

PASIG – Four-Tier Computing: Linking On-Premise and Cloud Infrastructures

Infrastructure to Support Preservation at Scale

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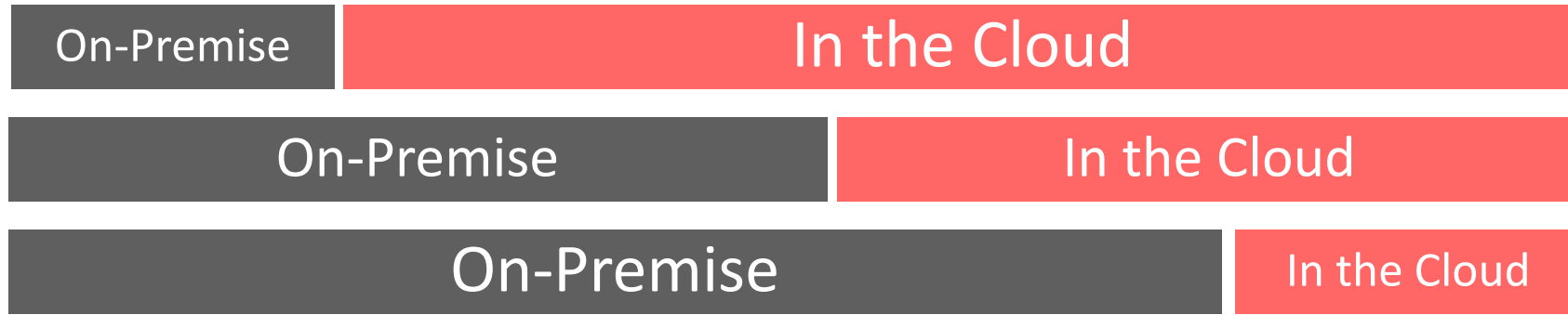
On-Premise

In the Cloud

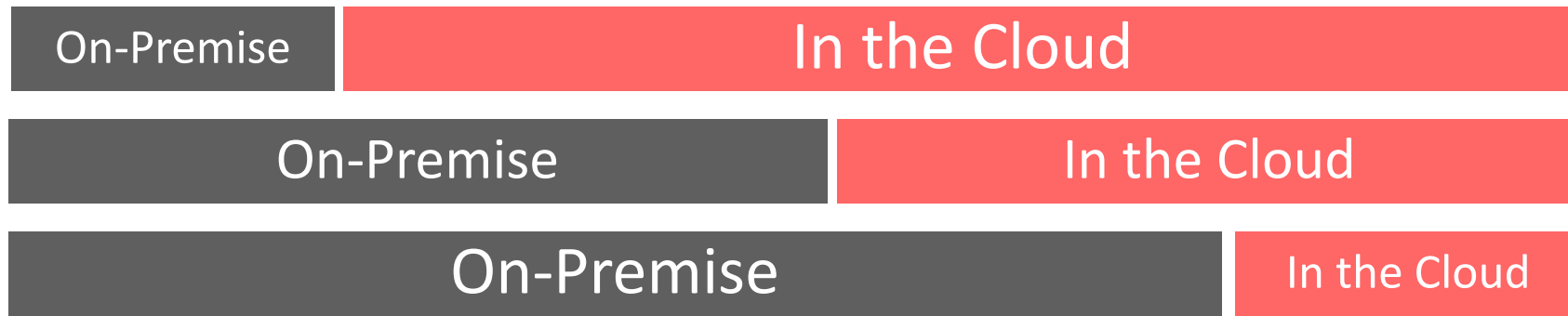
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Archive/LTP + Cloud → Tape + LTFS

Cloud Concerns

Take Care When Choosing What Data You Keep in the Cloud

Performance

Network bottlenecks can effectively stop restores/retrievals



Carefully size network requirements for all use cases & consider tape as transport

Security

Data is on-line and at risk for attacks



Ensure strong encryption as soon as data leaves premises

Cost

Monthly fees become an annuity

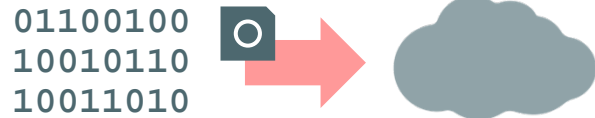


Understand all the cost aspects in various volume and access scenarios

Roles of Tape in the Cloud

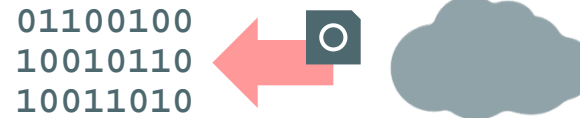
Cloud Seeding

- Get large volumes of data to the cloud



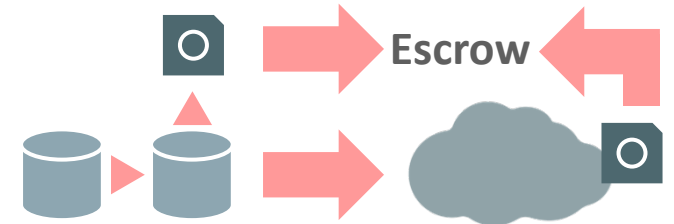
Cloud Recovery

- Get large volume of data from the cloud



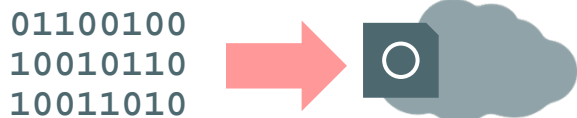
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- Additional cold storage tier



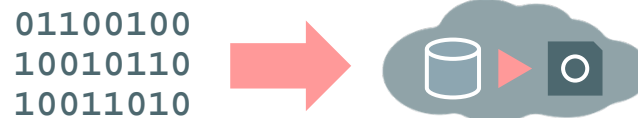
Cloud-based Tape

- Tape Web interface for direct cold storage service



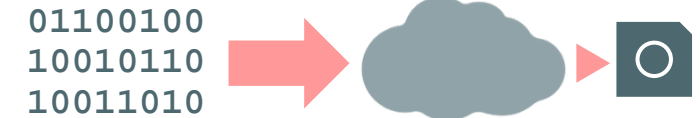
Cloud Tiering

- Tape as an internal low cost tier of storage



Cloud BR/DR

- XaaS Cloud Data Protection and Disaster Recovery



Tape-based versus Network-based Data Transport*

Tape-based data transport is preferred over network-based data transport when:

Limited Network Connectivity	Bandwidth to the cloud is insufficient to transport large volumes of data in a timely manner
Unreliable Network Connectivity	Network connectivity is not always available or is not reliable enough for transporting large volumes of data
Reserved Network Connectivity	Bandwidth is reserved for critical uses, and as a consequence, available bandwidth is insufficient for transporting large volumes of data
High Network Costs	Bulk data transfer is prohibitively expensive
High Data Volume	Volume of data being produced makes even the fastest network transfer take too long (e.g. 1 PB generated each day would require a 100Gbit link to keep up)
Tape as Final Destination	Final storage location of data is tape

* From SNIA CDMI

Why Tape?

Modern Tape is Ideal for Cold Storage

Power	Floor Space	Areal Density	Reliability	Life Cycle	Compression
Study* concludes that disk consumes ~230x more energy than tape	Tape is far more dense than disk based solutions	We expect a 35% per year areal density increase through 2020 for tape while HDD is expected to grow 20% annually	The uncorrected bit error rate of tape is 10,000 times more reliable than disk	Tape technology has a longer lifecycle than disk technology making it ideal for long-term retention.	Data can be compressed via tape drive hardware without impacting performance

Modern Tape Provides Lowest Cost Cold Storage: 1/14th the TCO of a disk based solution that uses industry standard components and desktop drives

*The Clipper Group: "In Search of the Long-Term Archiving Solution – Tape Delivers Significant TCO Advantage over Disk"