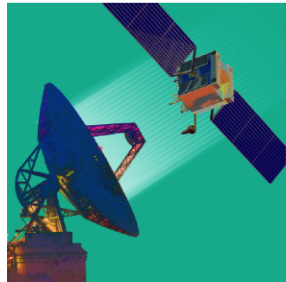


Working Group Outbrief

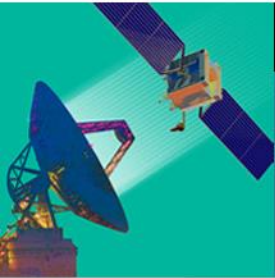
Ground System Architectures Workshop



Session 11E

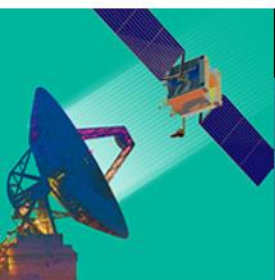
Cloud Computing for Ground Systems V

Ramesh Rangachar and Craig Lee, The Aerospace Corporation



Session Goals

- Examine the "State of the Art" and "State of the Possible" in Cloud Computing and Big Data
 - Talks from across industry
 - Discussion among the Ground System Community of Interest
- Evaluate the impact of Cloud and Big Data on ground systems
 - Design, implementation, acquisition, deployment, operations, sustainment (end-to-end life cycle)
 - Potential benefits and outstanding challenges
- Discussion to better understand the adoption issues and how to address them



Participants

Organizations Represented

Aerospace	USGS
Blackbridge AG	HP
Boeing	Intelset
Braxton Tech	Kratos ISE
Canadian Space Agency	LinQuest
CNES	Lockheed Martin
CRAY	NASA/JPL
Digital Globe	NOAA
EMC	Northrup Grumman
EUMETSAT	Nvidia
General Dynamics	Raytheon
Google (Skybox)	Splunk
Honeywell	

Types of Organizations

Government

Cloud providers

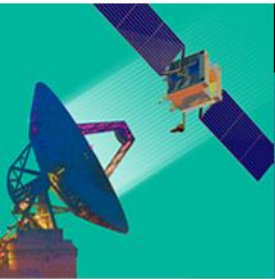
Defense Contractors

FFRDC

Satellite operators

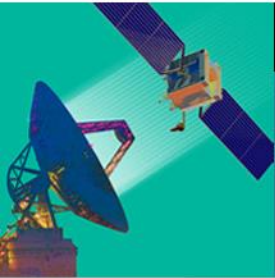
Software providers

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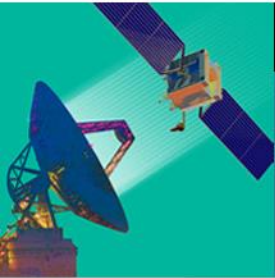
Presentations

Title	Presenter	Organization
Introduction	Ramesh Rangachar	The Aerospace Corporation
A Three-dimensional Approach to Implementation of Ground Systems in Clouds	Martin Dillmann	EUMETSAT
Cloud Research for Science Data Systems	Emily Law	NASA
The SMC Enterprise Ground Architecture Cloud Studies	Craig Lee	The Aerospace Corporation
Taming the Big Ocean Data	Thomas Huang	NASA
Discussion		
Break		
USGS Landsat Big Data Challenge	Brian Sauer	USGS
The NOAA Big Data Partnership	Jeff De La Beaujardiere	NOAA
Big Data for Satellite Business Intelligence	Loic Coulet	Kratos Integral Systems Europe (KISE)
KeyVOMS Cloud Federation Management Tool	Craig Lee	The Aerospace Corporation
Discussion, Wrap-up, and Next Steps		



Key Points

- Topics discussed:
 - Use of private, public, hybrid clouds, cloud bursting
 - Public/private partnerships to address big data challenges
 - Business Intelligence using Big Data
 - Future ground architectures involving the cloud
 - Cloud federation management
- Key takeaways:
 - Don't jump into cloud because it is popular. Use cloud where it makes sense (cost, reliability, performance)
 - Speed of access to data can become an issue (slow connection). Bring computing closer to data
 - Private clouds preferred for ITAR controlled data/software
 - Issues/concerns: data security, governance, cultural barriers, and policy issues
 - Find early adopters/success stories
 - Decouple infrastructure V&V from application V&V



Summary

- Cloud Computing and Big Data solutions are being implemented in ground systems; challenges still exist
- Cloud and Big Data will continue to provide innovative approaches to deliver ground system solutions
- There are opportunities to create sustainable private/public partnership
- Focus for next year:
 - Hot and evolving topics. Keep the conversation going with the Ground System Community of Interest
 - More implementation-specific presentations and discussions
 - Emphasis on non-technical aspects, cost analysis, and metrics