Relevance of the CMM to the SIAP MDA Process

Presented at:

MDA Implementers' Workshop:

Succeeding with Model Driven Systems

May 17-20, 2004 – Orlando, FL

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Topics Covered

- Introduction to Capability Maturity Model (CMM)

- Complexity of interactions between participants

- Assessment of the relevance of the CMM Practice Areas to the SIAP effort

Interesting Finding

- MDA does not necessarily eliminate the need for process.

- In some ways the need for CMM type best practices is more important in the SIAP MDA effort than for a stand alone project.

The Capability Maturity Model

- CMM has been developed and promulgated by the Software Engineering Institute. It represents a well structured compilation of best practices, divided into Levels of Compliance with associated Key Practice Areas.

- CMM is one of a number of such models
  - The Trillium Model: developed by Bell Canada
  - Bellcore Model (TR-179)
  - Bootstrap Method
  - ISO SPICE

- There are two "flavors" of the CMM
  - Staged and Integrated
  - We will work from the staged version.

Levels Of CMM Capability

- **Level 1 Initial** – the process is *ad hoc*, and occasionally chaotic. Few processes are defined success depends on individual talent and heroics.

- **Level 2: Repeatable** – basic processes are established at the project level, that help ensure success.

- **Level 3: Defined** – The software process for both management and engineering is documented, standardized and integrated at the organization level. This is used by all projects

- **Level 4: Managed** – Detailed measures of the process and product quality are gathered.

- **Level 5: Optimized** – Continuous process improvement based on quantitative feedback

CMM Practice Areas

- **CMM Maturity Level 2**

  - **Requirements management**
  - **Project monitoring and control**
  - **Supplier agreement management**
  - **Measurement and analysis**
  - **Process and product quality assurance**
  - **Configuration management**

- **Maturity Level 3**

  - **Requirements Development**
  - **Technical Solution**
  - **Product integration**
  - **Verification**
  - **Validation**
  - **Organizational process focus**
  - **Organizational process definition**
  - **Organizational Training**
  - **Integrated project management**
  - **Risk management**
  - **Integrated teaming**
  - **Decision analysis and resolution**
  - **Organizational environment for integration**

Process Overview

- Integrated Architecture Behavior Model (IABM) requirements sourced from all Services

- JSSEO outputs test requirements for Joint Interoperability Test Command (JITC)

- JSSEO produces IABM for use by Services
  - PIM developed by industry, university, FFRDC and government team
  - Distributed through Program Offices to primes
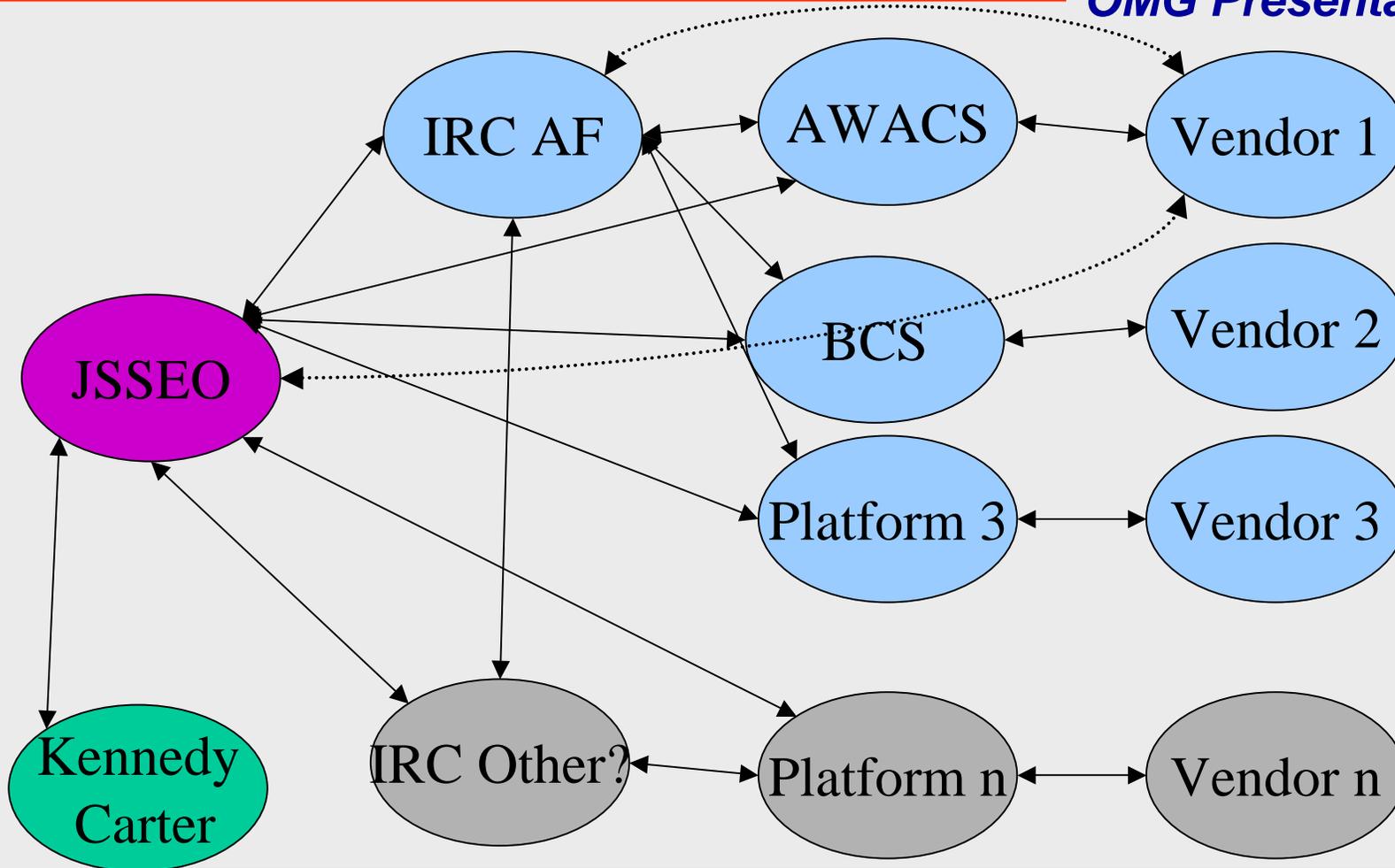
The SIAP Development Strategy

- Using Kennedy Carter's xUML toolset to develop and deploy a single PIM onto multiple weapon systems.

- The PIM represents a superset of capabilities that will be selectively integrated with legacy code.
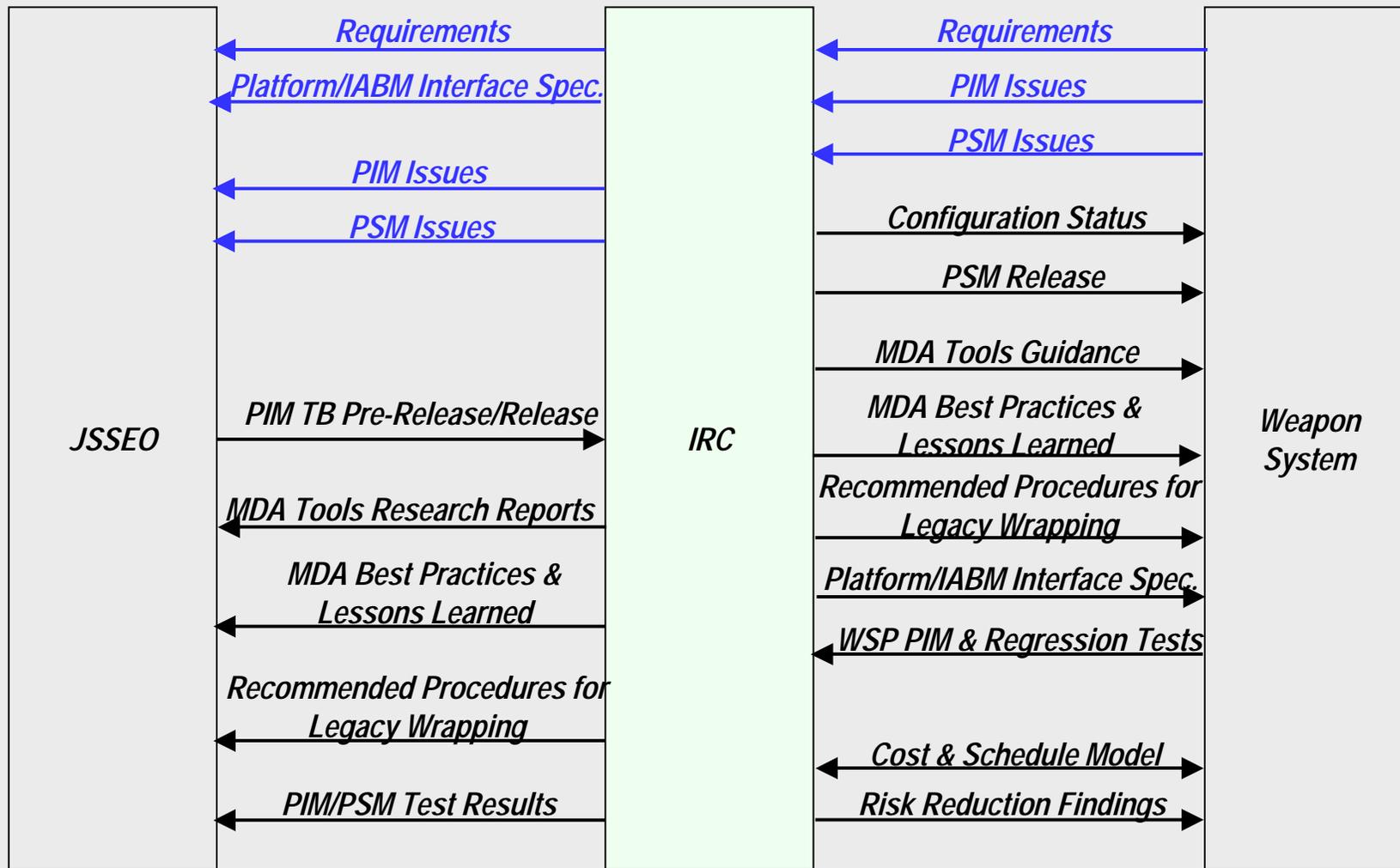
Complexity of Communications

Multiple participants involved in interactions over a broad spectrum of Weapon System deployments

CM Process Interfaces (notional)

Challenges

- Direct

  - Due to MDA itself

- Indirect

  - Due to the complexity associated with multi-platform deployments (which MDA facilitates)

Highly Pertinent CMM Practice Areas

- CMM Maturity Level 2

    - **Requirements management**

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- Maturity Level 3

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Requirements Management

- CMM Goal
  - Requirements are managed and inconsistencies with project plans and work products are identified

- SIAP Relevance
  - The requirements must satisfy multiple end systems
  - The model must be highly accurate and complete
  - Communication, and constant evaluation of requirements is critical

Configuration Management

- ## CMM Goal

  - Baselines of identified work products are established and maintained

  - Changes to work products under configuration management are tracked and controlled

- ## SIAP Relevance

  - Because of the large number of participants, and the need for a high fidelity model

Requirements Development

- CMM Goal
  - Stakeholder needs, expectations, constraints, and interfaces are collected and translated into customer requirements
  - Customer requirements are refined and elaborated to develop product and product component requirements for the product life cycle
  - The requirements are analyzed and validated , and definition of required functionality is developed

- SIAP Relevance
  - The requirements must satisfy multiple end systems
  - The model must be highly accurate and complete
  - Communication, and constant evaluation of requirements is critical

Conclusions

- The wide range of participants in the SIAP xUML effort make a number of CMM practice areas highly relevant

- The wide range of participants make Level 3 practices much more important than they would be for an isolated team

- MDA is expected to reduce verification needs by eliminating some informational translation and supporting direct testing of the executable model