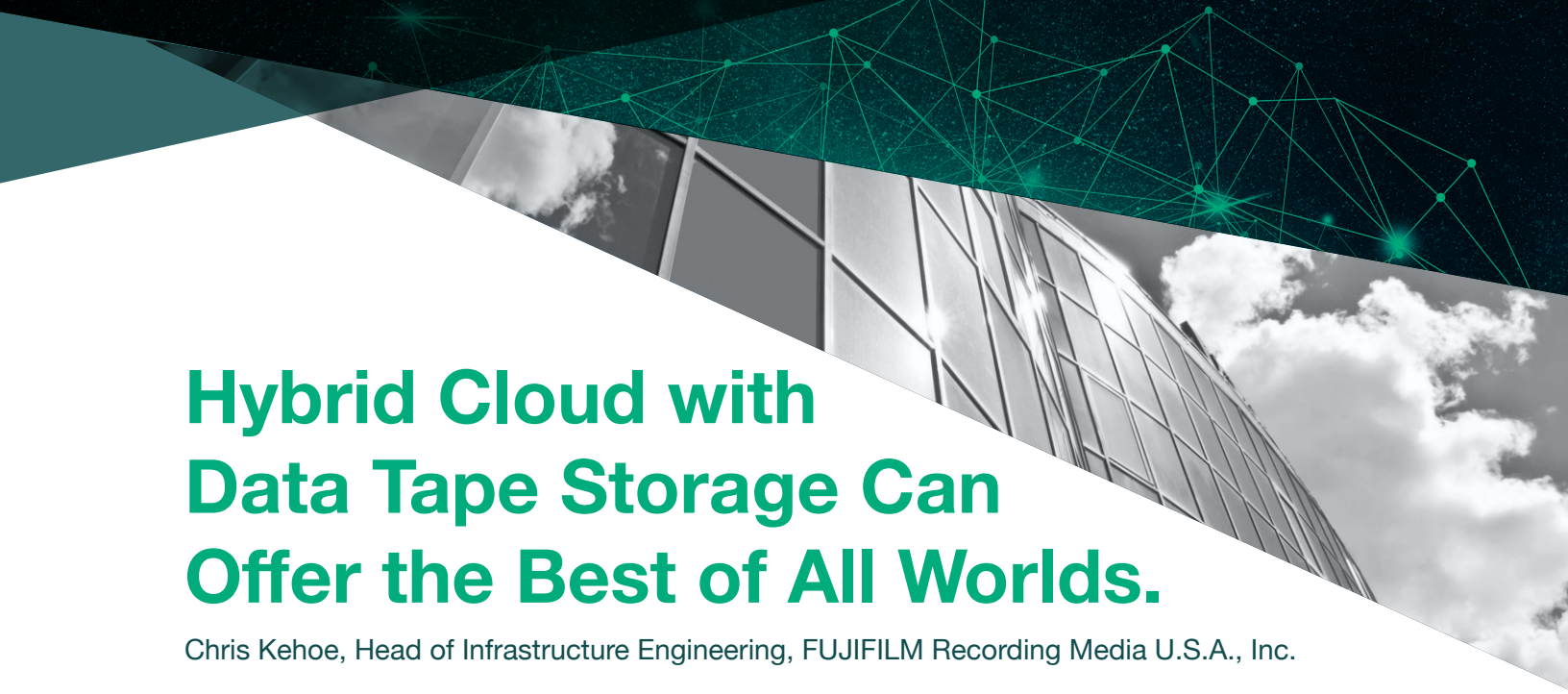

Hybrid Cloud with Data Tape Storage Can Offer the Best of All Worlds.

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Cloud technologies have changed the way we work with data. Ten years ago, most data was sitting on filesystems managed through network shares. Today, object-based data management has eclipsed the capacity of filesystems, enabling greater scale and simpler administration. The tape industry has taken advantage of these technologies by creating products that interface seamlessly with the cloud using industry standard APIs for the movement and management of data to and from tape. Today's data tape has entered the cloud ecosystem, allowing native cloud applications to be able to write to and read from tape without the need for specialized or proprietary skillsets or software. It is precisely the intersection of cloud technology and tape technology that enables a scalable, affordable and secure data strategy.

Managing a long term archive of your digital assets is quite an imposing task. Your organization has legal responsibility and obligations for its data. Data breaches, exposures or loss can carry significant fines and other costs. When the technology or service fails, the responsibility and financial burden is on you. This challenge keeps CIOs and data protection officers awake many nights. With data scattered across multi and hybrid cloud deployments with compliance and legal challenges, the decisions are many and the guidelines are few. I'd like to share a few principles with you to bring clarity to the challenge of data archival and security in the world of hybrid cloud computing.

Cost, scale and security are the main factors shaping 99% of all archive technology.

Cost - Many organizations find it difficult to justify the cost of keeping data that has an unknown value. With the exploding volume of data being generated, we know less about the data that is being generated today than we did last year, and even less compared to data generated years ago. With clearly monetizable digital assets, there's a real value that easily justifies the cost of an archive strategy. But when value is *not* known, how do you justify the costs of building an archive?

Scale – The archive must be able to scale. With data growth seeing an average 30% annual growth rate, one PB today becomes 13 PB in 10 years. That's a big challenge for today's relatively flat IT budgets. LTO Generation 8 tape cartridges (LTO8), with native

capacity of 12TB (30TB compressed) offer flexible capacity and scalability with a relatively small footprint. Coupling tape with cloud connectivity technology enables both the ability to scale and access data in the archive.

Security– The Computer Security Division of (U.S.) National Institute of Standards & Technology (NIST) provides technology guidance for the Federal Information Security Management Act (FISMA) including managing risk with appropriate technologies. Excerpt below taken from Page 42 *of NIST Special Publication 800-39:*

> "Risk avoidance may be the appropriate risk response when the identified risk exceeds the organizational risk tolerance. . . Thus, the organizations decide to avoid the risk by eliminating the electronic or networked connections and employing an "air gap" with a manual connection processes (e.g., data transfers by secondary storage devices)".

The specific mention of "air gap" (zero networked connections to stored data) as a method of risk avoidance is a key feature offered by design in digital tape. Removable media like tape allows data to be physically and logically removed from any electronic connections, thus avoiding inherent risks associated with online data. Furthermore, moving a tape archive offline and into a vault is one of the *least expensive* solutions to protecting data over its lifecycle.

Digital tape technology is the only modern means to provide air gap today. It can be architected seamlessly and affordably to multi-exabyte scale. And modern tape provides extreme stability of data for over 30 years, the longest interval between migrations. In 2019, the cybersecurity experts at IBM stated that $6 trillion USD will be spent on cybersecurity over the next two years. This includes protecting and recovering data, and paying for the damage done by exposure and attacks.

How does all of this technology apply to the use of hybrid cloud approaches? First off, each technology that exists today has a purpose. Flash, disk, tape, and cloud co-exist, and each offers unique merits. The strategy of an on-prem, tape-based archive coupled with a remote/cloud system delivers against the cost, scale and security concerns better than other combinations. Sticking to some industry standard best practices for data archive, the hybrid cloud approach fits well. Simply put, an archive should have 3 total copies, and 2 different technologies with 1 in a different geographic location or in the cloud. The cloud in this approach allows for a different technology and a separate geographic location. It provides a service-based delivery model without the capital investment.

Newly-created software interfaces allow tape solutions to "speak the same language" as the cloud, and let you use the same applications to write data to tape. Maintaining a local copy of data on-prem provides a much better access time to retrieve data than when stored and read from cloud archive service (like AWS Glacier). The on-prem tape copy will retrieve data in minutes and minimize the significant fees associated with recall and egress of data from the cloud. Archive tape technologies can make duplicate copies of data and provide automatic media migrations to newer generations of media.

By strategically moving modern tape technology into the cloud ecosystem your organization can achieve unmatched scale, cost, and security for your long-term data storage needs.

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