# Federated Infrastructures

**“Excellent IT infrastructure indispensable to transform data into knowledge”**

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KET Strategy Workshop

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UNI FREIBURG

# Needed support in the area of federated infrastructures

[A] WLCG/Experiment specific R&D and operation of WLCG Cloud in Germany

[B] Experiment/community overarching generic R&D for computing in the HL-LHC era

[C] Provisioning of pledge-able resources to WLCG

**[A] and [B] indispensable at least at the same level as in FP 2021-2024 with no gap between funding periods/schemes**

**[C] depends on whether and on which timescale the "KET Perspective for Computing in the HL-LHC Era" can be realized (Helmholtz centres and MPP expected to provide at least the current share)**

# Needed support in the area of federated infrastructures

[A] WLCG/Experiment specific R&D and operation of WLCG Cloud in Germany **must**

[B] Experiment/community overarching generic R&D for computing in the HL-L **must**

[C] Provisioning of pledge-able resources to WLCG

**must** **but hopefully not from ErUM budget**

**[A] and [B] indispensable at least at the same level as in FP 2021-2024 with no gap between funding periods/schemes**

**[C] depends on whether and on which timescale the "KET Perspective for Computing in the HL-LHC Era" can be realized (Helmholtz centres and MPP expected to provide at least the current share)**

# Overview of currently BMBF funded activities

- **Research Compound covering areas [A] and [C]**

  "**Föderiertes Computing für die ATLAS- und CMS-Experimente am Large Hadron Collider in Run-3**"

  partners: AA, FR, GÖ, HH, KIT, MU (LMU), WU  associates: DESY, KIT, MPP

  - invest for CPU and mass storage at 5 university Tier-2 centres (150 000 Euro per year per site + OH)
  - personal for operation of WLCG cloud and experiment specific developments (applied for 14 FTE)

- **Research Compound covering area [B]**

  **"Föderierte Digitale Infrastrukturen für die Erforschung von Universum und Materie (FIDIUM)"**

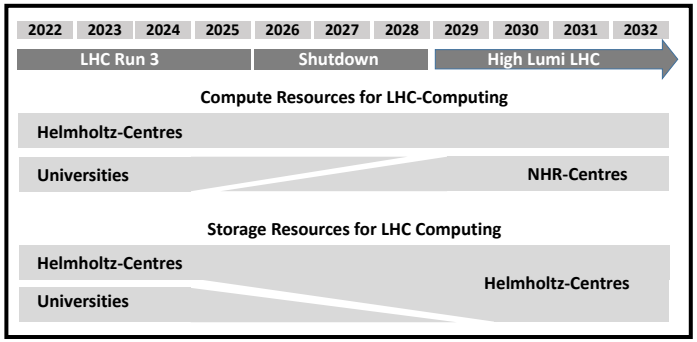
  partners: AA, BN, FRA (GU), FR, GÖ, HH, KIT, MZ, MU (LMU), WU  associates: CERN, DESY, GridKa, GSI

  experiment/community overarching R&D towards computing in HL-LHC era ( applied for ~18 FTE)
  - development of tools and technologies for integration of heterogenous compute resources
  - development of tools and technologies for data lake concept and fast caching solutions
  - performance evaluation and optimization of above technologies for different environments/use cases

- **Applications handed in for ErUM-Pro call but funded from ErUM-Data budget**
- **Funding period Oct 2021 until September 2024**

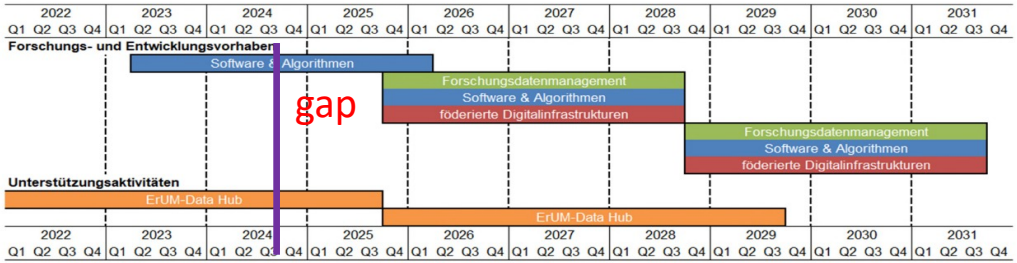
# Timelines and boundary conditions

## Timeline of KET perspective for transformed model for resource provisioning




Definite timely commitments / confirmation by NHR-Verein and Helmholtz-Association needed in order to decide that no new application for invest for CPU and mass storage at 5 university Tier-2 sites (AA, FR, GÖ, WU, MU (LMU)) is needed

## Preliminary timeline of funding periods for different research fields in ErUM-Data program




A gap would diminish/destroy the build-up expertise and will make our IT experts leave the field

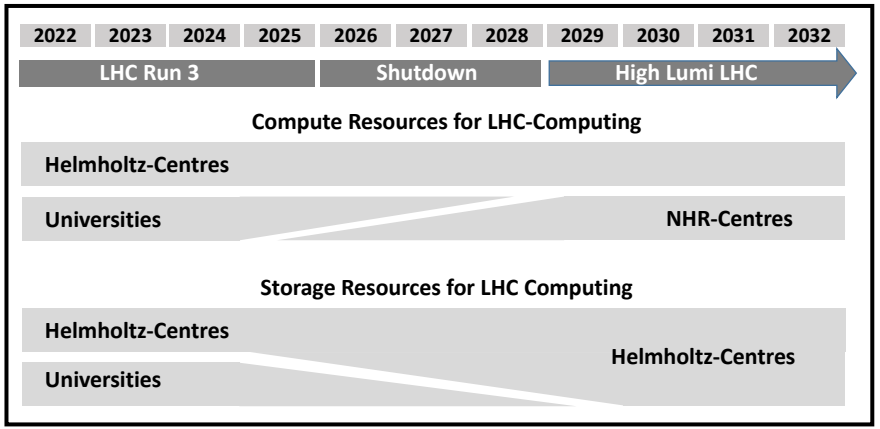
current funding for two compounds "ATLAS+CMS Computing in Run-3" and "FIDIUM" ends in September 2024

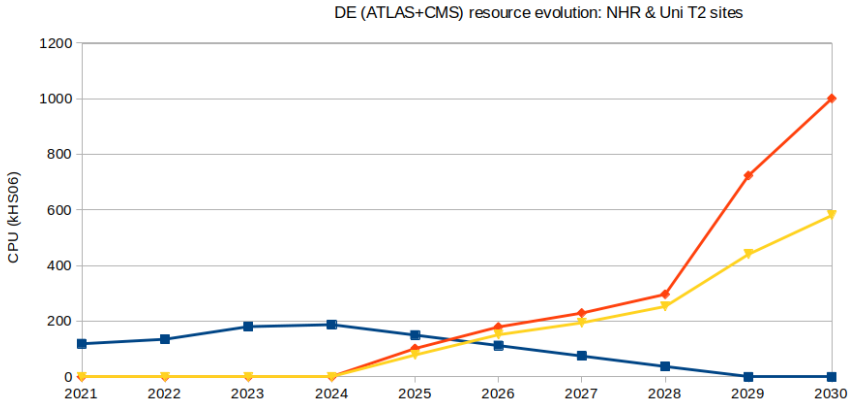
**continuation without a gap is indispensable**

- for successful operation of WLCG cloud and data analysis before Run-4
- for needed R&D work toward HL-LHC

# Provisioning of resources [C]

## Currently 150 000 Euro for invest plus overhead per site per year at five university Tier-2 sites




Whether invest for hardware at university Tier-2 sites is needed (which amount, for how long)

- depends on timeline of realisation of “KET Computing Perspective”
- requires definite commitments by NHR-Verein and Helmholtz Association

Yearly needed budget at university sites will probably increase compared to FP 21-24

- higher hardware costs due to significant increase in resources, huge inflation, smaller technical advancement than foreseen and eventual compensation for Russian sites
- maybe also costs for power consumption would need to be included in application

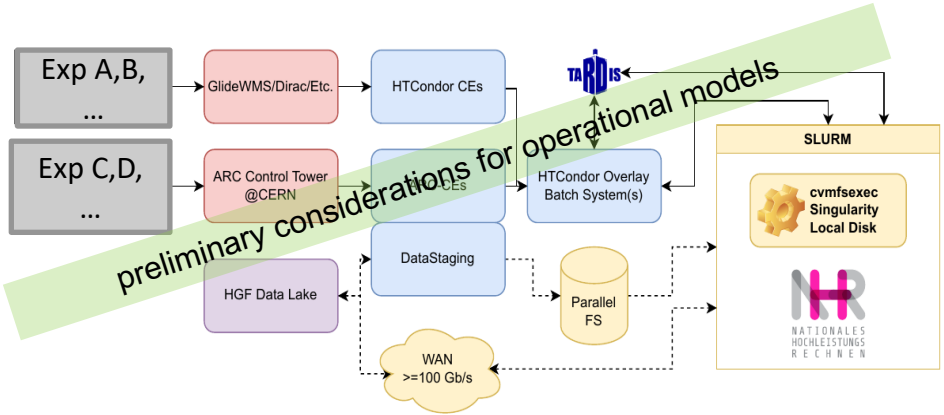
# Experiment specific R&D and operation of WLCG cloud [A]

## Continuous funding w/o gap at least at the same level for personal indispensable

Probably new partner TUM in ATLAS
Probably more FTE needed if NHR centres integrated in workflow of experiments (see below)

## Questions:

Again an experiment overarching compound “outside” FSPs ATLAS and CMS also w/o hardware invest?
How to secure timely funding given probable delay in ErUM-Data calls?




Integration of NHR centres in workflow of the ATLAS and CMS experiments
(update of software stacks, running of edge services, monitoring, accounting, ...)
probably requires additional FTE

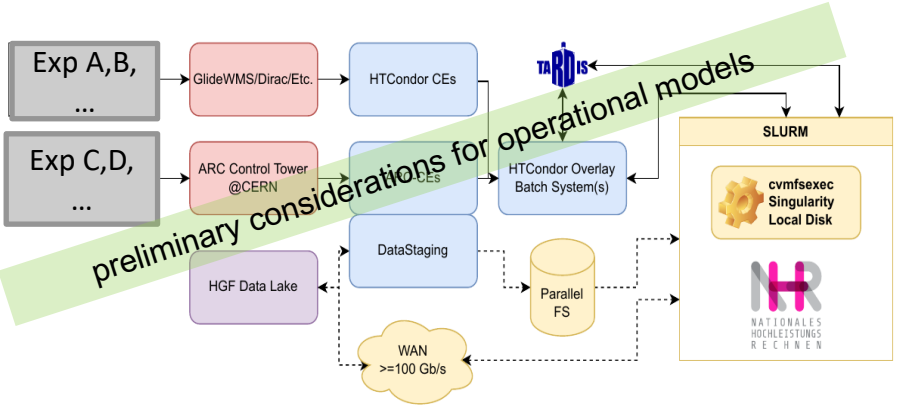
(reminder: at GridKa currently 1 co-financed FTE per experiment)

# Generic experiment overarching R&D [B]

**Continuous funding w/o gap at least at the same level for personal indispensable**

Additional partners may want to join
Probably more FTE needed for finalizing R&D in time and maintenance of developed tools (see below)

**Questions:**
How to secure timely funding given probable delay in ErUM-Data calls?




Probably more FTE needed
- in order to finalize the needed R&D in time for HL-LHC start and adapt them to NHR requirements
- maintenance, adjustment and optimization of developed tools such as COBalD/TARDIS, AUDITOR etc.



(developed in the compounds IDT-UM and FIDIUM)

# Conclusion as input for discussion

- **Continuous funding at least at the same level for personal indispensable for**
  - experiment specific R&D and operation of WLCG cloud in Germany
    (maybe more FTE needed if NHR centres included in WLCG workflow)
  - generic experiment/community overarching R&D
    (maybe additional FTE needed to finalize required R&D in time for HL-LHC and maintenance of tools)

A gap in the funding
- will damage the operation of the WLCG Cloud in Germany and hence analysis activities
- will diminish the build-up expertise and will make IT experts leave the field

- **Provisioning of hardware resources needs to be secured in agreement with WLCG-MoU**

Size and time period of funding for hardware invest at university Tier-2 sites
- depends on timeline of realisation of "KET Computing Perspective"
- requires definite commitments by NHR-Verein and Helmholtz Association

Yearly needed budget at university sites will probably increase compared to FP 21-24
- higher hardware costs due to significant increase in resources, huge inflation, smaller technical advancement than foreseen and compensation for Russian sites
- maybe also costs for power consumption would need to be included in application