TOPSS - A Metadata-Based Reporting System For Contractor Accountability (And More)

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Provide authorized users throughout the Federal Government with secure access to historical and near-real-time information that allows insight and the capability to dynamically affect ongoing contractor operations, and perform comprehensive analytics of prior activities. In short, SPOT ES seeks to deliver the right business intelligence information when and where it is needed by Government users to make the most efficient use of contractor resources.
SPOT ES: A Comprehensive Solution

**SPOT NIPRNet** *(unclassified)*
SPOT deployed on the Non-secure Internet Protocol Router Network
Hosted: ALTESS (Army)

**SPOT SIPRNet** *(classified)*
SPOT deployed on the Secure Internet Protocol Router Network
Hosted: DISA DECC

**JAMMS**
Joint Asset Movement Management System

**TOPSS** *(unclassified and classified)*
Total Operational Picture Support System: Business Intelligence (BI)
• TOPSS is the business intelligence component of SPOT ES
  – Although SPOT and JAMMS are the primary data sources...
  – ...TOPSS also provides access to other, heterogeneous data sources
• Puts power of data reporting and analysis in hands of analysts to make immediate and effective decisions
• TOPSS provides reporting on a Service Oriented Architecture (SOA) that enables advanced analysis:
  – Standard Reports that are generated from preset templates; useful for frequent queries and trend analysis. Consists of 2 components:
    1. The metadata-based query that defines a set of results
    2. A view definition of that data (e.g., tabular report, map, graphs)
  – Custom Reports that are generated by users on an ad-hoc basis; useful for detailed analysis and one-off queries
• Report results are filtered according to assigned user roles and permissions
• DOD’s ability to answer how many contractors are supporting contingency operations.
• Coordination of contracts (pricing, coordination, etc.)
• Planning for future contingencies-reliance on contractors
• Contracted capability in a Phase 0 environment
• Coalition and inter-agency coordination
• Warfighter focus on using local contractors
  – Resource Impact
  – Transition of Authority
Use of TOPSS

- Provides operational visibility to COCOM commanders
  - Picture of contractor footprint in theater
  - Where the dollars are going
- Compliance reviews
- Cost accountability / recovery
- Answers the who, what, where, why and when
- Timely information applied to management and decision cycles. (information based effects)
TOPSS SOA-based Internal and External Integration

- **Service Oriented Architecture (SOA)**
  - Web Services to consumer applications
    - IQGen and CARMA are application components within TOPSS
    - Enforces User and System Access Security and Audit at the boundary
    - Using SOA, TOPSS can be a data/information broker for external systems
  - Services and Interfaces to Authoritative Sources
    - Focus on **data access**, instead of data import
    - SPOT and JAMMS already integrated
    - Biometrics, NATO, other data feeds via push from source (XML, Excel, other formats) in development
    - External Web services interfaces in development
TOPSS Data Sources

• Direct access to SPOT data, including:
  – Contracts
  – Contractor personnel, including LOA status
  – JAMMS movement tracking data
  – Focus on the contingency business environment

• Integration of external movement tracking data, including BAT, DBIDS, BISA

• Includes Coalition partner integration
TOPSS enables leaders to get the correct information to the right place at the right time (Information based effects)

- Incorporates other data sources either through manual extracts to full web services
- Reduces the functional silo approach; leverages authoritative sources
- Community of Interest approach to formalizing data services with key data trading partners
• For SOA services within the application:
  
  – That’s Easy! All under your control.
  
  – Loosely coupled SOA interfaces are necessary for modern large-system development
  
  – Enables distributed development, component reuse, modularity, componentization, interoperability
SOA-based interoperability with other systems:

- **That’s Hard!** Need agreements with external systems
- Semantics-based SOA interfaces require an even richer set of agreements (e.g., common ontology)
- Two approaches:
  - **Collaborative development** of SOA and Semantic interfaces
    - Need to identify Communities of Interest (COI) with a common API and semantic approach
  - **Field-of-Dreams**: Build it and they will come
  - **Pragmatically**:
    - A combination of both approaches is necessary
    - Evolutionary maturity of partner interfaces:
      - Files → WebServices → Semantic-Based Services
• Metadata is used for mapping data sources/elements to logical entities/attributes
  – Supports access to multiple, heterogeneous data sources
    • Logical “Deployment” maps to Physical “Contract”, “Person”, etc
  – All queries are expressed in terms of Logical entities
  – Report Definition:
    • Used for definition and maintenance of pre-defined TOPSS reports
    • More importantly, used for dynamic construction of user-defined reports
  – **Now**: a custom XML-based representation
  – **Future**: use RDF/OWL, leveraging the variety of powerful semantic technologies
• Authentication model based on the metadata
• Data elements filtered by user rights and permissions
  – Users can generate only authorized reports
• Users can see only authorized data results
  – Data are filtered by user groups – e.g., COCOM users only see data relevant to their COCOM; Government agencies only see data related to their agency
  – Some data are further filtered for privacy (PII)
• All data access is fully audited and archived for quality, security, and performance considerations
• Reports Catalog
  ▪ Provides a starting point and reference of previously built reports
    • System provided
    • Reports by other users
• Pre-generated, Standard Reports
  ▪ Preconfigured reports run and filtered for individual users
• Ad Hoc / Custom Reports from Templates
  – Multiple Report Layouts supported, including:
Geospatial Analysis

- Report on Location-Based Data
  - Locations coordinates displayed on map
  - Use standard map display capabilities, such as Google Maps, Google Earth, etc
  - SIPR Maps via NGA
- Geospatial Queries
  - Provide Point Locations for entities on a map
  - Any location based coordinates and data
- Geometric Queries
  - Show time-based locations and movement of entities
  - Perform Proximity queries (what entities were “near” each other?)
• Top-level user interface
• Metadata-based catalog of Data Sources
  – On-demand external access or cached in TOPSS
• Catalog of Data Elements in each Data Source
  – Includes access mechanism
• Users, Roles, Permissions
• Catalog of Data Query Definitions
• Query Execution and Result Sets
• Report Definitions: Tables, Maps, Graphs, Gantt
• Report Execution and Generated Reports
  – Interactive results (e.g., drill-down)
• Currently migrating and extending the TOPSS custom XML-based metadata representations

• Target is to leverage the variety of powerful semantic technologies that have evolved from the OWL and RDF initiatives

• Challenges for TOPSS
  – Adoption outside of the operational contracting support environment
  – Cultural
  – Standard versus custom reporting capability
  – Budget reality
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