



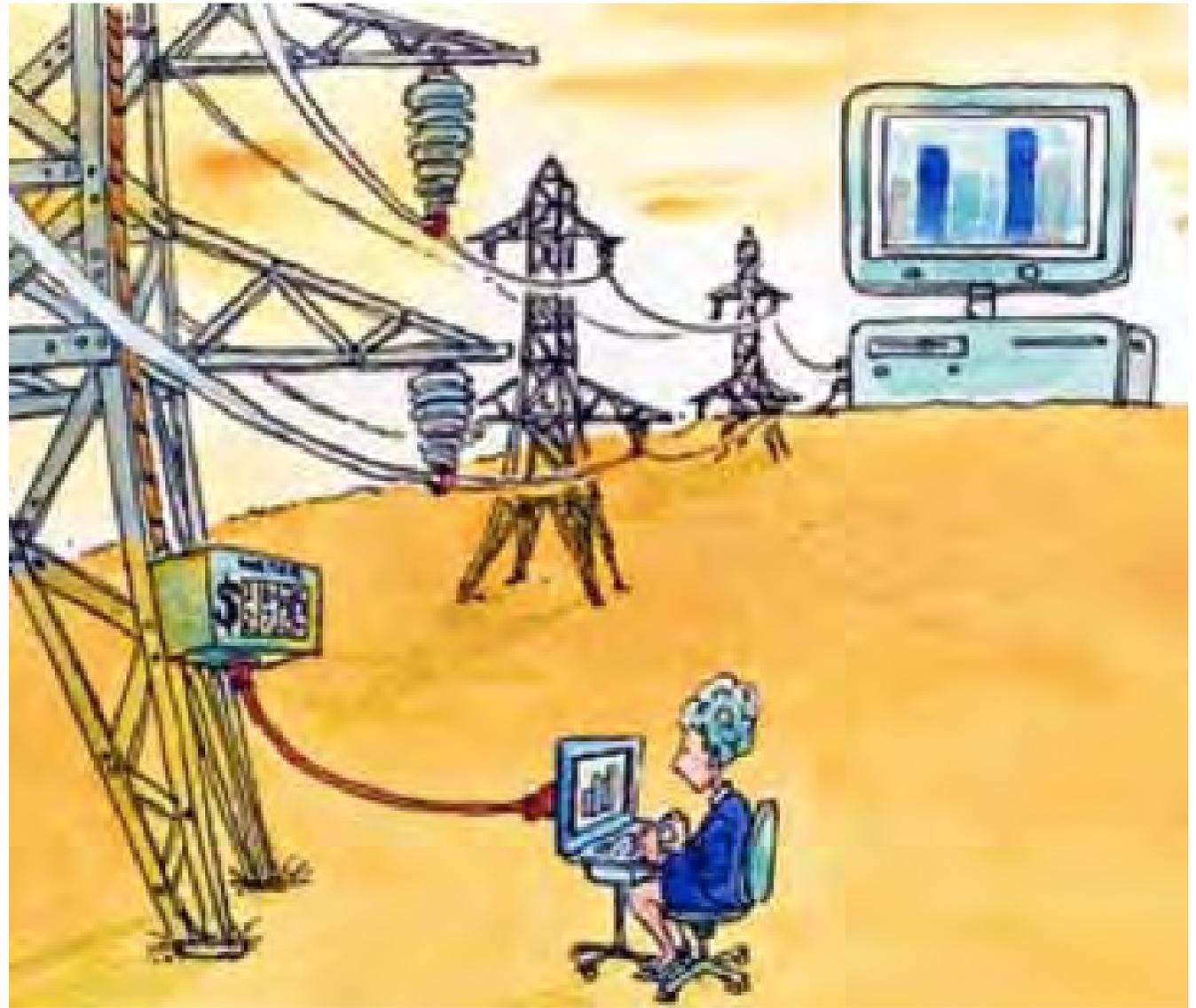
NATIONAL INSTITUTES OF HEALTH enterpriseARCHITECTURE

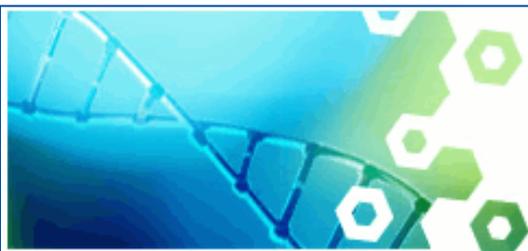
Cloud Computing Best Practices and
Considerations for Project Managers
Mike Lamoureux, PMP, MBA



Cloud Computing is the 5th Utility

- Water
- Electricity
- Gas
- Telephone
- **Computing**



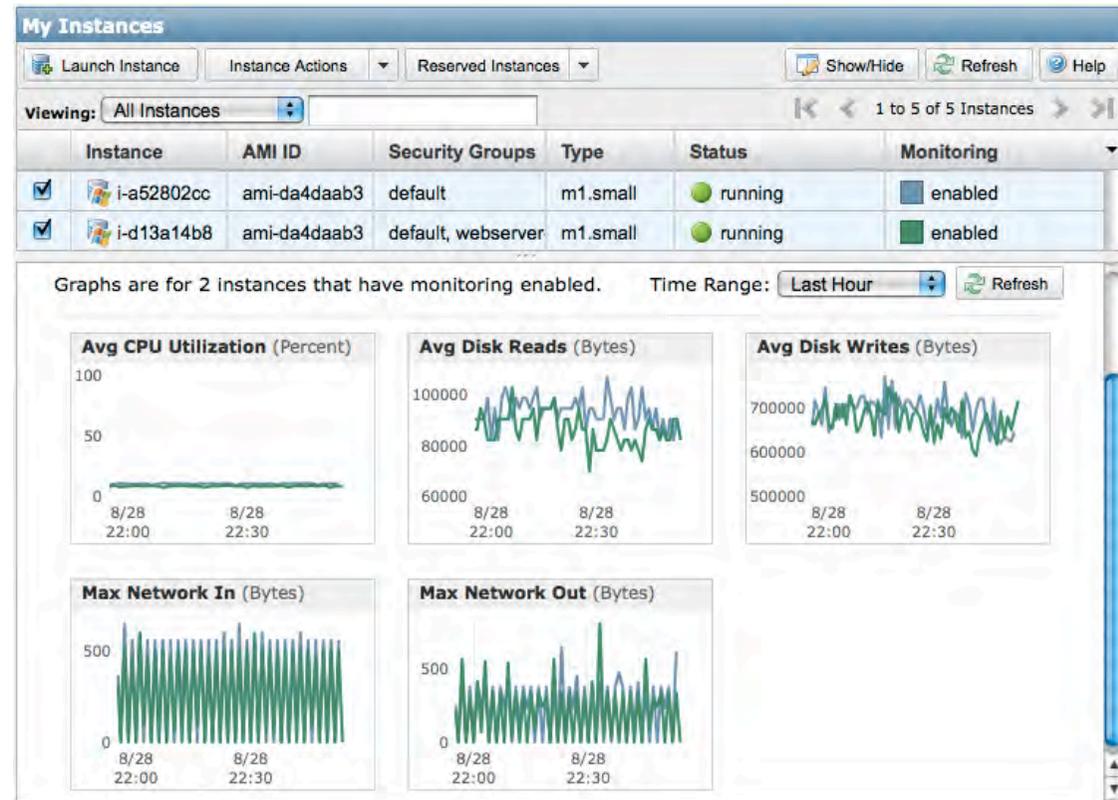


Why does a Project Manager have to know about the Cloud?

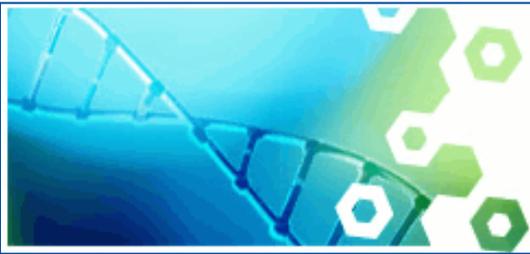
- If you know about insourcing and outsourcing, you know about Cloud Computing
- In a study, fifty-three percent reported that they have outsourcing challenges because their companies lack project management skills
 - *Source: Douglas Brown; Scott Wilson. The Black Book of Outsourcing: How to Manage the Changes, Challenges, and Opportunities*
- The PMBOK doesn't make reference to any best practices when outsourcing.
 - *Source: PMBOK 4th Edition*

Cloud Computing Essential Characteristics

- On-demand Self Service
- Broad Network Access
- Resource Pooling
- Rapid Elasticity
- Measured Service

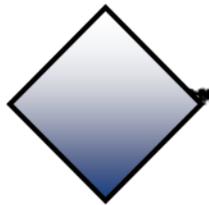


Key Takeaway: All essential characteristics are required to be considered a cloud. Not all data centers are clouds, and not all clouds are created equal.



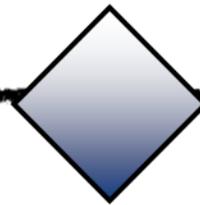
Considerations for Cloud Computing at Project Management Stages

Plan



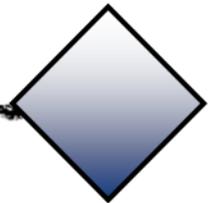
Pick the right cloud for your project

Execute

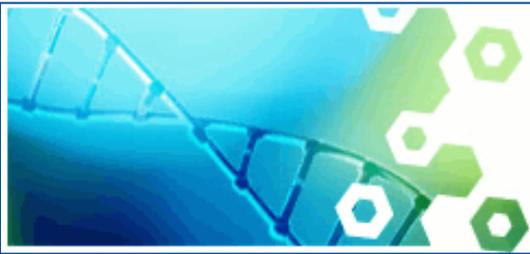


Understand your SLAs

Maintain



Manage your risk

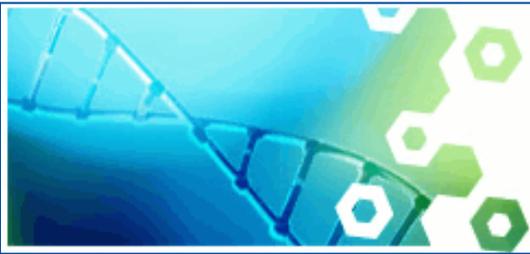


Planning Consideration: Pick the Right Cloud for your Project

- With Cloud Computing, a project is always outsourcing the management of the **Hardware** with the goal of making individuals more productive.
(Credit: Harvard Business Review Article BR1111, Andrew McAfee)
- With **Software**, there are three Service Models of Cloud Computing
 - Software as a Service (SaaS)
100% Buy
 - Platform as a Service (PaaS)
40 % Buy / 60% Build
 - Infrastructure as a Service (IaaS)
100% Build

Service Model	Examples
Software as a Service (SaaS)	
Platform as a Service (PaaS)	
Infrastructure as a Service (IaaS)	

Key Takeaway: Purchase the right service based on your needs. Take advantage of higher-level managed services whenever possible. Use IaaS only when the most configuration flexibility is needed.

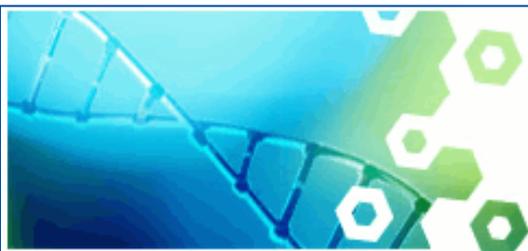


Planning Consideration: Pick the Right Cloud for your Project

- Be aware of who could be your neighbors (you likely will not know!)
- Use Case Tips for choosing a Deployment Model
 - Public Clouds are ideal for Public Government Services or non sensitive data
 - Community Clouds such as Amazon GovCloud restrict based on a closed community (such as Government-Only)
 - Private Clouds are best for areas requiring high privacy and security needs, and those that are required to be on-premise
- FISMA and FedRAMP are your guides to finding the appropriate cloud for the security of your application, can affect certification for HIPAA, etc.

Deployment Model	Audience
Private Cloud	
Community Cloud	
Public Cloud	
Hybrid Cloud	Contains two or more clouds of different types

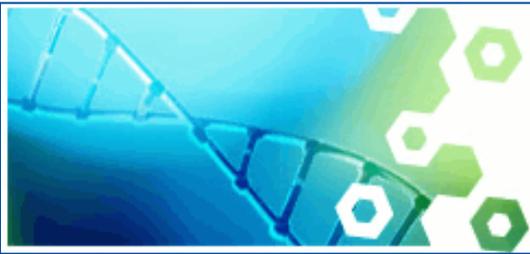
Key Takeaway: Pick the right deployment model that is most appropriate for your security and privacy needs while still allowing for the most economies of scale possible. Attempt to separate data that has high sensitivity to allow for public or large community cloud usage for a majority of components.



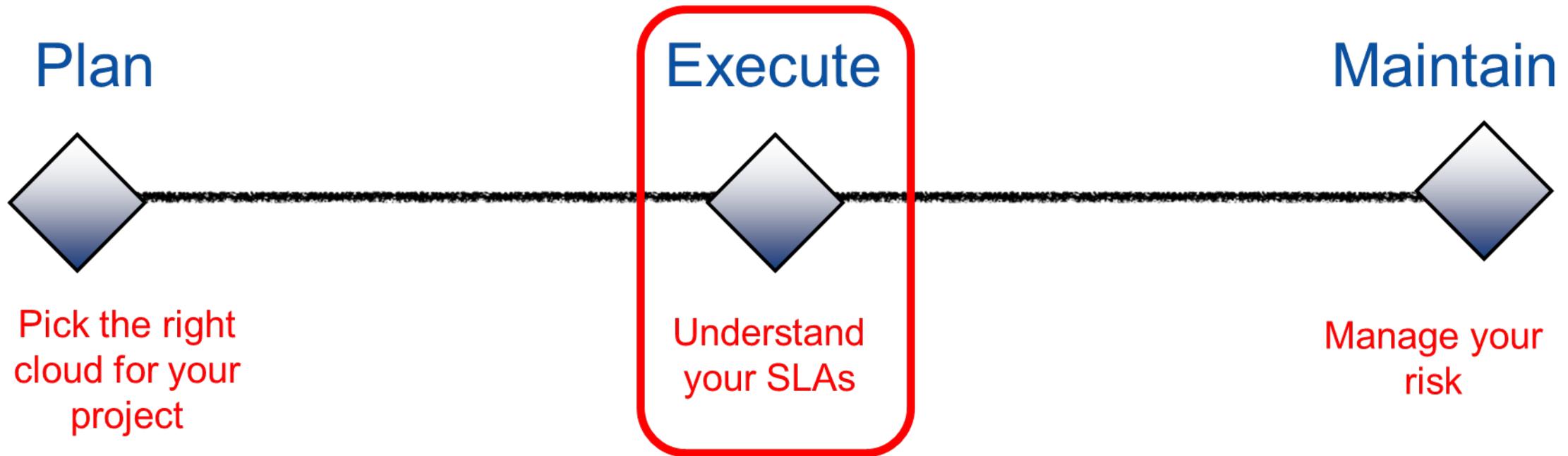
Use Cases

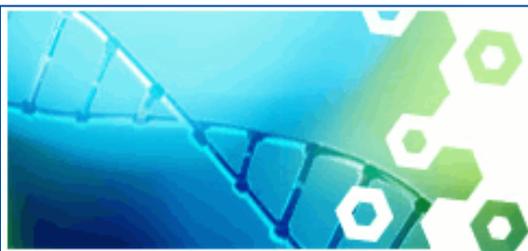
- **Use Case 1:** Your project involves setting up a Database with a standard configuration that will be filled with sensitive information, and utilized by other NIH Applications that are hosted on NIH Campus.
 - **Potential Solution:** PaaS, Private Cloud
- **Use Case 2:** Your project is to establish a collaboration environment for management of tasks, schedules, etc. The information that will go into the collaboration environment is not sensitive in any way.
 - **Potential Solution:** SaaS, Public Cloud
- **Use Case 3:** Your project is to perform heavy computational analysis on research data using a open source program that runs on Linux. You will need to manually scale up and down the number of servers required for the processing, which might overwhelm many smaller cloud providers. Your budget is very tight and the research data is not sensitive.
 - **Potential Solution:** IaaS, Public Cloud





Considerations for Cloud Computing at Project Management Stages





Execute Consideration: Understand your SLA

- Service Level Agreements vary per cloud provider, and will change in the metrics that are used based on Service Model (SaaS, PaaS, IaaS)
 - SLAs deal with much more than uptime, also includes service desk support, performance guarantees, configuration scope, and backup
- With Hybrid Cloud, dealing with multiple cloud providers and SLA's can be a challenging task (Cloud to Cloud standards are not yet strong)
 - An alternative is a Cloud Services Brokerage (CSB) which can aid program (or large projects) in cloud integration

Key Takeaway: PMs may or may not have control over their SLA with a cloud provider. Most important is to understand the SLA you have so that you can mitigate any risks you might find.

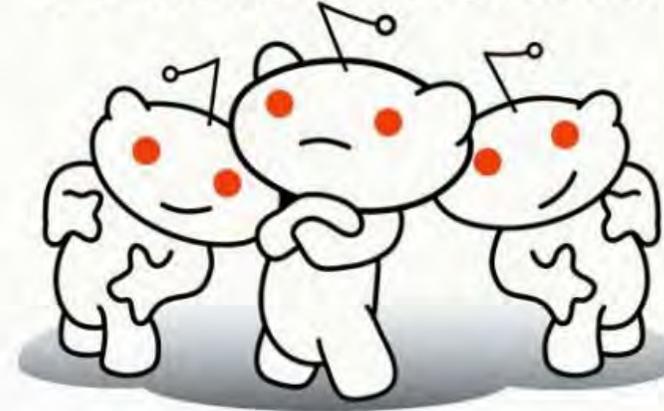
Should a PM be concerned with Cloud Outages?



@saurik
Jay Freeman (saurik)

Amazon EC2 (which does host the primary Cydia website, purchasing, etc.) is currently experiencing severe issues: nothing I can do but wait.

reddit is down.



Sorry! We're having technical difficulties

Latest post from status.foursquare.com:

Thu Apr 21 2011

This morning's downtime and slowness

Hi all,

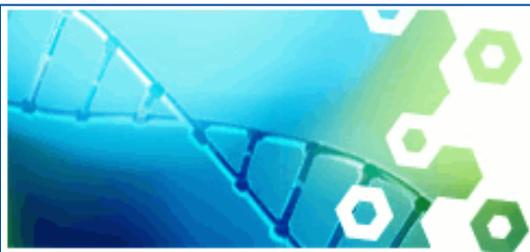
Our usually-amazing datacenter hosts, Amazon EC2, are having a few hiccups this morning, which affected us and a bunch of other services that use them. Everything looks to be getting back to normal now. We'll update this when we have the all clear. Thanks for your patience.



pause 1 2 3

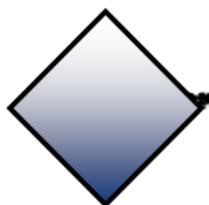
How to Avoid Getting Amazon-ed

Mon, April 25, 2011 The two-day outage at one of



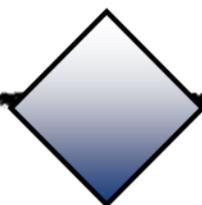
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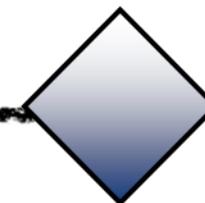
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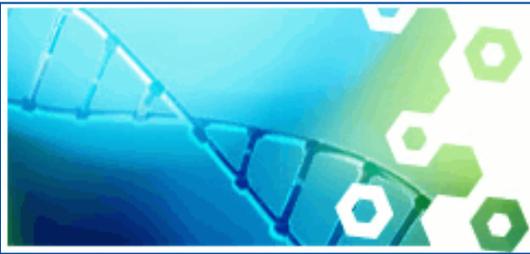


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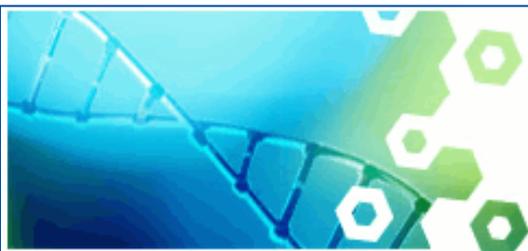


Maintain Consideration: Manage your Risk

- The utilities we count on sometimes experience outages
- An outage at a large-scale provider amplifies the impact
 - The damage to a companies reputation is typically worse than the economic impact
- If using PaaS or IaaS, consider the risk of self-damage such as software bugs that accidentally delete data
- Multi-Cloud scenarios can mitigate from outages for low-cost, but upkeep can be manually intensive (Consider Cloud Service Brokerage)

Key Takeaway: Consider ALL risks and decide on the proper mitigation plan. Single Cloud Provider solutions are ideal but may not always mitigate all risks.





Cloud Computing Resources

- **NIST Definition on Cloud Computing (SP800-145)**
 - <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>
- **Cloud Computing at NIH**
 - <https://enterprisearchitecture.nih.gov/Pages/NIH-in-The-Cloud.aspx>
- **Cloud Services Brokerage Materials (Gartner Research + NIH EA Briefing)**
 - Available upon request
- **NIH Cloud Storage Domain Team**
 - <https://enterprisearchitecture.nih.gov/Pages/Domain-Team-Reports.aspx>
- **OMB 25-Point Plan to Reform Federal IT**
 - <http://www.cio.gov/documents/25-point-implementation-plan-to-reform-federal%20it.pdf>
- **Andrew McAfee (blogger / author / professor)**
 - <http://blogs.hbr.org/hbr/mcafee/>
 - <http://andrewmcafee.org/blog/>

Questions?

Michael Lamoureux

Contractor, Octo Consulting Group

OD/OCIO/EA

michael.lamoureux@nih.gov

mike.lamoureux@octoconsulting.com

Twitter: @mlamoure

