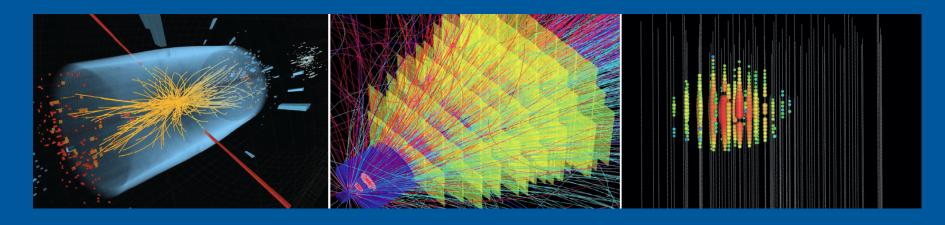
LK I — IT developments for HEP



Paul Millar – DESY



Introduction

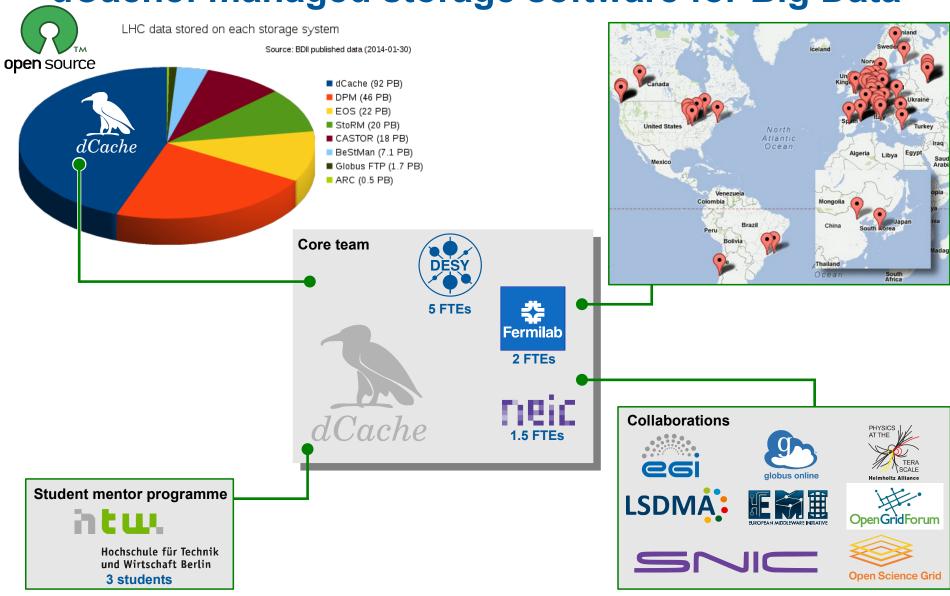
This talk introduces IT developments* from LK I:

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

The LK II developments are covered in a plenary talk.

^{*} IT developments reported here are from DESY; KIT IT developments are presented in the Research Field: *Key Technologies*.

dCache: managed storage software for Big Data

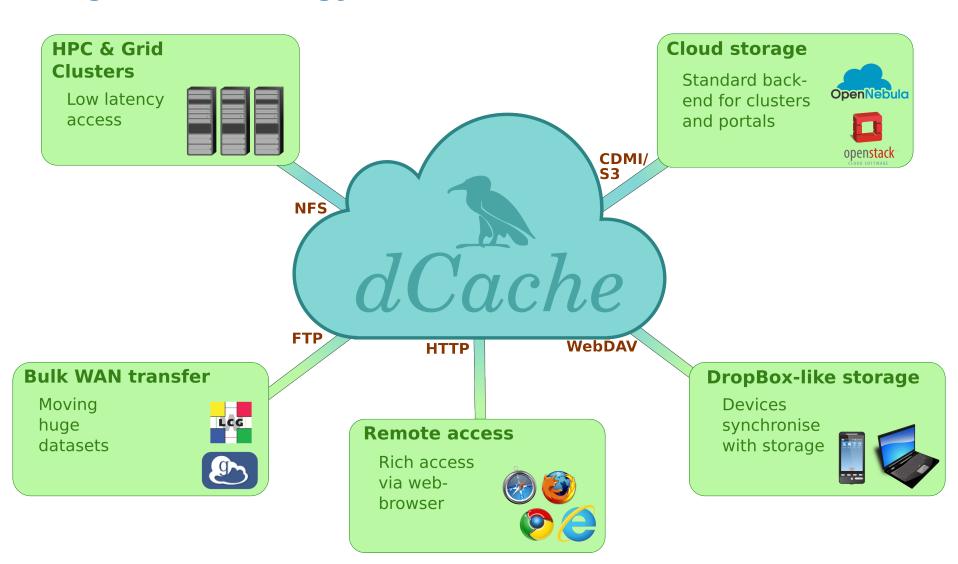


dCache evolution for Big Data and Cloud

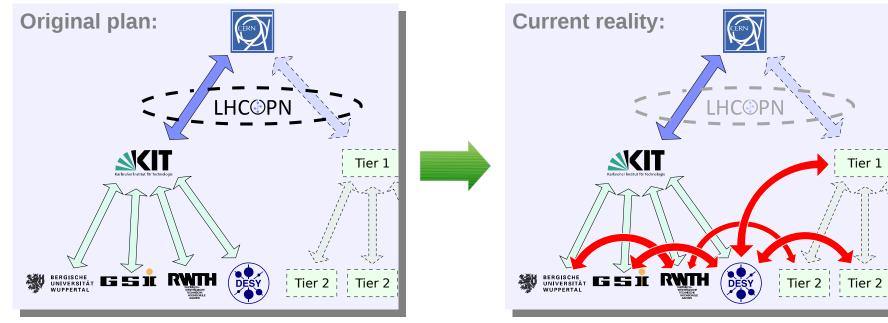
Era	Disk cache	Grid Storage	Generic Storage	Cloud Storage
Additional Communities	hermes HERA B	ALICE Cube	Fermilab Intensity Frontier European XFEL LOFAR LOFAR Industry PETRA III	LSDMA
Additional Authen- tication	Trusted host	X.509, Kerberos	Username+PW	SAML, OpenID, OAuth, Token,

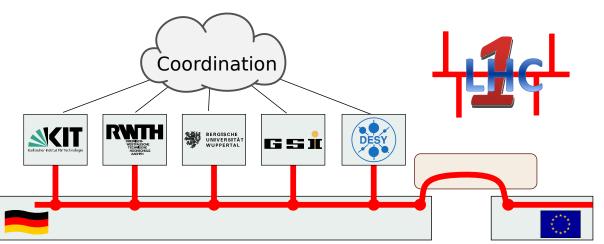
IT: development

Big Data Strategy



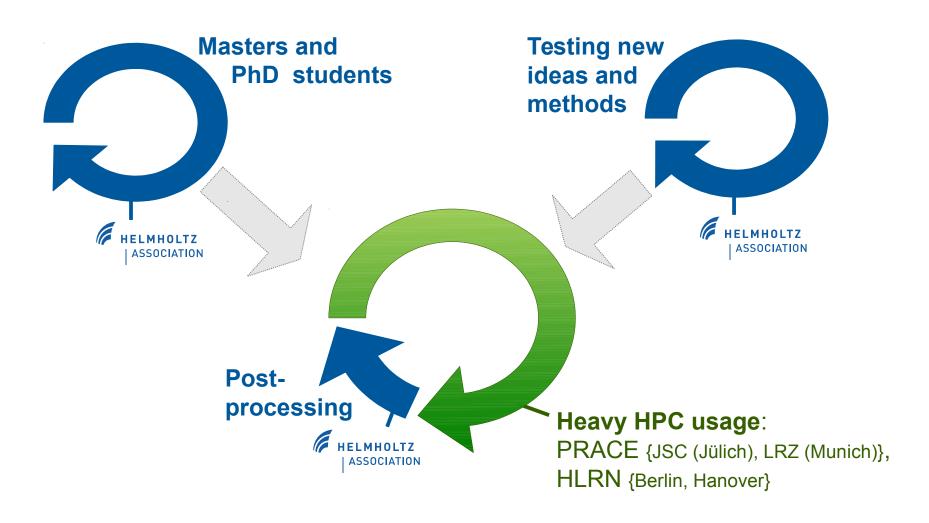
LHCone: advances in networking



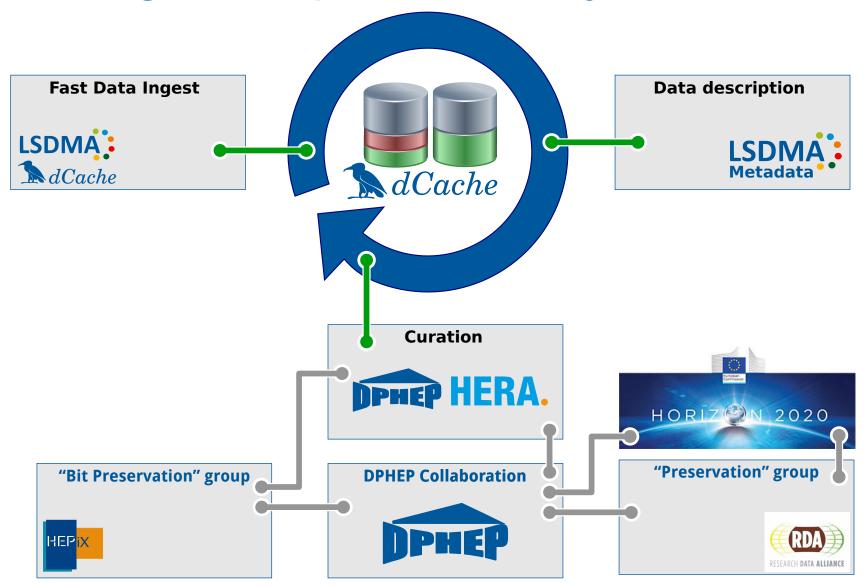


High Performance Computing (HPC):

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



Handling the complete data life-cycle



Strategic outlook

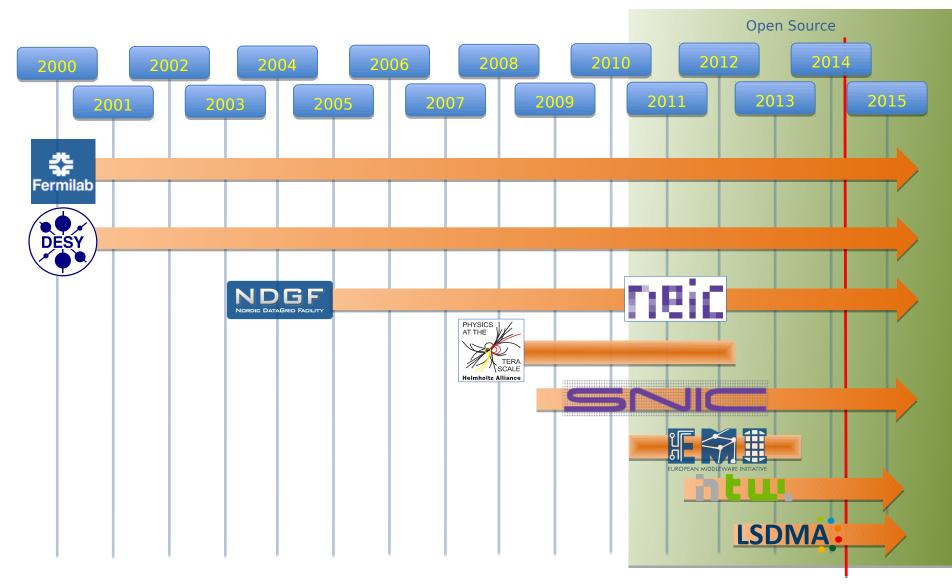
We are advancing IT by

- Solving many community's Big Data challenges,
- Advancing network connectivity,
- Developing solutions for High Performance Computing,
- Enhancing the complete data life-cycle:
 - Improving data ingest performance,
 - Managing data archive metadata,
 - Exploring data preservation.

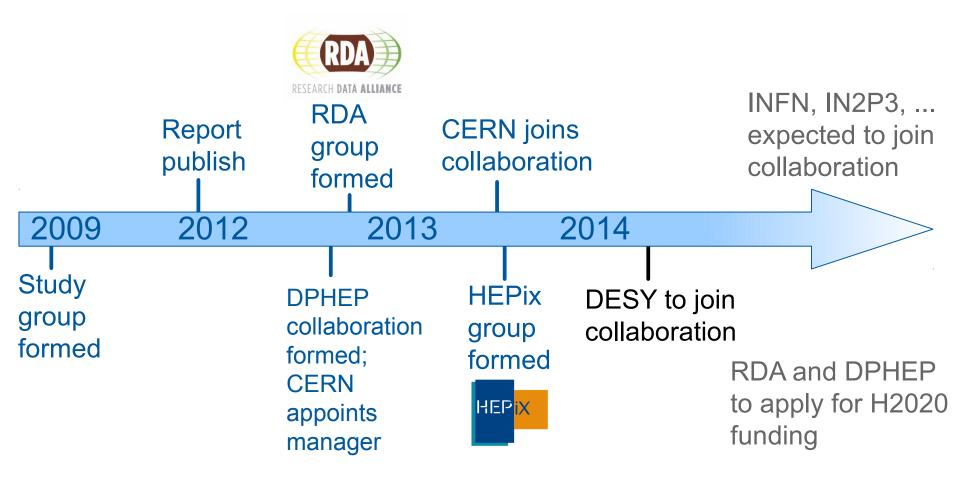
Supplementary slides

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Collaboration and funding for dCache



DPHEP: curation of unique data



See www.dphep.org.

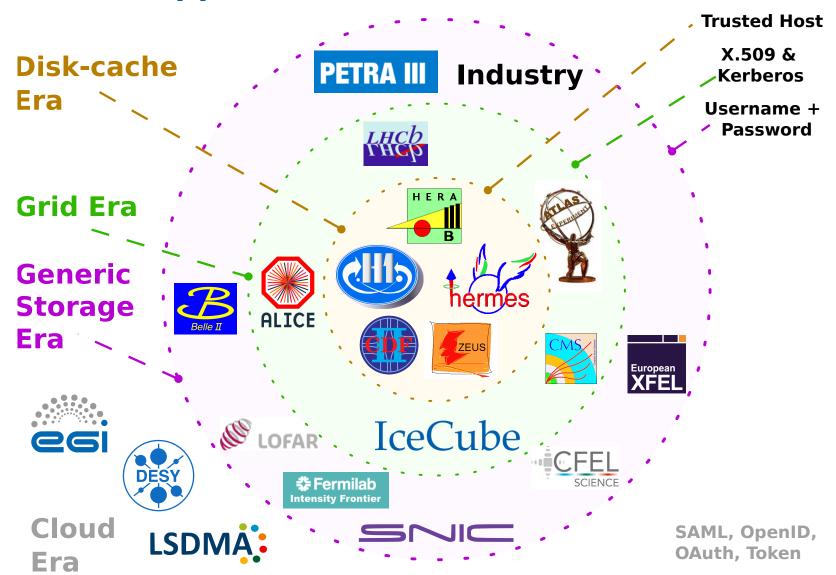
Backup slides

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dCache resources

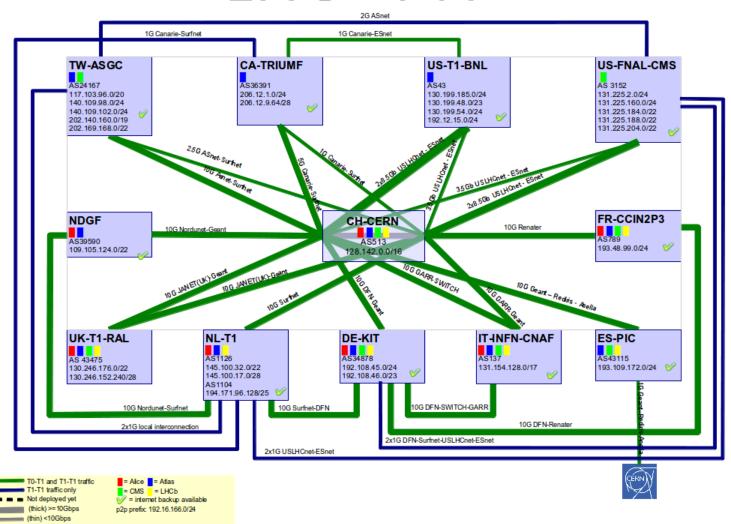
- DESY
 - PoF / Base funding: 2 FTEs
 - LSDMA: 3 FTEs
- Fermilab
 - 2 FTEs
- NEIC
 - 1.5 FTEs
- HTW
 - 3 Students

dCache supported communities



Advances in networking

LHC PN



Advances in networking

LHCONE: A global infrastructure for the LHC Tier1 Data Center – Tier 2 Analysis Center Connectivity SimFraU NDGF-T1a NDGF-T1a NDGF-T1c UAIb UTor **NIKHEF-T1 NORDUnet** TRIUMF-T1 McGill SARA Nordic **CANARIE** Netherlands, Korea Canada CERN-T1 CERN Korea Bill Johnston ESNet 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 ** R L I G H T" **NORDUnet** canarie 🐠 CUDI NTU End sites - LHC Tier 2 or 3 unless indicated as Tier 1 NLLight Mexico Regional R&E communication nexus **ZIRIS** Chicago GARR Data communication links, 10, 20, and 30 Gb/s Renater)

See http://lhcone.net for details.