A New Decision Support System Based on a Service-Oriented Architecture

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Introduction

- Joint Fire Science Program (JFSP)
- Design issues
- Software Tools and Systems (STS) study
- Interagency Fuels Treatment Decision Support System (IFT-DSS)
- JFSP vision
- STS future
- An approach, not a solution

In a distributed collaboration environment, what we want is ...

...that can take its place within the context of a mission environment
...that can be configured into the capability required for a given operation...
...conforming to key interface standards...

Modular, reusable elements...

Source: Carnegie Mellon Software Engineering Institute
Design Issues

- Multiple communities
- Implementation restrictions
  - Multiple agencies
  - IT policies
  - Skill levels
- Overlapping process implementations
  - Science
  - Interfaces
  - Modularity
Multiple Communities

- Fire and Fuel Operations Managers
- Scientist Developers
- Interagency Fuel Treatment Decision Support System Coordination Team
- Information Technologists and Software Managers
- Database Stewards

Governance through Agency Service Management, including National Wildfire Coordination Group
JFSP Vision

User communities

Integrated Systems
(IFT-DSS, BlueSky,
WFDSS, WFAS)

Common Interface
Standards
(allows for connections)

Capabilities
(algorithms, models, data)

Scientists and data providers create tools

Governance
Design Approach

• Community engagement
• Workflows
• Service Oriented Architecture (SOA)
• Separation of functions
  – User interface
  – Scientific modeling framework
  – Models
• Process level science
Service Oriented Architecture

- A generic software architecture framework designed to support a collection of services, such as databases and software applications
- Has well-defined software and data interfaces
- Facilitates the integration of new and legacy software applications
- Facilitates inter-operability with other systems
Architecture (1 of 3)

IFT-DSS Application (User Interface)

Scientific Modeling Framework (SMF)

Components

Models
IFT-DSS topology and the communication mechanisms
Model Integration Methods

Architecture (3 of 3)
Implementation Schedule

• Prototype – completed (June 2010)
  – Functional
  – One workflow
  – Limited GIS capability
  – All model interfaces

• Development and testing
  – Version 1.0 (June 2011)
  – Version 2.0 (June 2012)

• Enterprise operations – fall 2012
Discussion

• SMF is applicable to any discipline
• The SOA facilitates access to authoritative systems that are external to a DSS
• Some of the approaches to model integration in the IFT-DSS might be transferable to the integration of process-level science in meteorological, emissions, and air quality modeling
Summary and Conclusions

• A DSS is more than a model
• The development of an effective and sustainable DSS requires the participation of a community
• The STS study and IFT-DSS attempt to address long-standing issues with modularity and model interactions in the fuels treatment community
• The CMAS community faces many of the same challenges and might benefit from the lessons learned and engineering practices employed as a result of the STS study
Acknowledgments

Joint Fire Science Program

Fuels Management Committee

Test User Group

Collaborating Fire Scientists
Questions

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JFSP STS Study
http://frames.nbii.gov/jfsp/sts_study

IFT-DSS
http://www.firescience.gov/JFSP_IFT-DSS.cfm