

Cloud-based Open Architecture Approach for Common Enterprise Ground Services

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Agenda

- + BLUF
- + Key Concepts
- + Resilient & Agile Technologies
- + Solutions Overview
- + Key Tenets
- + Lessons Learned from Past Programs

BLUF

- + 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

*Reference: NDIA Brown Bag on Enterprise Ground Services (EGS). 18 Nov 15. Brig Gen Nina Armagno AFSPC/A5/8/9

Key Concepts

+ Concepts to apply to a common architecture

- Services
- Analytics
- Cloud data store
- Infrastructure

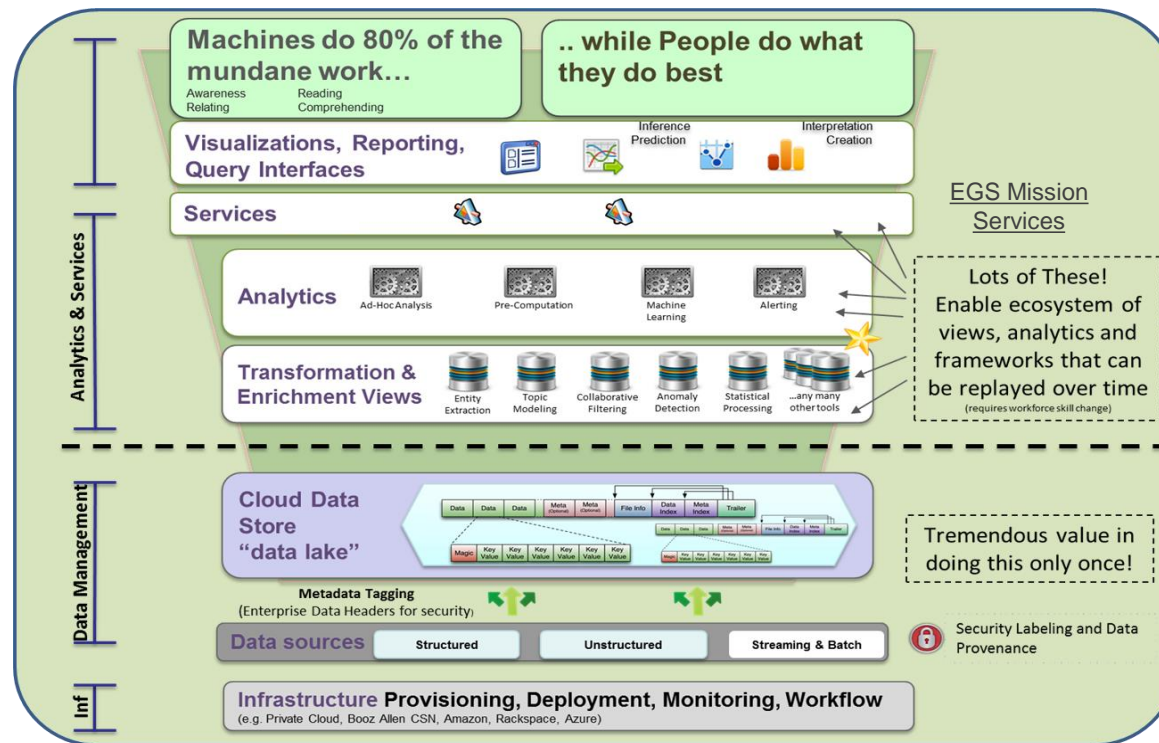
+ Key Concepts to apply to acquisition (Infrastructure, Framework, Applications)

- 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**

Key Tenets

*EGS Key Tenets for Implementation	
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
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.
3	Consolidate ownership and responsibility of shared and dedicated antennas/entry points (including DISA teleports) – connect to the GIG
4	Reuse existing mission services from existing satellite ground systems (best of breed)
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.
6	Each satellite Program Office to align with EGS vision by <ol style="list-style-type: none">connect assets and infrastructure to the GIGexpose authoritative data sources (see #5)separate out existing applications (many proprietary) into best of breed ‘services’

*Derived from Apr 2013 SMC/EN Study and State of Technology Overview

Lesson Learned from Past Programs

Program	Background	Challenges	Transition Plan & Objectives	Client Objectives Achieved
¹ NRO GED	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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&M costs, increased interdependency and perceived reduction in competitive advantage Security accreditation in a new environment 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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
² DCGS	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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

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

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