

WEBINAR

# Requirements Traceability Benchmark



# Our Speakers



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CEO

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Jama Software

# TAKEAWAYS



1. Determine how to calculate a **Traceability Score™**
2. Understand the impact **Traceability Scores** have on quality and cycle time
3. Grasp the differences in **Performance** among top and bottom quartile performers
4. Learn the **5 Best Practices** of top quartile performers
5. Determine **Next Steps** to apply Traceability Scores at your company

# Traceability Definitions

## Requirements Traceability

The ability to describe and follow the life of a requirement in both a forwards and backwards direction (i.e., from its origins, through its development and specification, to its subsequent deployment and use, and through periods of ongoing refinement and iteration in any of these phases).

## Live Traceability

Live traceability occurs in real time as the system development lifecycle progresses to improve engineer productivity and enable the process to be managed through data. Contrast to *after the fact* traceability.

## Traceability Model

A complete definition of expected, traceable relationships for each requirement in the project through the system development lifecycle.

## Traceability Score

The measurement of actual adherence to the specified traceability model.

Traceability Score = # **established** relationships among model elements / # of **expected** relationships among model elements as specified by the project's traceability model

# Why Measure Requirements Traceability?





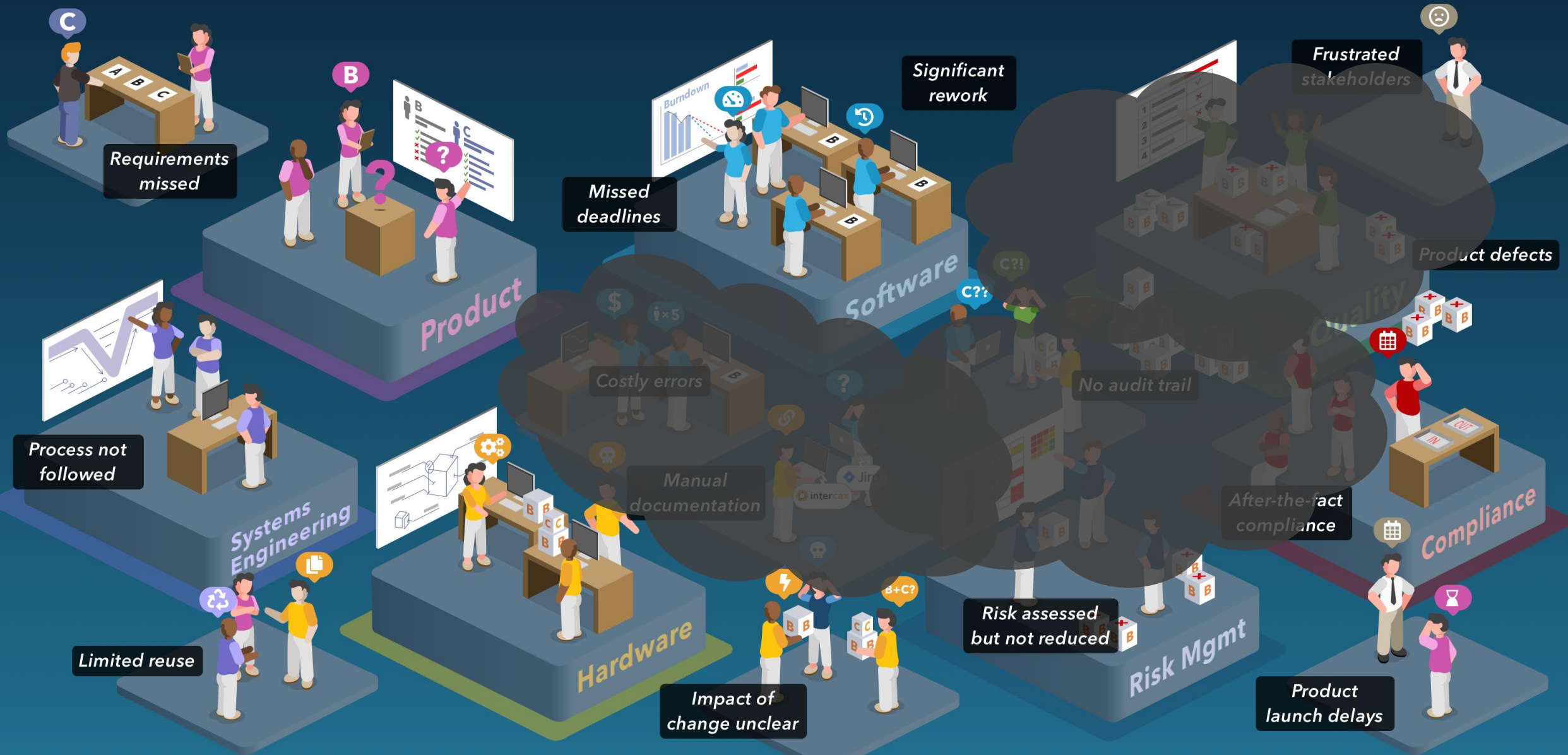
# How to Manage the Systems Development Lifecycle without data?

Establish and enforce a common methodology across engineering disciplines

Methodology

# The Problem

END-END PROCESS TO DELIVER PRODUCT IS FRAGMENTED INTO SILOED ACTIVITIES & TOOLS



# How to Manage the Systems Development Lifecycle?

Measure actual adherence to the methodology to alert and take action

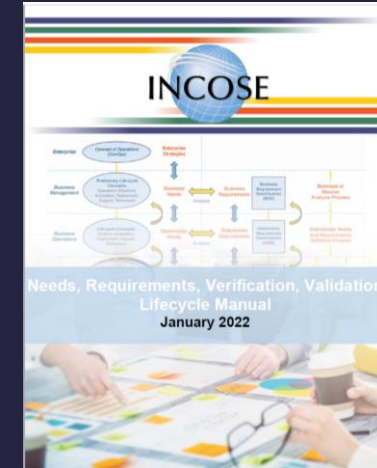
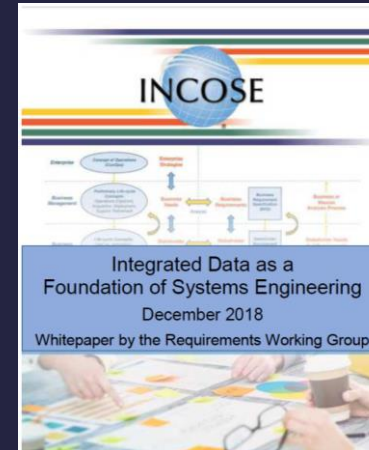
Establish and enforce a common methodology across engineering disciplines



# Focus on Process Measurement is Growing in System Engineering as part of Data Centric Mindset

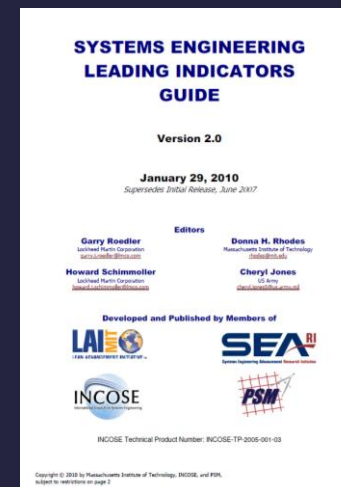
## INCOSE Requirements Working Group

- Lou Wheatcraft, Chair



## INCOSE Measurement Working Group

- Paul Frenz, Chair



# Benchmark Dataset & Methodology

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# Largest Systems Engineering Dataset

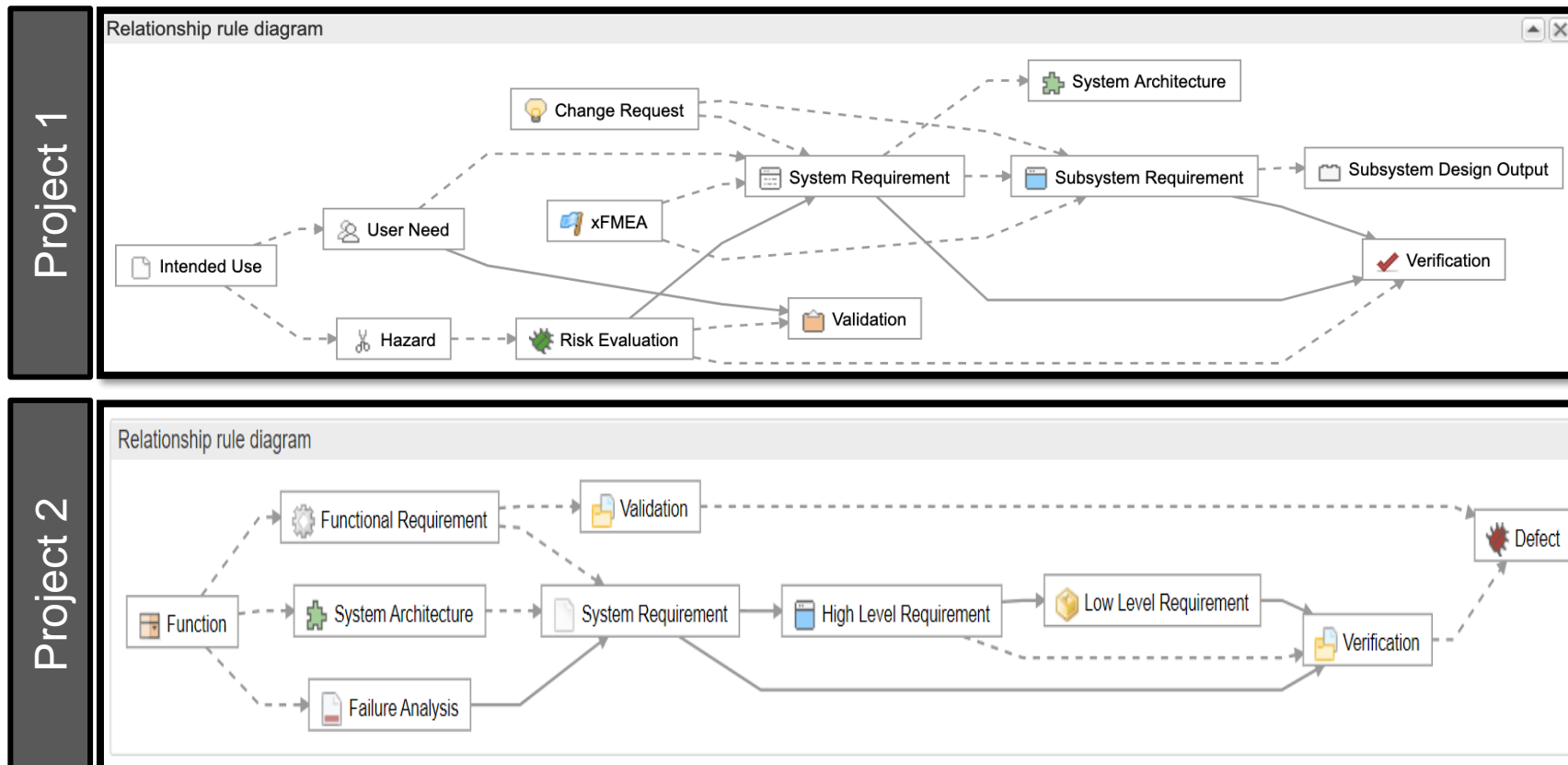
ANONYMIZED AND AGGREGATED REAL-WORLD PROJECTS



- #1 market share systems requirements management SaaS (software as a service)
- Over 250 million individual requirements managed in the cloud
- Largest community of engineers managing Live Traceable projects in the cloud with over 20,000 daily users
- Research dataset of anonymized data spans over:
  - 40,000 projects
  - 6,000 traceability models

# Measuring Adherence to Project Structure

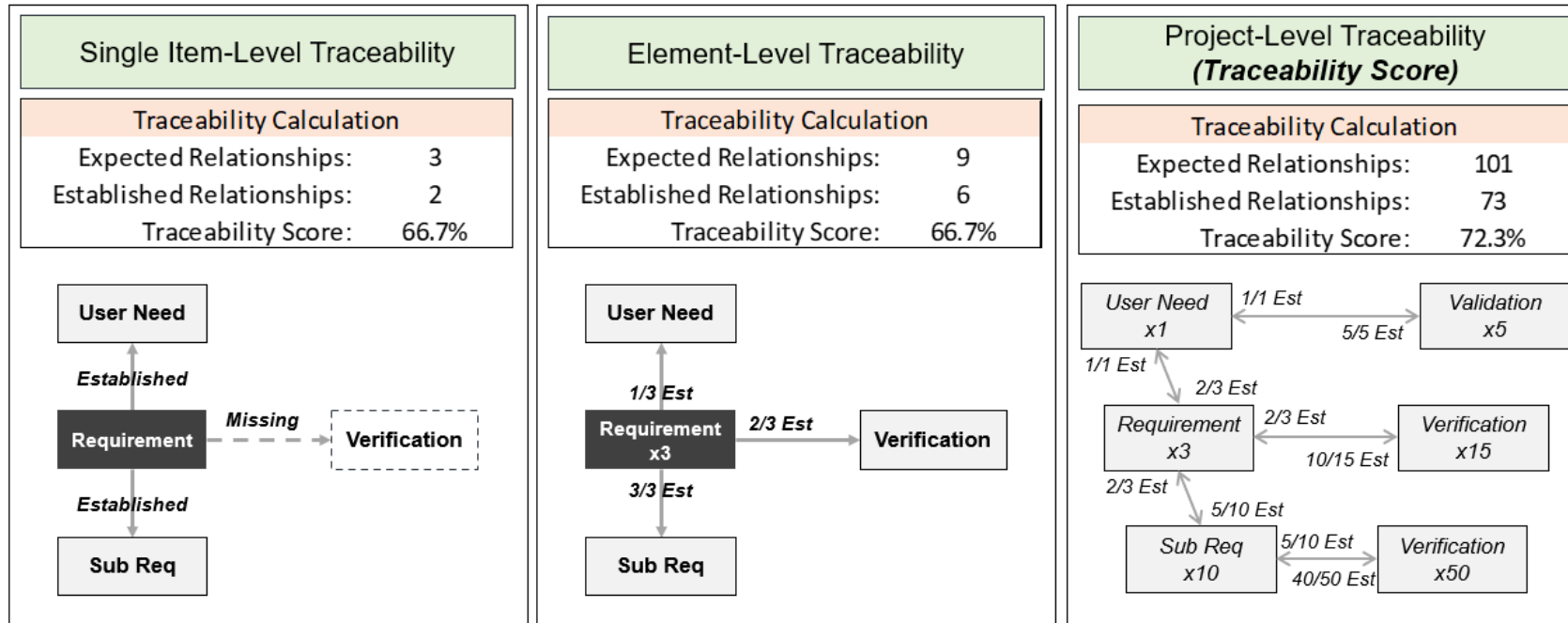
*How do we measure and compare projects with different elements / relationships?*



# Traceability Score™

MEASUREMENT OF ACTUAL ADHERENCE TO SPECIFIED TRACEABILITY MODEL

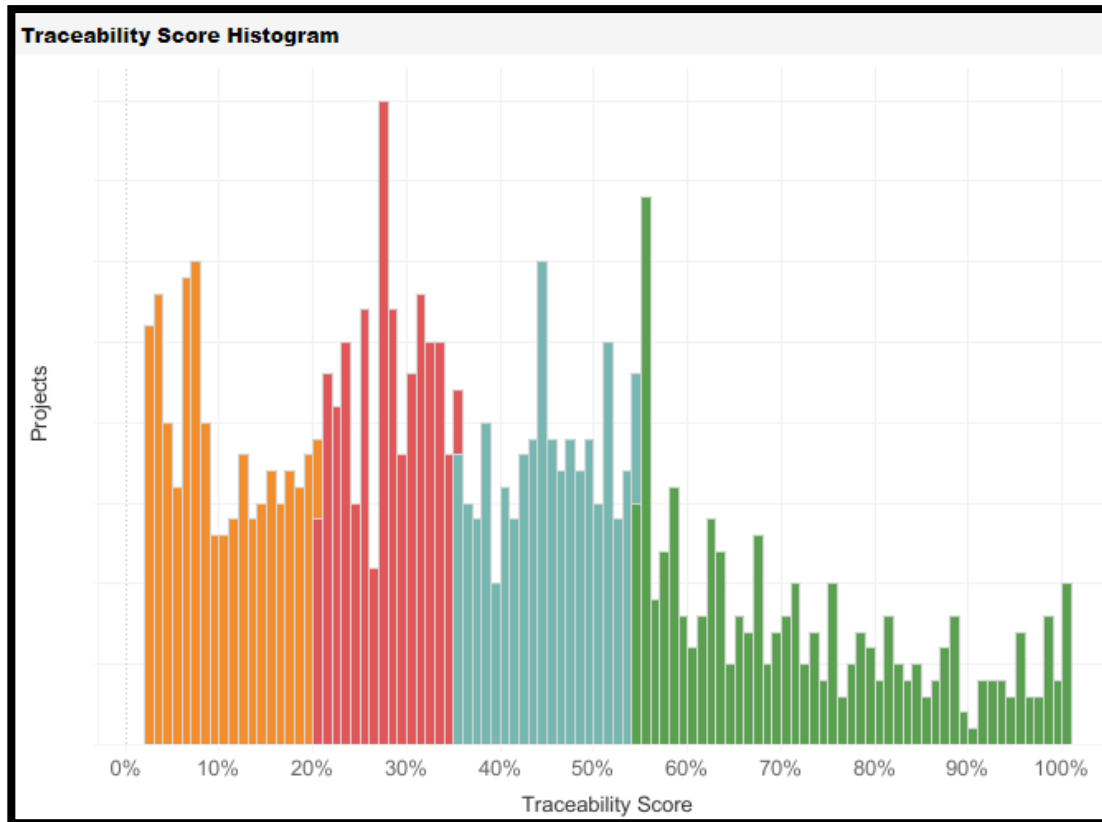
$$\text{Traceability Score} = \frac{\# \text{ established relationships among model elements}}{\# \text{ of expected relationships among model elements as specified by the project's traceability model}}$$



# Key Findings from Benchmark

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# High Level Findings

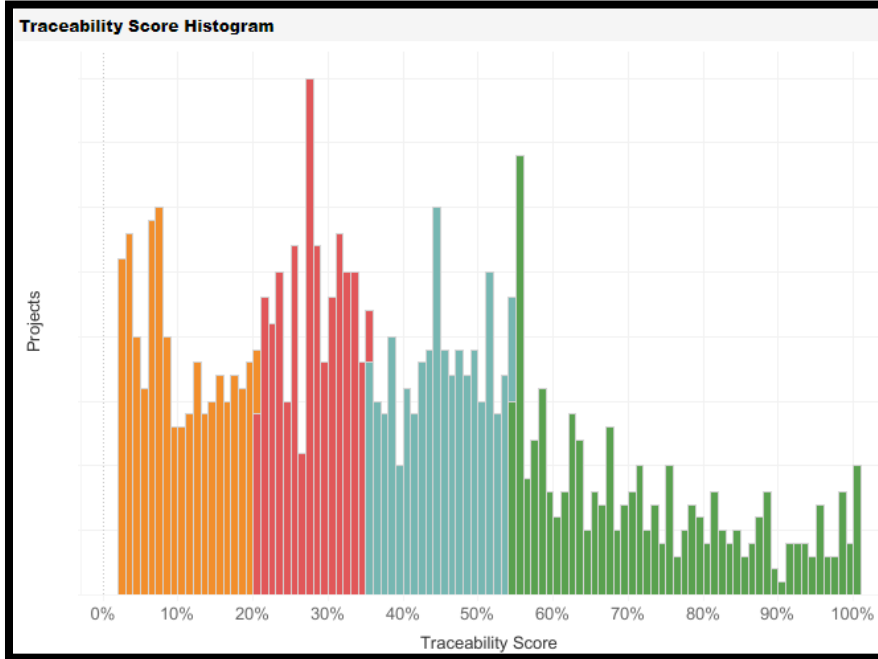


- 1. Median Traceability Score = 35%**  
As this report increases Traceability Score awareness and the impact on outcomes, we expect median scores to rise rapidly.
- 2. Top 10% of performers average Traceability Score = 87%**  
Top performing companies are already achieving impressive Traceability Scores
- 3. Top quartile performers outperform bottom quartile counterparts by over 7X**  
The performance variance between top and bottom performers is dramatic.
- 4. Within companies, project performance can vary significantly**  
In fact, 57% of companies have projects in more than one quartile.

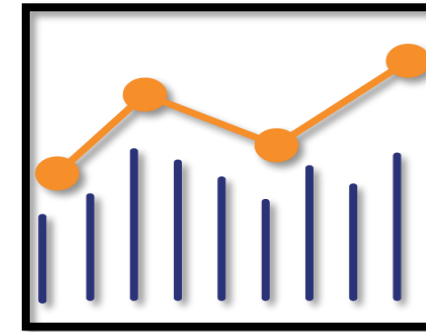
# Compared Performance by Traceability Score Quartile

DO HIGHER TRACEABILITY SCORES CORRELATE TO BETTER OUTCOMES?

Traceability Score by Quartile for all Projects in Benchmark



Able to Test Correlation to Outcomes



- Correlation between Traceability Score and product outcomes
- Comparison of product outcome variable distributions between two different Traceability Score quartiles

# Findings | Higher Scores Correlate to Better Outcomes

TOP QUARTILE OUTPERFORMS BOTTOM QUARTILE ON THESE OUTCOMES BY 1.9X-5.2X

High-Level Finding	Specific Metric	Validated Hypothesis
Faster Time to Market	'Testing' Cycle Time	Median Time to Execute Test Cases <b>(2.1X Faster)</b>
	'Defect Discovery' Cycle Time	Median Time from Beginning of Testing to Defect Detection <b>(1.8X Faster)</b>
		Median Time to Identify the Set of Defects <b>(2.1X Faster)</b>
Higher Quality	Verification of Requirements	Pct Requirements with Verification Coverage <b>(3.6X Higher)</b>
		Pct of Requirements Verified with Passed Test Case <b>(5.2X Higher)</b>
	Test Case Success Rate	Initial Test Case Failure Rate <b>(2.4X Lower)</b>
		Final Test Case Failure Rate <b>(2.9X Lower)</b>

Note: findings were validated across industries, project size and project age

# Analysis Recap

1. Need for the ability to measure adherence to a project's defined traceability model
2. Traceability Score provides a robust, scaled metric which provides a framework for benchmarking projects
3. Traceability Scores across the industry have room for improvement, but top performers do exist
4. Higher Traceability Scores correlate with improved product outcomes, providing evidence the metric is useful

# 5 Key Best Practices of Top Performers

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# 1

## FOCUS ON LIVE, NOT AFTER THE FACT, TRACEABILITY

Live Traceability  
(for improved project outcomes & compliance)

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Project Start



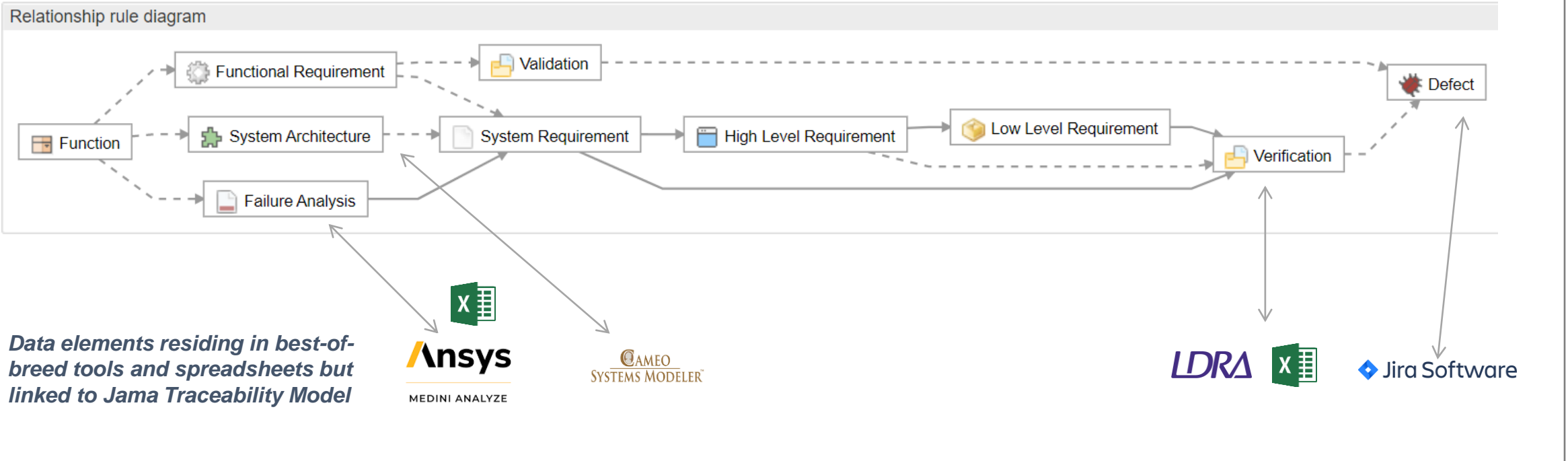
Project End

After the fact  
Traceability  
(for compliance)

# 2

## INTEGRATE TRACEABLE DATA ACROSS BEST OF BREED TOOLS

### jama connect™ | Airborne Systems Traceability & Toolchain



Critical, best-of-breed tools for traceability shown in this example. Additional and competitive alternatives to those listed are also supported.

# 3

## MAKE THE SYSTEMS ENGINEERING FUNCTION DATA CENTRIC

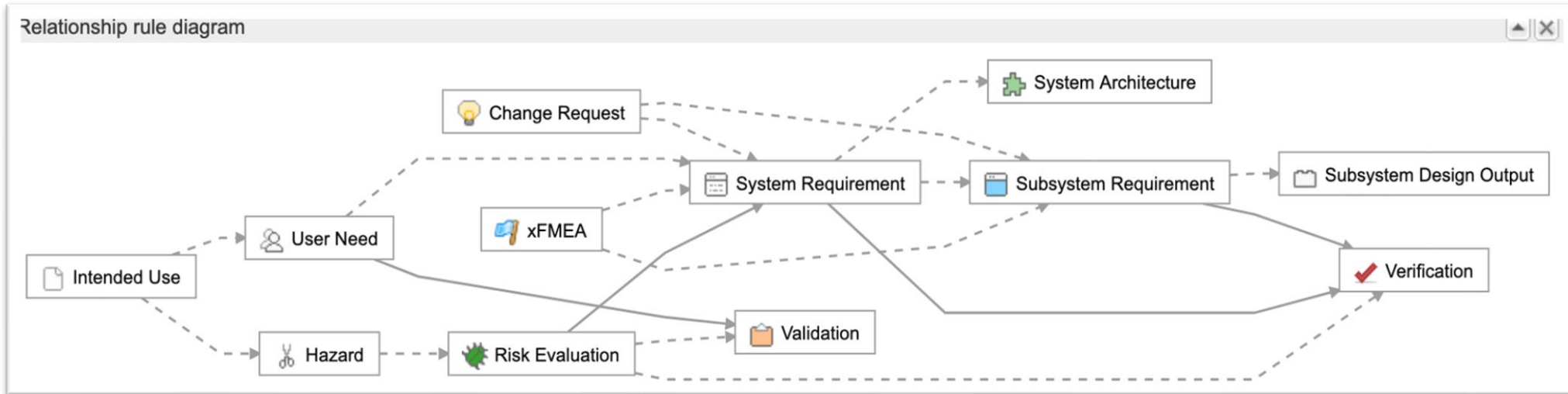
Measure actual adherence to the methodology to alert and take action

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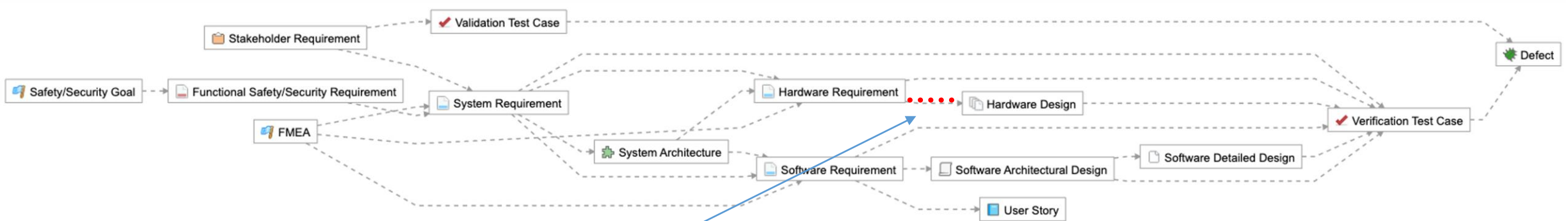
# 4 USE MODEL-BASED REQUIREMENTS TO SHORTEN AND IMPROVE DISCOVERY

jama connect™ | Design Control Process Toolchain



# 5 MANAGE BY EXCEPTION

jama connect™ | Automotive Functional Safety / Security Traceability Model



Traceability Score



Project Start



Project End

# How to get Started with Traceability Scores

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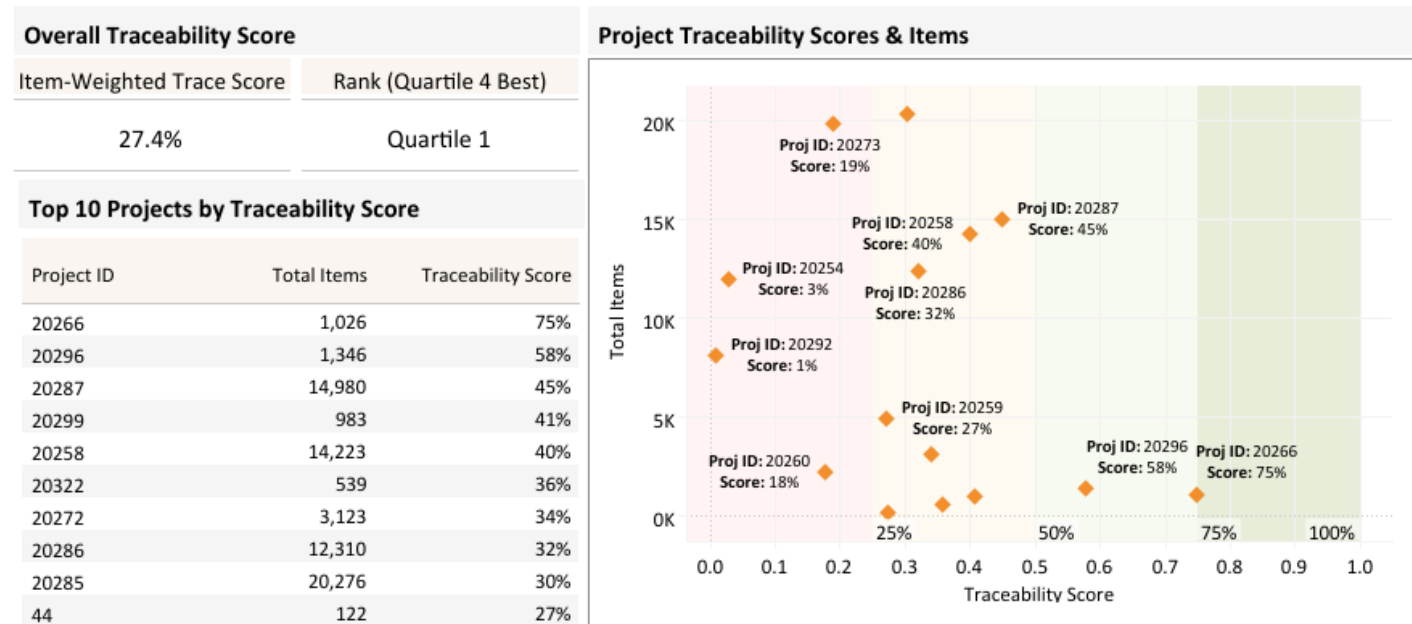
# Jama Connect SaaS Clients | Baseline & Improve

## MONTHLY REPORT FOR EXISTING JAMA CONNECT SAAS CUSTOMERS

- Benchmark to industry peers
- Determine internal best practices from high performing projects
- Correlate Traceability Scores to internal outcome measures
- Determine top performing Traceability Models
- Build support for systems engineering
- Use the Score to demonstrate compliance

Traceability Score determines the degree to which the defined traceability model was actually followed. The higher the Traceability Score, the greater the adherence to the traceability model defined for the project.

*Traceability Score = # established relationships for each item / # of expected relationships for each item*  
*\*Relationships defined by Project's Traceability Model*



### Benchmark Results:

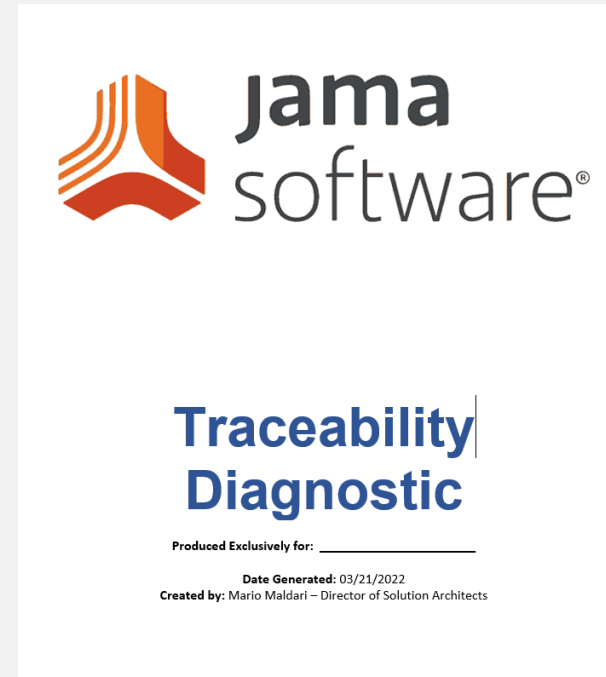
The Jama Software Traceability Score Benchmark found that higher Traceability Scores lead to faster time to market, fewer costly delays, higher quality, and less risk of recalls. Top quartile projects outperformed bottom quartile projects by **2X to 3X** in time to execute test cases and detect defects as well as the percent of test cases completed and the rate of positively verified requirements.

# New to Jama | Learn & Diagnose

## READ THE TRACEABILITY BENCHMARK



## CONDUCT A TRACEABILITY DIAGNOSTIC



# Questions

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# Thank You!

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Request a Traceability Diagnostic

<https://go.jamasoftware.com/requirements-traceability-diagnostic.html>

