Making HPC Cloud a Reality in the Federal Space

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Martin Rieger - ISSM | April 02, 2019
Brief History of Federal Cloud Computing

General Services Administration (GSA) awards first Infrastructure-as-a-Service (IaaS) Cloud Providers under a Blanket Purchase Agreement (BPA). 12 Cloud Providers were selected.


FedRAMP reaches initial operating capability (IOC) in accordance with OMB FedRAMP memo timelines and the 24 month clock starts for all clouds to meet FedRAMP requirements. FedRAMP baseline and parameters established.

First CSP received a FedRAMP Provisional Authorization (P-ATO).

All currently implemented cloud services and authorizations must meet the FedRAMP requirements.

DoD (DISA) releases the Cloud Computing Security Readiness Guide (SRG) to supplement FedRAMP.

OMB Released “Cloud Smart” as a second strategy to the “Cloud First Policy” from 2011.
NIST Definition of Cloud Computing

- On-demand Self-service
- Broad network access
- Resource Pooling (Multi-Tenant Only)
- Rapid Elasticity
- Measured Service
Definition of Cloud Computing – Service Models

- Software as a Service - SaaS
- Platform as a Service – PaaS
- Infrastructure as a Service - IaaS

Diagram showing:
- Vendor A
- Vendor B
- Vendor C
- Agency Controls
- SaaS Provider
- PaaS Provider
- IaaS Provider

Graph indicating:
- Agencies
- CSP

Vendor A
Vendor B
Vendor C
The Federal Policy Framework Overview is depicted with a triangle structure. At the top, "Agency ATO" is mentioned, implying the role of the Authorizing Official. Below this, "OMB A-130" and "FIPS 199, FIPS 200, NIST SP 800-37, 800-137, 800-53" are listed, indicating the federal policies and standards relevant to FedRAMP. The base of the triangle includes "eGov Act of 2002 includes Federal Information Security Management Act (FISMA)", which highlights the legislative foundation of FedRAMP.

A box on the right side explains FedRAMP builds upon NIST SPs, establishing common cloud computing baseline requirements. It states that agencies leverage NIST processes, with heads of agencies (Authorizing Officials) reviewing packages and risk, accepting risk and granting ATOs.

OMB A-130 provides policy, NIST provides what is known as the Risk Management Framework (RMF).

Congress passes FISMA as part of 2002 eGov Act.

Source: FedRAMP PMO (modified)
Penguin On-Demand Self Service & Accessibility

Self Service Web Portal
- Account Management
- GUI Job Submission
- On-demand Usage Reporting

Remote Desktops
- GPU Accelerated GFX
- 3D Accelerated Post-processing
- Interactive Visualization

Traditional SSH CLI
- Development Environment
- Familiar Scheduler Commands
- Fine Tune Workflow
Resource Management

- Easy to use tools for monitoring and alerting
- Manageable node attributes and boot options
- Visualization of "odd node out" to quickly identify problem nodes
Clear Measured Service & Predictable Billing

- Pay per use, no commitment required
- Compute by core hour, metered to 3 seconds
- Storage by average GB per month
- No network bandwidth charges
- Private Login Node included
- Detailed accounting and reporting in XLS format
- Monitor and control charges for your organization
Federal Needs– On Demand HPC Cloud Services

On-premise HPC Cloud solution tailored to meet federal compute, storage, and workflow needs.

Simplified ACL management of user access to HPC resources.

Optimized IT processes by eliminating the mundane tasks of user onboarding.
HPC Public Cloud Expectations

- Storage reporting and quota management
- Integration with technologies like TORQUE, Slurm, and GE
- Easy on-boarding with for federal users
- Secure Portal for government access
- Detailed reporting for CIOs and managers
- Enables remote desktop provisioning
- Resource ACL controls with **MFA** support for agency PIV, DoD CAC or HSPD-12
What are Federal Agencies asking for?

HPC Advanced Technologies

- Ready-to-go HPC
- Bare metal computing
- InfiniBand or Omni-Path
- HPC Support
- Installed optimized HPC applications
- Parallel file systems
Thank you for listening.

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