



# REQUIREMENTS MANAGEMENT FOR PTC WINDCHILL CUSTOMERS

Derek Piette

Product Management Director

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# AGENDA

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- Challenges
- Connected Requirements
- Demonstration
- Summary

# IOT'S IMPACT ON PRODUCT DEVELOPMENT



**IoT** is changing the way we do business and creating new business opportunities.

Product design has increasingly become much more complex and requires an **agile**, multi-disciplined approach.

Today's systems demands an integrated, **collaborative** approach within engineering, as well as with our customers, suppliers, and users.

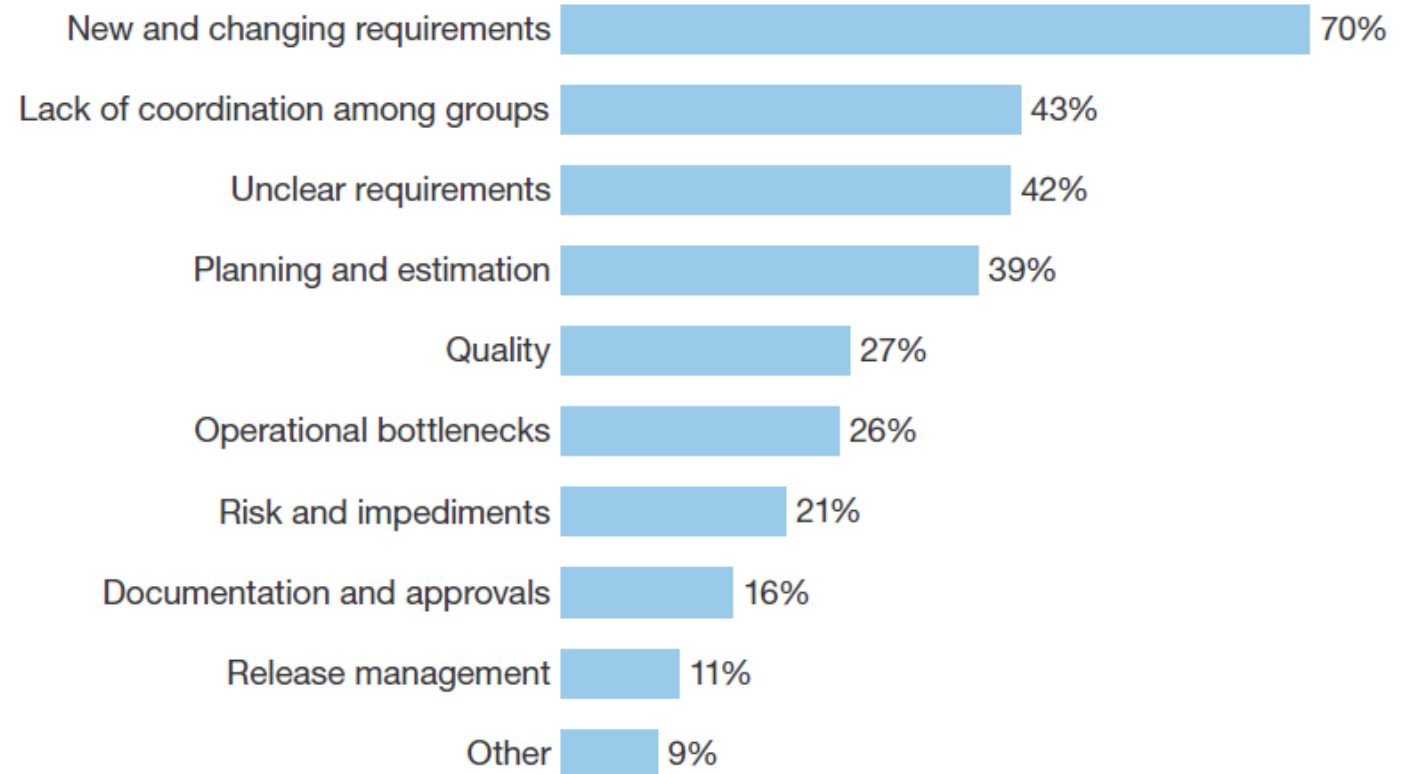
*Julie DeMeester, Engineering Fellow Raytheon Integrated Defense Systems*



**Raytheon**

*Figure 1* Requirements Are A Consistent Source Of Delivery Problems

**“When you cannot deliver on time, what are the usual points of failure?”**

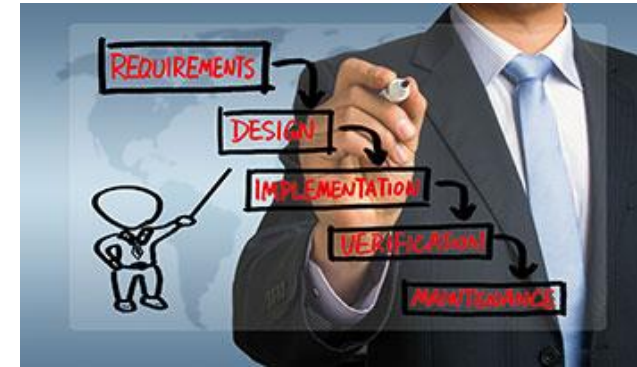


Base: 115 software development professionals  
(multiple responses accepted)

# WHY REQUIREMENTS MATTER

# 6 REASONS PROJECTS FAIL

- Requirements are not well defined
- Poor change management for requirements
- Lack of a single source of truth for requirements
- No link between requirements and test
- Inability to trace requirements throughout the development lifecycle
- Lack of traceability for functional safety or standard



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# Breakthrough Product Engineering

 **UNIFY**  
the cross-discipline team

 **SAFEGUARD**  
quality and safety

 **ORGANIZE**  
for product variants

 **CONNECT**  
to real-world insight

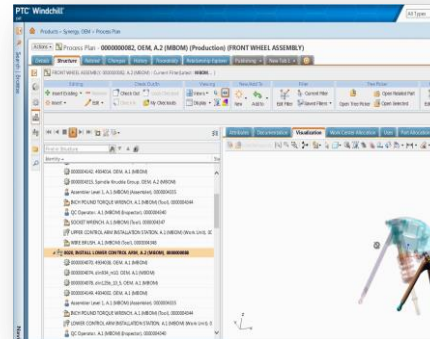




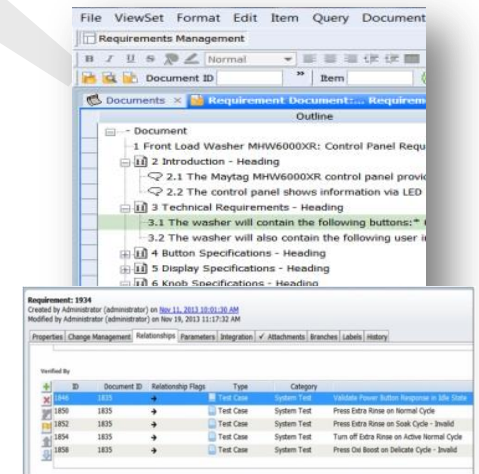
UNIFY

# THE CROSS-DISCIPLINE TEAM

- Organizational transparency
- Access to systems of record
- Collaborate across disciplines



Product Structures

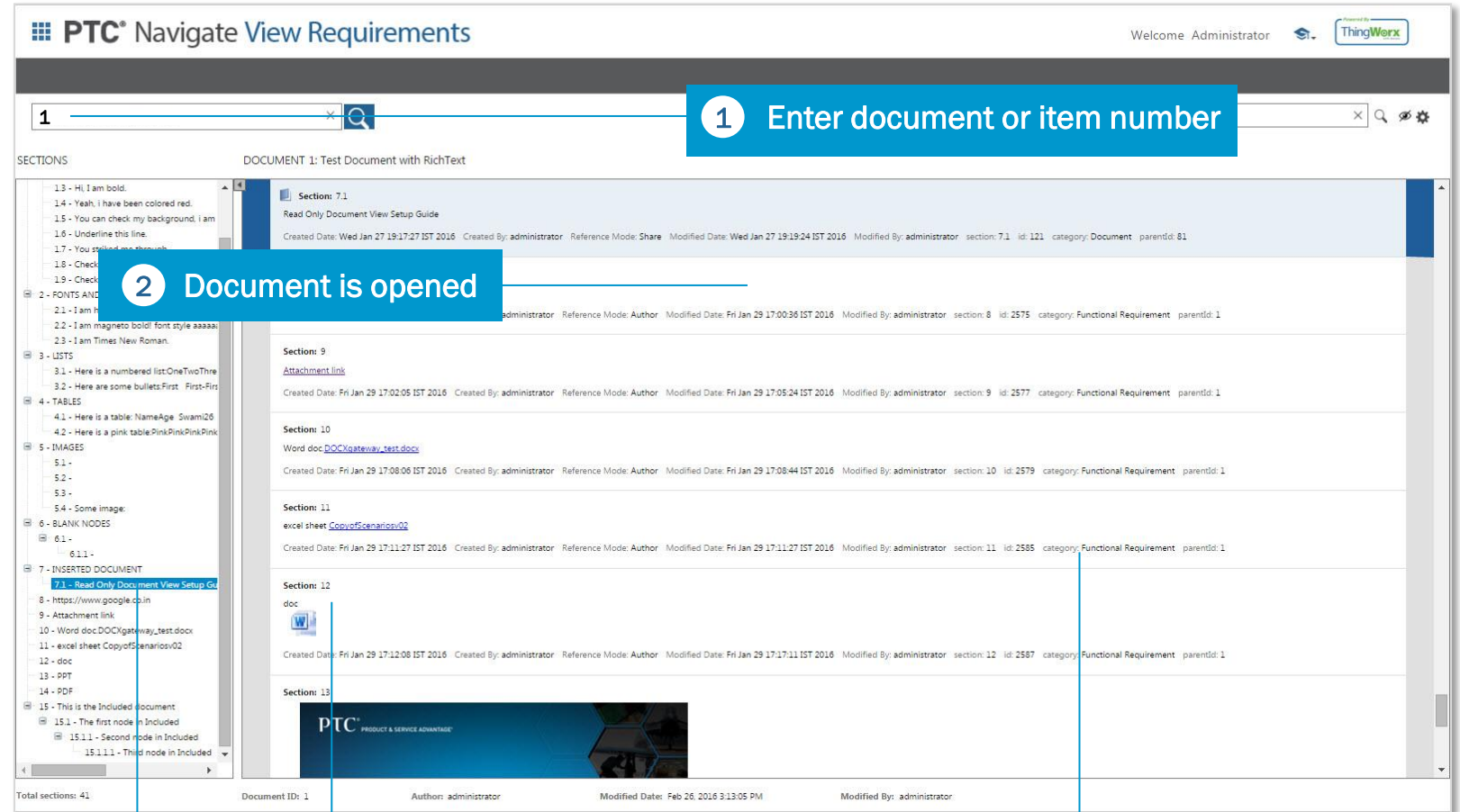


Requirements



## Capabilities

- View all Integrity Lifecycle Manager requirement or structured documents
- Displays all captured rich text information
- Fonts, tables, bullets, colors, subscript, superscript, etc.
- Embedded images and attachments
- Easily search and filter text
- Quickly open other inserted documents



Document structure with Row highlighted

Inserted documents and objects accessible

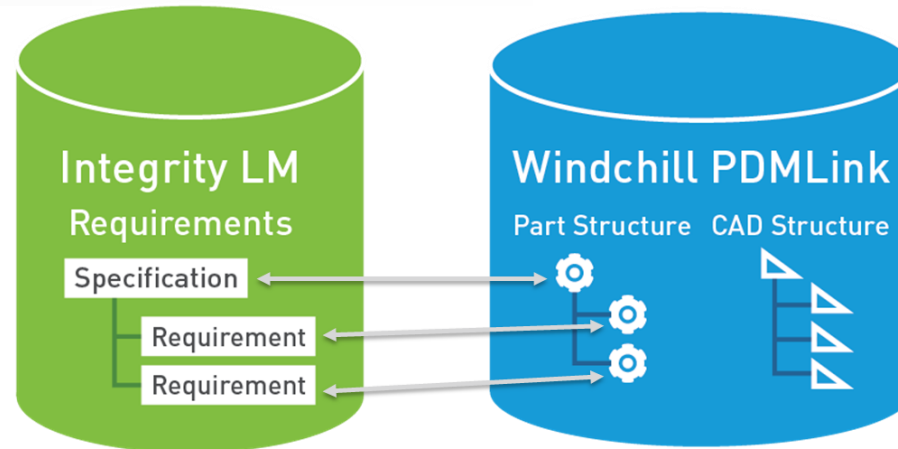
Rich text information and properties displayed

# REQUIREMENTS TRACEABILITY TO PRODUCT INFORMATION



## Capabilities

- Create traces without having to replicate data across systems
- Easily view Windchill information from Integrity Lifecycle Manager or Integrity Lifecycle Manager information from Windchill
- Task-based app to trace Integrity Lifecycle Manager Requirements to Windchill product information
- Leverage standards based infrastructure



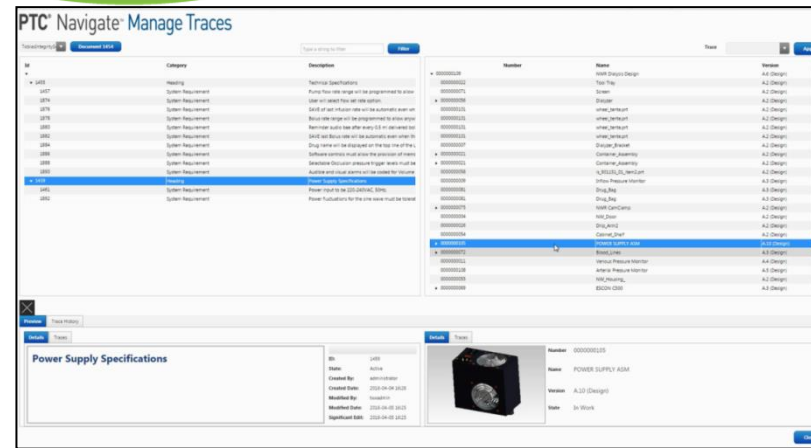
Create Traces from Requirements to Parts without requiring Replication of data

View Related Parts from PTC Integrity Lifecycle Manager

View Related Requirements from PTC Windchill

Quickly construct Allocate and Satisfy Traces

Easy to use App Leverages PTC Navigate Framework



**PTC®** Navigate™ Manage Traces

## BENEFITS

Respond quickly to market & customer needs

Ensure alignment of Requirements through the whole Product definition

Reduce rework costs related to meeting Requirements

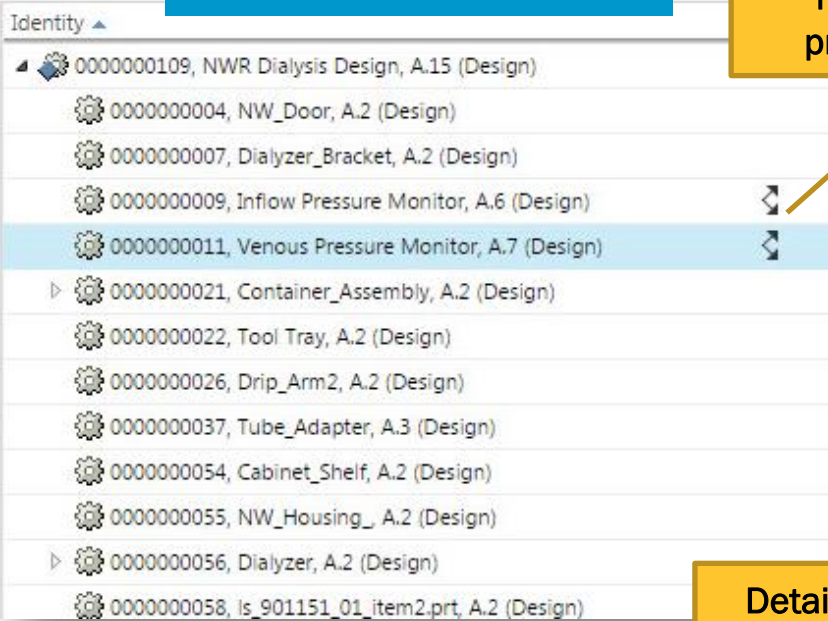
Improve Verification by clear understanding of needs

# VISIBILITY AND TRANSPARENCY OF INFORMATION

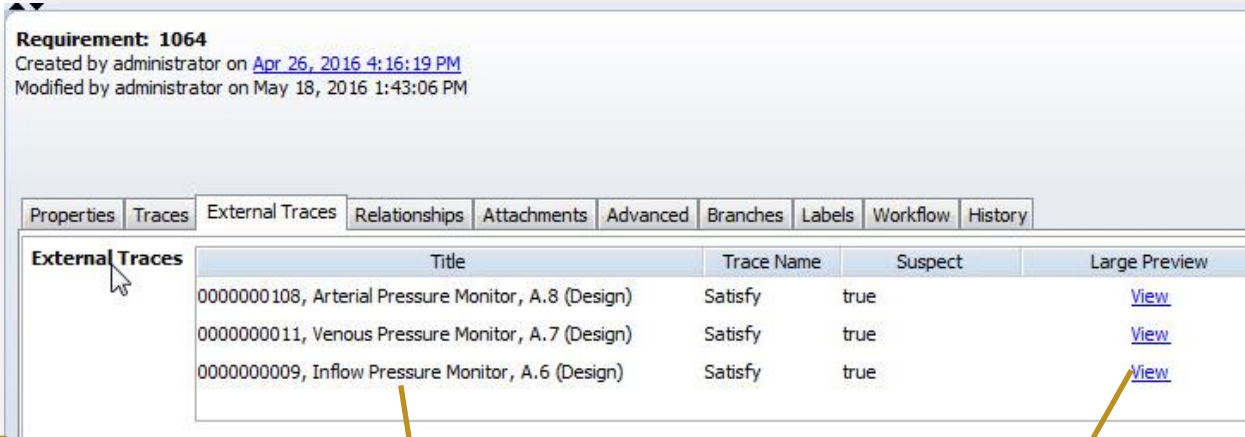


## Windchill

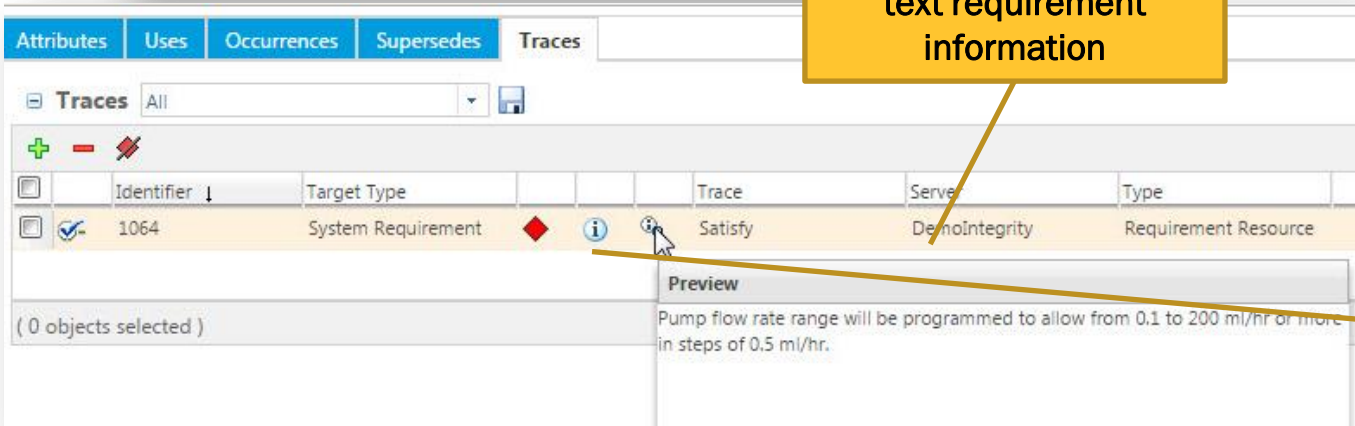
Quickly view related requirements in product structure



## Integrity Lifecycle Manager



Detailed view of rich text requirement information



Easily view part details from related requirements

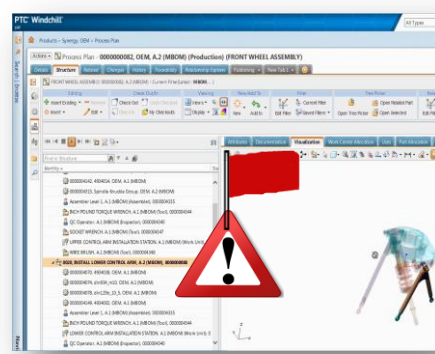
Direct access to native environment



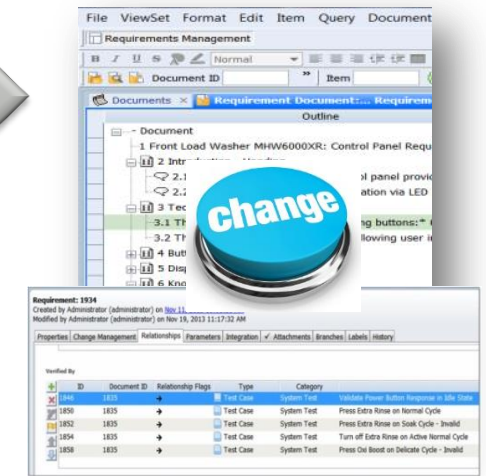
# SAFEGUARD

# PRODUCT QUALITY AND COMPLIANCE

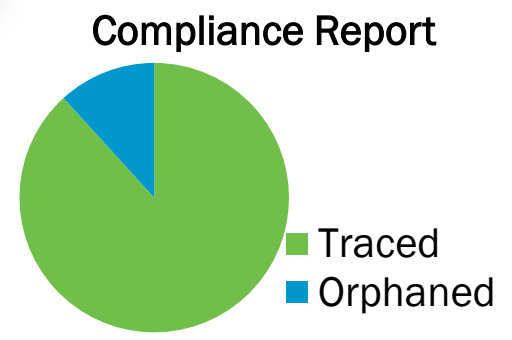
- Connected and traceable information
- Impact analysis
- Coverage analysis



Product Structures



Requirements



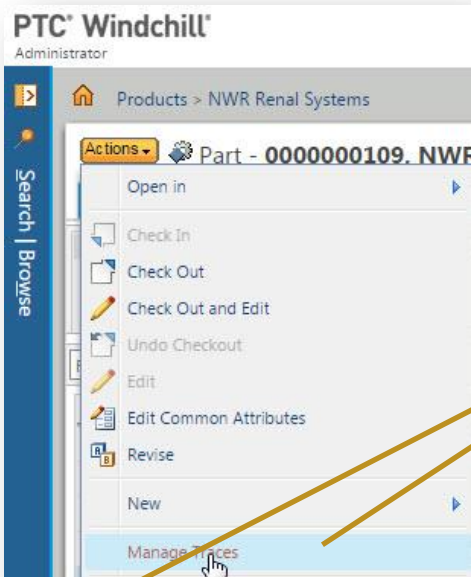


# TRACEABILITY BETWEEN REQUIREMENTS AND PARTS

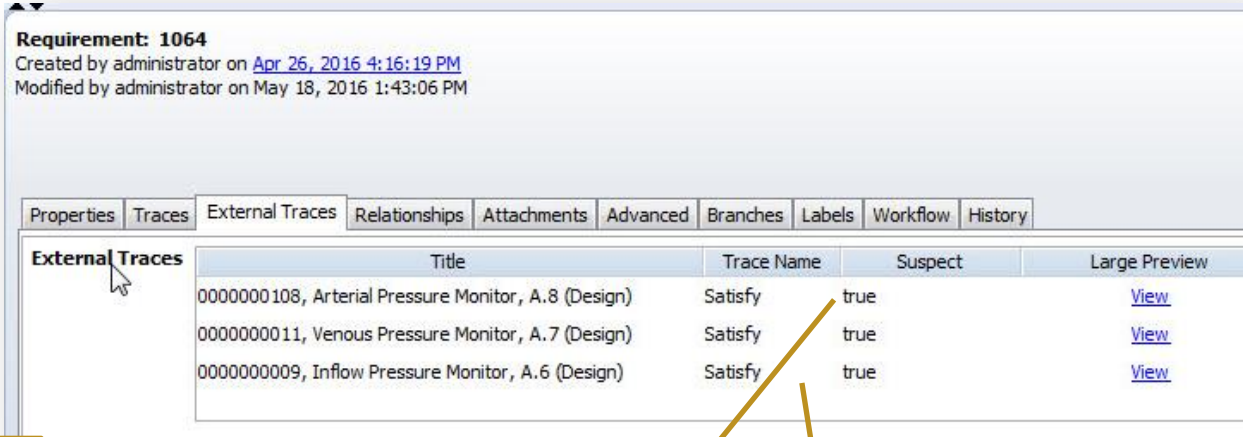


## Windchill

## Integrity Lifecycle Manager

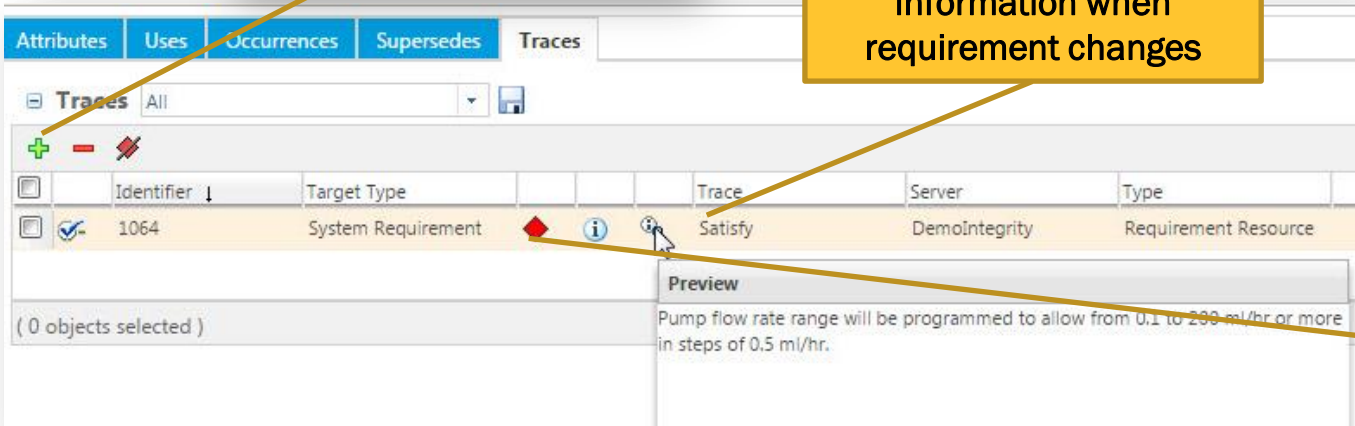


Launch Manage Trace application in context of product structure



View trace and suspect information when requirement changes

Understand trace and suspect information to product structure



Suspect flag is a "live" update in both systems during change

# TRACEABILITY BETWEEN REQUIREMENTS AND PARTS



## PTC® Navigate™ Manage Traces

Requirement text

Trace Satisfy Apply

Id	Category	Description	Number	Name	Version
6187	Heading	General	WCD5000001	01-10000.asm	A.1 (Design)
6189	Hardware Safety Requirement	The product shall be derived from Memory Seat Me	WCD5000316	01-70000.asm	A.1 (Design)
6191	Heading	Supplier Hardware Engineering Process SP-0815, Re	WCD5000534	01-20000.asm	A.1 (Design)
6193	Heading	Functional Requirements	WCD5000465	01-50000.asm	A.1 (Design)
6195	Heading	Power Stage	WCD5000231	01-51000.asm	A.1 (Design)
6197	Hardware Safety Requirement	One relay shall provide the power supply for all mot	WCD5000071	01-52120.prt	A.1 (Design)
6199	Hardware Safety Requirement	Relays shall switch front and reverse direction.	WCD5000367	01-512889.prt	A.1 (Design)
6201	Comment	Design Power Stage (will be used n-times for n mot	WCD5000456	01-52200.prt	A.1 (Design)
6203	Comment		WCD5000740	01-52115.prt	A.1 (Design)
6205	Comment	User Interface Design based on UI Safety Concept	WCD5000409	01-5128891.prt	A.1 (Design)
6207	Comment		WCD5000557	01-52000.asm	A.1 (Design)
6209	Hardware Safety Requirement	Condition Voltage at the ADC as fraction of Vcc Sho	WCD5000124	01-40000.asm	A.1 (Design)
6211	Heading	Non-Functional Requirements	WCD5000334	01-33100.prt	A.1 (Design)
6213	Non-Functional Requirement	The maximum failure rate within warranty shall be le	WCD5000098	01-33110.prt	A.1 (Design)
6215	Non-Functional Requirement	The ECU must be engineered according ASIL B.	WCD5000542	01-31000.asm	A.1 (Design)
6217	Non-Functional Requirement	Test and Qualification Criteria			
6219	Non-Functional Requirement	To be defined...			
6221	Non-Functional Requirement	Hardware architectural metrics requirements			
6223	Non-Functional Requirement	To be defined...			
6225	Non-Functional Requirement	Random hardware failure requirements			
6227	Non-Functional Requirement	The hardware shall consider random hardware failu			

View requirements and part structures in a single user interface

Quickly create traces for selected objects

Visualize rich information for requirements and parts

View created traces and suspect flags

Details Traces

ID: 6203  
State: Active  
Created By: administrator  
Created Date: 2015-02-17 13:33  
Modified By: administrator  
Modified Date: 2015-02-17 13:35  
Significant Edit: 2015-02-17 13:35

Details Traces

Number WCD5000001  
Name 01-10000.asm  
Version A.1 (Design)  
State In Work

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# LIVE DEMONSTRATION

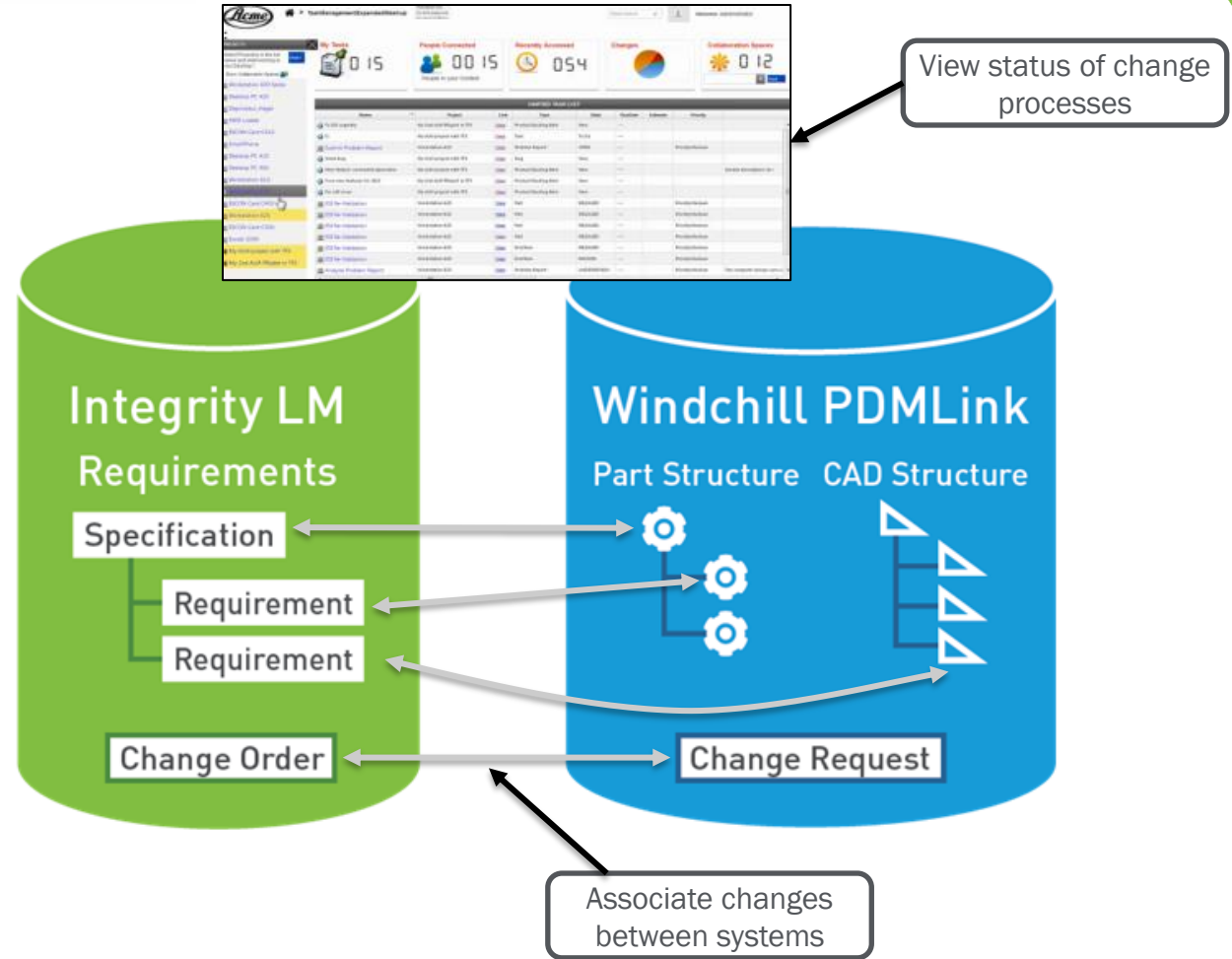


# COORDINATED CHANGE MANAGEMENT PROCESS



## CAPABILITIES

- Associate change processes and objects between Integrity LM and Windchill PDMLink
  - Provide process visibility & execution
- Visualize information about Integrity LM changes within a Windchill PDMLink change process
  - Streamlined view of linked information
  - Invoke application for more detailed access
- Common Change Reporting and Metrics across systems



## BENEFITS

Improve visibility into product releases

Streamline activities across organization

Improve compliance

Reduce rework costs

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# SUMMARY

- **Easily trace** Integrity LM requirements to Windchill parts
  - Quickly identify impact analysis of a requirement change
- **Simple user adoption** and training
  - User does not need to learn the other system
- **Linked data** across Windchill and Integrity LM
  - Data remains in system of record (*no replication or duplication*)
- Anecdotal integration pre-release customer feedback:
  - “Seems simple and easy to use”
  - “Very intuitive”
  - “Really like the approach of a focused app for the task“
  - “Can you make this app work for creating other relationships?”
  - “Investment is well spent on this effort”
- Available with Windchill 11.0 M010, Integrity 10.9, and ThingWorx 7.1
  - Similar installation and configuration to PTC Navigate
- Leverage same approach to trace Integrity Modeler elements to Windchill product structures

QUESTIONS?



The image features several colorful geometric shapes, including triangles and lines in shades of blue, green, yellow, and purple, scattered across the background. A large, multi-colored geometric shape is prominent on the right side. The text 'LIVE WORX 16' is centered, with 'LIVE' in a thin, outlined font and 'WORX 16' in a bold, solid black font. A small 'TM' trademark symbol is positioned to the right of the '16'.

LIVE  
WORX 16™

TAKE A FRESH LOOK AT THINGS

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