How do requirements behave today?

Requirements loosen up when moving from networks to services and applications.
Requirements without 50k of ITU/ETSI specs?

- No Microsoft type player around in Telecom??

- Industry Consortiums:
  - Symbian, EPOC operating system, www.symbian.com
  - WAP Forum, www.wapforum.org
  - Bluetooth

- Other de facto standards
  - IETF: Req. For Comments (RFC’s)
  - Java API’s
  - W3C (HTML, XHTML, XML)

CMM & Requirement Management

- CMM - Capability Maturity Model

- Levels 1-5

- Level 2 is project oriented, and is called “repeatable”

- KPA - Key Process Areas

- Requirement Management is a KPA in CMM level 2
CMM 2 - KPA - RM - Activity 1

- The software engineering group reviews the allocated requirements BEFORE they are incorporated into the software project

  - 4. Commitments resulting from the allocated requirements are negotiated with the affected groups.

CMM 2 - KPA - RM - Activity 2

- The software engineering group uses the allocated requirements as the basis for software plans, work products, and activities.

  - 1. Allocated requirements are managed and controlled.
Changes to the allocated requirements are reviewed and incorporated into the software project

– 1. The impact to existing commitments is assessed, and changes are negotiated as appropriate.
Introduction to Incremental Development

Part I
- Waterfall model
- Problems with the waterfall model
- Incremental Development concepts

Part II
- Incremental Development: Benefits, Pitfalls & Concerns
- Experiences

Waterfall model

Analysis | Implementation | Test
---|---|---
time
Existing Problems (1)

- Late feedback for customers and designers
- How to cope with changing requirements?
- Big bang integration with interface and integration problems

Big Bang Integration

Existing problems (2)

- Rush on test resources
- Lack of Project Control
- Slow process improvement

“Rush on test resources”
**ID Process View**

* Divide the work in small controllable parts (= increments)
* Increments must be testable parts of the system

**ID System View**

Each accumulation of developed increments is a complete user executable system.
Benefits

1) Lead-time reduction

waterfall: Analysis -> Implementation -> Test

incremental: Analysis <-> Implementation <-> Test
Benefits

2) No 'big bang' integration

Waterfall

Integrate

Time to solve problems

Incremental Development

Integrate

Integrate

Integrate

Benefits

3) Handling of unstable requirements

Unstable requirement

Added requirement
Pitfalls

1) Planning & Tracking

- Allocation of features dependent of technical contents.
- Delay in one part of the project can on short term impact early deliveries.

Planning

Anatomy

- Charging
- SW Sup
- Statistics
- Traffic
- HW Sup
- Commands
- Load appl
- HW Init
- Load OS

2) Configuration Management

project X

project Y

product baseline

incr. 1

incr. 1

incr. 1
Pitfalls

3) Postponement of features

Concerns

More increments implies shorter design - verification cycles

- Extra testing
  - Test cases needs to be rerun in several increments
  - Possibility for continues system test

- More reviews and inspections
  - Documents impacted by several increments need more inspections. (simplyfied inspections from R&I)
Conclusion

• ID solves the following problems in waterfall projects:
  – Late feedback / Changing requirements / Big bang integration
  – Rush on test resources / Lack of project control / Slow process improvement

• It has been used successfully for the last decade

• Extra attention needed for:
  – Planning & Tracking
  – Configuration Management

• Increased use of testing and reviews & inspections