System Development Methodology
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Mobile Arts
Working Process Overview

Product
- Research
- Development
- Maintenance
- Support

Product Structure:
- Architecture
- Terminology
- Reuse
- Stability
- Forward compatible
- Manageable (sub)projects

Document Structure:
- Product Structure based
- Usability
- Traceability

Project Structure:
- Project Management
  - Usability & Customisation
  - Planning
  - Milestones
  - Progress
  - Change

Other Projects
- OAM, Charging, ...

Transport
- Site
- Installation
- Upgrade
- Professional Services (Training, Support, ...

Marketing
- Operator
- End User
- Government
- Security

Mobile Arts
Project Stakeholders

Line Organisation
- Overall Steering & Priorities
- Development Environment
- Methodology
- Long-term view

Mobile Arts
Project Types

- Time To Market (TTM) Project
  - First System Creation, or
  - Subsequent System Modification

- Time To Customer (TTC) Project
  - Market Adaptation, and/or
  - Customisation, and
  - Deployment

- Maintenance Project
  - Support and help desk
  - Error correction
  - Maintenance upgrades

Mobile Arts
Overall Methodology

- Architecture
  - Terminology
  - Reuse
  - Stability
  - Forward compatible
  - Manageable (sub)projects

- Product Structure
  - Architecture based (sub-component hierarchy)
  - Define responsibilities
  - Define repositories

- Document Structure
  - Product Structure based
  - Usability
  - Traceability

- Project Structure
  - Product Structure based
  - External project/system relations
  - Phasing (Tollgates, Milestones)
Mobile Arts
Overall Methodology

- Iteration
  - Waterfall
  - Incremental
- Change control
  - Baseline
  - Subsequent releases
  - Requirement and architecture changes
  - Error correction
- Line Organisation responsibilities
  - Resource and development allocation
  - Cross-project prioritisation
  - Architecture change approval
  - Product documentation approval
  - Project Steering Group: Tollgate approval

Mobile Arts
Document Types

- Delta versus Full documents
  - Delta document: Modification focus only
  - Full document: All inclusive (inherited description)
- Product versus Project documents
  - Product document: Maintained during product lifetime
  - Project document: Used during project only
- Release specific versus Common (product documents)
  - Release specific: Dedicated to given product release and updated to next release
  - Common: Shared between releases and/or products
- Project document uses
  - Planning, Control, Follow-up
- Product document uses
  - Planning
  - Marketing
  - Specification
  - Implementation
  - OAM (Installation, Operation)
  - Professional Services (Training, Operation, Support)
- Methodology documents
  - Process Description
  - Role Description

Mobile Arts
Project Roles

- Project Management
  - Project Leader
  - Project Administrator
  - Test Leader
- Requirements
  - Product Manager
- Coordination
  - Technical Coordinator
  - Configuration Manager
  - Release Manager
- Implementation
  - Designer
  - Documenter
- Testing
  - Tester

Mobile Arts
Line Organisation Roles in Project

- Requirements
  - Product Manager
- Architecture
  - System Manager
- Implementation
  - Development Environment Manager
- Testing
  - Test Environment Manager
- Quality Control
  - Quality Manager
- Professional Services
  - Generic Requirements

Mobile Arts
Specifications

- Overview
  - Distribution of functionality upon components
  - Grey-box cross-component sequence diagrams
  - Additive
- Details
  - Component specification
  - Black-box single component sequence diagrams
  - Additive

Mobile Arts
Testing Types

- Function Test
  - Test of single function in component
  - Responsibility: Designer
- Joint Function Test
  - Test of function cross components
  - Responsibility: Tester
- Usability Test
  - Test of function usability (End-User and OAM)
  - Responsibility: Tester and OAM Guide writer
- System Test
  - Test of system characteristics (capacity, stability, quality of service, ...)
  - Regression test: “Daily builds”
  - Responsibility: System Tester
- Acceptance Test
  - Test of customer system
  - Responsibility: Field Tester and Customer
Mobile Arts
Used tools
► Marketing
  ✓ Power Point, Excel
  ✓ Word (PDF)
► Project Planning
  ✓ Project Planning: Excel, MS Project
► Development
  ✓ Specification: Word, Visio
  ✓ Coding: Erlang/OTP, (C, JAVA), Linux, Intel HW
  ✓ Testing: Own environment (QSM) simulation tools, Sun Solaris/Linux
► Repositories
  ✓ Specifications: MS Folder structures, Wiki
  ✓ Code: CVS
  ✓ Support and Maintenance
  ✓ Trouble Reporting: Bugzilla

Mobile Arts
Quality Control
► Methodology
  ✓ Documented
  ✓ Feedback and tuning
► Documents
  ✓ Use of Templates
  ✓ Reviews and approval
► Code
  ✓ Sanity-check of planned structure and principles
  ✓ Design check / Design-Test Iteration
  ✓ Trouble Report
  ✓ Trend

Mobile Arts
Project Communication
► A&O: Everyone sits close to each other
► Documentation
► Repositories
► Project Meetings
► Change Control Board

Mobile Arts
General Technology Requirements
► Operation, Administration, Maintenance (OAM)
  ✓ Operator Management
  ✓ Fault Management
  ✓ Performance Management
  ✓ License Management
► Charging
  ✓ Online/Pre-paid
  ✓ Online/Post-paid
► Regulatory Requirements
  ✓ Lawful Intercept
  ✓ Malicious Call Tracing
  ✓ Number Portability
  ✓ Emergency Call
  ✓ Environment
  ✓ Safety
  ✓ Certification
► Security Requirements
  ✓ Authentication/Authorization
  ✓ Encryption
  ✓ Firewalls/Hardening
  ✓ Fraud detection/prevention

Mobile Arts
Characteristics Requirements
► Scalability/Load-sharing
► Robustness/Resilience/Redundancy
  ✓ HW errors
  ✓ SW errors
► Capacity (and forward prediction)
  ✓ Processing
  ✓ Memory and disk
  ✓ Bandwidth
  ✓ External impact
► Quality of Service
  ✓ Delays
  ✓ Jitter
► Upgrade and Migration
  ✓ External compatibility
  ✓ Internal data

Mobile Arts
Professional Services
► Installation and upgrades
  ✓ HW, SW and documentation
► Customer Training
  ✓ OAM
  ✓ Application
► Support (office hour or 24/7)
  ✓ Help desk
  ✓ Trouble Shooting
  ✓ Emergency Correction
► Maintenance
  ✓ Approved Corrections
  ✓ Maintenance Packages
► Operation (optional)
  ✓ Remote
  ✓ Hosting
► Consultancy
  ✓ Investigations (e.g. network design)
  ✓ Customisation