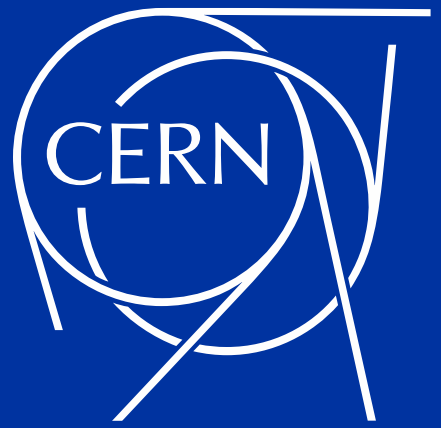


BoF:
Offsite Tape Backup Collaboration

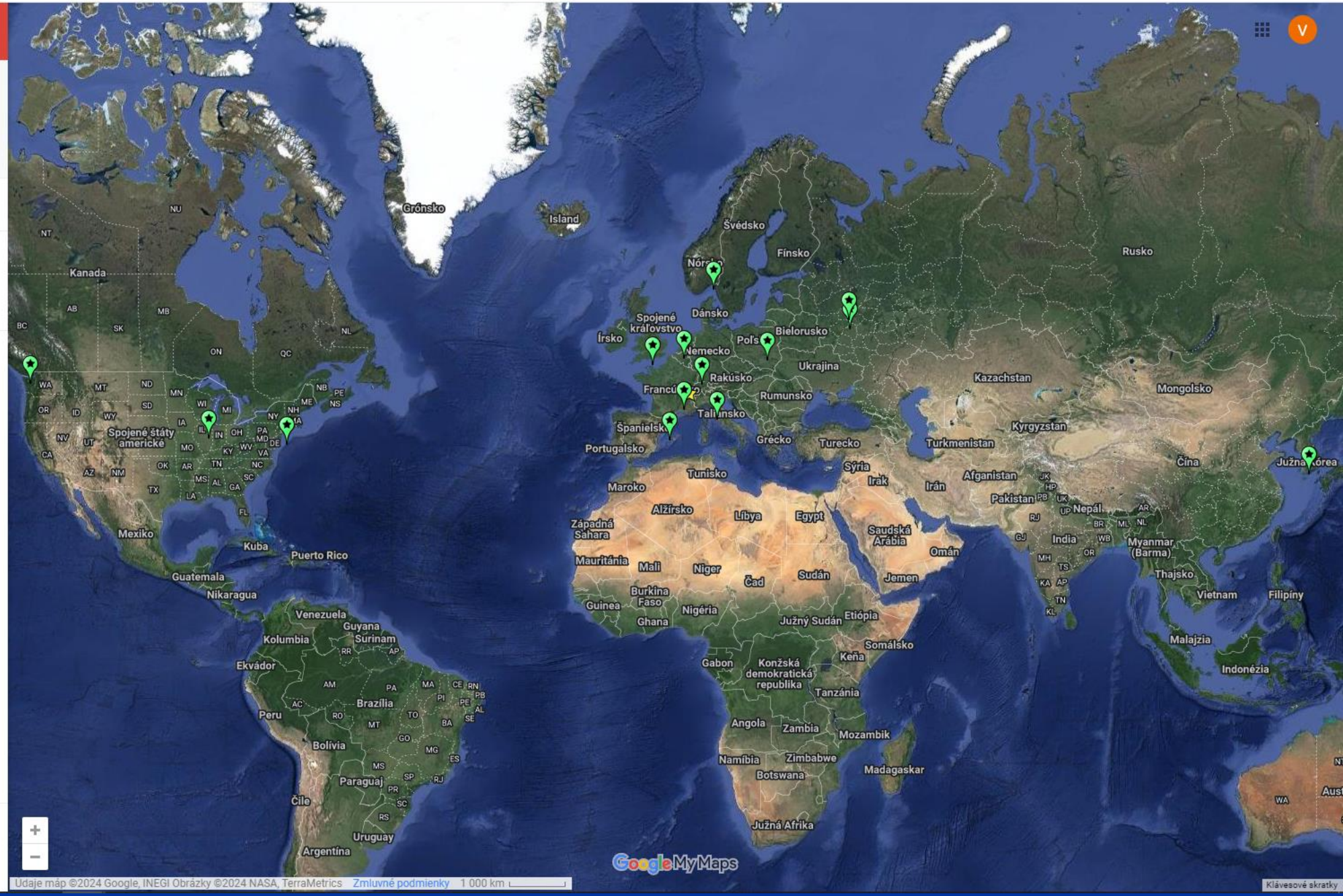
Vladimír Bahyl

March 2024

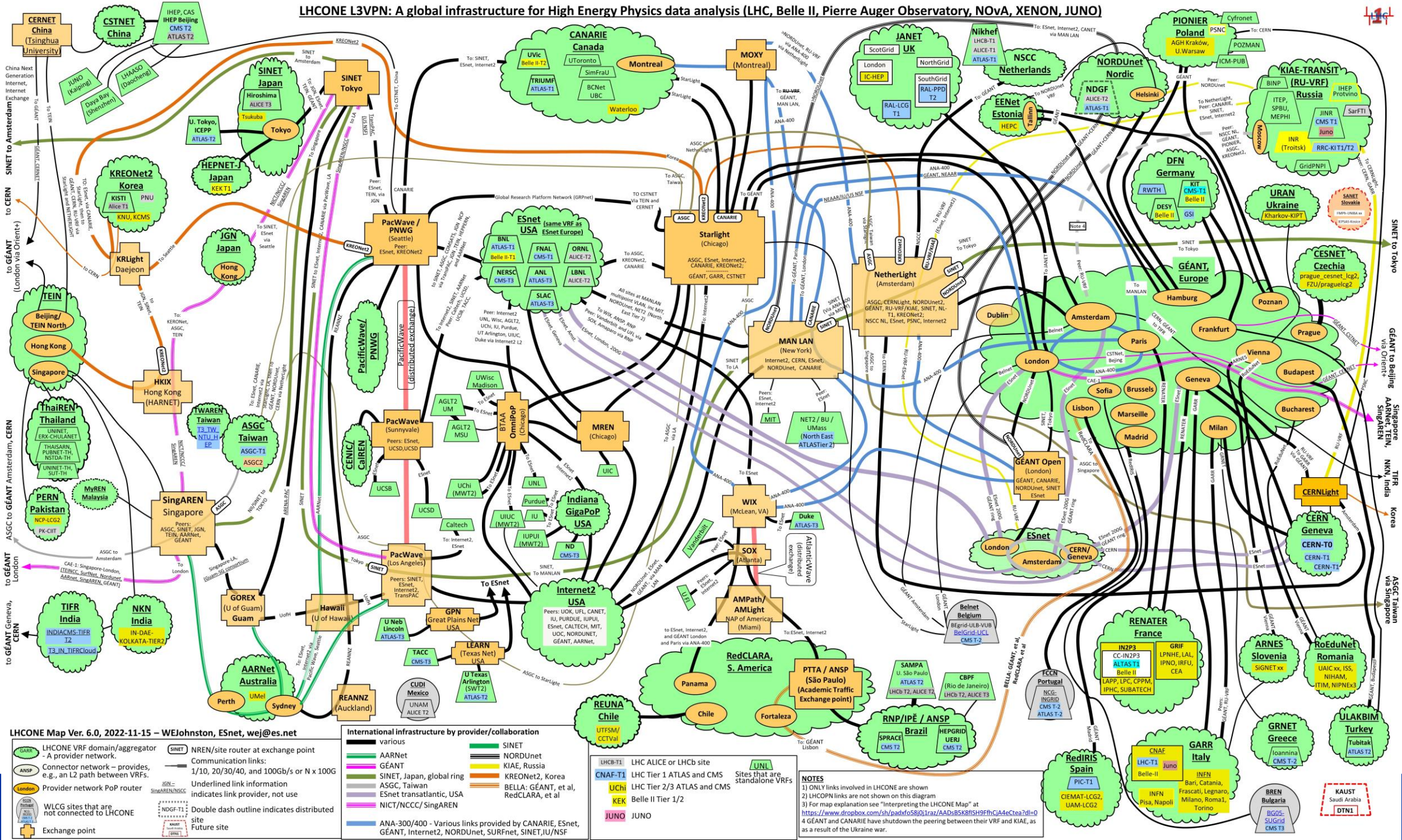
Worldwide LHC Computin...

This map shows registered WLCG sites currently in operation.

- [ ] Tier 2 sites
- [x] Tier-0 sites
  - CH | CERN Data Centre, Tier-0
- [x] Tier-1 sites
  - CA | TRIUMF-LCG2
  - DE | FZK-LCG2
  - ES | PIC
  - FR | IN2P3-CC
  - GB | RAL-LCG2
  - IT | INFN-T1
  - KR | GSDC-KISTI
  - NL | NIKHEF-ELPROD + SARA-MATRIX
  - PL | NCBJ
  - RU | NRC-KI
  - RU | JINR
  - Scand. | NDGF-T1
  - US | USCMS-FNAL-WC1
  - US | BNL-ATLAS



LHCONE L3VPN: A global infrastructure for High Energy Physics data analysis (LHC, Belle II, Pierre Auger Observatory, NOvA, XENON, JUNO)



LHCONE Map Ver. 6.0, 2022-11-15 – WEJohnston, ESnet, wej@es.net

- LHCONE VRF domain/aggregator - A provider network.
- Connector network – provides, e.g., an L2 path between VRFs.
- Provider network PoP router
- WLCG sites that are not connected to LHCONE
- Exchange point
- NREN/site router at exchange point
- Communication links: 1/10, 20/30/40, and 100Gb/s or N x 100G
- Underlined link information indicates link provider, not use
- Double dash outline indicates distributed site
- Future site

International infrastructure by provider/collaboration

- various
- AARNet
- GÉANT
- SINET, Japan, global ring
- ASGC, Taiwan
- ESnet transatlantic, USA
- NICT/NCCC/ SingAREN
- ANA-300/400 - Various links provided by CANARIE, ESnet, GÉANT, Internet2, NORDUnet, SURFnet, SINET,IU/NSF
- SINET
- NORDUnet
- KIAE, Russia
- KREONet2, Korea
- BELLA: GÉANT, et al, RedCLARA, et al

LHCB-T1 LHC ALICE or LHCb site
CNAF-T1 LHC Tier 1 ATLAS and CMS
UChi LHC Tier 2/3 ATLAS and CMS
KEK Belle II Tier 1/2
JUNO JUNO
UNL Sites that are standalone VRFs

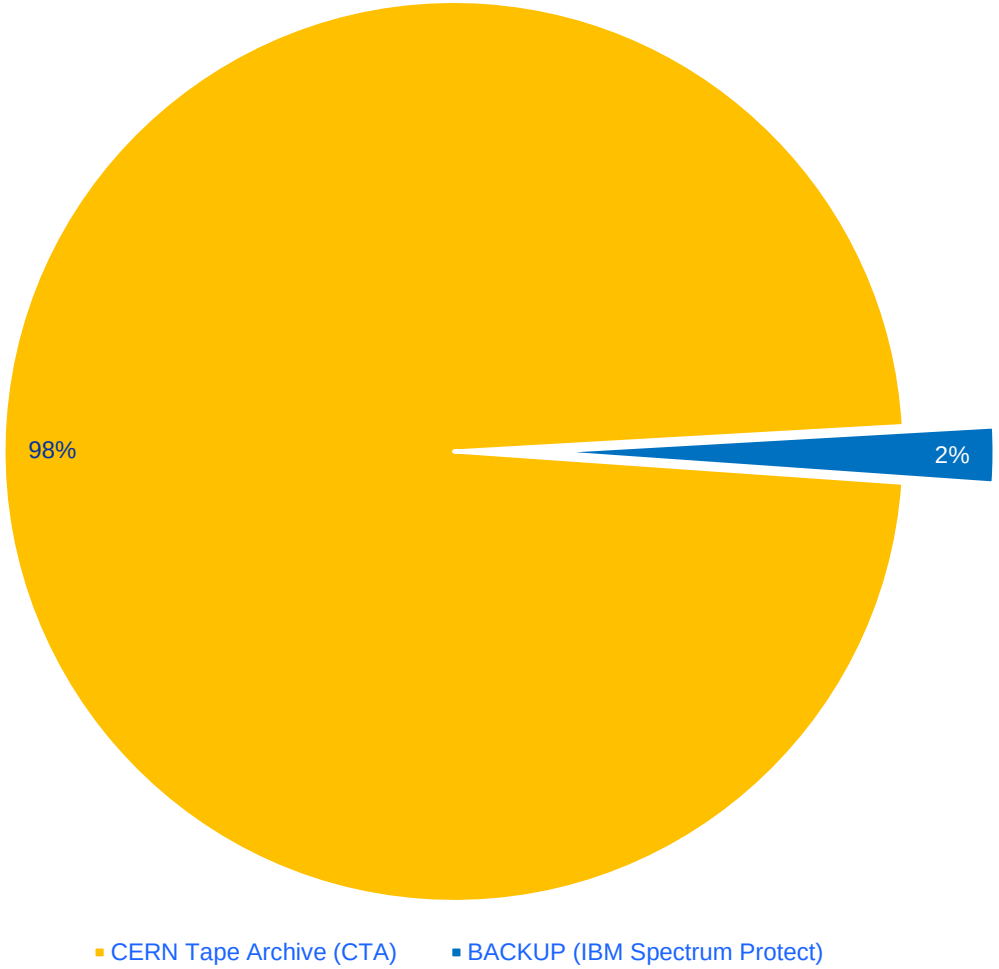
NOTES

1) ONLY links involved in LHCONE are shown
2) LHCOPN links are not shown on this diagram
3) For map explanation see "Interpreting the LHCONE Map" at https://www.dropbox.com/sh/padxfo58j0j1raz/AADsB5K8fiSH9FfhCjA4eCtea?dl=0
4 GÉANT and CANARIE have shutdown the peering between their VRF and KIAE, as as a result of the Ukraine war.

CERN Tape Infrastructure (September 2023)

CERN Tape Archive

- Archive of the physics data
- Provisioned capacity: ~730 PB



IBM Spectrum Protect

- Backup of the business data
- Licensed capacity: ~15 PB

3 – 2 – 1 Backup rule

3 copies of your data – 2 different media – 1 copy off site

Source: https://cactus-it.co.uk/the-3-2-1-backup-rule/

Source: https://www.pax8.com/blog/veeamwasabi-immutable-backup/

3-2-2 Backup Rule

x3

Create three copies of your data (1 primary copy and 2 backups)

x2

On at least two different media (disk & tape)

x2

With two copies stored offsite for disaster recovery (online & offline)

Source: https://www.restore.co.uk/Records/Resource-Hub/News/3-2-1-backup-isnt-enough

Backup of critical organisation data

- Most have onsite backup solution (CERN uses IBM Storage Protect)
  - Protection against most use cases, but not in case of a major disaster
- Some sites might have Offsite-Offline backup solution?
  - Protection against ransomware and major disaster but requires manual workflow
- Some sites might have Offsite-Online (cloud) backup solution?
  - Protection against ransomware and major disaster but has extra cost

Collaboration proposal

- A site will keep it's onsite solution
- Most critical data will be sent offsite to collaborating institution(s)
  - Data will be encrypted before sending
- Leverage the existing HEP community data transfer solutions (FTS)

- Offsite-Online (LCG) backup solution
  - Protection against ransomware and major disaster
  - Cost negligible as reusing existing infrastructure
- Reciprocal approach – ideally:
  - Site A backups to B and C
  - Site B backups to A and C
  - Site C backups to A and B

- Start a pilot with 100 TB (~5 LTO-9 tape cartridges)

Discussion