Ground System Architectures Workshop

GSAW2004

Manhattan, Beach CA. March 29 - April 1, 2004

-- OUTBRIEF --

10F

Component- and Web-Based Ground System Architectures

Breakout Chairs: Dan Smith – NASA/GSFC

Russ Abbott – The Aerospace Corporation

10F Presentations

1. Using Message-Oriented Middleware to Integrate Legacy Applications and Commercial Off-the-Shelf Products – The RADIUM Case Study
   - **Jared Stallings - Raytheon Intelligence and Information Systems**
   - **A successful internal prototype effort using MOM**

2. Telepresent Agents - A New Paradigm for Sharing Information in Networked Systems
   - **Russ Abbott - The Aerospace Corporation**
   - **Can we take communications concerns out of the equation?**

3. A Modular, Data Driven System Architecture for GSFC Ground Systems
   - **Everett Cary - Emergent Space Technologies, Inc.**
   - **GSFC has successfully allowed integration of dozens of components, now going operational.**

4. Successes of Component-Based Approach in Similar Industries
   - **Gamal Balady - Mass Group**
   - **80,000 copies sold! We can learn from similar industries.**

10F Findings

1. We agree the industry is ready for more consistent approaches, interchangeable components, simplified integration, etc.
   - We can't afford not to standardize key aspects
   - It is key to more rapid capability advancement

2. Message standards could be helpful, but . . .
   - Effort can be overtaken by raging incrementalism
   - Insufficient to allow plug-and-play development

3. API standards help plug-and-play development, but . . .
   - Tied to architecture approach (MOM, Web Services, etc.)
   - Effort almost guaranteed to be overtaken by raging incrementalism

4. Therefore . . .
   - Maybe we just punt! We can revisit the issue next year when things are worse
   - Groups like NASSA/GSFC can "standardize" plug-and-play through shared usage, not formal standards
   - We can keep working on technologies that help abstract comm details so that the standards approach becomes more viable

10F Communication Hierarchy

Technology	Hides
Move from N^2 to 2*N	Connectivity issues
JMS/MoM	Read/write issues
XML	Formatting issues
Interoperability standards	Field definition issues
Shared database	Communication issues
Telepresent agents	Content issues

10F "We are not alone"

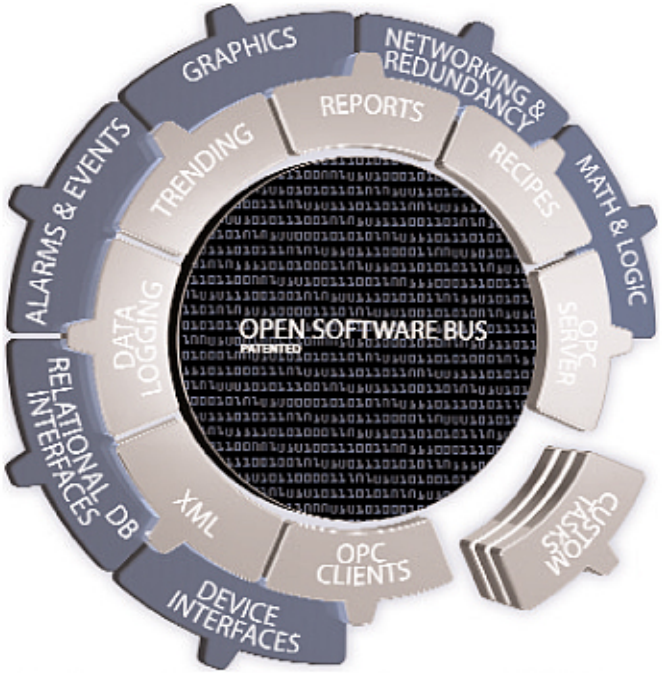
- **Other industries address similar functionality**
  - SCADA – Supervisory Control and Data Acquisition
  - Factory control, environmental monitoring, building mngt, nuclear power plants, etc.
- **How can one company sell 80,000 systems?**
  - End-users demanded standardization
  - Device interface standards developed about 5 years ago
    - OPC. Test software released with each standard
  - 150 vendors now sell compatible components!
  - System is highly scaleable/configurable; decoupled (independent) component design

Having a non-aerospace presenter provide lessons-learned (and a "reality check") should be considered for future GSAWs.

10F Economies of scale start with quantity 2.

Over 80,000 copies sold!

NASA GSFC working to field 3 systems this year.



The diagram shown here shows the patented (U.S. Patent #4,908,746) Open Software Bus architecture.