

A photograph of a man and a young boy sitting on a wooden dock, fishing. The man is on the left, wearing a light blue polo shirt and sunglasses, looking towards the water. The boy is on the right, shirtless and wearing patterned swim trunks, also looking towards the water. A fishing rod is visible in the water. The background is a calm body of water with some ripples.

Connecting Conversations, Requirements, Design, and Testing

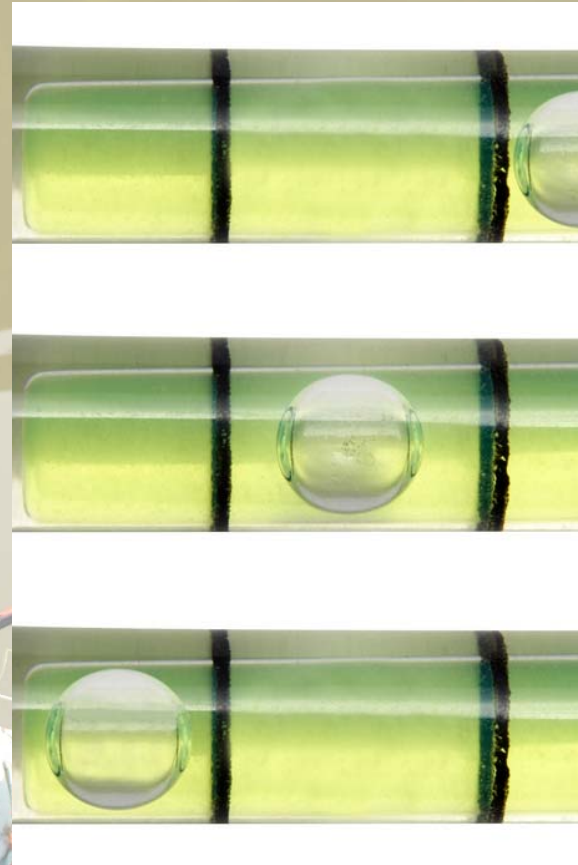
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Level Set

- Understanding the Speaker
- Understanding the Audience
- Clarity of common vocabulary
- What is Connecting ...?



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Who am I

- Microsoft Most Valuable Professional
 - Awards in Windows Server-Networking and Commerce Server.
 - One of 3 Commerce Server MVPs, one of 1300 MVPs in the US
- Author and Editor
 - Author of 16 books, editor of 100 more
 - Author of approximately 50 articles per year on IT Management, Software Development, and other topics.
- Certifiable
 - More than 10 certifications from Microsoft, CompTIA, and Novell.



What is important to you?

- What do you want to get out of today?
- What do you struggle with in your organization?
- What's missing in your process?



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Conversations

- Definitions
 - The spoken exchange of thoughts, opinions, and feelings
 - An informal discussion of a matter by representatives of governments, institutions, or organizations

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Requirements

- Definitions
 - The first stage of software development which defines what the potential users want the system to do...

Copyright 1993-2005 David How, The Free On-line Dictionary of Computing

- Something that is required; a necessity

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Design

- Definition
 - To conceive or fashion in the mind; invent
 - To formulate a plan for; devise
 - To create or contrive for a particular purpose or effect

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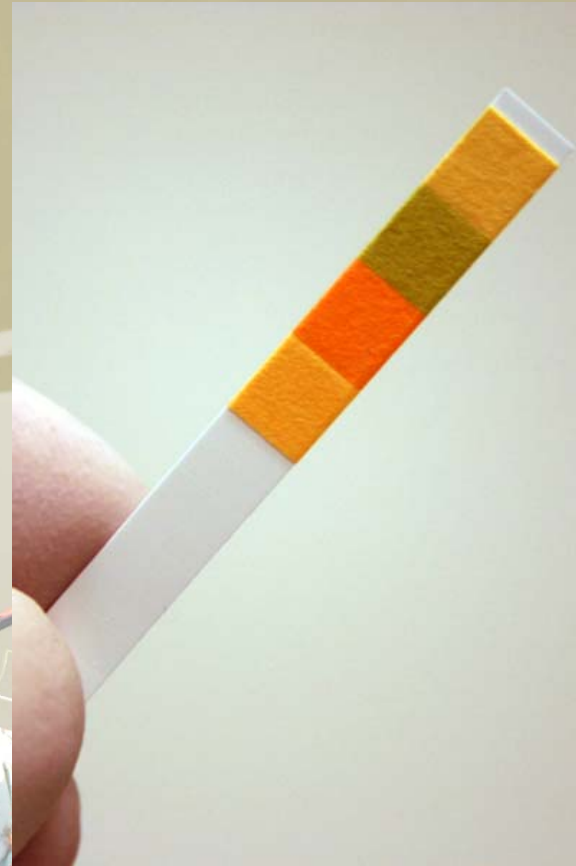


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Testing

- Definition
 - A procedure for critical evaluation; a means of determining the presence, quality, or truth of something; a trial

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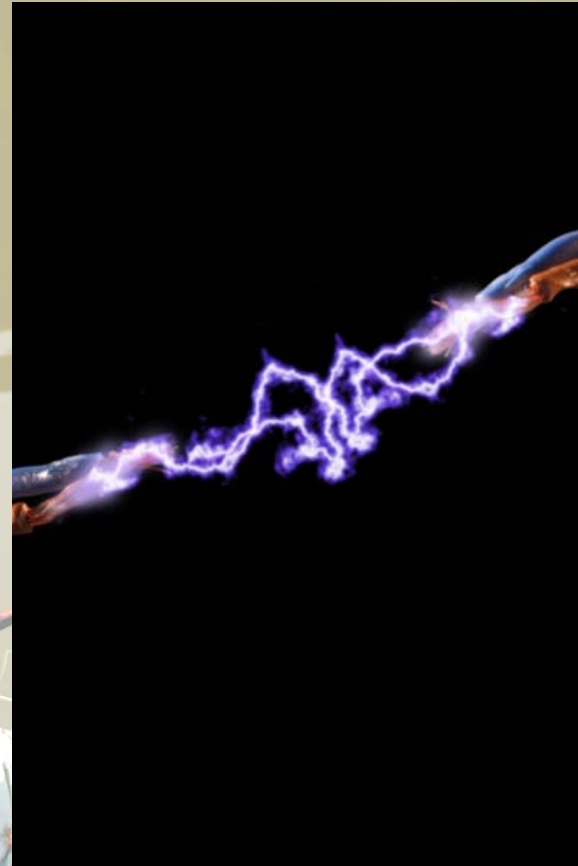


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Connecting

- Definitions
 - To become joined or united
 - To establish a report or relationship

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Requirements Traceability (RT)

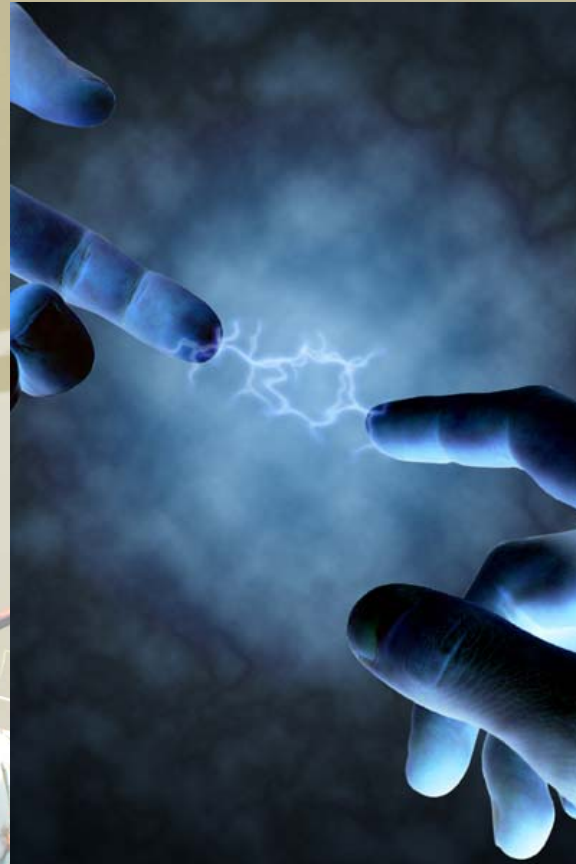
- Requirements Traceability – *the ability to track backwards to the origin of a requirement and forward to it's implementation* – is a part of, but not all of, the ideas we'll explore today



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Creating Connections

- Remove barriers to Understanding
- Promote continuous learning through questioning
- Exposing assumptions and disconnects



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More Detail Needed

- “For the truth is, the clients do not know what they want. They usually do not know what questions must be answered, and they almost never have thought of the problem in the detail that must be specified”

The Mythical Man Month, Frederick P. Brooks, Jr



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The Cost of Rework

- Current software projects spend about 40 to 50 percent of their effort on avoidable rework
- Approximately 80% of the avoidable rework costs on a software development project are a direct result of only 20% of the defects

Software Defect Reduction Top 10 List, IEEE Computer, January 2001



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Cost of Quality

"Estimates of the economic costs of faulty software in the U.S. range in the tens of billions of dollars per year and have been estimated to represent approximately just under 1 percent of the nation's gross domestic product (GDP)."

The Economic Impacts of Inadequate Infrastructure for Software Testing, NIST May 2002



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Cost of defects

- Reworking a software requirements problem once the software is in operation typically costs 50 to 200 times what it would take to rework the problem in the requirements stage

"Understanding and Controlling Software Costs", IEEE Transactions on Software Engineering, October 1988



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Genesis

- Requirements are the refined output of a process designed to distil the essential and common elements from the ideas of the stake holders.



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Finding Roots

- Problems with Requirements
 - Who asked for this requirement?
 - What does this requirement mean?
 - What is the context of this requirement?



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Disciplined Ideas

- Requirements tie to design
- Tests tie to requirements and/or design
- Work together as a team
- No frozen artifacts
- Traceability matrixes



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Agile Ideas

- Customer On Site
- Co-located development team
- Learn as much as possible about the problem – when you need to



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Capturing Conversations

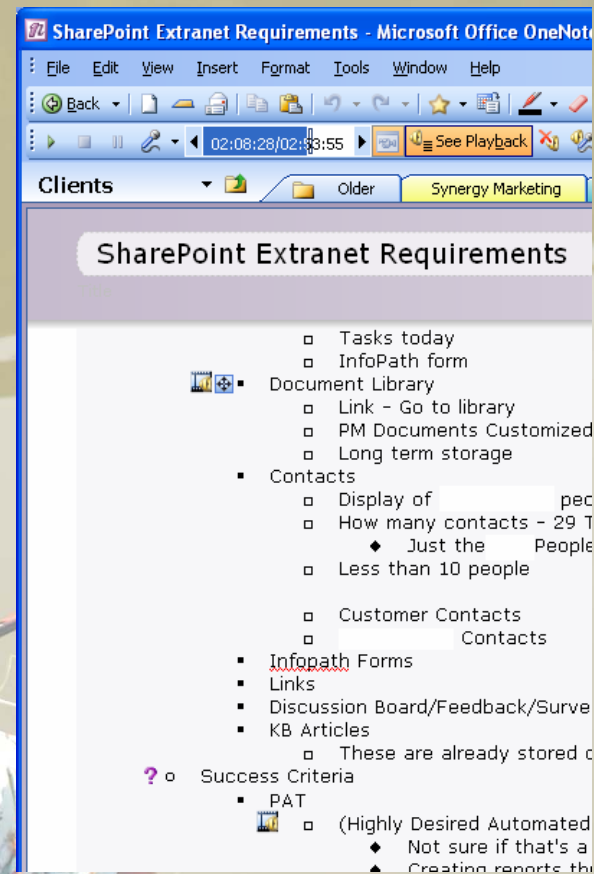
- Note taking with a purpose
- Record the idea and the person
- Identify each conversation uniquely (i.e. by number)
- Identify each idea or topic by number



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Tool: Microsoft OneNote

- Specifically designed for note taking
- Allows for synchronized audio recording and notes



Capturing Requirements

- McKinsey – Mutually Exclusive, Collectively Exhaustive (MECE)
- Characteristics of the specification
 - Complete – No missing requirements, they're hard to spot.
 - Consistent – Requirements can't conflict with one another
 - Modifiable – Able to be changed when the requirements change
 - Traceable – Linked backwards to origin and forward to design elements and source code that implement it.



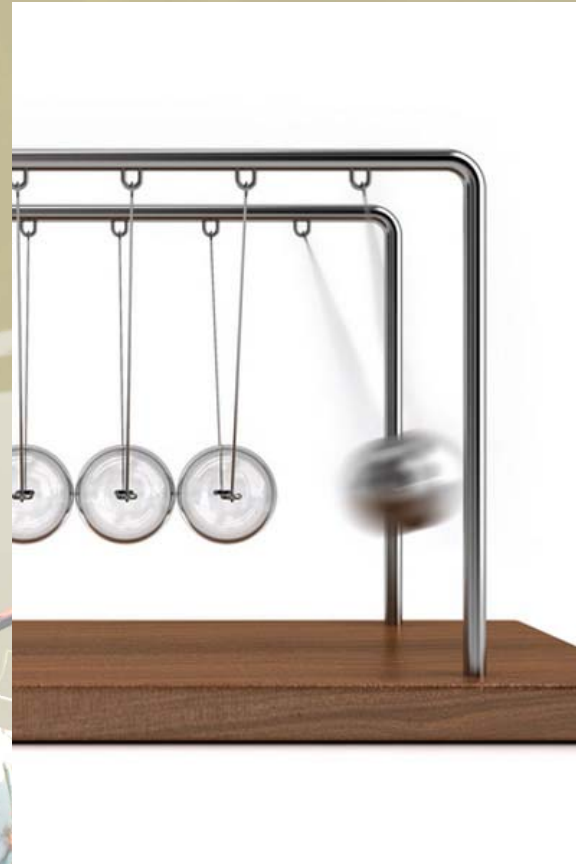
A Good Requirement is

- Objective – “Based on observable phenomena; presented factually.”

(American Heritage Stedman's Medical Dictionary)

- Precise - Clearly expressed or delineated; definite

(American Heritage Dictionary of the English Language, Fourth Edition)



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A Good Requirement is also

- Measurable – Possible to be quantified
- Criterion-based – Identification of the value necessary to meet the standard
- Clear and Understandable – without ambiguity



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The RT Problem

- “Surprisingly, the inability to locate and access the sources of requirements and pre-RS (Requirements Specification) was the most commonly cited problem across all the practitioners in our investigations.”

“An Analysis of the Requirements Traceability Problem”,
Gotel and Finkelstein (1993)



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Lack of RT Consensus

- Definition: “A software requirements specification is traceable if (i) the origin of each of its requirements is clear and if (ii) it facilitates the referencing of each requirement in future development or enhancement documentation”

ANSI/IEEE Standard 830-1984

- “Although requirements traceability has been in practice for more than two decades, there has yet to be a consensus on what information should be captured and used as a part of a traceability scheme”

“Lessons Learned from Implementing Requirements Traceability”
Ramesh, Stubbs, Powers, and Edwards April 1995



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RT ROI

- “... twice the normal documentation costs associated with developing a system of that size and complexity. This estimate still fell far short of the actual costs associated with traceability.”
- It was estimated that 10 employees lost over six months of productive work time [from trying to recreate requirements and design details], resulting in over 60 lost work-months.

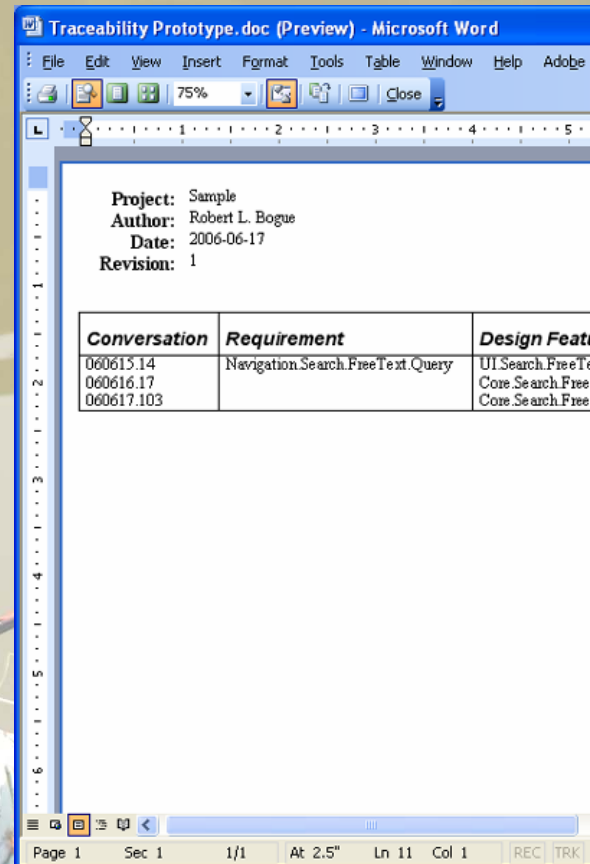
“Lessons Learned from Implementing Requirements Traceability”
Ramesh, Stubbs, Powers, and Edwards April 1995



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Tool: Word for RT

- Tables with columns for:
 - Conversations
 - Requirements
 - Design Feature Point (DFP)
 - Test Case and Script



Beyond RT

- Seeking Deeper Understanding
- Planning for change



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No Frozen Artifacts

- “But the objectives of the phases are not described in terms of finishing an artifact, but bringing it to the right level of maturity to be able to make correct decisions about it.”

The Rational Unified Process Made Easy, Kroll and Kruchten



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Requirements Dirty Little Secret

- Requirements change 25% or more

Applied Software Measurement, Jones 1997

- Research of many projects has shown that 45% of features were not used with an additional 19% rarely used.

Standish Group CHAOS Report 2000



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Connecting Design

- Design Feature Point (DFP) – A concrete, measurable description of how one atomic aspect of the system shall be constructed.
- DFPs become the unit for tracking



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Connecting Construction

- Construction should directly relate back to design much like a building should represent it's blueprints.
- Specific construction may drive testing



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Connecting Testing

- Connected to Requirements, Design, and Construction



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A photograph of a man and a young boy sitting on a wooden dock, fishing in a body of water. The man, on the left, is wearing a light blue polo shirt and sunglasses. The boy, on the right, is shirtless and wearing patterned swim trunks. They are both looking out at the water. A fishing rod is visible in the water. The text "Thank You" is overlaid in the upper center.

Thank You

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