Cloud-based Open Architecture Approach for Common Enterprise Ground Services

GSAW Conference
Feb. 29-March 3, 2016

© 2016 by Booz Allen Hamilton. Published by The Aerospace Corporation with permission.
Agenda

+ BLUF
+ Key Concepts
+ Resilient & Agile Technologies
+ Solutions Overview
+ Key Tenets
+ Lessons Learned from Past Programs
Government has been implementing cloud-based open architecture approaches for at least 5-10 years on IT and back office systems.

DOD and IC agencies are beginning to implement cloud approaches for mission data.

Per the *NDIA Brown Bag held 18 Nov 15, Air Force Space Command (AFSPC) requested industry to “embrace our vision & objectives: look at ways you can contribute to or help us develop”

- Standards for common user interface, common infrastructure, data sharing
- Apps to enable data exploitation and enhanced BMC2 between programs and with JMS
- Capabilities that fit into non-proprietary, government- controlled interfaces as a given
- Risk reduction paths for legacy transition

We’re recommending the following approach for the Air Force Enterprise Ground Systems

Key Concepts

+ **Concepts to apply to a common architecture**
  - Services
  - Analytics
  - Cloud data store
  - Infrastructure

+ **Key Concepts to apply to acquisition (Infrastructure, Framework, Applications)**
  - Infrastructure provider separate from Framework and Applications
  - Framework Integrator separate from Applications
  - Provides robust marketplace of providers to increase innovation and reduce dependence and provider/technology lock-in
Resilient & Agile Technologies

+ Open architecture and leverage agile development
+ Ensure resiliency
+ Utilizing open source standards and products whenever possible
+ Refactoring and utilization of micro-services and container technologies
Solutions Overview

Leverage Reference Implementation (RedDisk), NRO GED & DCGS-Army for EGS reuse
Consistent with DoD Joint Integration Environment (JIE) Guidance
<table>
<thead>
<tr>
<th>*EGS Key Tenets for Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Combine data processing infrastructure (i.e. Cloud type commodity infrastructure and middleware). Consolidate data storage, processing, data sharing across satellite programs. Separate instances geographically separate connected to GIG = resiliency</td>
</tr>
<tr>
<td>2. Establish a thin client web browser interface (to the Cloud type Data Center) connected to the GIG. Supports resiliency and distributed operations. Assists with IA strategy.</td>
</tr>
<tr>
<td>3. Consolidate ownership and responsibility of shared and dedicated antennas/entry points (including DISA teleports) – connect to the GIG</td>
</tr>
<tr>
<td>4. Reuse existing mission services from existing satellite ground systems (best of breed)</td>
</tr>
<tr>
<td>5. Expose data as close to the raw data source as possible (at closest data center). Expose in a net-centric format consistent with DoD guidance, including metadata.</td>
</tr>
<tr>
<td>6. Each satellite Program Office to align with EGS vision by a) connect assets and infrastructure to the GIG b) expose authoritative data sources (see #5) c) separate out existing applications (many proprietary) into best of breed ‘services’</td>
</tr>
</tbody>
</table>

*Derived from Apr 2013 SMC/EN Study and State of Technology Overview*
# Lesson Learned from Past Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Background</th>
<th>Challenges</th>
<th>Transition Plan &amp; Objectives</th>
<th>Client Objectives Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>1NRO GED</td>
<td>Increased software reuse • Centralized management of reusable software • Maintenance of reusable software • Standards and specifications for SIGINT and GEOINT processing applications • Processing of data from space-based sensors in the cloud</td>
<td>• Shared services and capabilities bring increased dependency management across the programs • Stakeholder engagement and coalition building among developer community and acquisition offices are essential to overcome inherent resistance to reduced O&amp;M costs, increased interdependency and perceived reduction in competitive advantage • Security accreditation in a new environment</td>
<td>• Processing systems have been developed for INT-specific environments resulting in stove-piped applications intended to optimize specific mission operations. • Evolution to a converged architecture with common software and services will enable faster time to mission, lower costs and focus on unique, mission-specific capabilities • Development of new capabilities in the cloud to realize efficiencies</td>
<td>• Ongoing outreach and collaboration across developer community, including architecture review conferences with over 75 attendees from 20 different companies and Government representatives • Stood up Common SW Library and deployed 30+ assets for discovery • Developed, accredited and “deployed” cloud-based solution for sensor data dissemination in less than a year</td>
</tr>
<tr>
<td>2DCGS</td>
<td>Provided Army interoperability engineering, data strategy, configuration management and standards support to ensure interoperability of DCGS-A with DoD Army and Intelligence Community (IC) systems</td>
<td>• Warfighters require relevant, accurate, and timely ISR support • Need to facilitate integration of current and emerging ISR capabilities, net-centric operation and joint service interoperability</td>
<td>• Need for consolidated systems into a single integrated ISR ground processing system • Allow analysts to gather intelligence data from multiple other sources and distribute it to the network of Army battle command applications</td>
<td>• Developed a SOA-based architecture using web services and XML to exchange data among 192 systems • Fielded the Army’s first operational Cloud computing capability in Afghanistan • Developed the DCGS-A process model providing a virtual representation of the architecture to support acquisition decisions</td>
</tr>
</tbody>
</table>

1NRO Ground Enterprise Directorate (GED) Software Architecture and Development Programs
2Distributed Common Ground System-Army (PM DCGS-A) Intelligence and Information Warfare Directorate (I2WD) & Program Manager
Contact Information

Josh Perrius  
Principal  
Booz | Allen | Hamilton  
Booz Allen Hamilton  
15059 Conference Center Drive  
Chantilly, VA 20151 USA  
Tel (703) 633-3139  
perrius_josh@bah.com

Bill Nichols  
Chief Technologist  
Booz | Allen | Hamilton  
Booz Allen Hamilton  
5220 Pacific Concourse Drive  
Los Angeles, CA  90045  
Tel (310) 297-2142  
nichols_william@bah.com

Brian Zimmermann  
Principal  
Booz | Allen | Hamilton  
Booz Allen Hamilton  
5220 Pacific Concourse Drive  
Los Angeles, CA  90045  
Tel (310) 297-2150  
zimmermann_brian@bah.com

Tom Vanek  
Senior Lead Technologist  
Booz | Allen | Hamilton  
Booz Allen Hamilton  
5220 Pacific Concourse Drive  
Los Angeles, CA  90045  
Tel (310) 297-2148  
vaneck_tom@bah.com