Cloud and Mobility

J Travis Howerton, NNSA Chief Technology Officer
Anil Karmel, NNSA M&O Chief Technology Officer
Delivering revolutionary business transformation within a government agency requires navigating a complex maze.
To deliver solutions through the RightPath framework, we have partnered the best of the NNSA and OCIO capabilities into one integrated team:

- Program Manager – Travis Howerton, NNSA
- Architecture – Anil Karmel, NNSA
- Operations – Robbie Green, OCIO
- Policy/Partnerships – Peter Tseronis, OCIO
- Cybersecurity – Mary Hitson, NNSA
There is a perfect storm of disruptive technology on the horizon that will enable a leaner, smarter government.

The key is to have a framework that enables you to turn ideas into execution.
Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources.
Organizations are faced with large existing technology investments and dwindling budgets.

US Data Centers consume between 1.7-2.2% of the energy budget.
Virtual Desktops | Enterprise Services (e.g. ONEvoice) | Servers

M&O Cloud | DOE IE Cloud | NNSA 2NV Cloud | Other Federal Gov't Clouds

M&O / DOE Site(s) | Commercial Cloud Service Providers | Other Government Sites

Cloud Portal | Service Catalog | YOURcloud Enclaves
Secure Hybrid Cloud

LANL’s Infrastructure on Demand is the Department’s first Infrastructure-as-a-Service secure hybrid cloud service broker to automatically request and provision virtual servers.

Value Added Features / Services:
- Full backup / recovery of systems
- System Administrators will support the underlying infrastructure
- No ongoing infrastructure refresh costs
- Automatically provision virtual servers

Requestor Responsibility:
- Security plan
- System Administration / Maintenance of operating system and application
Secure Hybrid Cloud

**INFRASTRUCTURE ON DEMAND**

30 Minutes

<table>
<thead>
<tr>
<th>Staff requiring server</th>
</tr>
</thead>
<tbody>
<tr>
<td>One stop shop: iod.lanl.gov</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sharepoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharepoint workflow kicked off</td>
</tr>
<tr>
<td>Successful vApp creation</td>
</tr>
<tr>
<td>Validation of returned data, packaged for vCD</td>
</tr>
<tr>
<td>Document machine in &quot;Completed List&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hostmaster (IPA/M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Register selected IP Address, MAC address, System owner, data type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>vCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCD workflow initiated, Generates vApp and MAC Address</td>
</tr>
<tr>
<td>vApp tied to IP and MAC address</td>
</tr>
</tbody>
</table>
Security Journey

**TRADITIONAL SECURITY**

**Complex**
- Multiple provisioning interfaces
- Overlapping admin roles
- Multiple point solutions

**Rigid**
- Agents in each VM, AV storms
- No granular segmentation
- Rigid – Policies tied to servers

**Labor Intensive Compliance**
- Not change-aware, data leaks
- Manual assessment
- Manual remediation

**VIRTUALIZED SECURITY**

**Simple**
- Single interface for provisioning
- Separation of duties
- Firewall policy reduction
- Virtual security appliances

**Adaptive**
- Agentless
- Adaptive trust zones, compromised apps quarantined
- Virtualization aware firewall

**Automatic Compliance**
- Discover sensitive data
- Continuous assessment
- Automated remediation, programmable
Physical Security Architecture
Cloud Security: Protect the VDI Clients
Cloud Security: Quarantine the Compromised Virtual Machines
Secure Hybrid Cloud Computing

Service A VDC

Service B VDC

Secure VPN

Secure Hybrid Cloud Computing

Cloud Datacenter
Cross Cloud Management Makes Hybrid Cloud Real

- Visualize resources across hybrid clouds
- Copy and operate resources across clouds
- Deliver enterprise level security
Elastic Compute

Benefits:

Cross cluster mobility within or across datacenters

On demand networks without physical network configuration
INFRASTRUCTURE ON DEMAND

KILOWATT HOURS
188381 kWh saved per year

Environmentally Sustainable Computing
Deploying a virtual server as opposed to racking and stacking a physical system results in considerable power savings and reduced electronic waste.
See for yourself!

Green IT » Streamlined » Scalable » Secure

CLOUD COMPUTING AT LANL

LANL’s Infrastructure on Demand (IoD) gives you the ability to request and receive virtual Windows, Linux or Solaris servers. The virtual environment functions identically to a physical environment with greater reliability for users and flexibility for the system owner. Providing basic information on our request form will launch the process to dynamically provision a virtual server on demand, reducing average server provisioning cycle time from 30 days to 30 minutes.

OUR SERVICE
NET will provide users of this service:

- Full Operating System backups of Virtual Servers on a weekly basis
- Inobstrusive refresh of the underlying server infrastructure
- 24x7x365 Tier 3 On-Call Support

YOUR RESPONSIBILITIES

Users of this service (system requestors / owners) will be responsible for:

- Security Plan Compliance (patching of operating system, file backups, etc.)
- Application Installations, Configuration, Maintenance and Support
- User Interface / Tier 1 and 2 Support

FOR CUSTOMERS

Create a Server
Crypto card login required

Already a user? Customer Login

SUPPORT

Please refer to the FAQ page for all general questions
For further info, contact lod@lanl.gov
Real Life Savings

It takes 8,900 kilowatt hours to provide electricity to one average US house for a year. With the energy saved annually through Infrastructure on Demand (IoD), LANL can power 216 homes.
## Server Operating System

**Linux VM – No OS Installed**

<table>
<thead>
<tr>
<th>CPUs</th>
<th>Memory</th>
<th>Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CPU</td>
<td>1024MB</td>
<td>20GB</td>
</tr>
</tbody>
</table>

### Workload

<table>
<thead>
<tr>
<th>Normal</th>
<th>High Availability</th>
<th>Mission Critical</th>
</tr>
</thead>
</table>

### Storage

| SATA | SATA | Fiber Channel |

### Replication

| No | Yes | Yes |

### Snapshot

| 4 hrs | 4 hrs | 2 hrs |

**Total:** $67 per month
## Server Operating System

- **Windows Server 2008 Standard 64-Bit**

### System Resources
- **CPUs:** 2 CPU
- **Memory:** 2048MB
- **Disk Space:** 80GB

### Service Levels

<table>
<thead>
<tr>
<th>Workload</th>
<th>Normal</th>
<th>High Availability</th>
<th>Mission Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>SATA</td>
<td>SATA</td>
<td>Fiber Channel</td>
</tr>
<tr>
<td>Replication</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Snapshot</td>
<td>4 hrs</td>
<td>4 hrs</td>
<td>2 hrs</td>
</tr>
</tbody>
</table>

### Total Cost

- **Total:** $134 per month

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Next
## Virtual Machines

<table>
<thead>
<tr>
<th>System Name</th>
<th>CPU (#)</th>
<th>Memory (MB)</th>
<th>Disk (GB)</th>
<th>Total Monthly Cost</th>
<th>Expiration Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1536</td>
<td>143</td>
<td></td>
<td>$134.00</td>
<td>12/31/2011</td>
<td>Active</td>
</tr>
<tr>
<td>2</td>
<td>4096</td>
<td>75</td>
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<td>$268.00</td>
<td>12/31/2011</td>
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<td>1</td>
<td>1024</td>
<td>78</td>
<td></td>
<td>$67.00</td>
<td>12/31/2011</td>
<td>Active</td>
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<tr>
<td>2</td>
<td>8192</td>
<td>928</td>
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<td>$804.00</td>
<td>12/31/2011</td>
<td>Active</td>
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<tr>
<td>4</td>
<td>30720</td>
<td>90</td>
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<td>$1,608.00</td>
<td>12/30/2011</td>
<td>Active</td>
</tr>
<tr>
<td>Sum = $2,881.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>System Name</th>
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<th>Total Monthly Cost</th>
<th>Expiration Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4096</td>
<td>100</td>
<td></td>
<td>$268.00</td>
<td>12/7/2011</td>
<td>Active</td>
</tr>
<tr>
<td>1</td>
<td>1024</td>
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<td>$67.00</td>
<td>12/31/2011</td>
<td>Active</td>
</tr>
<tr>
<td>Sum = $335.00</td>
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<td></td>
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<td></td>
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</tbody>
</table>

<table>
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<tr>
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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4096</td>
<td>80</td>
<td></td>
<td>$268.00</td>
<td>6/8/2012</td>
<td>Active</td>
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<tr>
<td>Sum = $268.00</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
### Virtual Machine Management

#### Snapshots Library

<table>
<thead>
<tr>
<th>Virtual Machine</th>
<th>Snapshot Name</th>
<th>Description</th>
<th>Created</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TESTMIE</strong></td>
<td>TESTMIE</td>
<td>This is a test of the workflows as they stand now</td>
<td>7/12/2011 11:19 AM</td>
<td>7/19/2011</td>
</tr>
</tbody>
</table>
Create a New Snapshot

Snapshot Title:  

Virtual Machine:  

Description:  

Warning: If you already have 5 snapshots for this virtual machine, this snapshot will not be created! Please delete one of your snapshots before trying to create a new one.

Also, if you get an error when you try to Create this Snapshot, it is because you already have a snapshot for this Virtual Machine with the same name. Please change the Snapshot Title and try again.
PEOPLE

Change How People Behave
- Embrace cloud services
- Adapt to new cost model
- Educate users on new self-service delivery model

PROCESSSES

Change How We Do Things
- Reduce 30 day cycle time to 30 minutes
- Execute business process reengineering
- Reduce physical infrastructure procurements

TECHNOLOGY

Evolve our Capabilities
- Employ best-in-class cybersecurity
- Deploy predefined templates
- Calculate energy savings
Mobility

Delivering a comprehensive platform for on-the-go worker capabilities
Deploying modern wireless technology is incredibly difficult within government.

Multiple federal approvals are required that slow speed to impact or block progress all together.

Customers demand devices they are most familiar with yet show little interest in devices we are comfortable with securing.

True wireless automation and a connected government are years, if not decades away.
The Enterprise Mobility project takes a field of dreams approach to infrastructure...
To make mobility real...

Data has to be available everywhere, while limiting where it goes
There are two main strategies for data security: Virtualization and Containerization. Secure the data not the device.

Employees must be able to work wherever they are at on the device of their choosing.

You don’t truly understand your risk until you understand your transport.
What Does Mobility Mean For You?

- Virtual Workforce
- Cost Savings
- BYOD
- Classified Wireless
Change How People Behave

- Bring Your Own Device
- Mobile/Virtual Worker
- Collaboration
- Mobile Applications

Change How We Do Things

- Enterprise Mobility Policy
- Risk Management Framework
- Enterprise C&A and Procurements

Evolve our Capabilities

- 802.11 everywhere
- VDI and containerization
- Sensor Networks
- Classified Wireless

RightPath
Today’s investments create a target rich environment for future cycles of innovation

- Interactive Intelligence
  - Business
  - Social
  - Cyber
- Enabling VForce21
- NextGen Cybersecurity
In less than one year, we will move from an antiquated architecture to thought leaders by leveraging key technologies coupled with people and process evolution to transform an agency.
<table>
<thead>
<tr>
<th>Begin with the end goal in mind</th>
<th>Rapid results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on real business solutions</td>
<td>Low risk</td>
</tr>
<tr>
<td>Take a lean, agile approach to technology</td>
<td>Low cost</td>
</tr>
</tbody>
</table>