Digital Engineering Roles and Responsibilities

Definitions and Considerations

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Jason Forth

- **Senior MBSE / SE Associate Manager**

- **18 years of MBSE/DE Experience:**
  - Lockheed Martin RMS
    - Ground Based Radar Systems
  - NAVAIR
    - Common Control System MBSE Lead
    - PMA-276 MBSE Lead
    - Systems Engineering Transformation (SET) Functional Lead
  - Lockheed Martin Space
    - Ground Station & Satellite Design

- **Specialty Areas:**
  - Cyber and Safety Engineering
  - System-of-System Architecture
  - Program Management
  - Technical Leadership

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David Fields

- **Founder/CTO of Enola Technologies**

- **15+ years of MBSE/DE Experience:**
  - NAVAIR
    - MQ-25 MBSE Lead
    - Systems Engineering Transformation (SET) Functional Lead
    - Naval IME Lead
  - Army PEO Aviation
    - FLRAA DE Lead

- **Specialty Areas:**
  - Environment Deployment
  - Automation (Macros, Scripts, Plugins)
  - Profiling/DSL
  - Report Generation
  - Training & Mentorship

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Agenda

- **Presenter Bio's**
- **Agenda**
- **Bottom Line Upfront**
- **Roles**
- **Role Relationships**
- **Q&A**

For each role:

- Description
- Scope
- Skills
- Responsibilities
- Why is the Role Important?
- Examples

Bottom Line Upfront

The Model Librarian, Application Manager, and Model Sheriff are essential roles in driving the success of Model-Based Systems Engineering (MBSE) and Digital Engineering (DE) initiatives within an organization.

These roles ensure that organizations can maintain a cohesive and efficient environment while implementing MBSE and DE efforts.

By fostering collaboration, resource management, and adherence to best practices, these roles contribute to the overall success of the engineering projects.

Employing and empowering these roles ultimately results in a more effective DE and MBSE implementation, and better realization of organizational goals.

Model Librarian

Model Librarian - Overview

The Model Librarian is a pivotal role responsible for creation and management of reusable model libraries. This individual plays a key role by ensuring models in the libraries are up-to-date, well-documented, and easily accessible to the organization.

The Model Librarian is responsible for fostering a collaborative environment by promoting accessibility of models across teams, ensuring efficient utilization of resources, and enhancing overall awareness of the model library.

Organization Level/Scope: Enterprise

Skill/Experience: Experienced Senior Model-Based Systems Engineer possessing a strong foundation in Systems Engineering and an extensive background in model-driven development.

Model Librarian – Responsibilities

- Curate and maintain a comprehensive, easily accessible inventory of reusable models developed within the organization, ensuring transparency and visibility for all stakeholders.
- Manage the model catalog, implementing timely updates and revisions as needed.
- Develop, establish, and oversee common strategies and patterns to standardize and streamline the reuse of models within the organization.
- Champion Product Lifecycle Engineering (PLE) in the MBSE domain, driving efficient model reuse and collaboration among different teams.
- Enhance model library visibility and awareness by effectively communicating its significance and benefits across the organization.
- Organize and maintain a repository of common model profiles and reusable models, promoting efficiency and consistency throughout the organization.

Model Librarian – Why is it Important?

The Model Librarian role is essential for maintaining organization-wide awareness of modeling efforts, ensuring teams have a clear understanding of the integration process and potential challenges when combining multiple models. This role is integral to the smooth functioning of Model Based Systems Engineering initiatives, as it consolidates knowledge and resources for efficient collaboration.

Without a dedicated individual or team to fulfill this responsibility, the organization's MBSE and Digital Engineering initiatives may struggle to reach their full potential, leading to reduced efficiency and hindered progress in achieving overarching goals.

Examples:

- None…?

Application Manager

Application Manager - Overview

The Application Manager plays a vital role in overseeing and effectively managing an individual tool or a suite of tools utilized in Model-Based Engineering (MBE) and Digital Engineering (DE) initiatives within the organization. This individual is responsible for maintaining the DE ecosystem, ensuring seamless communication and promoting awareness of the tools' capabilities across the enterprise.

Organization Level/Scope: Enterprise

Skill/Experience: A junior or senior Model Based System Engineer with a background in Computer Science, Computer Engineering, or Information Technology. They must possess at least moderate expertise in System Engineering and enterprise application management, demonstrating a strong understanding of model development processes within the context of project-driven MBE and Digital Engineering (DE) initiatives.

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Application Manager – Responsibilities

- Establish and maintain the organization's DE ecosystem.
- Serve as the primary communicator of tool capabilities to the wider organization.
- Monitor application updates and changes from vendors.
- Develop migration schedules for new application versions released by different vendors.
- Monitor applications for obsolescence and address potential issues.
- Act as the principal liaison with tool vendors, communicating required capabilities based on input from subject matter experts (SMEs) using the toolsets.
- May provide Tier 3+ IT/ support for tools in use.
- Justify and manage budgets for recurring and non-recurring costs associated with the environment and toolsets, emphasizing the importance of maintaining the ecosystem to organizational leadership.

Application Manager – Why is it Important?

The Application Manager ensures a shared understanding of the capabilities offered by the tools in the Digital Engineering (DE) ecosystem, fostering their effective use across the organization. They actively communicate with tool vendors to address technical issues and determine the availability of solutions for identified problems. Furthermore, they highlight the importance and organizational cost of maintaining the tool environments to the leadership team.

In addition, the Application Manager supports project teams by assessing their needs for executing DE initiatives, ensuring the right mix of capabilities is deployed to meet both project-specific and broader organizational goals. This comprehensive approach facilitates a cohesive and efficient environment for DE implementation.

Examples:

- A Senior Model-Based Systems Engineer with a fundamental enterprise IT background who oversaw and managed an enterprise-wide MBSE environment. This individual was responsible for implementing and maintaining a comprehensive Knowledge Base and Service Desk while supporting individual project needs.
- An Information Technology expert with a fundamental knowledge of Systems Engineering who deployed, managed, and maintained a Digital Engineering ecosystem for multiple Army weapon systems.

Model Sheriff

Model Sheriff - Overview

The Model Sheriff plays a crucial role in aligning modeling efforts within an organization or project by establishing and enforcing model schema, style guides, and model build methodologies.

Often serving as the Model-Based Systems Engineering (MBSE) or Digital Engineering (DE) lead for a project, this individual works closely with the Lead Systems Engineer (LSE) to ensure a cohesive and efficient approach to model development and integration within a project.

Organization Level/Scope: Enterprise and/or Project

Skill/Experience: The Model Sheriff should be a Senior MBSE with a strong understanding of Systems Engineering principles and extensive modeling expertise, including model management, domain specific language, and strong skills in language syntax. This individual should also possess many of the skills required for a Lead Systems Engineer role, at times serving as a Deputy LSE.

Model Sheriff – Responsibilities

- Act as the right hand to the Lead Systems Engineer.
- Establish the model schema or adhere to the commonly established model schema.
- Develop the model style guide and ensure consistent implementation.
- Create the Architecture/Model Development Plan and Model Configuration Management Plan for the project.
- Select the appropriate modeling language to achieve the project's goals.
- Enforce model schema, style, and build methodology consistency across the team as the model evolves.
- Provides/assists configuration management of the model.
- Serve as the principal administrator of the model, adjusting permissions as needed for the team.
- Enforce the core principles of MBE and DE throughout the project execution.

Model Sheriff – Why is it Important?

The Model Sheriff is committed to preserving the consistency of the model by ensuring compliance with the language, style, and schema rules in place. Clear communication of Model-Based Engineering (MBE) and Digital Engineering (DE) principles among the broader team is crucial for the success of MBE/DE initiatives within a project.

Acting as a bridge between project leadership and the model development team, the Model Sheriff guarantees the uniform application of vision and strategy for the project while enforcing adherence to established model practices. By collaborating with project leadership and stakeholders, they ensure that the engineering effort's objectives are accurately reflected in the work being accomplished within the model.

Examples:

- As a lead architect for different projects, this role was established to be exactly as described. For projects that embraced this position as described, they succeeded and are continuing to succeed in the MBE/DE arena. For those that haven’t, they are struggling a bit more.
- The role was also established as part of discussions with leadership in various organizations that asked what Senior MBSEs saw themselves as in terms of role on a project, and the responsibilities emerged as described herein.

Role Relationships

Role Relationships

When these roles work together, they create a more efficient and streamlined collaboration process, ensuring that team members have easy access to relevant models and information, which can significantly reduce duplication of effort and enhance overall productivity.

Establishing and managing common schema and model standards helps to ensure that all models within the organization adhere to consistent methodologies and patterns, which can improve the quality and consistency of the models and facilitate their integration.

By enabling Product Lifecycle Engineering (PLE) in the MBSE arena, these roles ensure that the organization achieves maximum reuse of the models, leading to cost savings, faster development cycles, and more efficient use of resources.

A well-coordinated effort between these roles allows for better scalability and adaptability, as the organization grows and evolves.

Model Librarian and Application Manager Relationship

The Model Librarian assesses impacts to all models as a result of pending tool changes and provides findings to the Application Manager

The Application Manager works with the Model Librarian to ensure that proper tools and infrastructure are in place to enable the discovery, accessibility, and reuse of models.

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Application Manager and Model Sheriff Relationship

Model Sheriff reports impacts of tool migrations to the Application Manager

Model Sheriff report tool related issues to the Application Manager

Application Manager supplies tool-related defect resolutions to the Model Sheriffs

Application Manager communicates tool roadmaps and other pending upgrades to the Model Sheriffs

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Model Sheriff and Model Librarian Relationship

The Model Librarian provides common profiles and PLE-related models to the Model Sheriff

Model Sheriff provides feedback on common model product to the Model Librarian to ensure best practices and emerging needs are available to the wider organization

The Model Sheriff and Model Librarian sustain open communication to address concerns and maintain situational awareness on model content being used at the project level

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Wrap-Up

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We've highlighted three essential roles for organizations to adopt, but many other roles must be taken into account to guarantee the overall success of Digital Engineering (DE) and Model-Based Systems Engineering (MBSE) initiatives.

These roles foster a well-integrated and streamlined atmosphere during the implementation of MBSE and DE projects.

Advantages such as enhanced collaboration, efficient resource utilization, and compliance with industry best practices are some of the key contributions made by these roles.

Incorporating these roles, along with others, is crucial for building a successful DE and MBSE organization, but they are not the sole components.

Questions?

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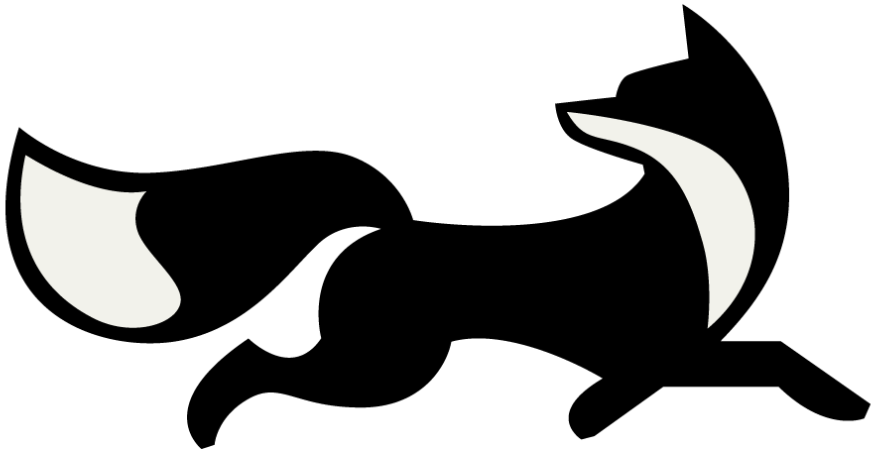

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Abstract

Model-Based Engineering (MBE) is a critical aspect of modern digital engineering. However, organizations often overlook or ignore the essential roles and responsibilities needed to manage, maintain, and streamline MBE efforts. This oversight leads to failures in the broader MBE/digital engineering arena.

To address this issue, this topic will focus on the key roles that are crucial for successful MBE implementation. These roles include a Model Sheriff, Model Librarian, and an Application Manager, among others. While these roles will be highlighted, the presentation will not only define the roles, but also delve into their practical application within organizations.

By better understanding these critical roles and their impact, attendees will gain a clearer understanding of how they can implement MBE best practices and processes, ultimately leading to more efficient and effective digital engineering efforts. Don't miss this opportunity to learn about the key roles and responsibilities that will transform your organization's digital engineering paradigm.

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