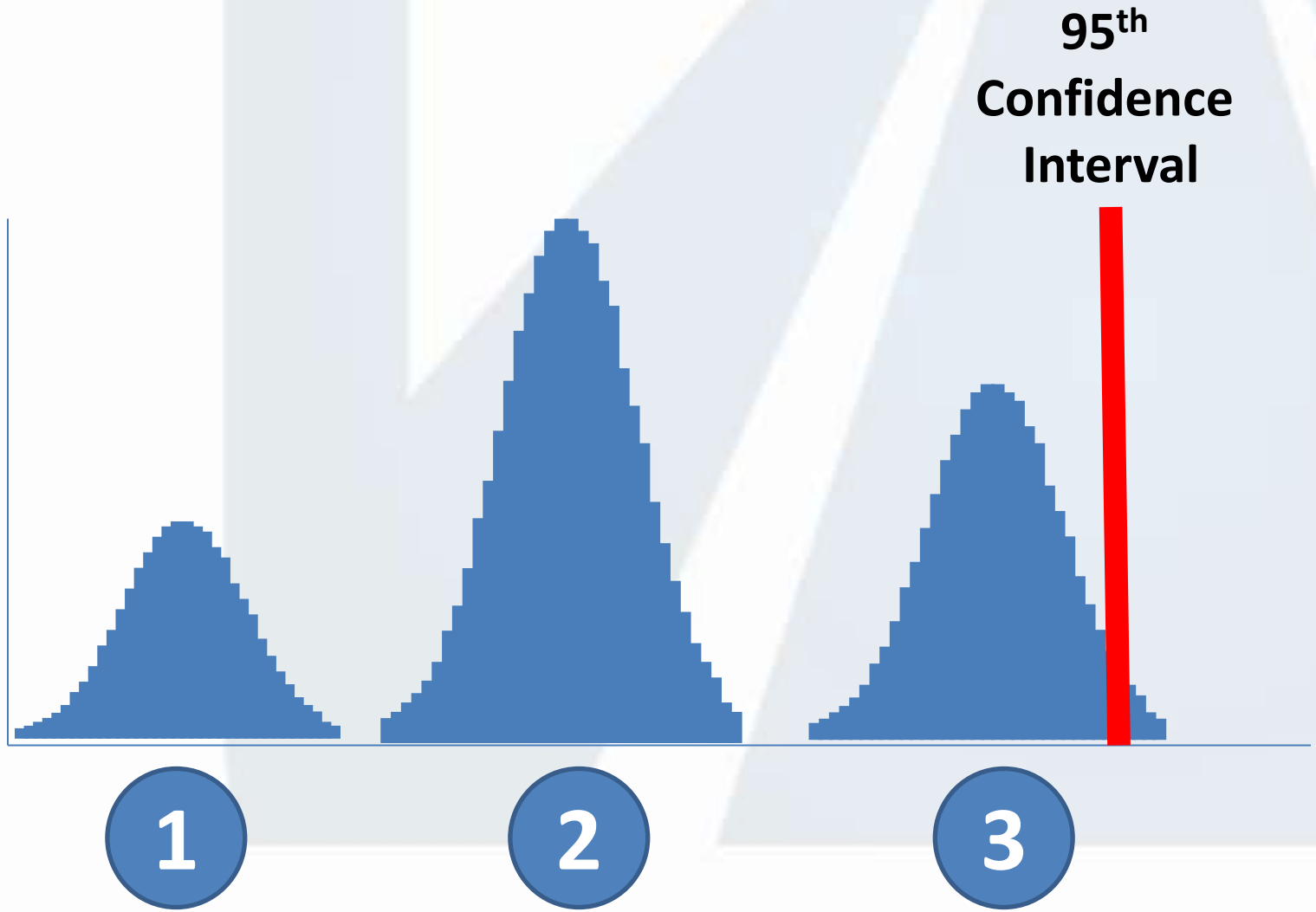
External Vendor Delay

1

2

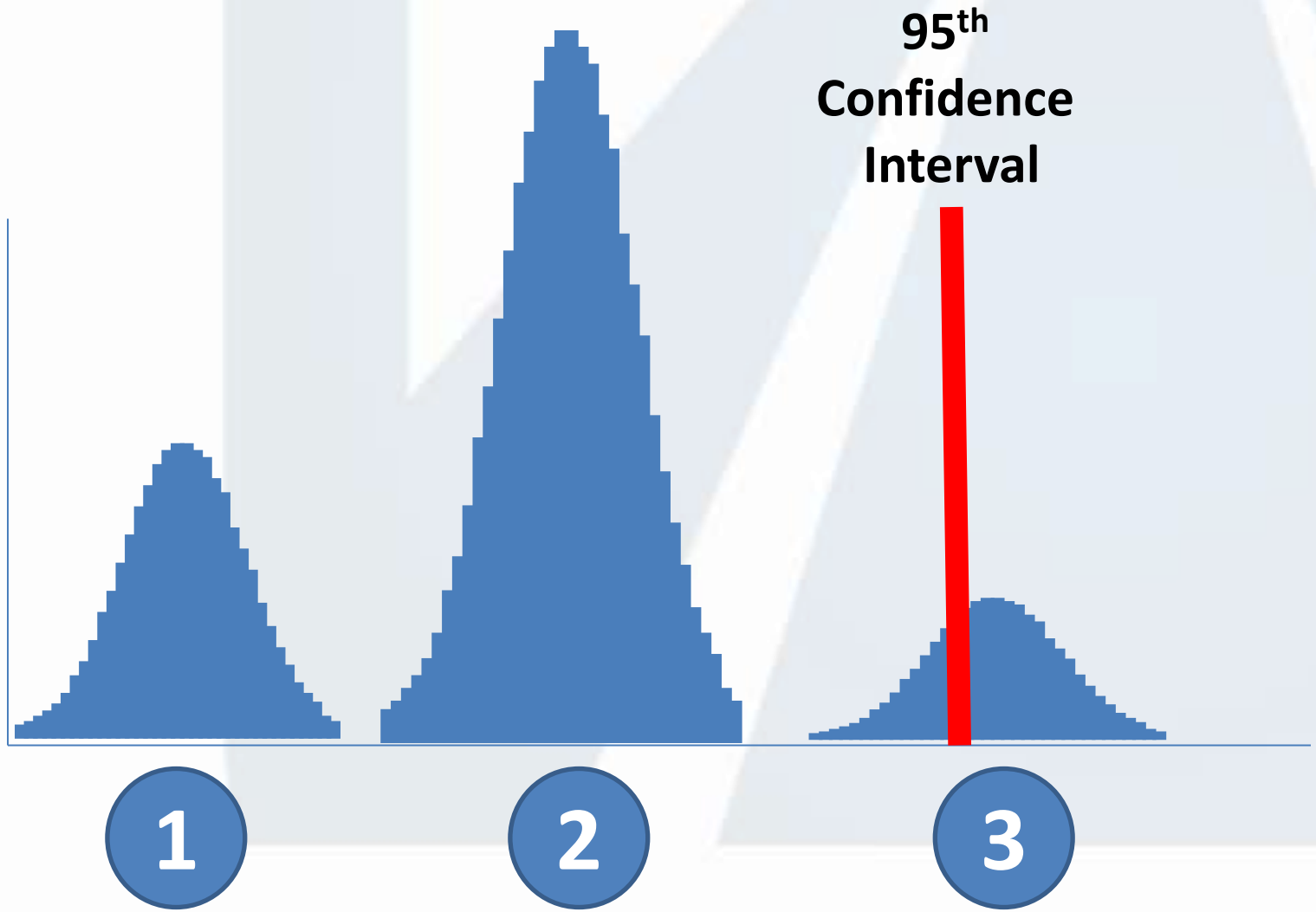
3

Risk likelihood changes constantly



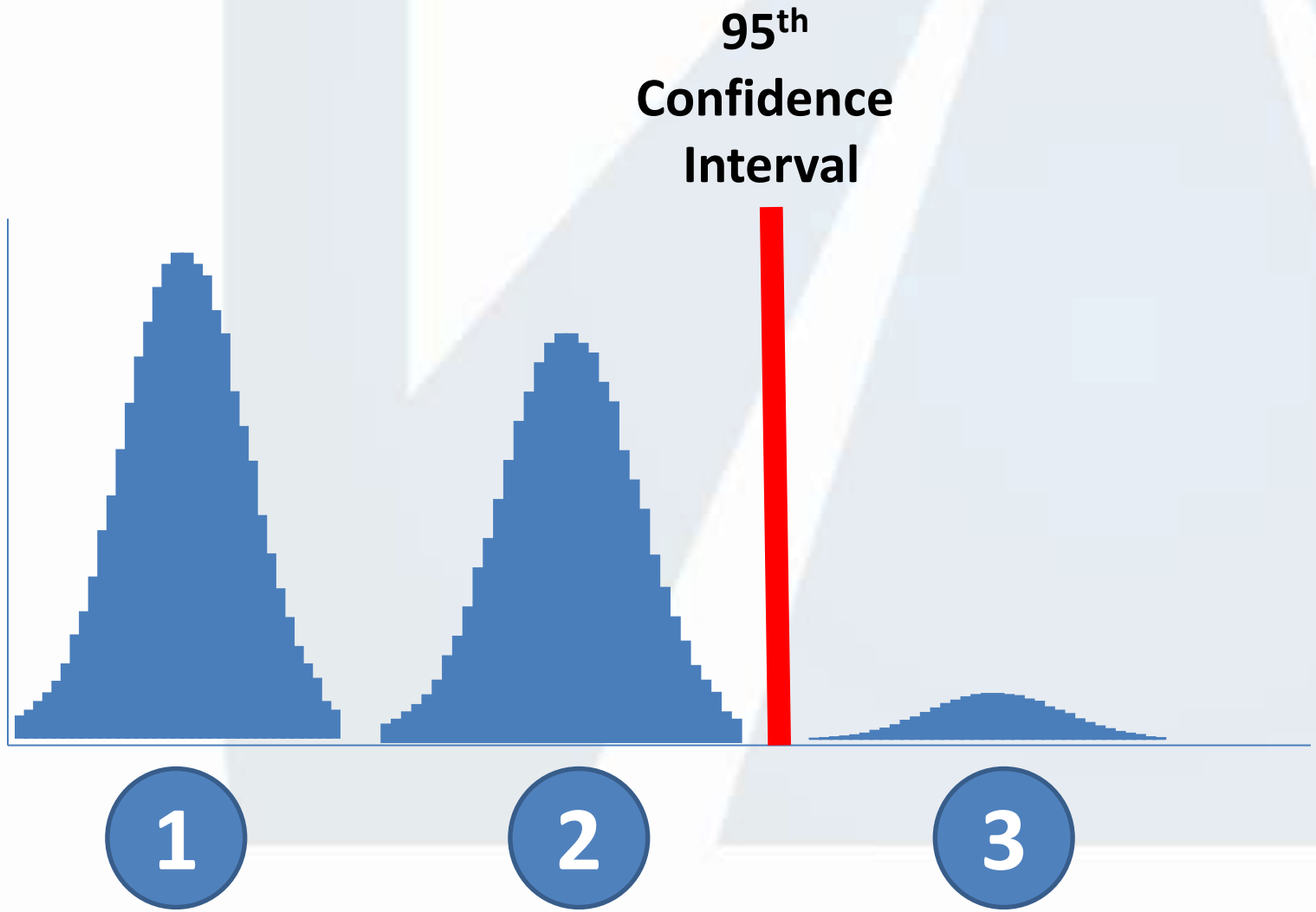
LeadingAgile

Risk likelihood changes constantly



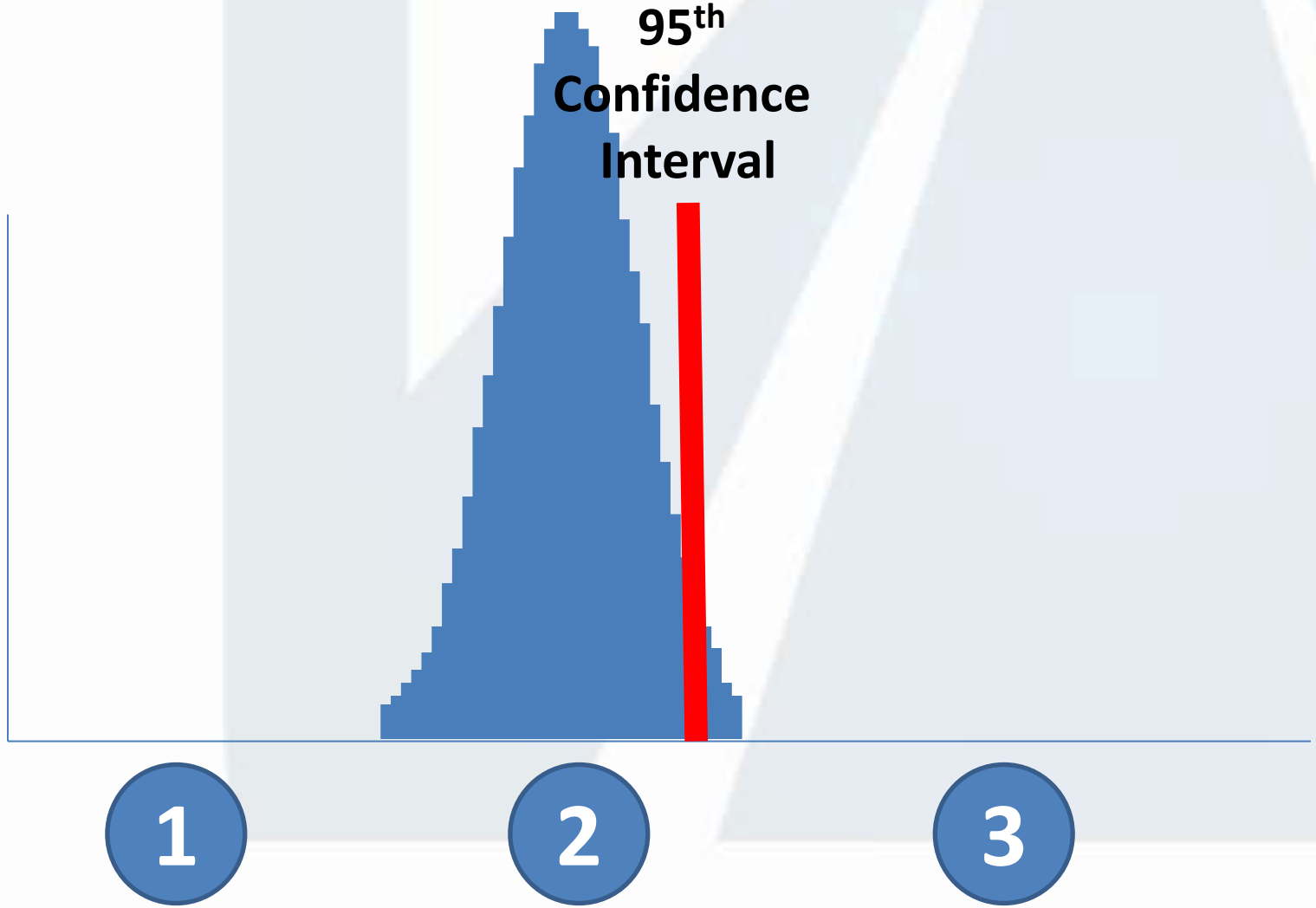
LeadingAgile

Risk likelihood changes constantly



LeadingAgile

Risk likelihood changes constantly



LeadingAgile

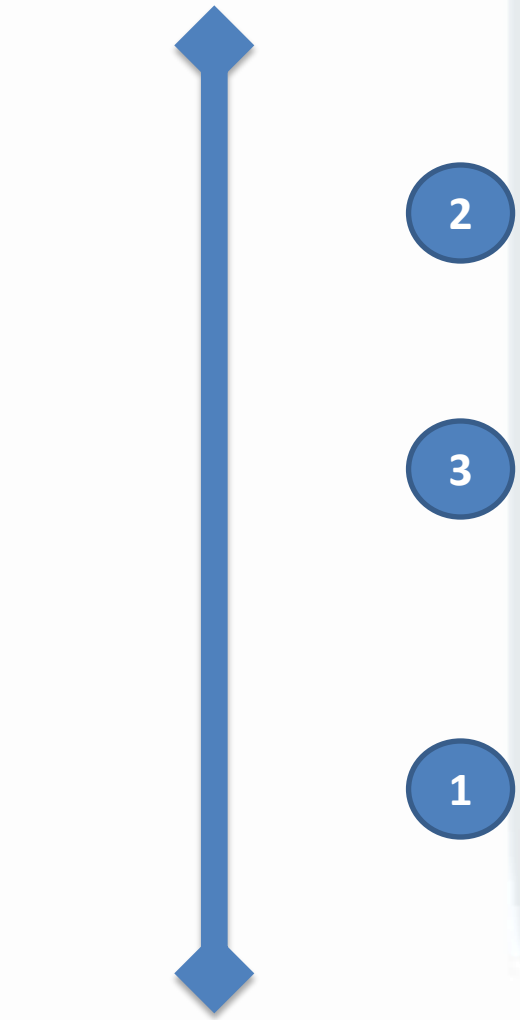
What are the chances the next sample will be within the range of previous samples

SAMPLING AND PREDICTION INTERVALS

LeadingAgile

Q. What is the chance of the 4th sample being between the range seen after the first three samples?

(no duplicates, uniform distribution, picked at random)



LeadingAgile

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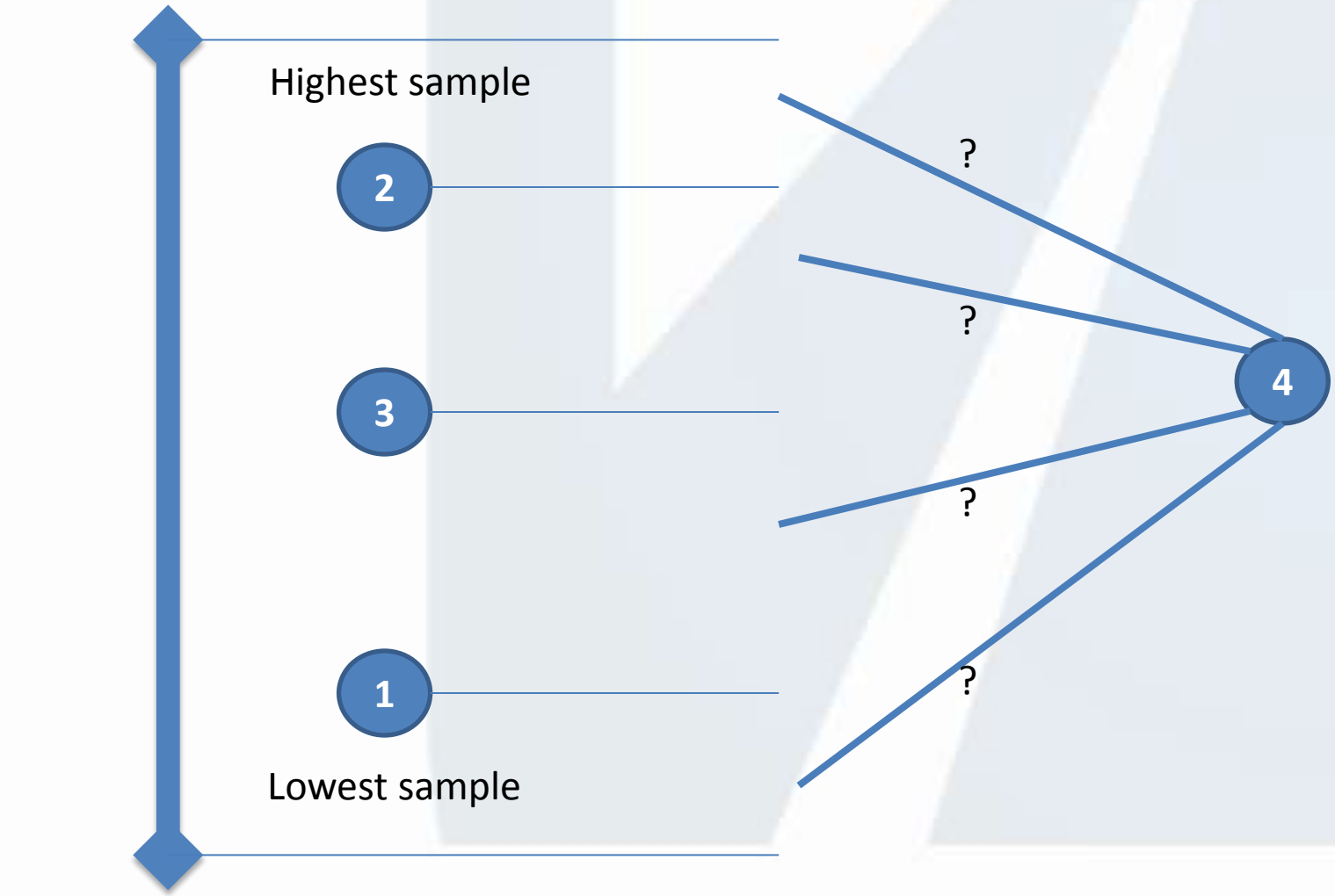

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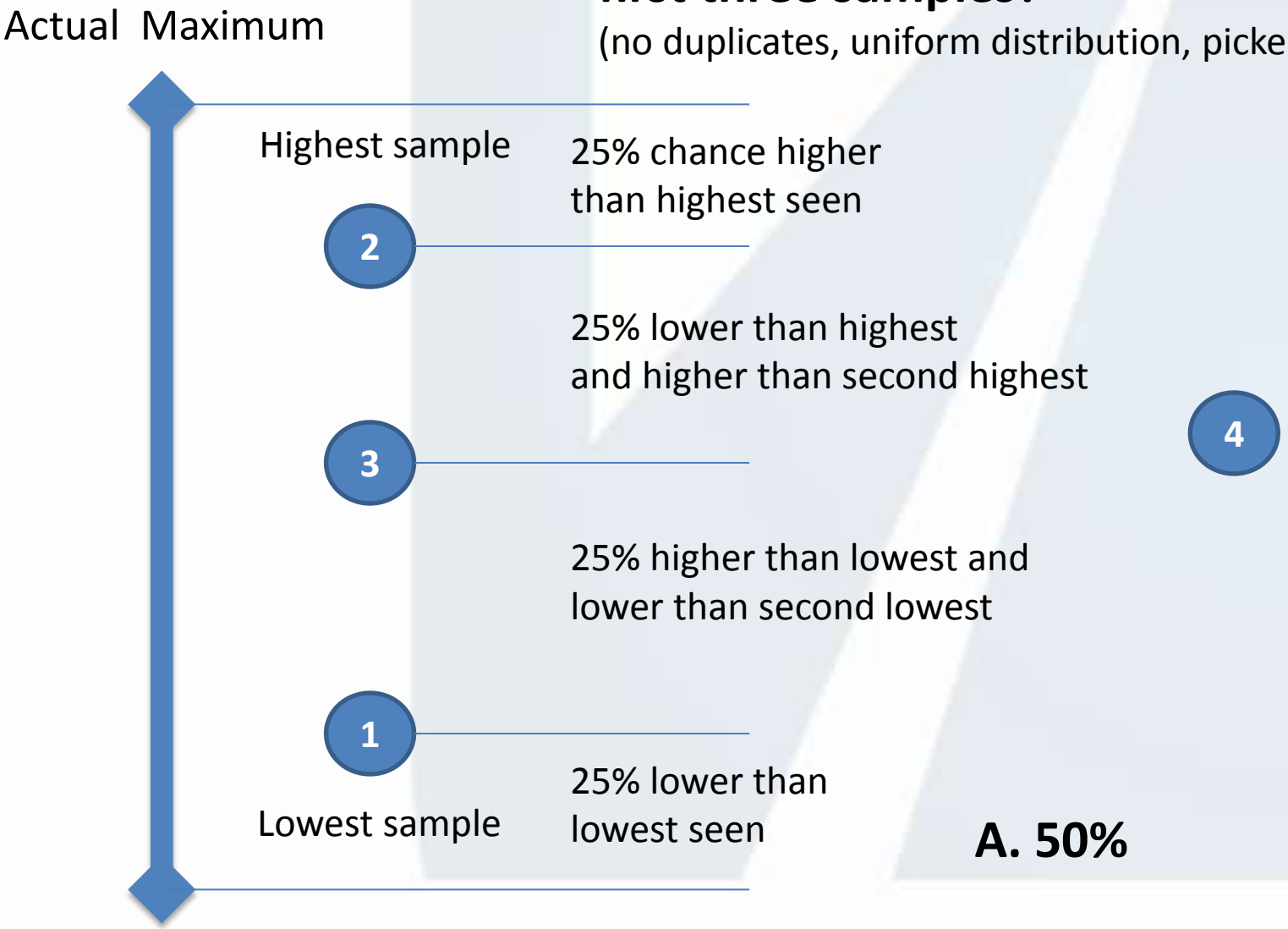

A. 50%

% = (1 - (1 / n – 1)) * 100

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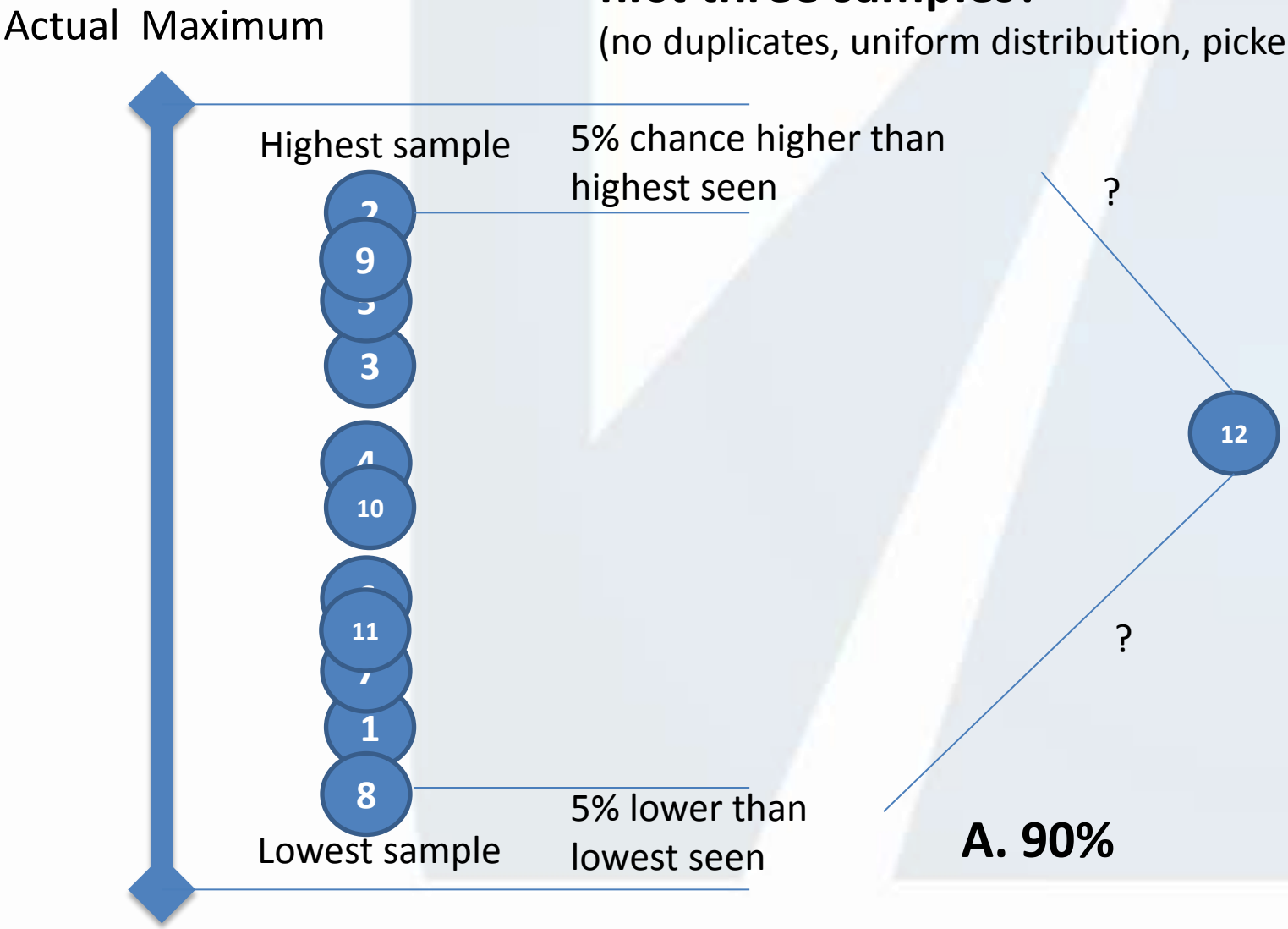
Q. What is the chance of the 12th sample being between the range seen after the first three samples?

(no duplicates, uniform distribution, picked at random)



A. 90%

% = (1 - (1 / n – 1)) * 100

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# Prior Samples	Prediction Next Sample Within Prior Sample Range
3	50%
4	67%
5	75%
6	80%
7	83%
8	86%
9	88%
10	89%
11	90%
12	91%
13	92%
15	93%
17	94%
20	95%

Sampling at Random

- If you pick what samples to use, you bias the prediction!
- Strategies for proper random sampling –
  - Use something you know is random (dice, darts)
  - Pick two groups using your chosen technique and compute your prediction separately and compare
  - Don’t pre-filter to remove “outliers”
  - Don’t sort the data, in fact randomize more if possible