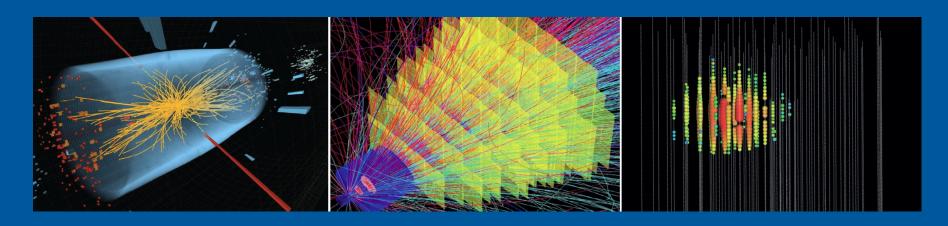
# **LK I — DESY IT developments for HEP**



Paul Millar – DESY



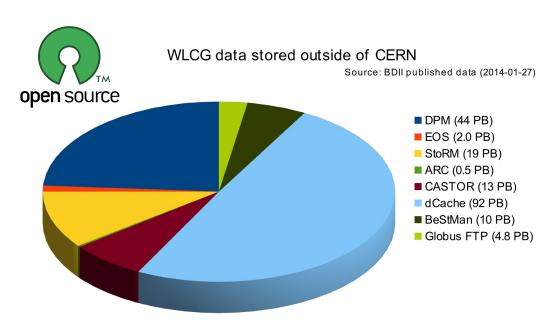
#### Introduction

### This talk introduces **LK I\* IT developments**:

- Big Data solutions with dCache,
- Network connections,
- Complete data life-cycle,
- High Performance Computing (HPC).

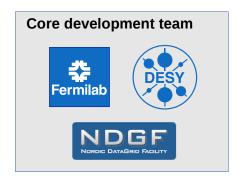
\* The LK II large scale facility is covered in the plenary talk later.

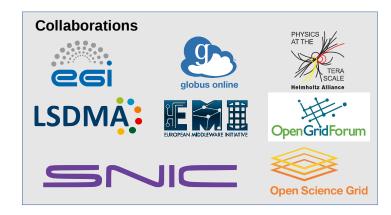
### dCache: open-source, managed storage











# dCache evolution for Big Data and Cloud

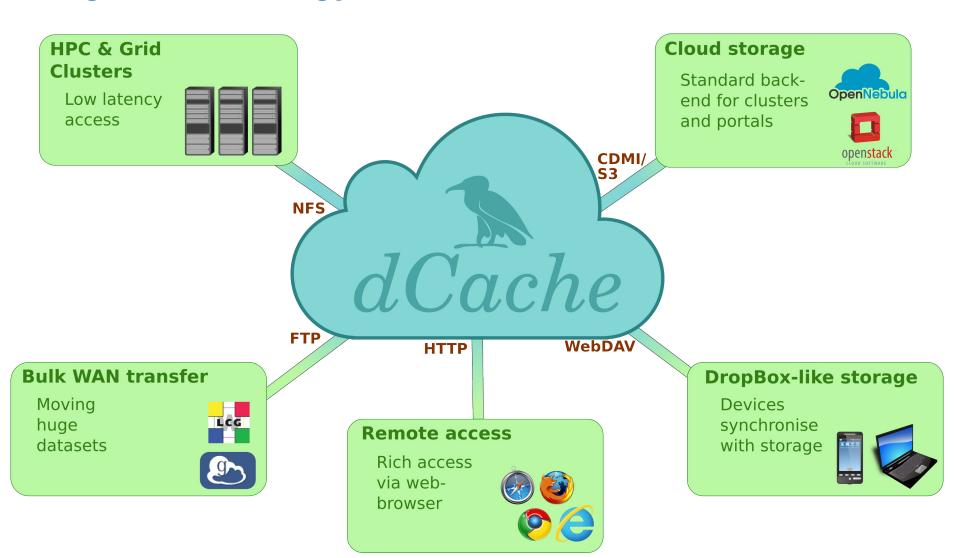
Era	Disk cache	Grid Storage	Generic Storage	Cloud Storage
Additional Communities	hermes  HERA  B	ALICE STATE OF THE PARTY OF THE	Fermilab Intensity Frontier  LOFAR  LOFAR  Industry  PETRA III	LSDMA
Additional Authen- tication	Trusted host	X.509, Kerberos	Username+PW	SAML, OpenID, OAuth, Token,

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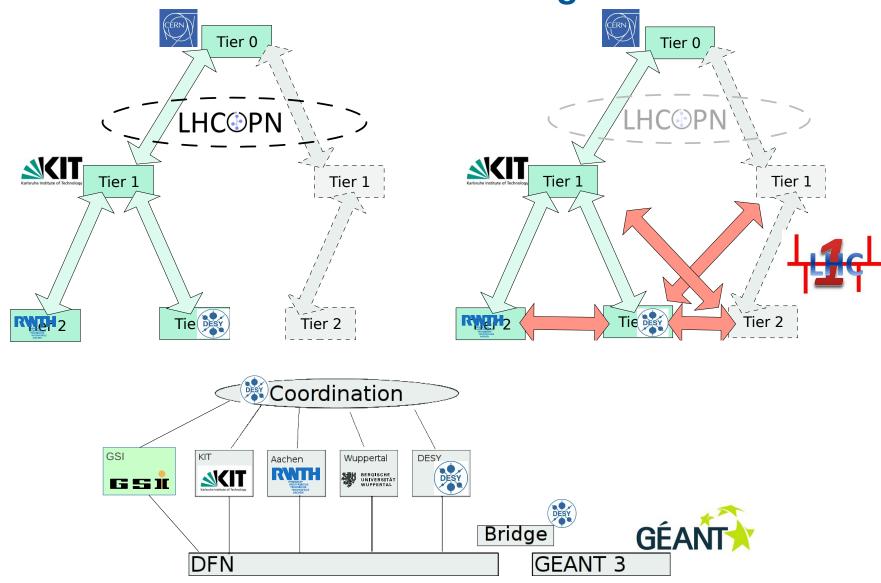
Paul Milla

IT: developme

# **Big Data Strategy**

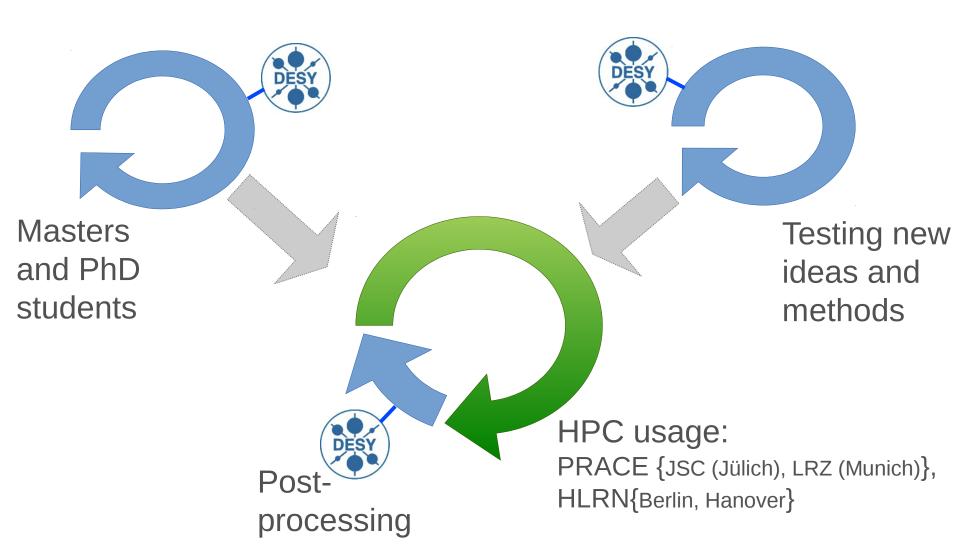


# **LHCone: Advances in networking**



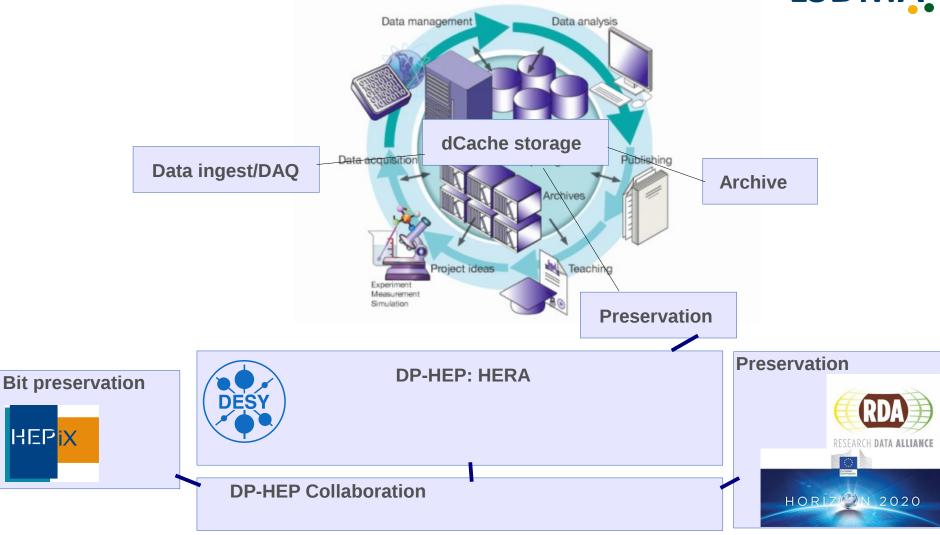
## **Supporting Heavy HPC users:**

Lattice QCD, Simulation for Photon Science, Plasma, ...



# Handling the complete data life-cycle





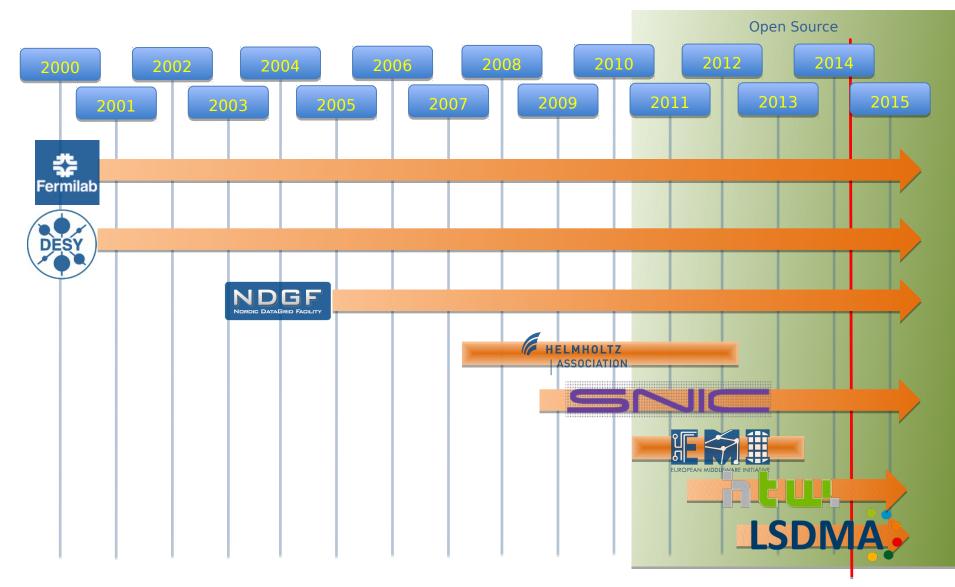
# **Strategic outlook**

### DESY is advancing IT by

- Developing Big Data solutions,
- Pushing network connections,
- Supporting the complete data life-cycle:
  - Supporting fast data ingest from DAQs,
  - Managing data archives,
  - Exploring bit-preservation.

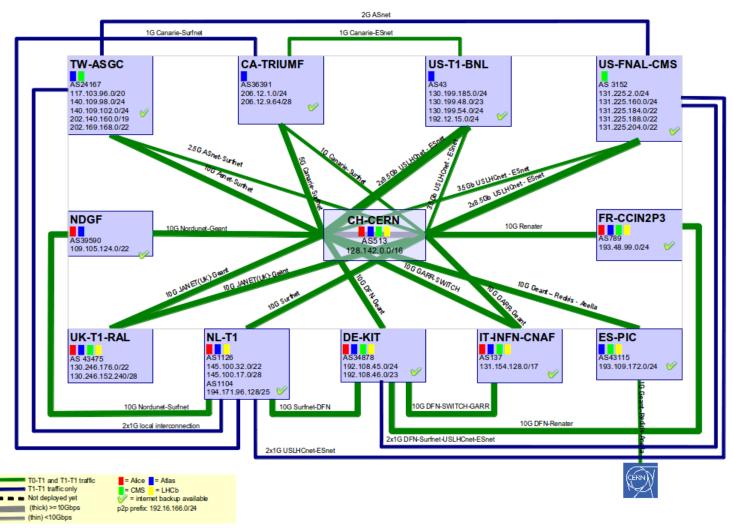
# **Backup slides**

# **Collaboration and funding for dCache**



# **Advances in networking**

### **LHC** PN



# **Advances in networking**

LHCONE: A global infrastructure for the LHC Tier1 Data Center – Tier 2 Analysis Center Connectivity NDGF-T1a SimFraU NDGF-T1a NDGF-T1c UAIb UTor **NIKHEF-T1 NORDUnet** TRIUMF-T1 McGill SARA Nordic CANARIE Netherlands, Korea Canada CERN-T1 CERN **Bill Johnston ESNet** Korea Amsterdam Geneva TIFR Chicago Geneva India **US LHCNet** DESY DE-KIT-T1 SLAC ESnet KNU GSI DFN KREONET2 FNAL-T1 USA BNL-T1 **New York** Germany India Korea Seattle **GÉANT** Europe ASGC-T1 Caltech NE **ASGC** UCSD **UFlorida** SoW Washington **UWisc** CC-IN2P3-T1 Taiwan MidW PurU UNeb GRIF-IN2P3 Sub-IN2P3 **GLakes** RENATER Internet2 Harvard NCU NTU France USA **TWARE** PIC-T1 INFN-Nap CNAF-T1 RedIRIS GARR Taiwan DFN Spain Italy INTERNET US LHCNet LHCONE VPN domain UNAM ST#RLIGHT" **NORDUnet** canarie CUDI NTU End sites - LHC Tier 2 or 3 unless indicated as Tier 1 NLLight Mexico Regional R&E communication nexus **BIRIS** Chicago GARR Data communication links, 10, 20, and 30 Gb/s Renater)

See http://lhcone.net for details.

#### **Curation of Hera data**

