



36 Years of Success – since '79

Privately Held

Boulder, Colorado USA HQ

Bracknell, UK

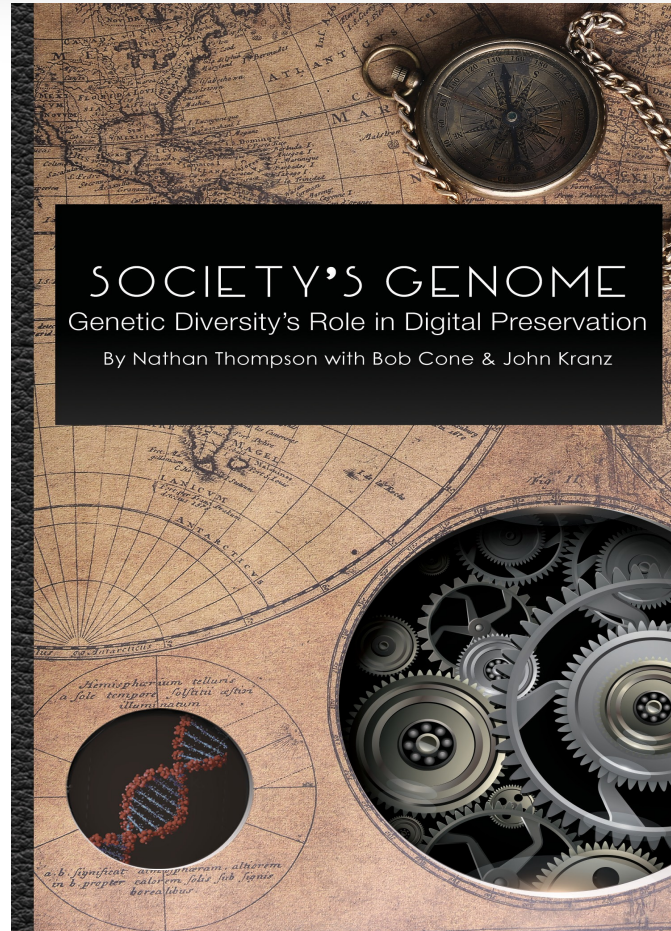
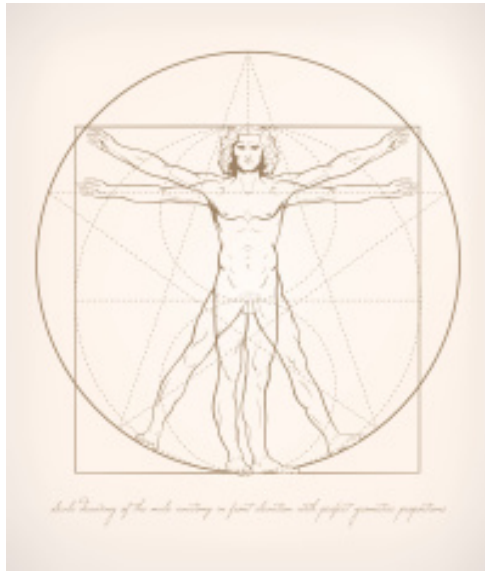
Melbourne, Australia

Over 450 Employees in 11 Countries

Managing *Exabytes* of Content Globally



DEEP STORAGE EXPERTS



Society's Genome



- Organizations are like Organisms—they must preserve their DNA—which is their most important asset
- There's no permanent storage medium available at this point
- Digital Preservation, Maintaining and moving this information forward, may be our most important mission



***Genetic Diversity serves as a way for
populations to adapt to changing
environments***

DEEP STORAGE EXPERTS

The Digital Universe: Risks and Threats

- New Forms of Cyber Attack

Malware infecting hard disk firmware
The New Normal in App Attack: Saudi Arabia
- Remained hidden for the years ages of compute
- Ransomware
- Shift from cyber spying to destruction of operation



Electromagnetic Pulse (EMP)

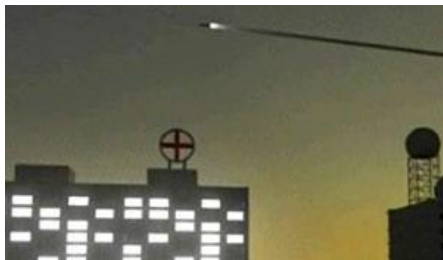


IT infrastructure can be destroyed by short, sharp pulses high in voltage but low in energy

Intentional Electromagnetic Interference (IEMI)

“With the proliferation of cloud computing, more data is being placed in fewer baskets, and that reliance on failover sites has reduced physical security”

- George Baker, CEO of BAYCOR , Data Center World Conference, 2014



Nation-State



\$2,000



\$250

Archival Storage Technologies for Genetic Diversity



Technology	Flash SSD*	Archive SMR SATA HDD	Transactional SAS HDD	IBM LTO7 Digital Tape	IBM TS1150 Digital Tape	Cloud
Capacity	400 GB	8TB (Raw)	8TB (Raw)	6TB (Native)	10TB (Native)	Unlimited
Transfer rate	550MB/sec	150MB/sec	160MB/sec	320MB/Sec	366MB/Sec	???
Bit error rate**	1×10^{-17}	1×10^{-14}	1×10^{-15}	1×10^{-19}	1×10^{-20}	???

* Stats vary for SSD based on model

**Bit error rate – unrecoverable data error



DEEP STORAGE EXPERTS

Traditional Functions of Storage Cloud

- Using the Cloud to improve process
 - Transcoding
 - Distribution / Convenience Copy
- Using the Cloud for long-term storage
 - Diversity of Geography
 - Disaster Recovery

Private Cloud vs. Public Cloud

How long will it take to payoff the CapEx if the same amount of data were kept in Amazon's Glacier?

Private Cloud Solution

1 year CapEx costs per GB:

- 10 PB \$0.099
- 2.4 PB \$0.163
- 300 TB \$0.307

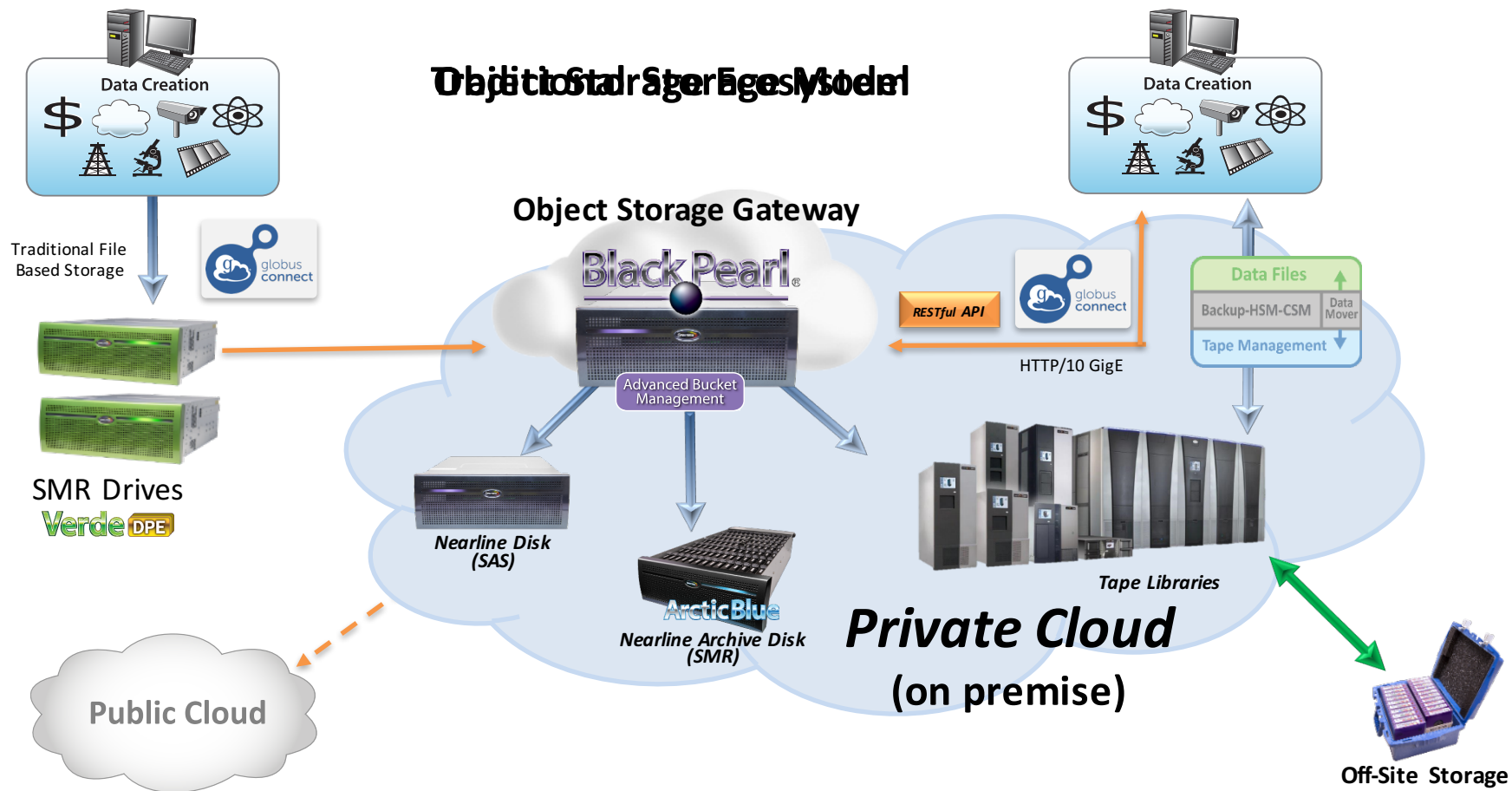


Amazon Glacier Storage

Private system paid for after:

- 10 months
- 1.5 years
- 2.5 years

Achieving a Diversified Storage Platform





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environments***

DEEP STORAGE EXPERTS

The logo for SPECTRA, featuring the word "SPECTRA" in a bold, black, sans-serif font. To the right of the text is a stylized, multi-colored arc that transitions from purple to blue, green, yellow, and red, resembling a spectrum of light.

SPECTRA



Thank You!

DEEP STORAGE EXPERTS