Mission Critical Cloud Computing in a Week

Jet Propulsion Lab
Caltech
Amazon Web Services

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ELBs on Steroids
Route53
CloudFormation
Regions and AZs
ARCHITECTURE
Live Streaming Architecture

Cloud Formation Stack

Availability Zone: us-east-1a

Elastic Load Balancer
Tier 2 Nginx Cache
Tier 1 Nginx Cache
Adobe Flash Media Server

Availability Zone: us-west-1b

Elastic Load Balancer
Tier 2 Nginx Cache
Tier 1 Nginx Cache
Adobe Flash Media Server

CloudFront streaming for museum partners

Telestream Wirecast
CloudWatch Monitoring

• Overview of ELB group performance
• Web Console provides basic visualization support
  – individual EC2 instances
  – auto-scale groups
  – ELBs
• Alarms
BATTLE TESTING
Benchmarking
US-East Cache Node
Performance

11.4 Gbps
US-East Cache Node Performance

25.3 Gbps
US-East Cache Node Performance

10.1 Gbps
US-East Cache Node Performance

40.3 Gbps
US-East Cache Node Performance

26.6 Gbps
Impact on US-East FMS Origin Servers

Only ~42Mbps
Impact on US-East FMS Origin Servers

Only ~42Mbps
Fun with CloudFront Behaviors

<table>
<thead>
<tr>
<th>Precedence</th>
<th>Path Pattern</th>
<th>Origin</th>
<th>Viewer Protocol Policy</th>
<th>Forwarded Query Strings</th>
<th>Trusted Signers</th>
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<td>/msl-raw-images/*</td>
<td>S3-ml-raws</td>
<td>HTTP and HTTPS</td>
<td>No</td>
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<td>ELB-Prod</td>
<td>HTTP and HTTPS</td>
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USING AWS FOR MISSION OPS
MSL Interface
Data Ingestion Architecture

- **Job Orchestration**
- **Product Data**

**Job Management** (Simple Workflow)

**Image Storage** (S3)

**Image Catalog** (SimpleDB)

- **JPL Network**
- **Mission Network Filesystem**
- **Upstream Processing**
- **MSLICE Worker Computers**

**MSLICE Client**

**jpl task list**

**cloud task list**
Final Destination
Enabling Space with the Cloud

Cost-effective, Scalable, Nimble
(use what you need, change things when you want to)

Durable Services for Mission Criticality
(lots of datacenters, lots of regions)

Simple APIs for Rapid Development
(make cool stuff quickly)