

Software Requirements Engineering (SE2001)



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Requirements Managements

Requirements Traceability

- ❖ Refers to ability to describe and follow the life of a requirement, in both a forwards and backwards direction.
- ❖ That is from its origins, through its development and specification, to its subsequent deployment and use, and through all periods of on-going refinement and iteration in any of these phases.

Tracing Requirements

- ❖ It is important to trace requirements both ways:
 - Origin of a requirement.
 - How is it implemented.
- ❖ This is a continuous process.

Classifications Of Requirements Traceability

- ❖ Backward-from traceability
- ❖ Forward-from traceability
- ❖ Backward-to traceability
- ❖ Forward-to traceability

Backward-from Traceability

Links requirements to their sources in
other documents or people

Forward-from Traceability

Links requirements to design and
implementation components

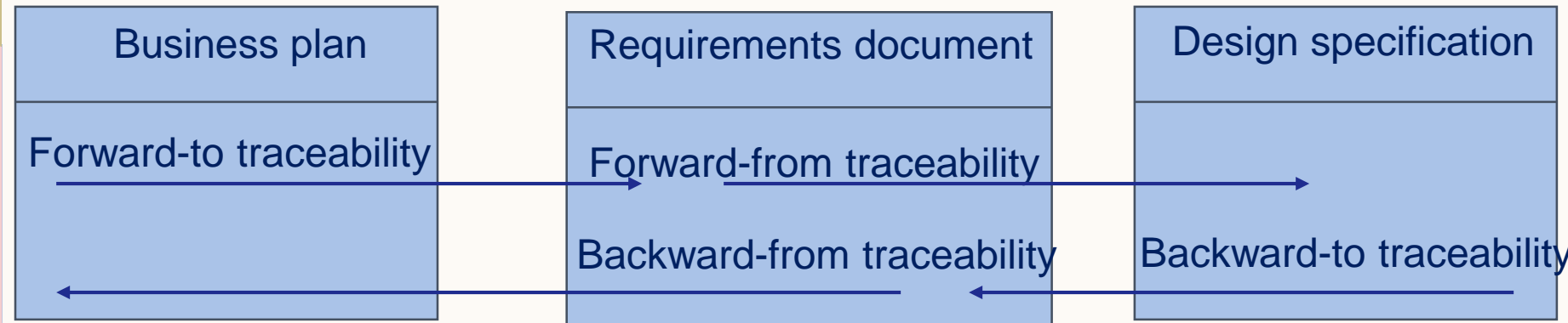
Backward-to Traceability

Links design and implementation
components back to requirements

Forward-to Traceability

Links other documents (which may have preceded the requirements document) to relevant requirements

Backwards And Forwards Traceability



Categories of Traceability

- ❖ Requirements-sources traceability
- ❖ Requirements-rationale traceability
- ❖ Requirements-requirements traceability
- ❖ Requirements-architecture traceability
- ❖ Requirements-design traceability
- ❖ Requirements-interface traceability



Requirements-sources Traceability

- ❖ Links the requirement and the people or documents which specified the requirement.

Requirements-Rationale Traceability

- ❖ Links the requirement with a description of why that requirement has been specified.
- ❖ This can be a distillation of information from several sources.

Requirements-requirements Traceability

- ❖ Links Requirements With Other Requirements Which Are, In Some Way, Dependent On Them.
- ❖ This Should Be A Two-way Link (Dependent On Them And Is-dependent On)

Requirements-architecture Traceability

- ❖ Links requirements with the sub-systems where these requirements are implemented.
- ❖ This is particularly important where sub-systems are being developed by different sub-contractors



Requirements-design Traceability

- ❖ Links requirements with specific hardware or software components in the system, which are used to implement the requirement.

Requirements-interface Traceability

- ❖ Links requirements with the interfaces of external systems, which are used in the provision of the requirements

Traceability Tables

- ❖ Requirements traceability information can be kept in traceability tables, each table relating requirements to one or more aspects of the system or its environment.

A Generic Traceability Table

	A01	A02	A03		Aii
R01		✓	✓		
R02	✓	✓			
R03		✓			✓
Rnn	✓	✓			

Traceability Table - Example

Online Ticket Booking Application

Test Case ID#	Test Case Description
TC#001	Verify if user is able to book one way ticket
TC#002	Verify if user is able to book multiple one way tickets
TC#003	Verify if user is able to book round way ticket
TC#004	Verify if user is able to book multiple round way tickets
TC#005	Verify if user is able to book one way ticket for multiple cities
TC#006	Verify if user is able to book round way ticket for multiple cities
TC#007	Verify if usre is able to pay by Master Card
TC#008	Verify if usre is able to pay by Visa Card
TC#009	Verify if usre is able to pay by Debit Cards
TC#010	Verify if usre is able to pay Fully by Reward Points
TC#011	Verify if usre is able to pay partially by Reward Points

Traceability Table - Example

Online Ticket Booking Application

REQUIREMENTS TRACEABILITY MATRIX					
Project Name: Online Flight Booking Application					
Business Requirements Document BRD		Functional Requirements Document FSD			Test Case Document
Business Requirement ID#	Business Requirement / Business Use case	Functional Requirement ID#	Functional Requirement / Use Case	Priority	Test Case ID#
BR_1	Reservation Module	FR_1	One Way Ticket booking	High	TC#001 TC#002
		FR_2	Round Way Ticket		TC#003 TC#004
		FR_3	Multicity Ticket booking	High	TC#005 TC#006
BR_2	Payment Module	FR_4	By Credit Card	High	TC#007 TC#008
		FR_5	By Debit Card	High	TC#009
		FR_6	By Reward Points	Medium	TC#010 TC#011

Need For Traceability Policy

- ❖ Huge amount of information, which is expensive to collect, analyze, and update
- ❖ Need to continuously update traceability information
- ❖ A traceability policy is needed

Traceability Policy

- ❖ Traceability information
- ❖ Traceability techniques
- ❖ When to collect information
- ❖ Roles
- ❖ Documentation of policy exceptions
- ❖ Process of managing information

Traceability Information

- ❖ No. of requirements
- ❖ Estimated lifetime
- ❖ Level of organization's maturity
- ❖ Project team and composition
- ❖ Type of system
- ❖ Specific customer requirements

Basic Types Of Requirements Traceability

❖ Pre-RS Traceability:

- Concerned With Those Aspects Of A Requirement's Life Prior To Its Inclusion In The RS (Requirements Production)

❖ Post-RS Traceability:

- Concerned With Those Aspects Of A Requirement's Life That Result From Its Inclusion In The RS (Requirements Deployment)

PRE-RS TRACEABILITY

- ❖ Depends on the ability to trace requirements from and back to, their originating statements, through the process of requirements production and refinement, in which statements from diverse sources are eventually integrated into a single requirement in the RS.
- ❖ Changes in the process need to be re-worked into the RS.

POST-RS Traceability

- ❖ Depends on the ability to trace requirements from, and back to, a baseline (the RS), through a succession of artifacts in which they are distributed.
- ❖ Changes to the baseline need to be re-propagated through this chain.

POST-RS Traceability

- ❖ Mostly only Post-RS traceability is considered sufficient
- ❖ Pre-RS traceability captures the rationale for each requirement, which is a very important aspect in managing requirements properly



THANK YOU

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