ICM and Software Sub-Systems

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Systems Development Life Cycle

MBASE/RUP -- ICM for software systems

ICM for Software Intensive Systems & Systems of Systems
RUP/MBASE Application Development Model

1 (efforts not to scale)
ICM LC Processes For Systems (Hw, Sw & Pw)

DoD, General DoD Milestones

Activities
Phases (EVADO)

Exploration
Valuation Commitment Review
Architecture Commitment Review
Development Commitment Review
Operations Commitment Review

Concurrent Risk-and-Opportunity-Driven Growth of System Understanding and Definition

Initial Scoping
Concept Definition, Investment Analysis
Software System Architecting
Increment 1 Development
Increment 1 Architecting Rebaseline
Increment 1 Operations
Increment 2 Development
Increment 2 Architecting Rebaseline
Increment 3 Architecting Rebaseline
Increment 4

Evaluation of Evidence of Feasibility to Proceed
Feasibility Rationales

Stakeholder Review and Commitment
Risk?
Acceptable
High, but Addressable
Too High, Unaddressable

Acceptable
High, but Addressable
Too High, Unaddressable

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Adjust Scope, Priorities, or Discontinue
Why Multiple Build Software Systems

Simplest: Early Functionality in the hands of ALL users

- Architecture/Core plus some functionality
- Implies Full Qualification/Acceptance Testing each cycle

Increasingly Complex

- Multiple, diverse "platforms"
- Different "foci" of functionality
- Network Centric Systems Operation
  - Evolution/federation of legacy systems
  - System of Systems by design
Overlaps Across Software Builds

Evolve During Transition [After Sw IOC]

<table>
<thead>
<tr>
<th>Inception</th>
<th>Elaboration</th>
<th>Construction</th>
<th>Transition</th>
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Evolve After Architecture Complete

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I. Elab. Construction Transition
ICM Showing Multi-Build Software in Systems
COINCOMO Direction

Legend
- COCOMO + COPSEMO
- COSYSMO
- COSOSIMO

Architecting
Inc.  Elab.  Const.  Trans.
Inc.  Elab.  Const.  Trans.

etc.
ICM Showing Multi-Build Software in DSOSystems
ICM and Software Sub-Systems

DoD, General/DoD Milestones

Phases (EVADO)

Activities

Concurrent Risk-and-Opportunity-Driven Growth of System Understanding and Definition

Initial Scoping

Concept Definition, Investment Analysis

Evaluation of Evidence of Feasibility to Proceed

Feasibility Rationales

Stakeholder Review and Commitment

Risk?

Acceptable

High, but Addressable

Negligible

Too High, Unaddressable

Adjust Scope, Priorities, or Discontinue

Increment 1 Development

System Architecting

Increment 1 Architecting Rebaseline

Increment 2 Development

Increment 2 Architecting Rebaseline

Increment 3 Development

Increment 3 Architecting Rebaseline

Increment 4 Development

Increment 4 Architecting Rebaseline

Increment 1 Operations

Increment 2 Operations

Increment 3 Operations

Increment 4 Operations
Background

WinWin Spiral Model (WWSM)

WWSM: CSCI577 Unrolled with Repeated Cycles

ICM & CSCI577ab (2007-2008): Much easier for students and clients to understand
Background and Definitions (cont.)

WinWin Spiral Model

- Risk Driven Selection, Execution and Validation of Activities and Products
- Feasibility "demonstration" needed to proceed
- Stakeholder concurrence to proceed at major milestones
- Life Cycle Process(s) Model Generator: Select and document/plan for next "rounds" a specific "Development Process Model"
Stylized WinWin Spiral with Activities Mapped to Original Spiral

[radial dimension (cost) not to scale]

1a. Identify Success-Critical Stakeholders
1b. Stakeholders Identify System Objectives, Constrains, & Priorities (OC&Ps)
Alternatives Solutions Elements

2a. Evaluate Alternatives with respect to OC&Ps
2b. Assess, Address Risks

3. Elaborate Product and Process Definition

4. Verify and Validate Product and Process Definitions

Stakeholders’ Commitment
Stakeholders’ Review

Progress Through Steps
WWSM: CSCI577 Unrolled With Repeated Cycles

Time Line

Start Of Fall Semester

EOCD
Inc. Cycle

Spring Semester Ends

Summer Semester Ends

Semester Break

Inc. Elaboration Construction Transition

EOCD IRR LCO LCA RLCA C C D IOC TRR TRR TRR


Inc. Cycle

EOCD

Fall Elab. Cycle

Const. Cycle

Prelim. Trans.

Enhancement Cycle?

Key: IRR - Inception Readiness Review
 LCO - Life Cycle Objective
 LCA - Life Cycle Architecture
 RLCA- Rebaselined LCA

CCD- Core Capability Demo.
 IOC- Initial Operational Capability
 TRR- Transition Readiness Review
 PRR - Product Release Review

577ab Software ICM

Start Of Fall Semester

Semester Break

Spring Semester Ends

Summer Semester Ends

Time Line

Teams formed; Projects assigned

Design and Code Review

Development: Transition Part

Valuation

Architecting

Development: Construction part

Exploration

RUP Inc. Cycles

RUP Elab. Cycles

RUP Const. Cycles

Trans. Cycles

Enhancement Cycles?