



Sustainable long term digital preservation

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MASSIVE AMOUNT OF DATA



Problem of data

50%

Amount of
data increases
every year

88%

of organizations
have already
lost data

6 ZB

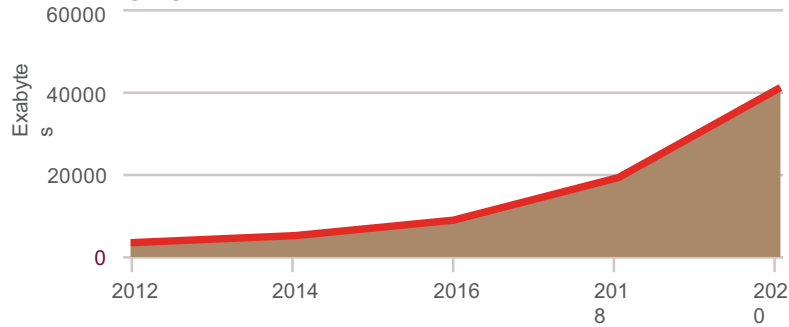
of global data needs to
be secure stored and
preserved in 2020

MASSIVE AMOUNT OF DATA



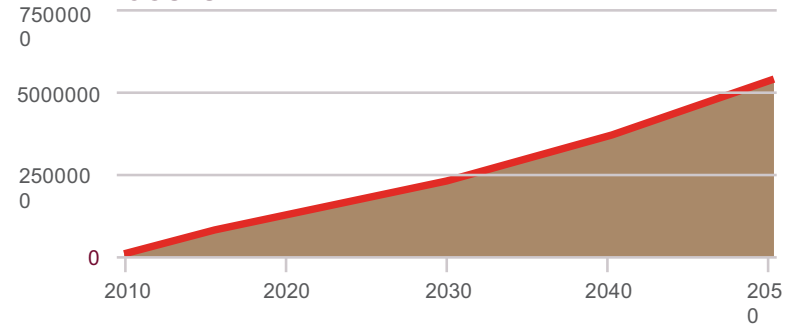
Problem of data

DIGITAL DATA GROWTH



Source: IDC, "Digital Universe Study", April 2014

MIGRATION COSTS



Source: Erik Oltmans and Nanda Kol, "A comparison between emulation and migration in terms of cost", 2005

Requirements for long term data preservation



Future-proof

Data retrieval process must be independent of technological obsolescence.



Migration-free

It must be migration-free to avoid the risk of data loss, high migration cost and secure full authenticity



Unalterable

It must be impossible to modify or delete. Offline.



Permanent

It must be scientifically tested for several hundred years longevity.



Secure

It must be protected from cyber attacks, logical threats, EMP and physical threats.



Searchable

Metadata must be searchable..



Visual representation

It should be able to store any kind of files; both digital and visual.

Trusted by the EU to solve this problem



€ 27 million





We created a digital snapshot

We have digitized the film



Photosensitive optical medium where photons are used to store binary values (we write digital bits and bytes onto film)

piqlFilm – nano-film with tested longevity of a minimum of 500 years

piqlBox – Unique container created by a new polymer material tested to last more than 500 years



Data



Binary codes



Bits-on-Film

Why piqFilm is unique?

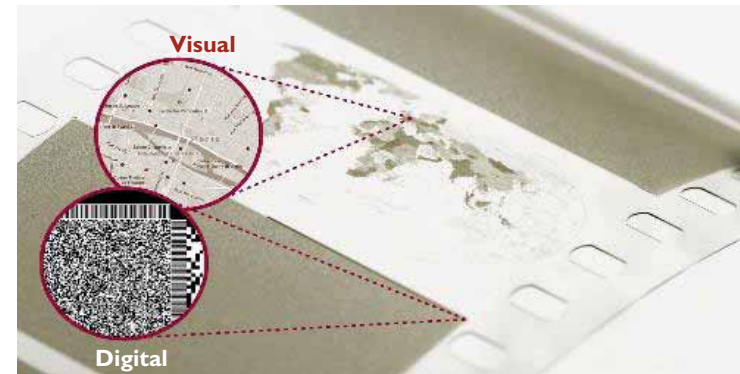


Flexible Data Storage medium: visual and digital information is stored on the same medium.

Self-contained storage medium: includes all information in a human readable format to recreate the reading technology and understand the content in the future

Robust medium:

- Open technology - Documented lifetime of 500 years
- Unalterable, secure and offline medium
- Integrates with the IT environment – data searchable



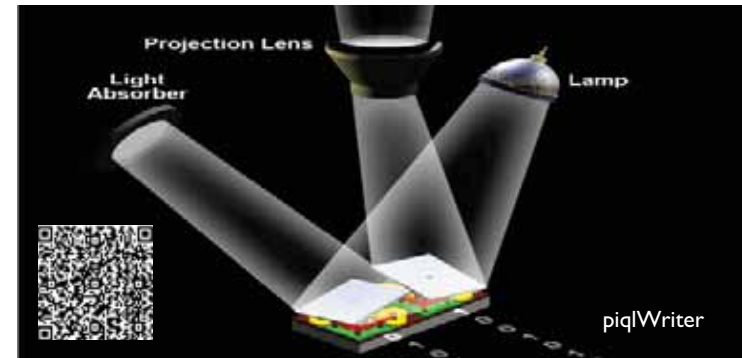
Technology “Bits on Film”

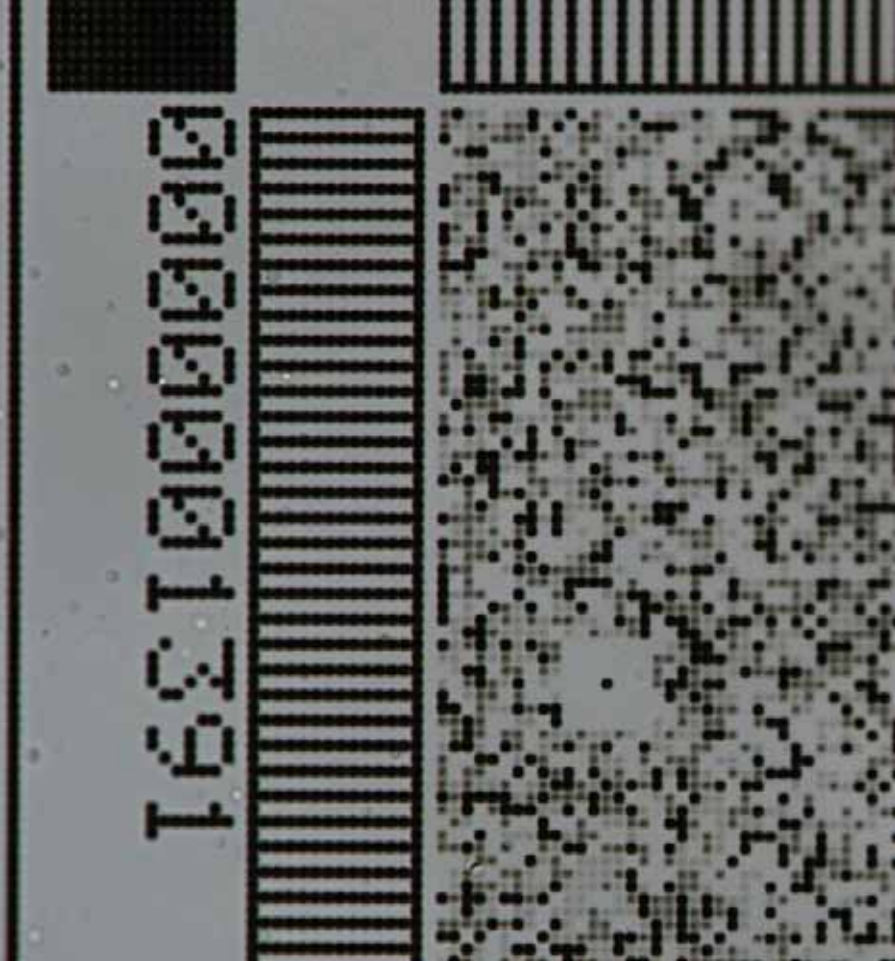


piqlWriter: data written as high-density QR codes

piqlProcessor: photographic processing of film

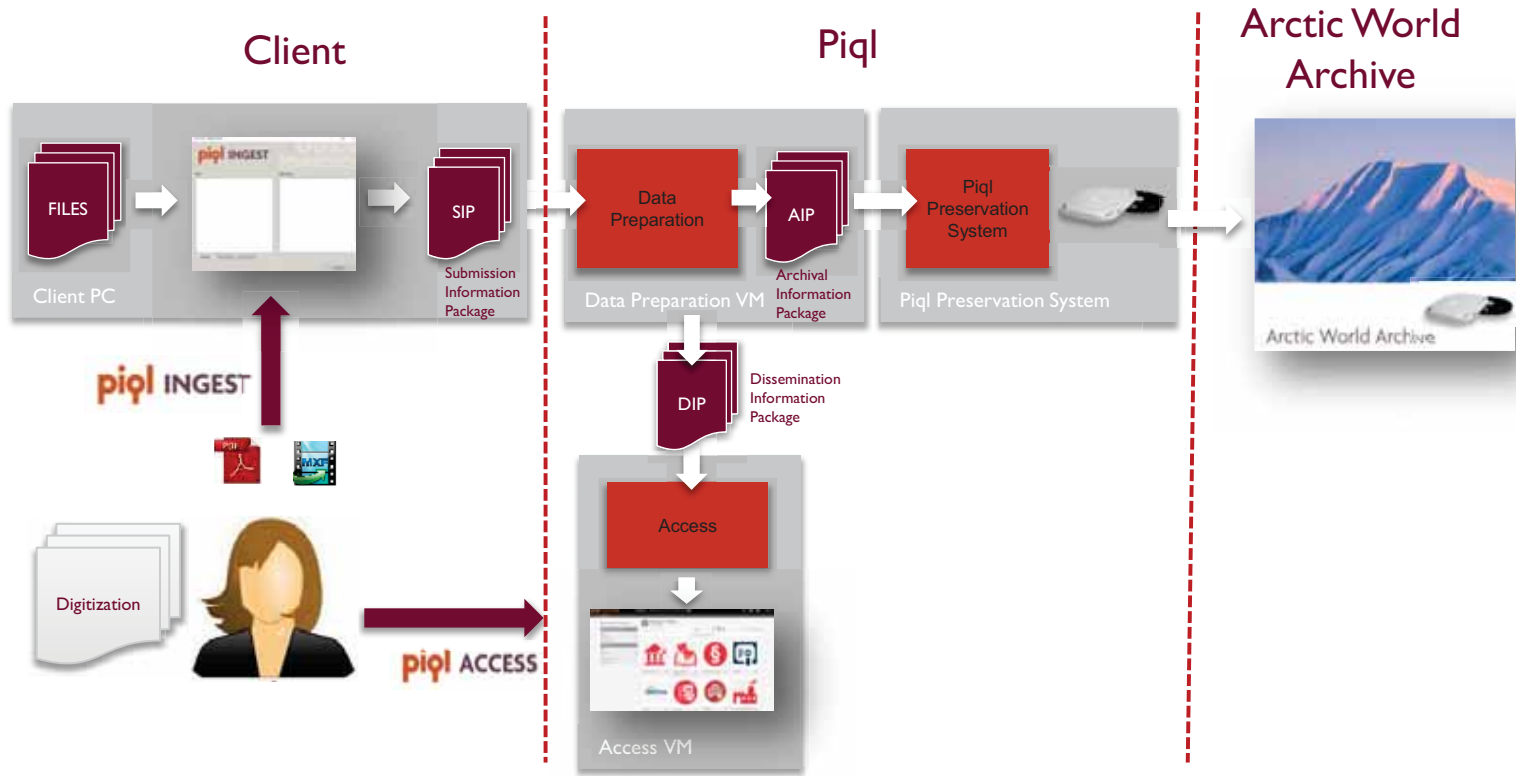
piqlReader: open platform for data verification and retrieval
Image scanning and decoding software (open source)





1651000000

OAIS-compliant Architecture



Why Piql is Technology Independent?



The reading process is independent of proprietary technology.

Only a magnifying glass, an image capturing device and a computer is needed

The film describes:

- How to build a reader and decode the digital data
- The source code of the decoding software
- The documentation and description of file formats

Data retrieval demonstration at the stand E09



Scanned film



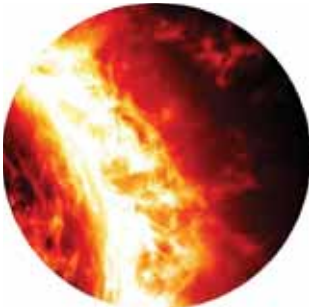
Decoding Software

Institutions



MORE INSECURE WORLD

piqi



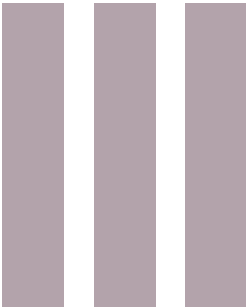
Solar flares



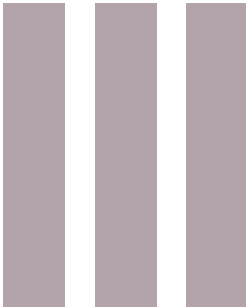
Earthquakes



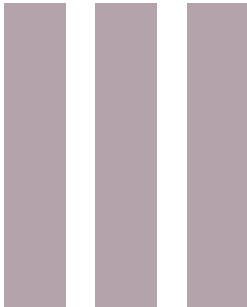
Crazy dictators



Hurricanes



Terrorism



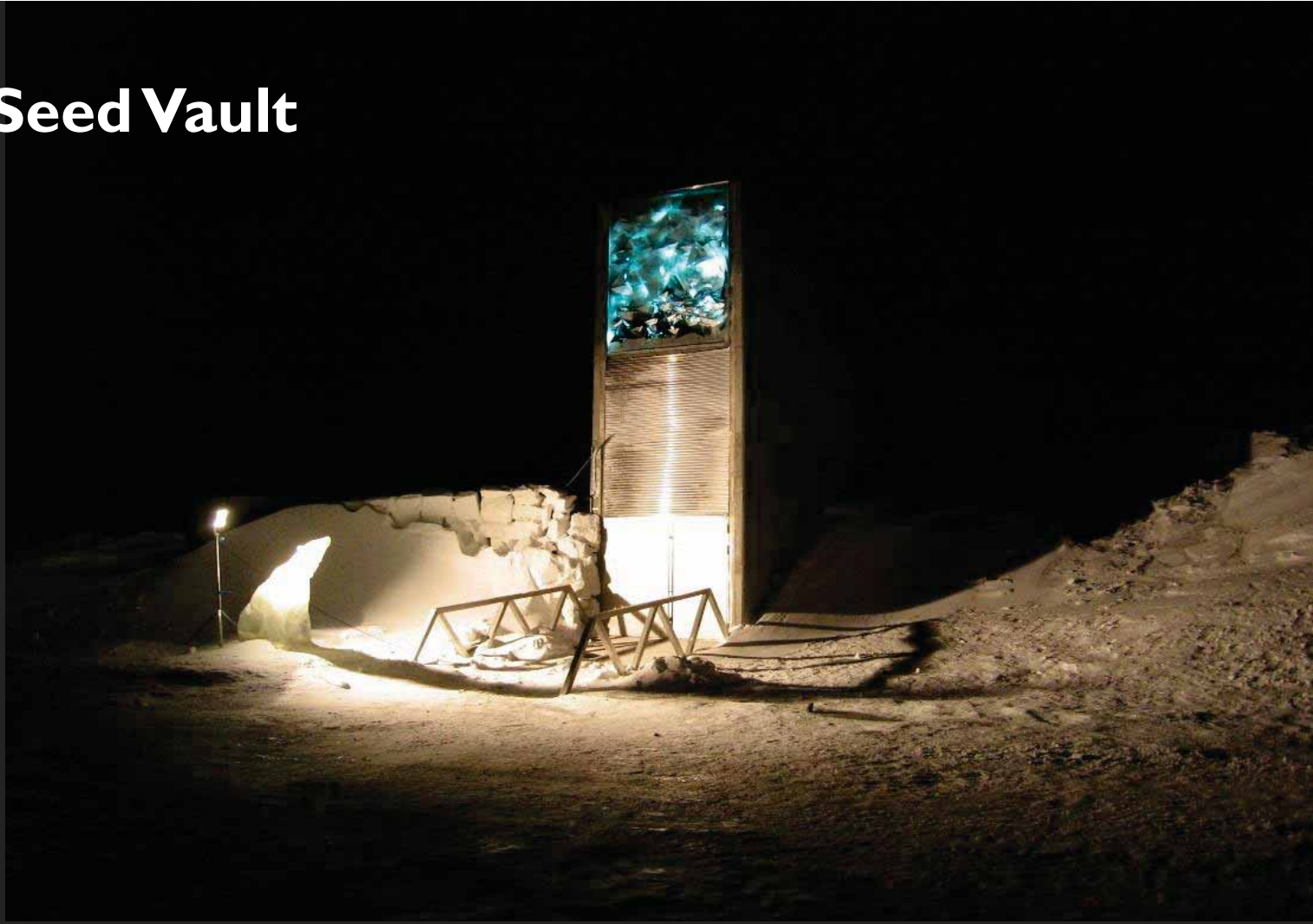
A satellite-style map of Europe and the surrounding regions, including Iceland, Greenland, and parts of North America and Africa. A red circle highlights the island of Iceland, and a red arrow points from the left towards it. The text "Safest place to protect valuable data?" is overlaid in white on the left side of the map. In the bottom right corner, the "Google earth" logo is visible. At the bottom center, there is a small copyright notice: "© 2009 GeoBasis-DE, BKG © 2015 Google Image Landsat US Dept of State Geographer".

**Safest place to
protect valuable data?**

Google earth

© 2009 GeoBasis-DE, BKG
© 2015 Google
Image Landsat
US Dept of State Geographer

Global Seed Vault



**Protected by polar bears...
and permafrost**



Arctic World Archive



Offline data vault securing the ultimate protection of irreplaceable data for future generations

National Archive of Brazil and Mexico opened the Arctic World Archive



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It's a unique and ultra-secure way for the future generations to get information from the past easily in the present





Thank you !