

Why Use Multiple Clouds?

Live Webcast

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Today's Presenters



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Agenda

- Risk Reduction
 - Avoid lock-in
 - Avoid single points of failure
 - Political, regulatory and compliance restrictions
- Cost Reduction
 - Operational cost reduction
 - Exit cost reduction
 - Running work in parallel across clouds
 - Hybrid cloud / Burst to cloud enablement
- Access to Features/Performance
 - Access to cloud-specific features
 - Latency reduction
 - Throughput increase (parallelism)
 - Egress cost reduction
- Multi-cloud challenges
- Examples





Justifications & Benefits of Multiple Clouds

Mark Carlson

Avoid Lock-In

- Applications built on technology from a single cloud are tightly coupled to that one cloud provider
- Moving to another cloud requires development work
 - Potentially expensive
 - Takes a long time to complete
- Missing technology may need to be re-implemented or removed before moving to another cloud



Storage Abstraction Layer

- Insulates the application from the underlying cloud provider's interfaces
- Allows an application to store and access data across multiple clouds
 - Placement of data can be transparently changed without having to modify the application
- Reduces or eliminates the cost to exit any given cloud
- Ensures that applications are not tightly coupled to cloud-specific technologies

Avoid Single Points of Failure

- Applications built on a single cloud are dependent on the reliability and availability of that cloud
- Spanning more than one cloud increases reliability, availability and performance
- Enables greater control over the cost vs. reliability, availability, and performance tradeoffs



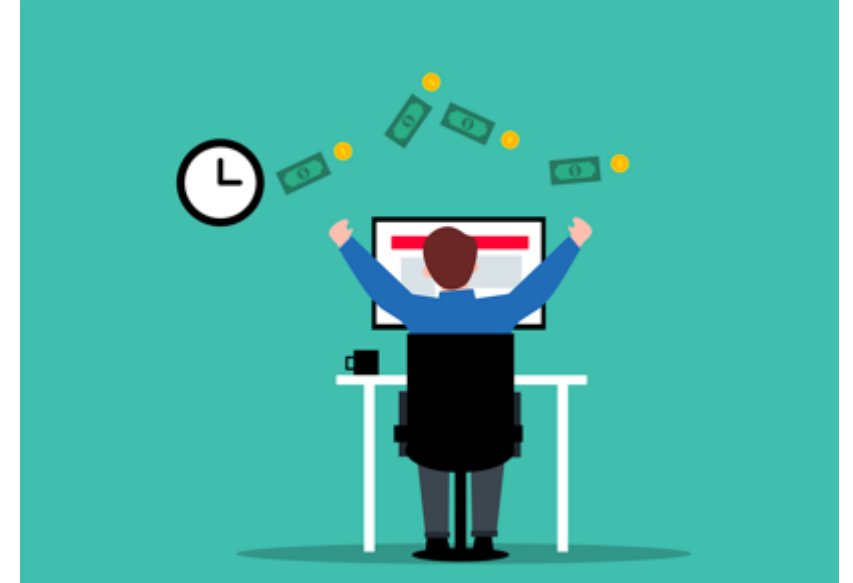
Political, Regulatory and Compliance Restrictions

- Regulatory, compliance and political constraints change over time
- Storage abstraction layer allows data to be evacuated or moved from cloud to cloud transparently
- Example: Data governed by different regulations can be placed in different clouds that are compliant with those regulations
- When cloud storage is not acceptable can be stored on-premises



Operational Cost Reduction

- Opportunity to take advantage of lower cost service offerings on a different cloud
- Minimizes paying for SLO levels that are not required
- Data can be transparently moved from cloud service to cloud service
 - When egress costs are less than the potential savings



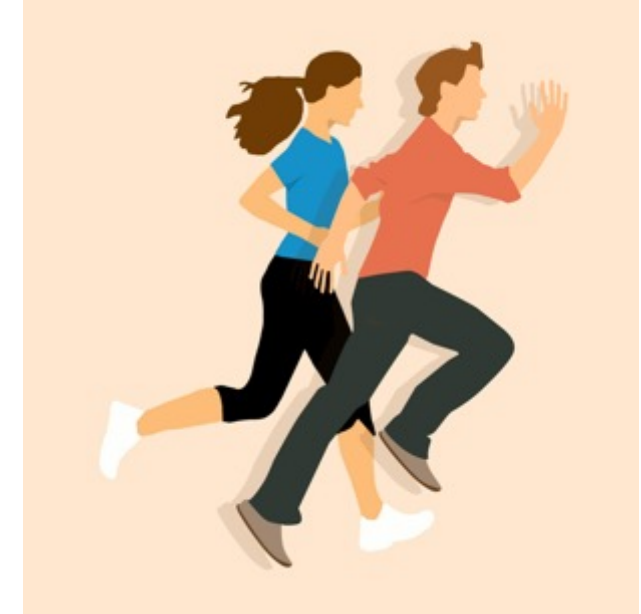
Exit Cost Reduction

- Applications that are built on a single cloud are unable to stop using that cloud
- Supporting multiple clouds, an application can choose:
 - Migrate services to an alternate cloud
 - Stop using services on a given cloud without disrupting application operation
- Container orchestration solutions, such as Kubernetes, enable workload packaging and mobility between clouds
 - And Multicloud storage makes it easier



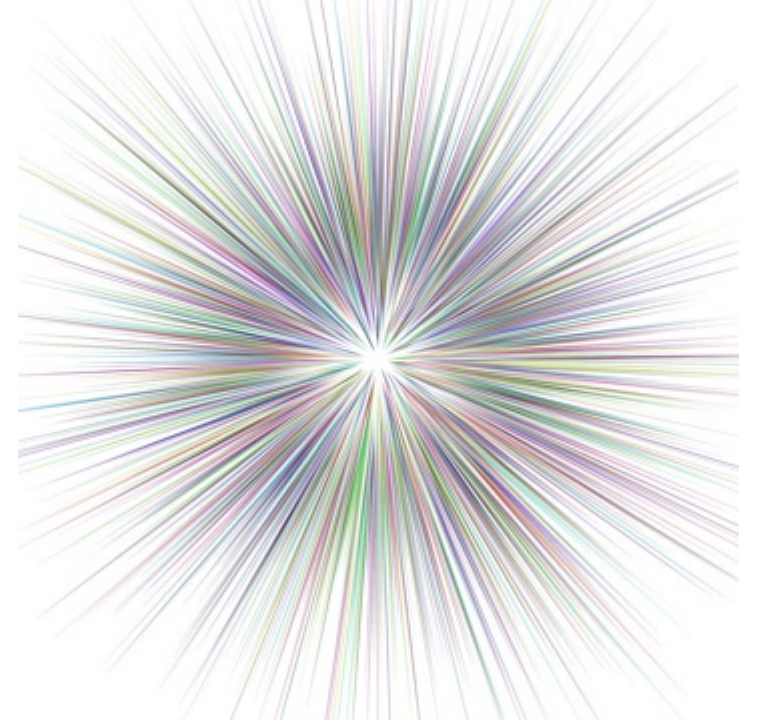
Running Work in Parallel across Clouds

- Applications built on a single cloud must process data in the cloud where the data is stored
- Multiple clouds take advantage of:
 - Lower computing costs
 - Available computing resources, including running processing in multiple clouds in parallel
- Approach does not work well for large datasets where the cloud-resident application must access the full dataset
- Storage abstraction layer allows collections of data to be stored together on the same cloud
- Computing performed on that cloud can be performed against locally stored data
- Provides transparent access to remotely stored data for computing in any given cloud
- Enables transparent migration of data when computing moves from cloud to cloud



Hybrid Cloud / Burst to Cloud Enablement

- Supporting a storage abstraction layer allows:
 - Uniformed data access on-premises and in the cloud
 - May ease burst to cloud when on-premises capacity is exhausted
 - Remote batch execution using cloud resources



Access to Cloud-Specific Features

- Features that are present only on a given cloud can still be taken advantage of without having to use that cloud exclusively
- Allows storage features specific to a cloud to be:
 - Exposed in a standardized manner
 - Allows data to be transparently accessed and migrated
 - Removes the application being aware of the underlying mechanics



Latency Reduction

- When storing the same file in multiple clouds, a simultaneous request can be made for the file from each of those clouds
- The first response can be used to satisfy the request
- Other requests can be aborted to save egress charges
- Can be hidden behind a proxy CDMI™ (Cloud Data Management Interface) server so applications need not do anything different

Throughput Increase (Parallelism)

- Storage objects on-prem are accessible to multiple clouds
- Hard-limits can be exceeded and increase the aggregate total throughput
- Storage objects can be sharded and erasure coded
- Parallel requests to each cloud return the shards
 - Sufficient number of shards are returned, the object can be reconstituted
 - Workaround for individual cloud provider's bandwidth limits
- Sharding also increases the security since no one cloud has all the data



Egress Cost Reduction

- Cloud providers have varying charges for egress
- Some may not charge at all for egress
- Using multiple clouds to store the data, the cloud with the lowest egress charges can be used to fetch the object

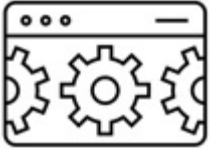




Multi-cloud Challenges and Usage Examples

Gregory Touretsky

Multi-cloud Challenges



- Manageability

- API
- Functionality



- Costs

- Track and control across clouds
- Egress



- Security

- Reliable, error-prune cross-cloud security model
- Multicloud audits



- Talent

- And keeping up with the changes



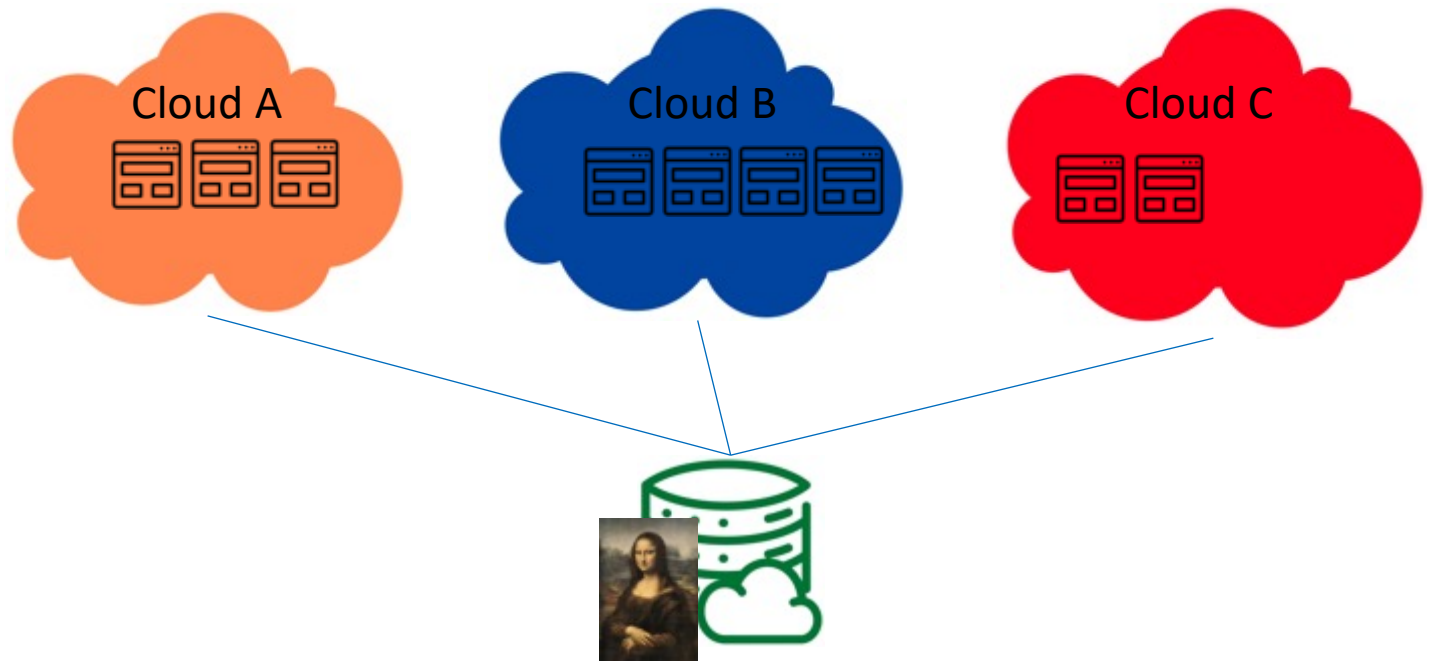
- Interoperability

- 3rd party apps
- Managed services

These challenges must be analyzed when planning a multicloud architecture

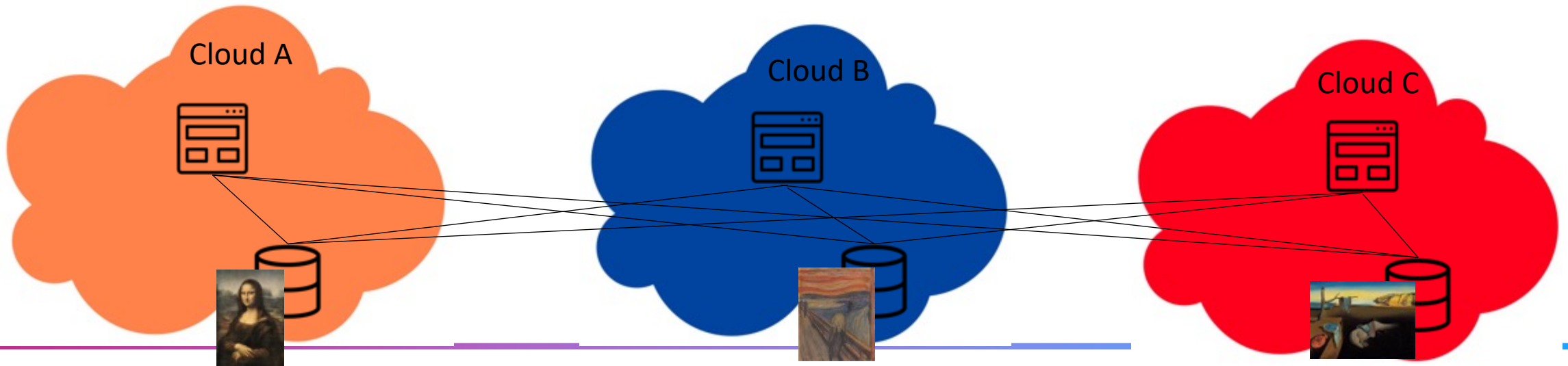
Example 1: Shared Multi-cloud Storage

- Use case: rendering at the lowest cost
- Solution: leverage lowest cost “spot” instances in any of the clouds
 - Access data on a shared storage from multiple clouds
 - Mostly-read access
 - All objects are in the same storage cloud



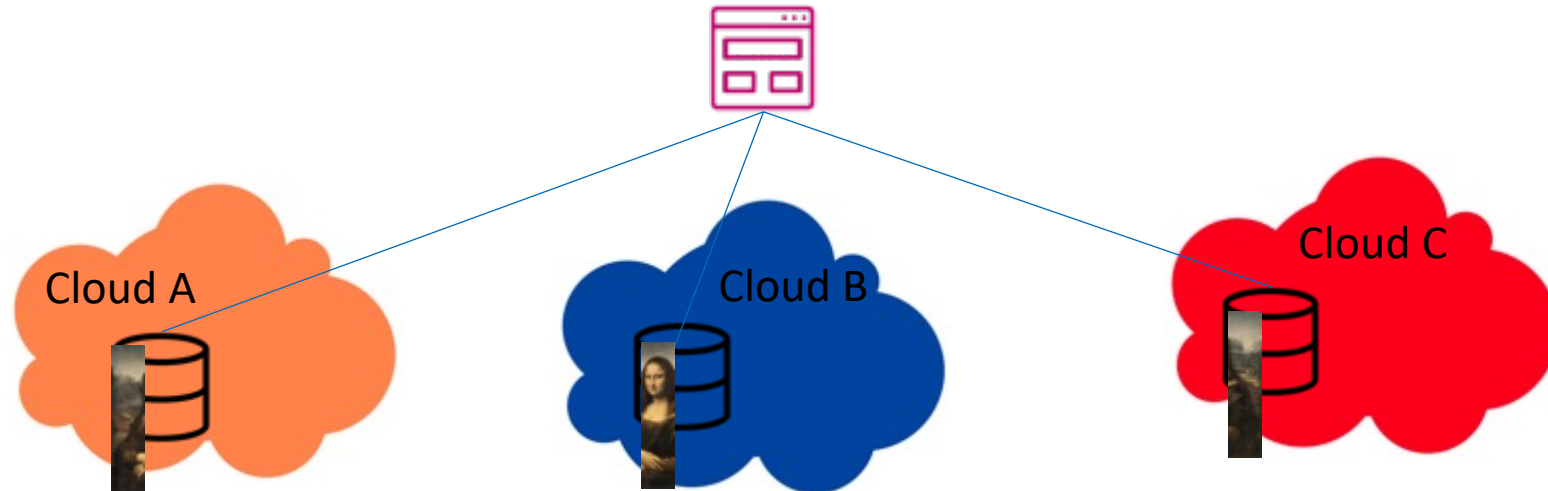
Example 2: Distributed Multi-cloud Storage

- Use case: scientific research using data sources from multiple clouds
- Solution:
 - Build an abstraction level for cloud-agnostic data access
 - Implement global authentication mechanism
 - Read anywhere, write (preferably) in the same cloud
 - Every object is stored within a specific cloud



Example 3: Dispersed Multi-cloud Storage

- Use case: secure archive storage
- Solution:
 - Build an abstraction level for cloud-agnostic data access
 - Stripe data across multiple clouds
 - No single cloud stores all parts of an object
 - An application must read from multiple clouds to gain access to the entire object



Summary and Q&A

- Multi-cloud infrastructure is a reality for many companies
 - Hybrid cloud = multi-cloud
- Multi-cloud strategy is important to address potential challenges
- Multi-cloud adoption can be simplified with a common abstraction layer
 - Especially for storage

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SNIA Quick Poll Questions

- What Storage Cloud(s) do you use today?
- What platform or solution do you use to abstract multiple clouds?
 - Take the quick anonymous survey at <https://www.surveymonkey.com/r/SNIACloud>



Thank You