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# CLOUD COMPUTING

Revolutionizing Business Processes in  
Government, Healthcare & Financial Services

# EAST 2013

**MAY 19-21, 2013**  
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## **Optimizing IT: To Cloud or Not to Cloud**

Christopher L Poelker  
VP Enterprise Solutions  
FalconStor Software

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# US Cloud Commission

## Commission on the Leadership Opportunity in U.S. Deployment of the Cloud (CLOUD<sup>2</sup>)



Full Report Text Available online at: [www.techamericafoundation.org/cloud2](http://www.techamericafoundation.org/cloud2)

# Commission Goals

The commission's mandate is to provide the Obama Administration with recommendations for how government should deploy cloud technologies and for public policies that will help drive U.S. innovation in the cloud.

- **Determine roadblocks**
- **Recommend solutions**
- **Initiate standards**
- **Validate strategy**
- **Enable adoption**



# Cloud Commission Leaders

The Commission is comprised of 71 experts from industry and academia.

Commission reports to U.S. CIO Vivek Kundra and now Steven VanRoekel

[Marc Benioff](#), *Co-Chairman*  
Chairman and CEO  
salesforce.com

[Michael Capellas](#), *Co-Chairman*  
Chairman  
VCE, The Virtual Computing Environment

[Dan Reed](#), *Vice-Chairman*  
Corporate Vice President  
Technology Policy and Strategy  
Microsoft

[Jim Sheaffer](#), *Vice-Chairman*  
President  
North American Public Sector  
CSC

[Michael Nelson](#), *Academic Representative*  
Visiting Professor of  
Internet Studies  
Georgetown University

[John C. Mallery](#), *Academic Representative*  
Research Scientist, Computer Science and  
Artificial Intelligence Laboratory (CSAIL)  
Massachusetts Institute of Technology (MIT)

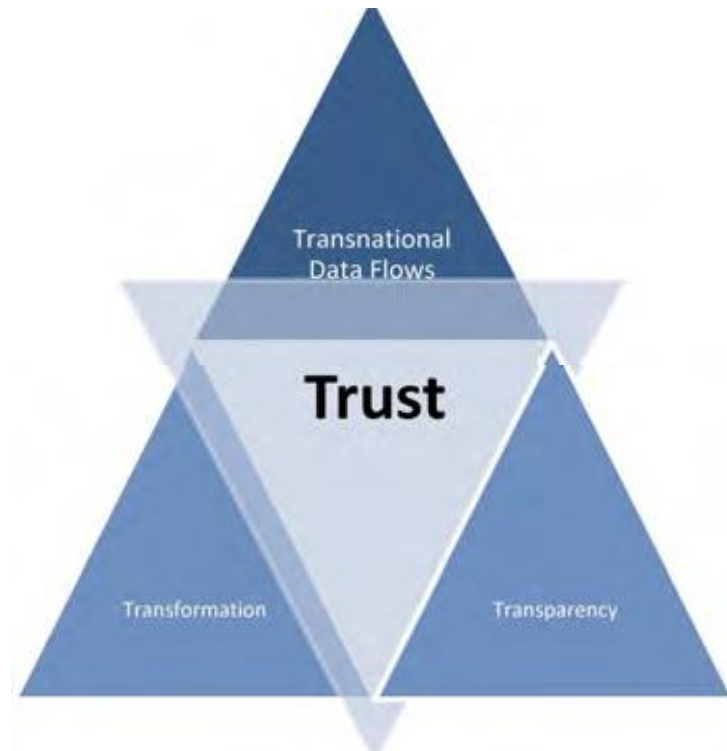
# Commission Report and Area of focus

The report provides recommendations for how the US government, including the White House and key federal agencies, in cooperation with industry, academia, and other nations can:

- (1) Adopt policies that will foster development and growth of the cloud.
- (2) Deploy the cloud effectively, making government work better, cheaper, and smarter.

## Areas of Focus:

- Trust
- Transnational Data Flows
- Transparency
- Transformation



# 14 Recommendations for Cloud Adoption

## Trust

- Recommendation 1 (Security & Assurance Frameworks): Develop infrastructure standards
- Recommendation 2 (Identity Management): Develop strong authentication standards
- Recommendation 3 (Responses to Data Breaches) Enact data breach and cyber security laws
- Recommendation 4 (Research) Leverage NSF and DARPA and academia which invented internet

## Transnational Data Flows

- Recommendation 5 (Privacy) Develop commonly accepted privacy frameworks and standards
- Recommendation 6 (Government/Law Enforcement Access to Data) Fix international access laws
- **Recommendation 7 (E-Discovery and Forensics) Data access for compliance and litigation**
- Recommendation 8 (Lead by Example) Show trust by using other countries clouds

## Transparency

- Recommendation 9 (Transparency) Publicize information about operational aspects of the service
- Recommendation 10 (Data Portability) Develop standards and best practices

## Transformation

- Recommendation 11 (Federal Acquisition and Budgeting) Adapt current procurement models
- Recommendation 12 (Incentives) Reward and support cloud adoption by agencies
- Recommendation 13 (Improve Infrastructure) Move to IPv6 and improve nations bandwidth
- Recommendation 14 (Education/Training) Incentives to adopt new cloud skills for IT workforce

Full Report: <http://www.techamericafoundation.org/cloud-commission>

# Back to the Basics: Understanding Cloud Concepts



# NIST: Working Definition of Cloud Computing



*“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction”*

This cloud model promotes availability and is composed of three **service models**, four **deployment models** with five **essential characteristics**.

# NIST: The 3 Cloud Service Models

- **Cloud Software as a Service (SaaS)**
  - Use provider's applications over a network
- **Cloud Platform as a Service (PaaS)**
  - Deploy customer-created applications to a cloud
- **Cloud Infrastructure as a Service (IaaS)**
  - Rent processing, storage, network capacity, and other fundamental computing resources

Gartner is forecasting that service-led solutions – software as a service (SaaS), infrastructure as a service (IaaS), platform as a service (PaaS) and so forth – will displace more traditional sourcing methods by 2015.

# NIST: 4 Cloud Deployment Models

- **Private cloud**
  - Enterprise owned or leased
- **Community cloud**
  - Shared infrastructure for specific community
- **Public cloud**
  - Sold to the public, mega-scale infrastructure
- **Hybrid cloud**
  - Composition of two or more clouds

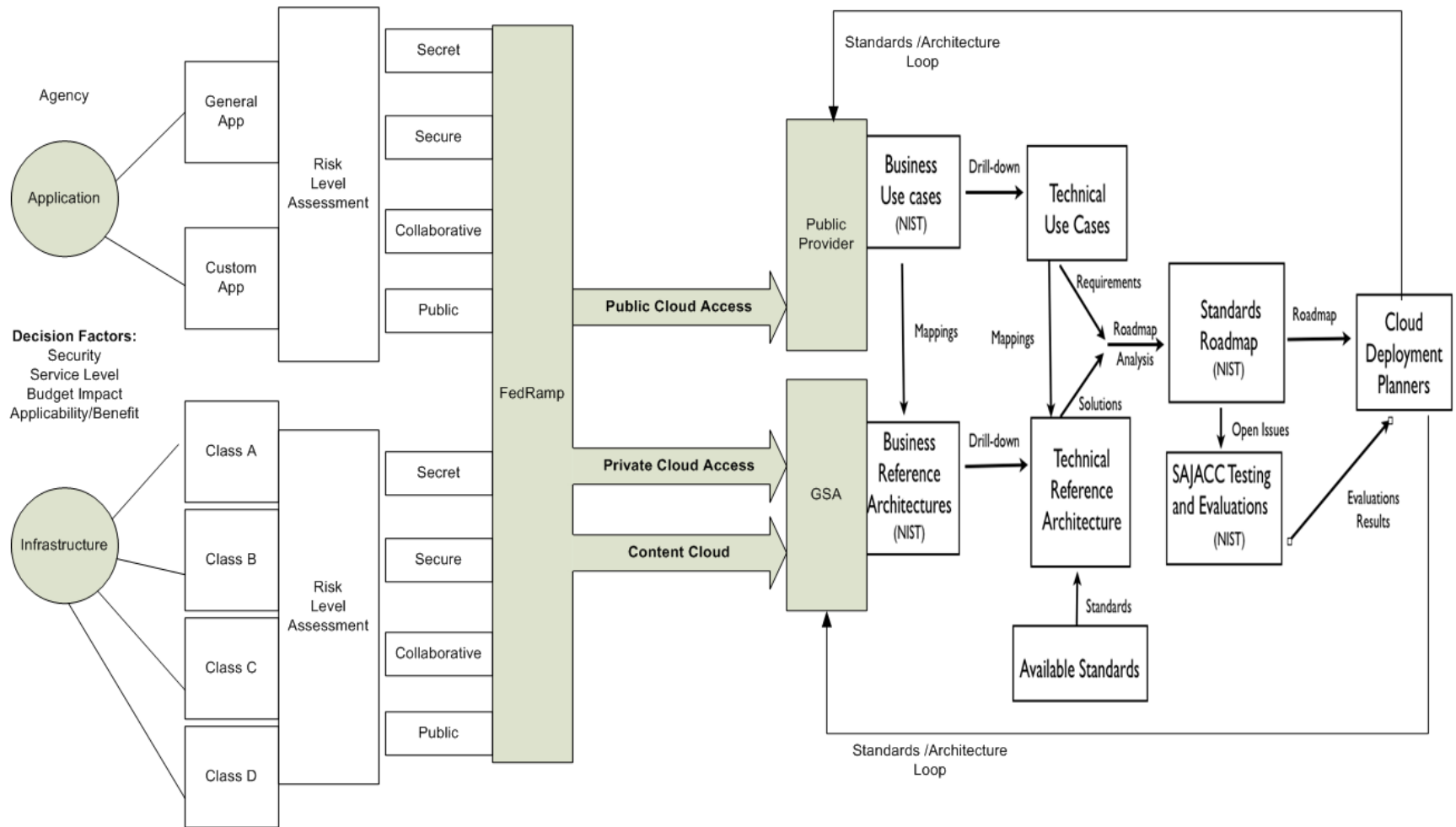
**To be considered “cloud” it must be deployed on infrastructure that has five key characteristics**

# NIST: 5 Essential Cloud Characteristics

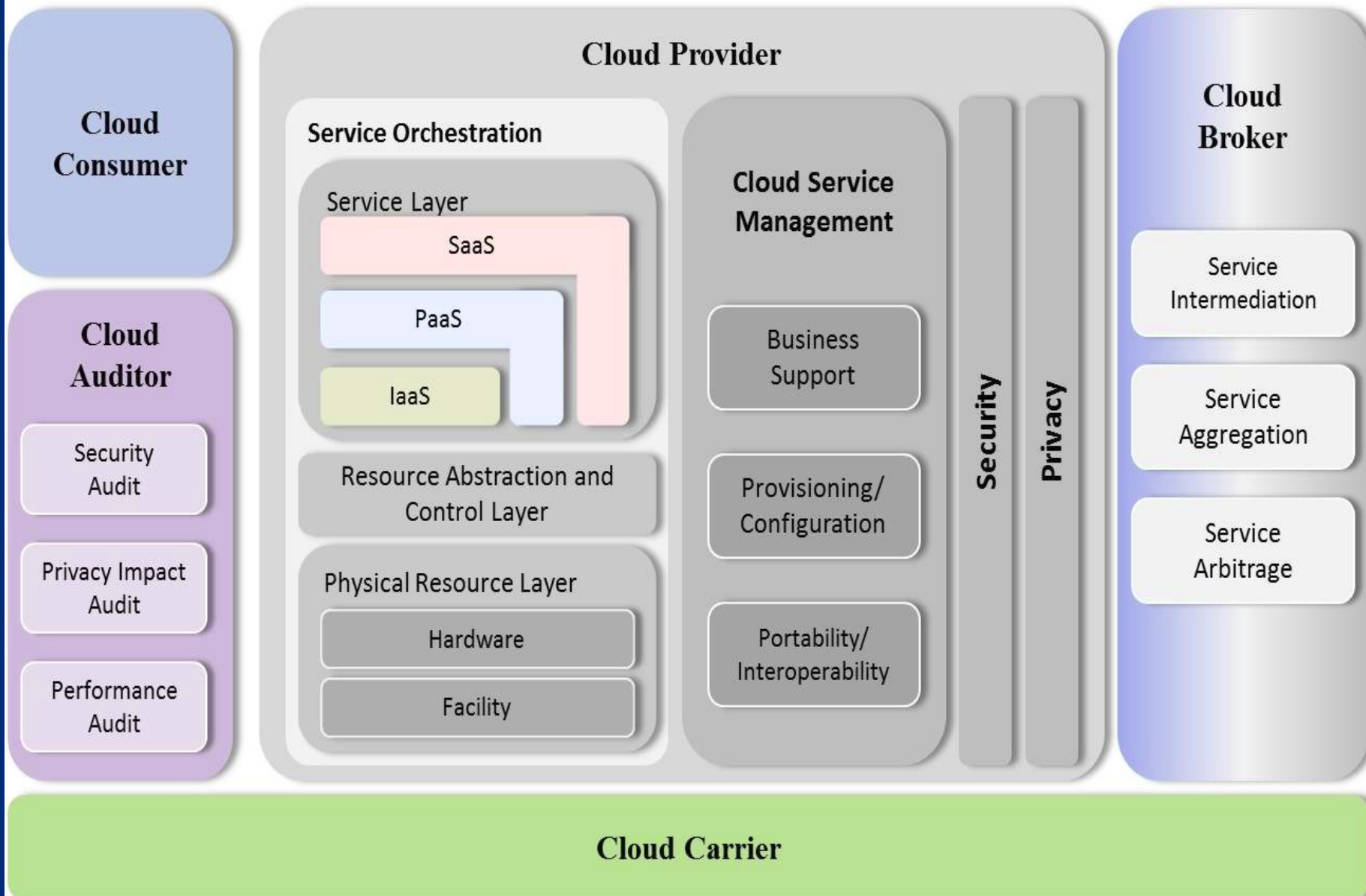
- On-demand self-service
- Broad network access
- Resource pooling with location independence
- Rapid elasticity
- Measured service

<http://www.nist.gov/itl/cloud/index.cfm#>

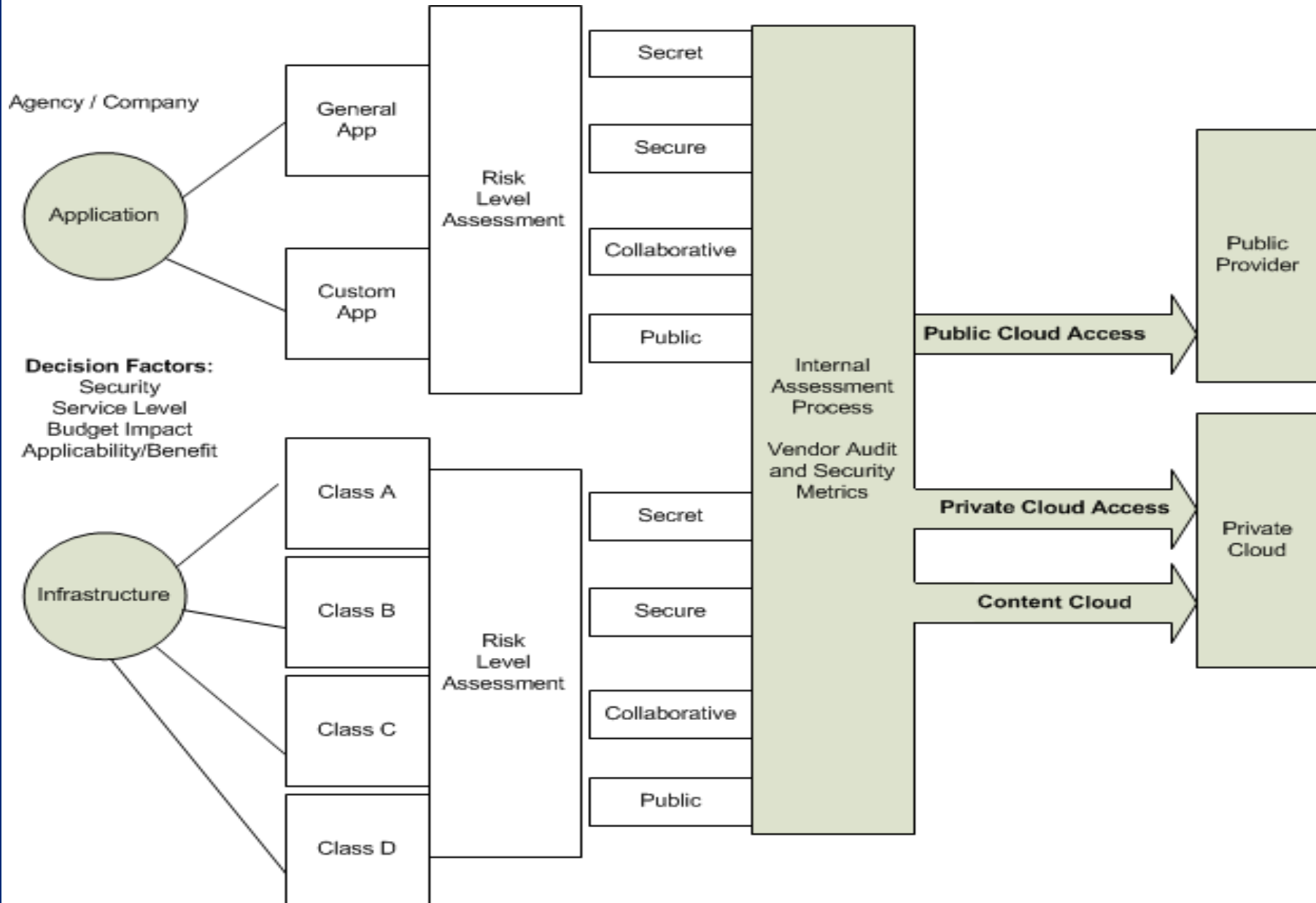
# Commission Infrastructure Working Group: Choosing Applications for the Cloud



# NIST: Cloud Reference Architecture



# Commercial CloudFormation Chart



# Standards: Services Measurement Index

The Service Measurement Index (SMI) is a set of business-relevant Key Performance Indicators (KPI's) that provide a standardized method for measuring and comparing a business service regardless of whether that service is internally provided or sourced from an outside company <http://www.cloudcommons.com/about-smi>

## The 7 top-level Categories of the CSMIC SMI

	Category	Questions
1.	Accountability	Can we count on the provider organization?
2.	Agility	Can it be changed and how quickly can it be changed?
3.	Assurance	How likely is it that the service will work as expected?
4.	Financial	How much is it?
5.	Performance	Does it do what we need?
6.	Security and Privacy	Is the service safe and privacy protected?
7.	Usability	Is it easy to learn and to use?



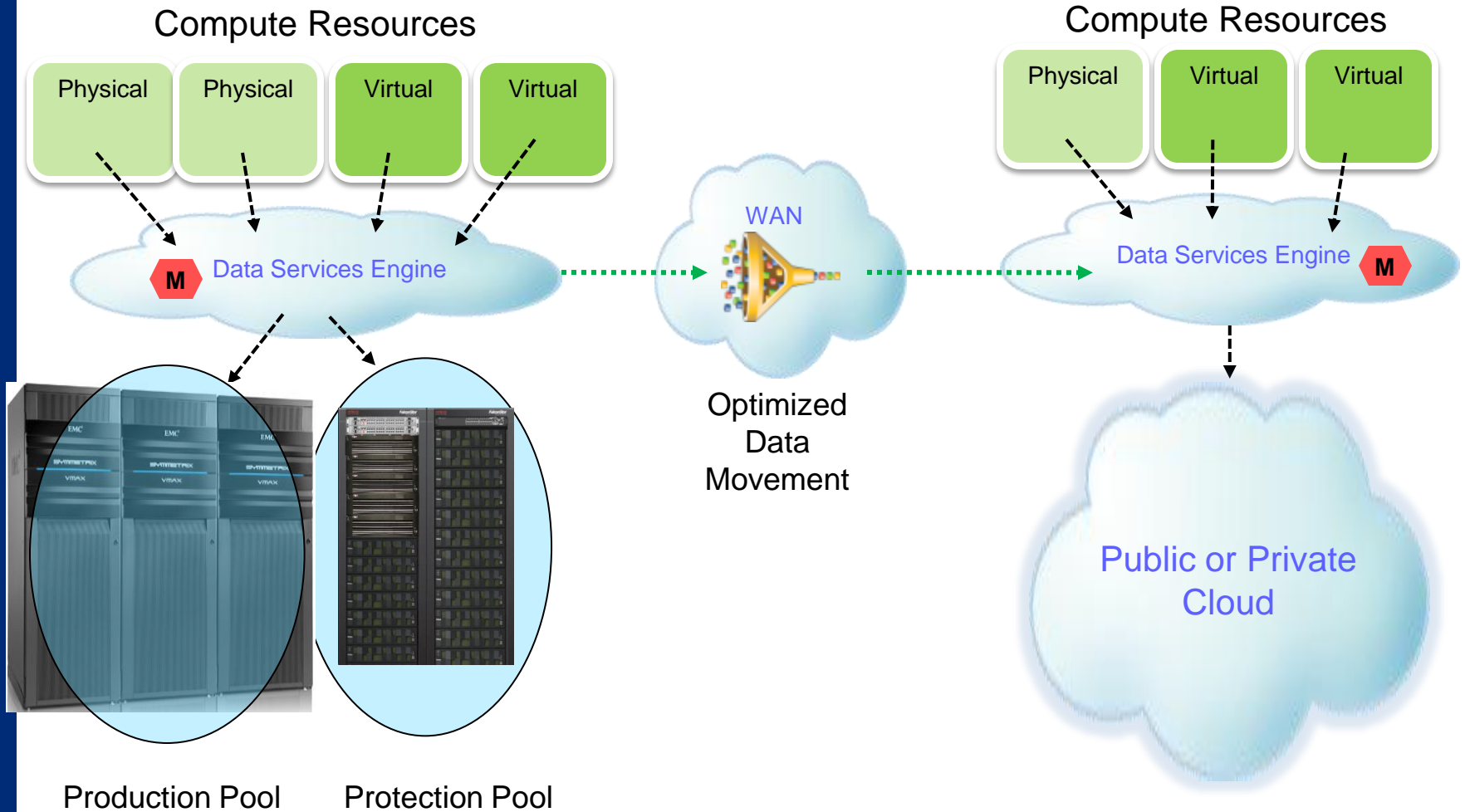
# Becoming Cloud Ready

- 1- Enable application and data mobility by virtualizing servers and storage
- 2- Audit applications to assess areas where cloud would be beneficial
- 3- Embrace encryption at rest and robust key management guidelines
- 4- **Assess utilization / costs of existing infrastructure and operations**
- 5- Determine data growth trends and dedupe or delete where required
- 6- Audit data assets by capacity and access metrics and assign classes
- 7- Create data storage tiers for structured and unstructured data classes
- 8- Consolidate infrastructure and minimize complexity (Policies / Automate)
- 9- Perform detailed analysis of application interdependencies
- 10- Outsource where appropriate

# Five Steps to Enable Private Cloud Services

1. First focus on low hanging fruit: Backup and Continuity
2. Implement snapshots and continuous data protection
3. Leverage protection storage for test and development
4. Virtualize servers and storage to consolidate and commoditize
5. Centralize and automate operations

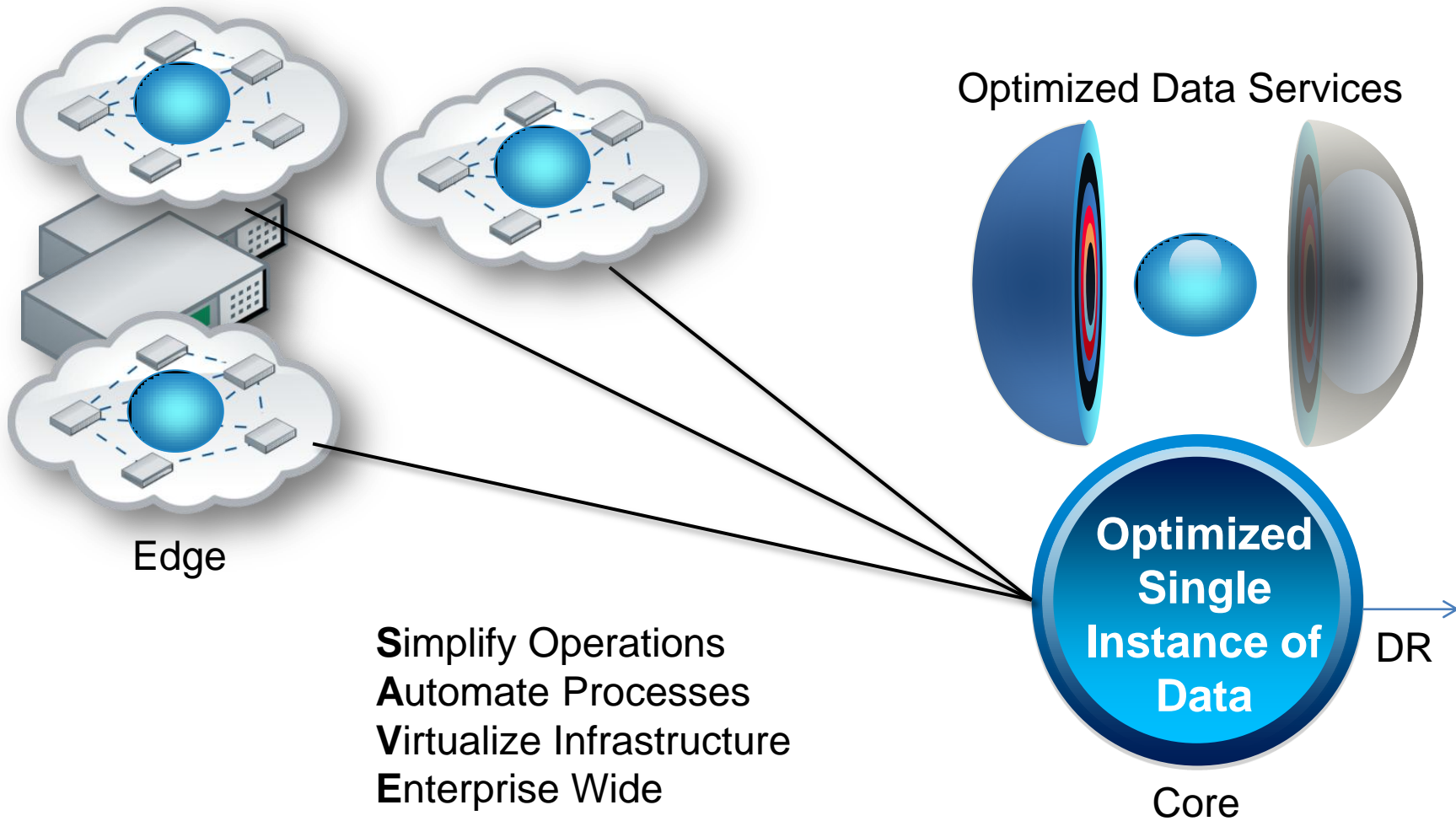
# Cloud Enabled Infrastructure



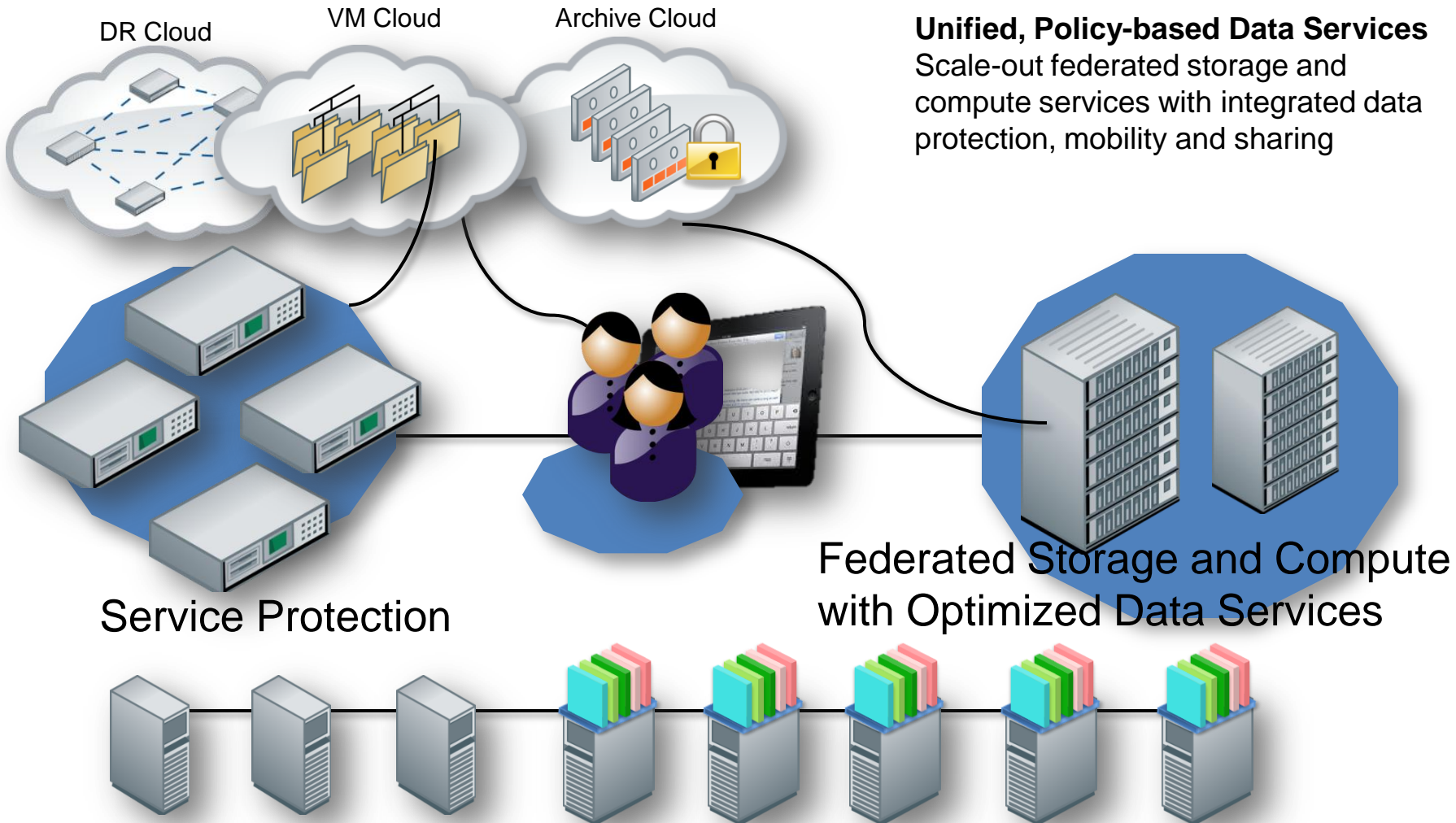
Production Pool

Protection Pool

# Holistic Data Management across the Enterprise



# The Goal: A Unified Vision



# Where to go to learn more about Cloud

- **(NIST) National Institute of Standards and Technology** <http://www.nist.gov/itl/cloud/index.cfm#>
- (SAJACC) Standards Acceleration to Jumpstart Adoption of Cloud Computing (SAJACC) developed by NIST <http://www.nist.gov/itl/cloud/sajacc.cfm>
- (SMI) Service Measurement Index: A method for calculating the performance and quality of cloud-based services from Carnegie Mellon University <http://csmic.org/understanding-smi/>
- (CRF) Cloud Reference Framework: Internet engineering task force (IETF) draft for cloud service providers. <http://tools.ietf.org/html/draft-khasnabish-cloud-reference-framework-02#page-6>
- CIO Council: Cloud Computing. <https://cio.gov/building-a-21st-century-government/cloud/>
- Cloud Commission site: Includes a buyers guide and the final report <http://www.techamericafoundation.org/cloud-commission>
- TOSCA : Topology and Orchestration Specification for Cloud Applications (TOSCA) TC [https://www.oasis-open.org/committees/tc\\_home.php?wg\\_abbrev=tosca](https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=tosca)



Thank You

Questions?

Christopher L Poelker 516-456-3935

## Contact us

Corporate Headquarters  
2 Huntington Quadrangle  
Melville, NY 11747  
USA

Tel: +1 631.777.5188

Support: +1 631.777.3332  
[salesinfo@falconstor.com](mailto:salesinfo@falconstor.com)

## Asia Pacific Headquarters

20 Science Park Road  
#02-04A/5, Teletech Park  
Singapore Science Park 2  
Singapore, 117674

Tel: +65-6361-2450

[salesasia@falconstor.com](mailto:salesasia@falconstor.com)

## European Headquarters

58 rue Pottier  
78150 Le Chesnay  
France

Tel: +33.1.3923.9550

[salesemea@falconstor.com](mailto:salesemea@falconstor.com)