

# The obsolescence of Information and Information Systems

The Digital Memory project

Jean-Yves Le Meur - Information Technology - 2018



# World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval universe of documents.

Everything there is online about W3 is linked directly or indirectly to this project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked C](#)

## [What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc

## [Help](#)

on the browser you are using

## [Software Products](#)

A list of W3 project components and their current state. (e.g. [Line M robot](#) , [Library](#) )

## [Technical](#)

Details of protocols, formats, program internals etc

## [Bibliography](#)

Paper documentation on W3 and references.

## [People](#)

A list of some people involved in the project.

## [History](#)

A summary of the history of the project.

## [How can I help ?](#)

If you would like to support the web..

## [Getting code](#)

Getting the code by [anonymous FTP](#) , etc.



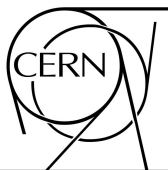
## Ce site est inaccessible

**info.cern.ch** n'autorise pas la connexion.

Essayez les suggestions ci-dessous :

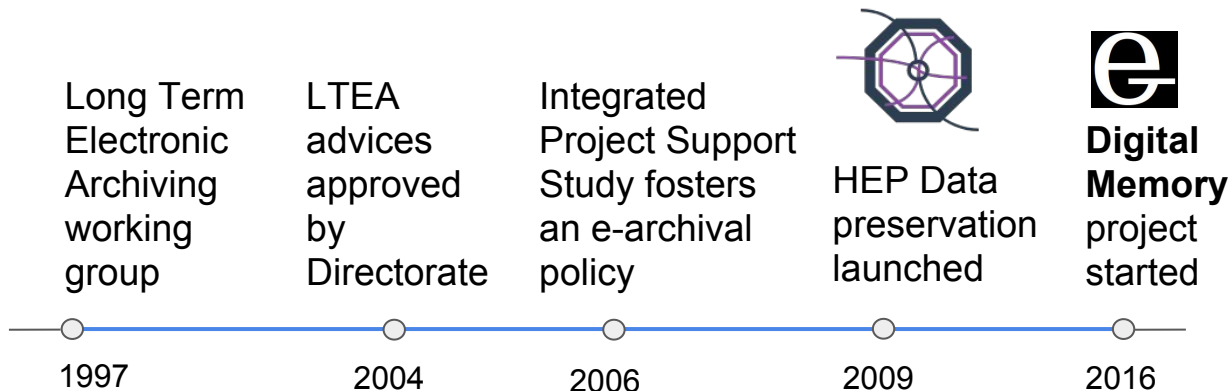
- Recharger la page
- Vérifier la connexion
- Vérifier le proxy et le pare-feu

ERR\_CONNECTION\_REFUSED



# Digital preservation at CERN: step by step

## A short history of commitments



## The urgency of safeguarding multimedia



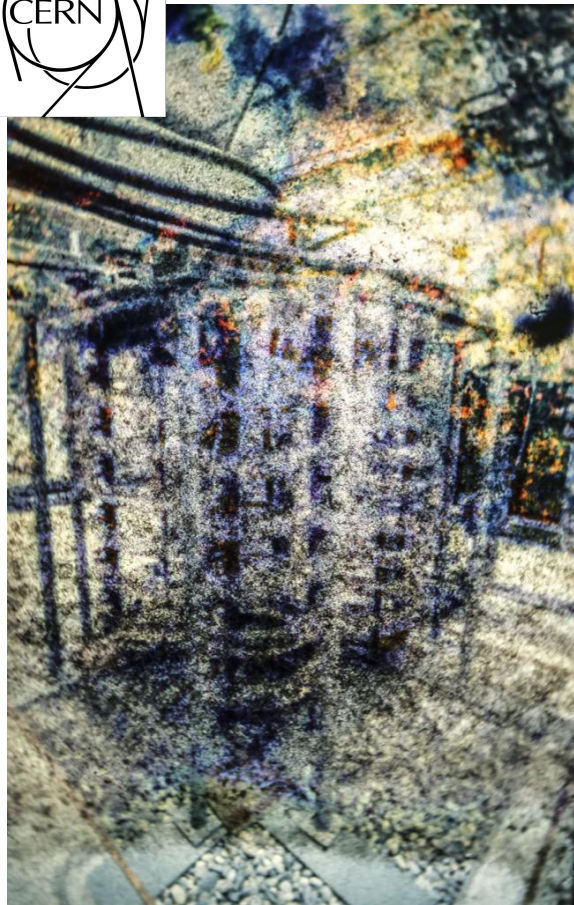
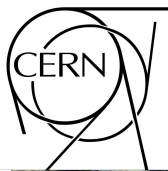
audio



video/film



photo



# Starting in troubled waters

## Inventory ?

- no numbers

## Carriers ?

- no uniformity

## Catalog ?

- no metadata

## Funding ?

## Knowledge

- no experts

## Formats ?

- no standards

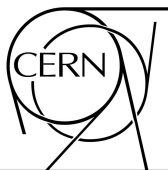


Memoriav partnership for  
**Videotapes** digitization

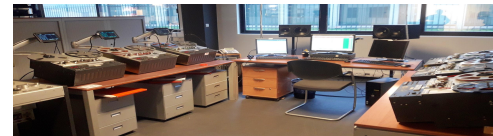
CERN Council starts to fund  
**Audio** conversion

CERN IT supports full  
**AV & Photos** scanning





# The Digitization



## Audio recordings

Speeches of **official committees** since 1956: closed access to Archive & Translation services

→ 7'500 tapes & cassettes converted to **wav** uncompressed (48kHz&16 bit) + ogg and mp3 (320 kbps) files

Speech to text ?



## Video recordings

**Footages, documentaries and seminars**; 13 different carrier types; everywhere on CERN site: unclear access rights

→ 5'700 carriers converted to **mkv/ffv1** (4K,2K or SD) & mov and mp4 files : with ~10% of “dead/damaged” supports



## Slides & Negatives

120'000 B&W photos scanned in 2014, **300'000 color pictures** captured by photoLab:organized in 13'000 albums

→ converted to **TIFF** (48 bit) and JPEG (24 bit) at 4800 ppi for 24x36mm

Human captioning ?

Quality Control



Surprise!



Surprise!



Surprise!





## APERTURE



<http://cern.ch/volmeur>

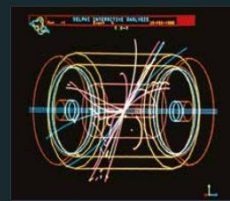
### Breaking the mould

AT THE Large Hadron Collider near Geneva, Switzerland, physicists are used to looking for signs of particle decay in the detectors. But as they were digitising archival photos of particle collisions, Matteo Volpi and Jean-Yves LeMeur came across a different kind of decay: mould.

For 30 years, this slide was exposed to a mould that marched across the image, eating through the protein in the gelatin-based emulsion. The resulting chemical reactions left a chaotic swirl of colours and textures reminiscent of an abstract painting. To save the corroded image as it is now, Volpi and LeMeur shone a light through the slide and then photographed the projection.

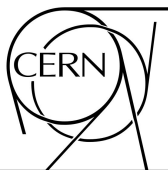
Volpi is a photographer himself, and has tried to recreate the effect. "I've tried burning and freezing, and I use yeast and beer to create mould. It makes a nice effect, but I can't reproduce these colours and textures. I don't have 30 years to wait, like this mould did."

The slide was unearthed in a dusty desk drawer in a corridor of the experimental physics department at CERN. Like its better-preserved companions slide below, it showed a simulation of an electron-positron collision at DELPHI, one of four detectors at the LHC's predecessor, the Large Electron-Positron Collider. The blue horizontal lines represent the beams of particles that meet head on in the detector's cylindrical cavity, and the spray of arcs extending from the middle track the particles born in the smash-up. Chelsea Whyte



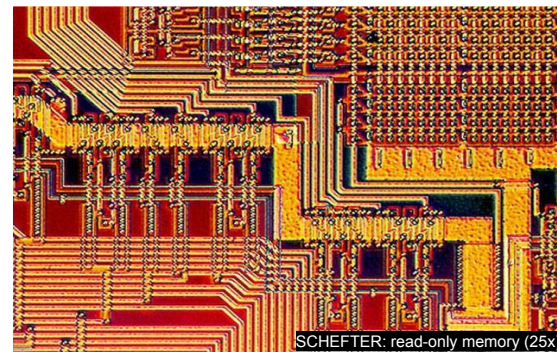
Photographer  
Volmeur © 2017 CERN

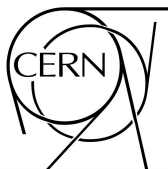




# Entering the digital preservation paradigm

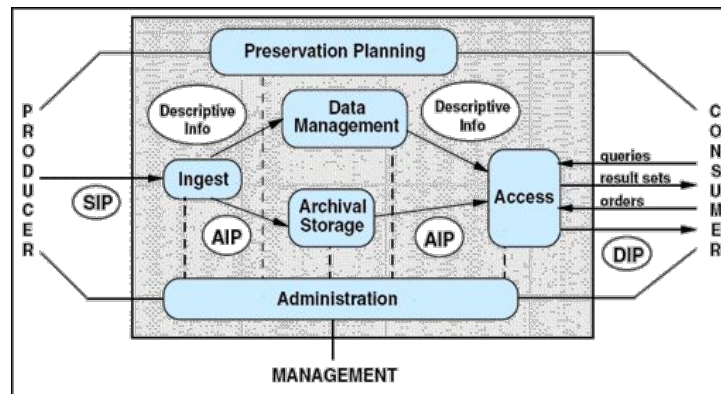
- All multimedia soon fully digitized (by mid 2019)
  - ~350'000 master & access files → up to 3'150'000 files (with all the formats, replicas and md5)
  - ~ 550 Tb : < 3% of CERN Data Cloud
  - retiring the good old tapes
- Facing the new risks
  - Physical obsolescence
    - bit rot; redundancy failure
  - Time obsolescence
    - readers, formats, OS, HW
  - Human obsolescence
    - lost in transitions; missing context; dissipation
    - economic failure; corruption by mistake or attack





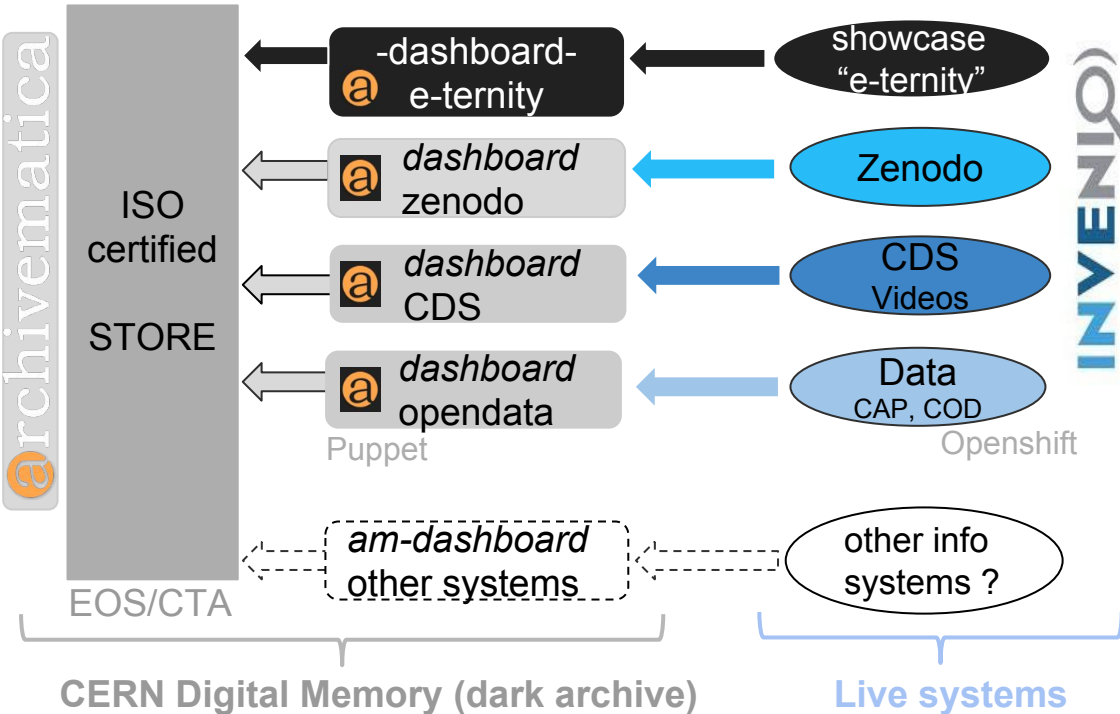
# The Open Archival Information System (OAIS)

- Strict and powerful reference model
  - Trustworthy Digital repo “ISO 16363”
- Three levels
  - Organizational
  - Infrastructure
  - Digital Object
- AIP: Archival Information Packages
  - Self-sufficient
- Supported by existing SW
  - Preservica, Rosetta, Archivematica, etc
    - Creation of AIP (METS & PREMIS schemas)
    - Conversions to master formats
    - Workflow support





# Integration of CERN Information Systems into an ISO 16363 OAIS Platform



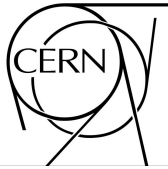
ISO 16363



- Requirement of the European Strategy for Particle Physics (2013) → DPHEP
- On-going self assessment for the 2020 ESPP Update

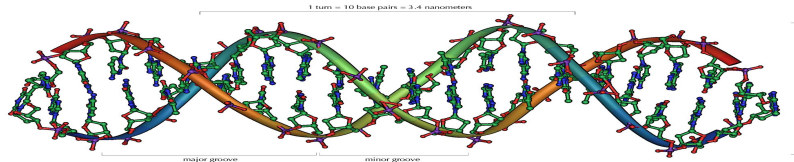
Planned Developments

- Consolidating the showcase
- Extending the platform
  - Infrastructure (Db/ES-od)
  - Invenio-AM gateway
- Plugging Invenio digital repos
- Adding other systems
  - AFS phased out content



# Concluding words

- Preserve the past
  - Digitize analog material
  - Archive it with digitally born content
  - On an ISO-certified platform on CERN cloud
  - Using Invenio & Archivematica OS SW
- Prevent “leak of memory” in the future
- Enlight the “dark archive”
  - Share Multimedia with grand public
  - Modern displays for old content
  - Wide interest in CERN historical content



## *Memory Collider: Displaying Science*

