Requirements Engineering Processes

Why RE Processes?

What are RE Processes?

RE Processes & Sw Lifecycle Models

Why Processes?

- Every product is the result of some process
- A process involves a collection of actions for achieving a goal
- A process is a partial order.
  E.g., "send reminders" can be in any temporal relation with "reserve facilities"
- A sw lifecycle is a coarse-grained process

natural selection  
gene combination  
metamorphosis  
select meeting topic  
select participants  
send notification  
receive confirmation  
send reminders  
reserve facilities  
hold meeting  

human beings today  
meeting memoirs  

### Why RE Processes?

#### Example: A Software Reengineering Process

*Old Reality* → *New Reality*

**Old Implementation** → **New Implementation**

- **Old Reality**
  - Legacy Integration

- **New Reality**
  - New Implementation

**+** fast production
**+** might work for a small project (1-person, 1-version, stays forever)

- **-** many party involvement: users, customers, developers, contractors
- **-** no solid medium for communication or coordination
- **-** for a reasonably large sys, difficult to understand the why, what & how of old
difficult to understand what changes are
difficult to understand what to change

=> *A vicious cycle*

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### What are RE Processes?

#### The Basic Evolutionary RE Process

*Old Reality* → *New Reality*

**Old Implementation** → **New Implementation**

- **Old Reality**
  - Initial Model
  - reverse analysis

- **New Reality**
  - New Model
  - Change Definition
  - change incorporation

**Evolution is inevitable**

=> *traceability* (forward: from specs to design to impl., make sure a solution exists
backward: from specs to sources, make sure the problem is real)

=> *dependency* (hypertext linking, QFD, Access paths (SSADM), Composer)

**A new model is characterized by a "vision", a global goal to be achieved**

- reduce average duration of the loan approval process from 2 weeks to 2 days
- substantially improve customer satisfaction ratings
What are RE Processes?

C A Framework
for initial model construction & subsequent reengineering

3 fundamental concerns: understand (formally) describe attain an agreement on

Elicitation
determine what’s really needed, why needed, whom to talk to acquire as much knowledge as possible

Specification
produce a (formal) RS model; translate “vague” into “concrete”, etc. make various decisions on what & how

Validation
assure that the RS model satisfies the users’ needs

RE Processes & Sw Lifecycle Models

The Waterfall Model

Systems Engineering
Requirements Analysis
Project Planning

forward engineering
Software Architecture and Design
Implementation
Testing
SQA and Metrics
Maintenance

reverse engineering

Project Mgmt
Software Process
Configuration Mgmt
Evolution And Re-engineering

Lawrence Chung
(Rapid) Prototyping

**Throwaway**

1. **Elicitation**
2. **Validation**
3. **Specification**
4. **Prototype construction**
5. **"Quick" design**
6. **Engineer product**

**Evolutionary**

1. **Elicitation**
2. **Validation**
3. **Specification**
4. **Prototype construction**
5. **"Good" design**
6. **Release**

**The Spiral Model**

1. **Elicitation**
2. **Validation**
3. **Specification**
4. **Requirements**
5. **Risk Analysis**
6. **Construction**
7. **(1st, 2nd, ..., nth prototypes)**