

Lecture # 20

# Requirements Traceability

# Recap of Last Two Lectures

- ◉ We talked about different aspects of requirements management, i.e., managing the changes in requirements in detail
- ◉ Requirements cannot be managed properly if requirements traceability is not implemented

# 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

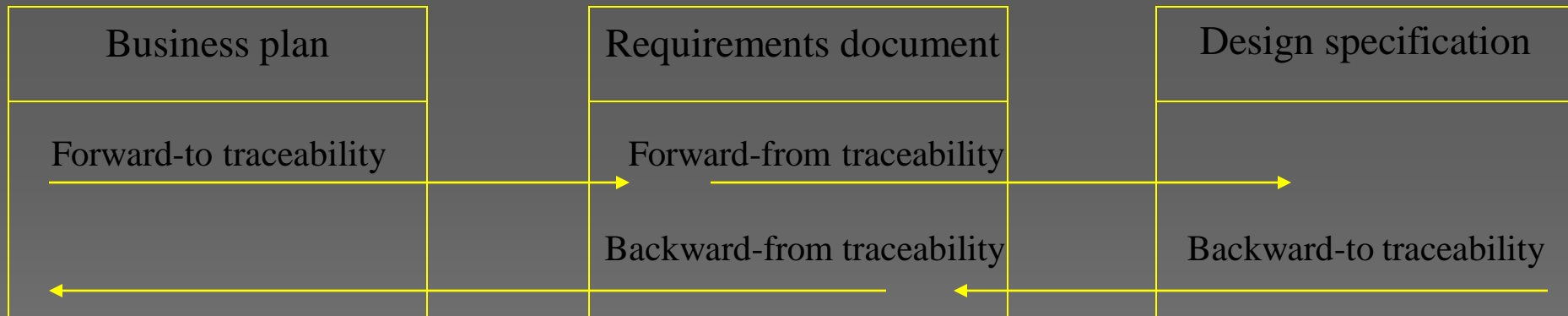
- ◉ Links design and implementation components back to requirements



# 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	✓	✓			

# 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 - 1

- ◉ 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

# Pre-RS Traceability and Rationale

- ◉ 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

# Summary

- Requirements traceability is an on-going process, and has two basic types: pre-RS and post-RS
- There are four classifications of requirements traceability
- We discussed traceability information, policies, and techniques
- Without proper traceability, requirements cannot be managed