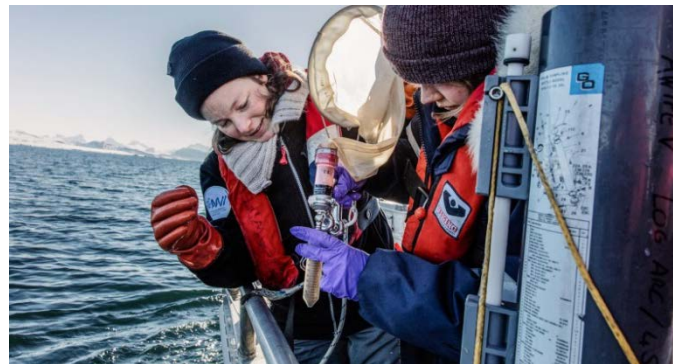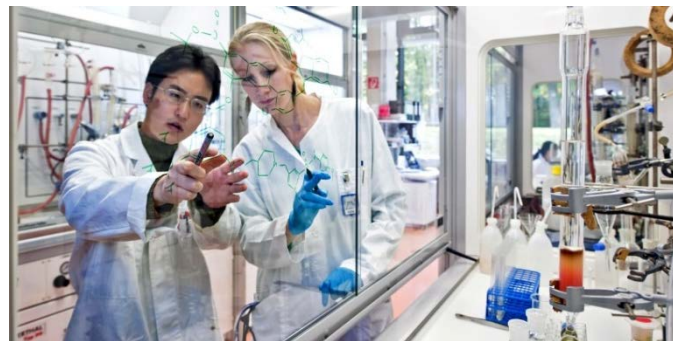**HELMHOLTZ**

HIFIS Software Services, the Competence Cluster for a Sustainable Software Development in the Helmholtz Association

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Helmholtz-Centre Dresden-Rossendorf

HIFIS | HELMHOLTZ FEDERATED IT SERVICES

Helmholtz Research Mission & Strategy

- Systems solutions for grand challenges based on:
  - Scientific excellence
  - Interdisciplinarity and critical mass
  - long term research programs

- Helmholtz provides a highly attractive environment for talents and brilliant brains

- Profound expertise in large scale research infrastructure

- Helmholtz as a prime strategic partner at the local, national and international level

- Transfer of knowledge into economy and society

Helmholtz Research Centers

1. Berlin
Helmholtz-Zentrum Berlin für Materialien und Energie (HZB)

2. Berlin-Buch
Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC)

3. Brunswick
Helmholtz Center for Infection Research (HZI)

4. Bremerhaven
Alfred-Wegener-Institut Helmholtz-Zentrum für Polar- und Meeresforschung (AWI)

5. Bonn
**German Center for Neurodegenerative Diseases (DZNE)**

6. Darmstadt
GSI Helmholtz Center for Heavy Ion Research

7. Dresden
Helmholtz Center Dresden Rossendorf (HZDR)

8. Garching
Max Planck Institute for Plasma Physics (IPP) (Associate Member)

9. Geesthacht
Helmholtz Center Geesthacht Center for Material and Coastal Research (HZG)

10. Hamburg
Deutsches Elektronen-Synchrotron DESY
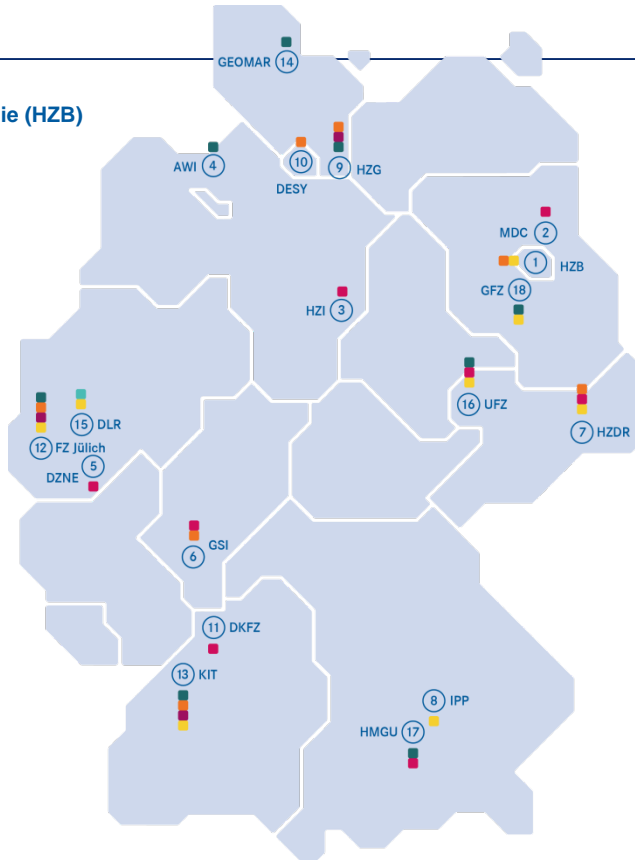
11. Heidelberg
German Cancer Research Center (DKFZ)

12. Jülich
Forschungszentrum Jülich

13. Karlsruhe
Karlsruhe Institute of Technology (KIT)

14. Kiel
GEOMAR Helmholtz Center for Ocean Research Kiel

15. Cologne
German Aerospace Center (DLR)

16. Leipzig
Helmholtz Center for Environmental Research (UFZ)

17. Munich
Helmholtz Center Munich – German Research Center for Health and the Environment

18. Potsdam
Helmholtz Center Potsdam German Research Center for Geosciences GFZ

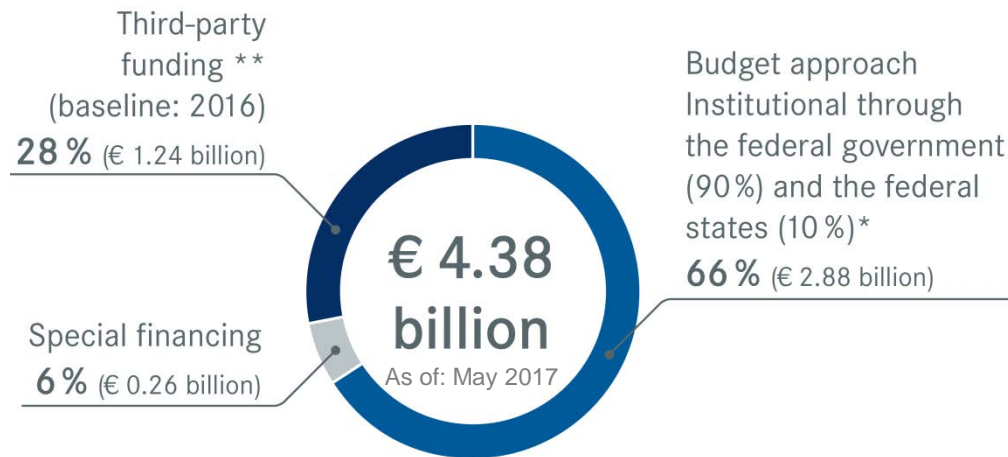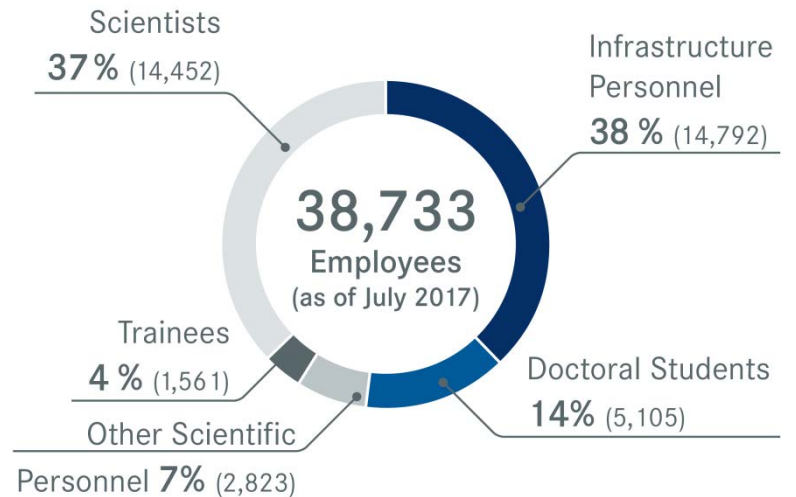

Research Areas:

- Energy
- Earth and Environment
- Health
- Aeronautics, Space and Transport
- Matter
- Key Technologies

The Helmholtz Association

Facts and Figures

Scientists
37 % (14,452)

Infrastructure Personnel
38 % (14,792)

38,733
Employees
(as of July 2017)

Trainees
4 % (1,561)

Other Scientific
Personnel **7%** (2,823)

Doctoral Students
14% (5,105)

Third-party funding **
(baseline: 2016)
28 % (€ 1.24 billion)

Budget approach
Institutional through the federal government (90 %) and the federal states (10 %)*
66 % (€ 2.88 billion)

€ 4.38 billion
As of: May 2017

Special financing
6 % (€ 0.26 billion)

* As of 2016, the German federal government alone is financing the pact increase so that the federal government's share is over 90%.
** Including project sponsorships
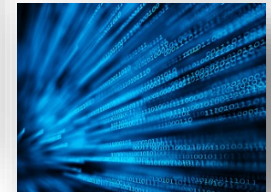
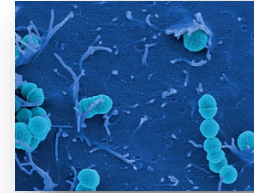**HELMHOLTZ**

The Helmholtz Incubator

The Helmholtz Incubator aims to bundle the competences of the Helmholtz association in the data science field. The Incubator identified 5 strategic fields:

- Helmholtz Artificial Intelligence Cooperation Unit – HAICU

- Helmholtz Imaging Platform – HIP

- Helmholtz Infrastructure for Federated ICT Services – HIFIS

- Helmholtz Information & Data Science Academy – HIDA

- Helmholtz Metadata Centre (HMC)

Helmholtz Federated IT Services

Starting position

- Top position of Helmholtz research relies increasingly on cross-centre collaboration and international cooperation

- Increasing importance of access to common data treasure and –services, regardless of location and time

- Rapidly growing data exchange from research instruments requires excellent data networking

- Recognised significance of a sustainable software development for the research process!

Helmholtz Federated IT Services

Vision

- Excellent information environment for outstanding research in all Helmholtz research fields

- Top level information services for getting the „best brains" to the Helmholtz

- Seamless and performant information environment connecting knowledge from all research centres

- Secure and easy-to-use collaborative environment

- Efficiently accessible ICT services from everywhere

- Research software with a high level of quality, visibility and sustainability

© Steve Geelhoed

Approach

Platform for overarching services to support research

- **Cloud Services**
  federated platform for proven
  first class cloud services

- **Backbone Services**
  high-performance trusted
  network infrastructure with unified
  basic services (e.g. authentication)

- **Software Services**
  platform, training and support for
 high-quality, sustainable software
  development
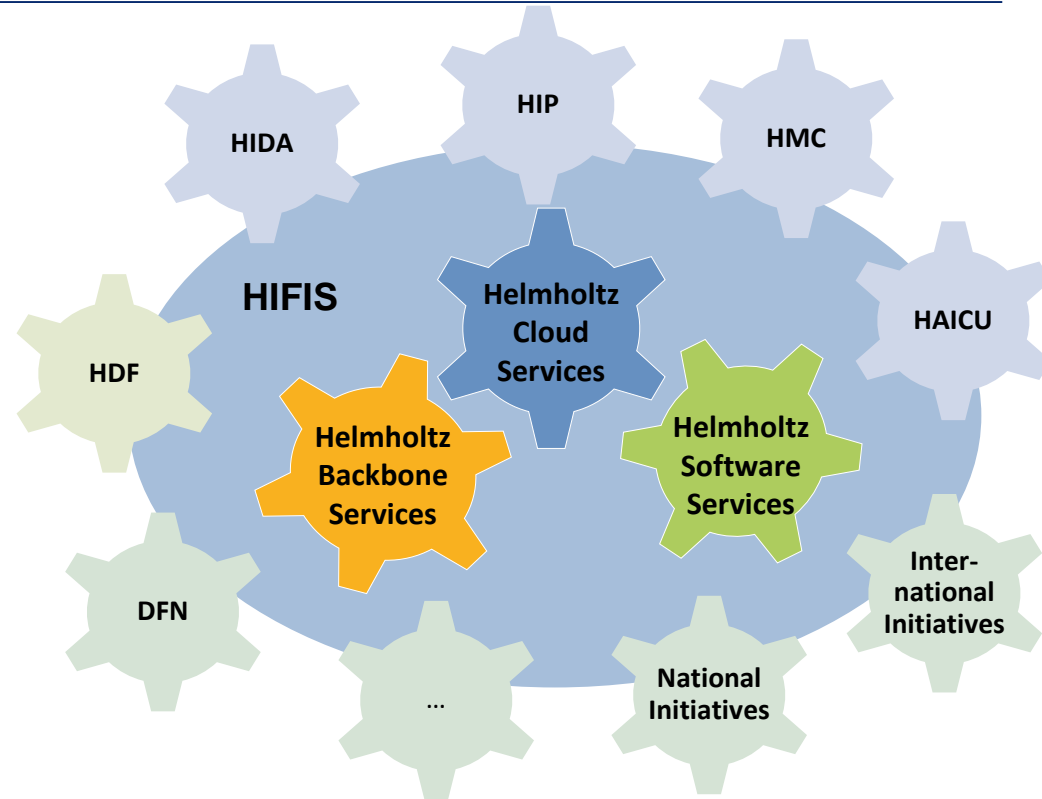
Common Platform of all Centres

Federated approach on a broad basis and proposed allocation of contribution

Modular concept for service platforms

- Manifold existing competences and local solutions, distributed at centres

- Integrating existing services of common interest

- Federation of Helmholtz Computer Centres
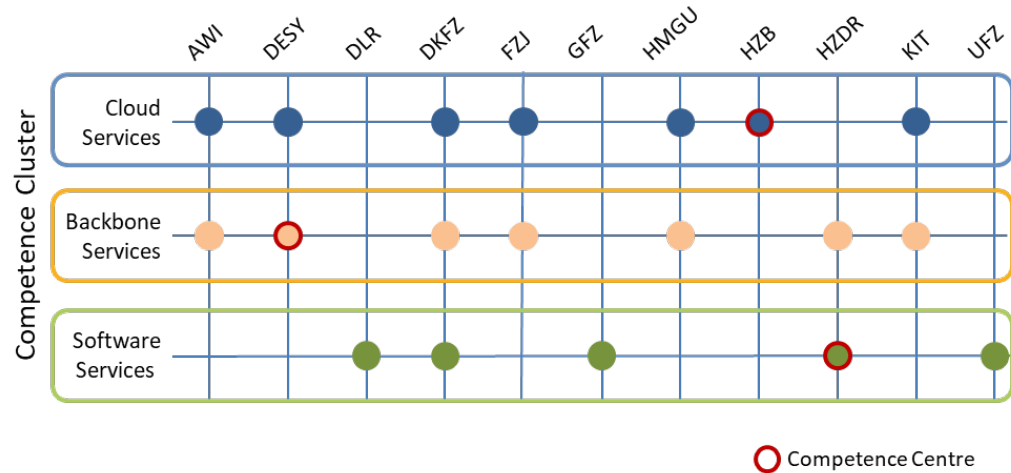
Overall budget ~4.3 million €/a!

Helmholtz Cloud Services

Task: Development of a federated Cloud Infrastructure

Access to and integration of Cloud Services like …
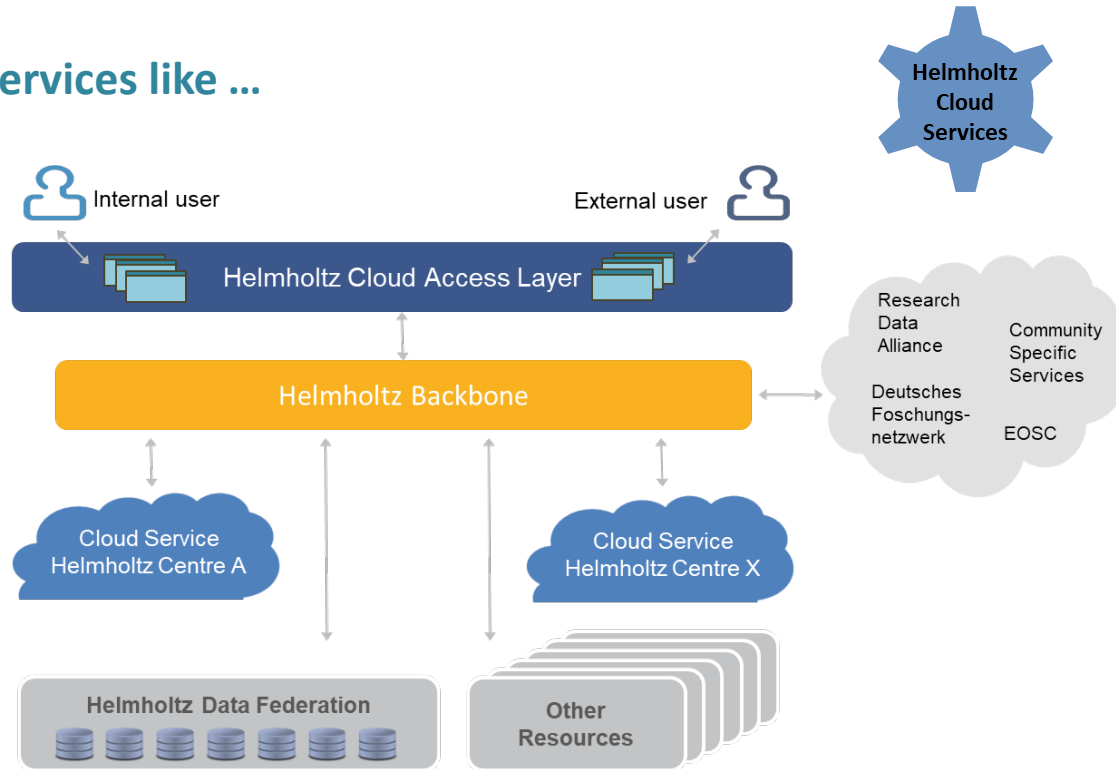
- **Infrastructure Services**
  - On demand Cloud Storage
  - Cloud Computing
- **Collaborative Services**
  - Sync & Share
  - Collaborative Writing/Citing
  - Software Development & Repository
  - Events & Conferences
- **Scientific Services**
  - Data and Software Repositories
  - Container Repositories
  - Analysis Pipelines
  - Simulation & Visualisation
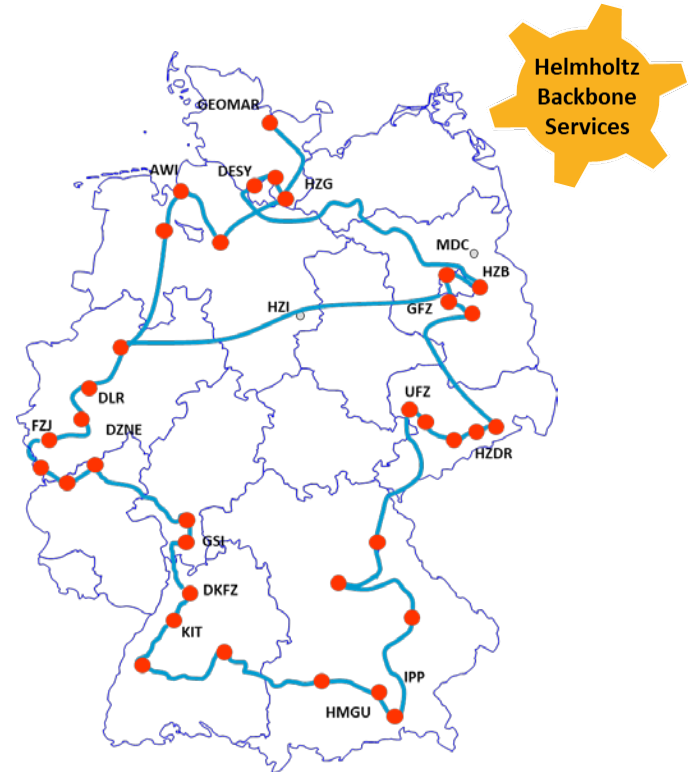
Helmholtz Backbone Services

Task: Provision of a high bandwidth network linking all Helmholtz Centres
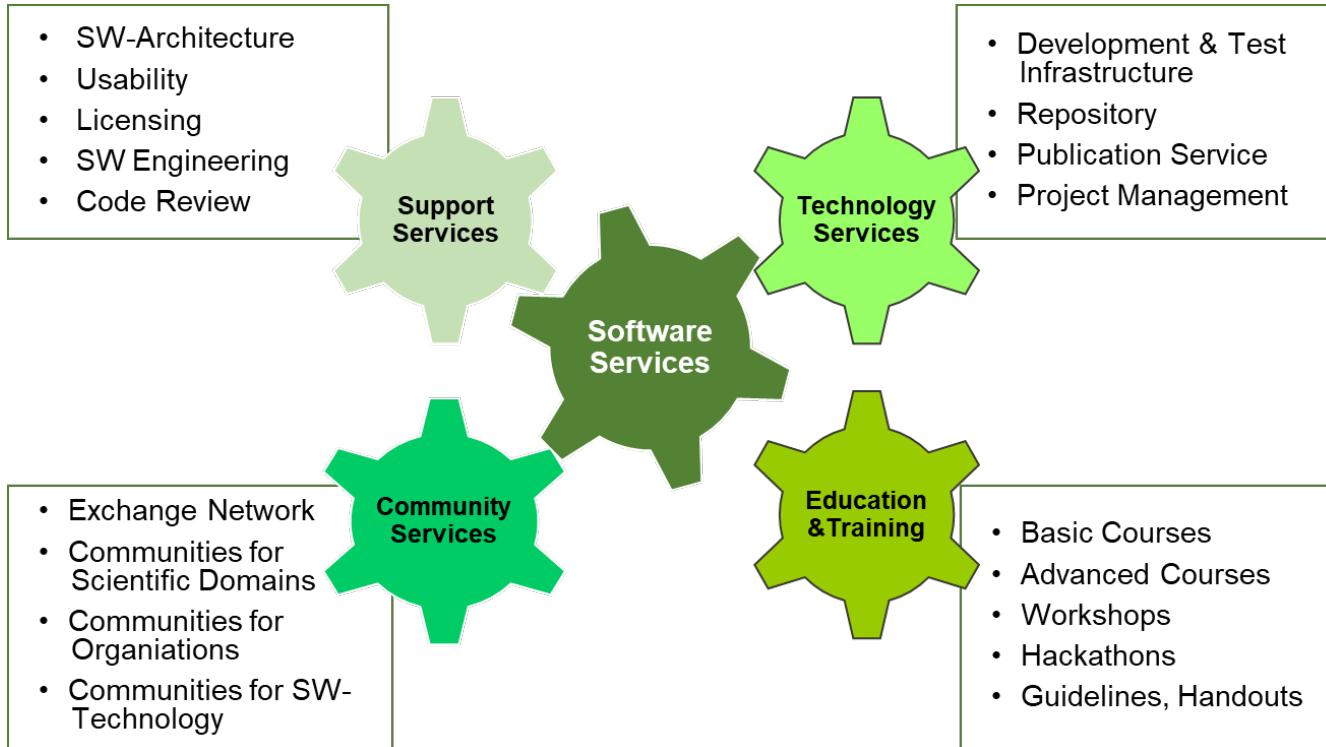
- **Physical Layer**
  - Helmholtz Virtual Private Network Backbone interfacing local resources with 10 Gb/s → 40 Gb/s → 100Gb/s; Quality-of-Service
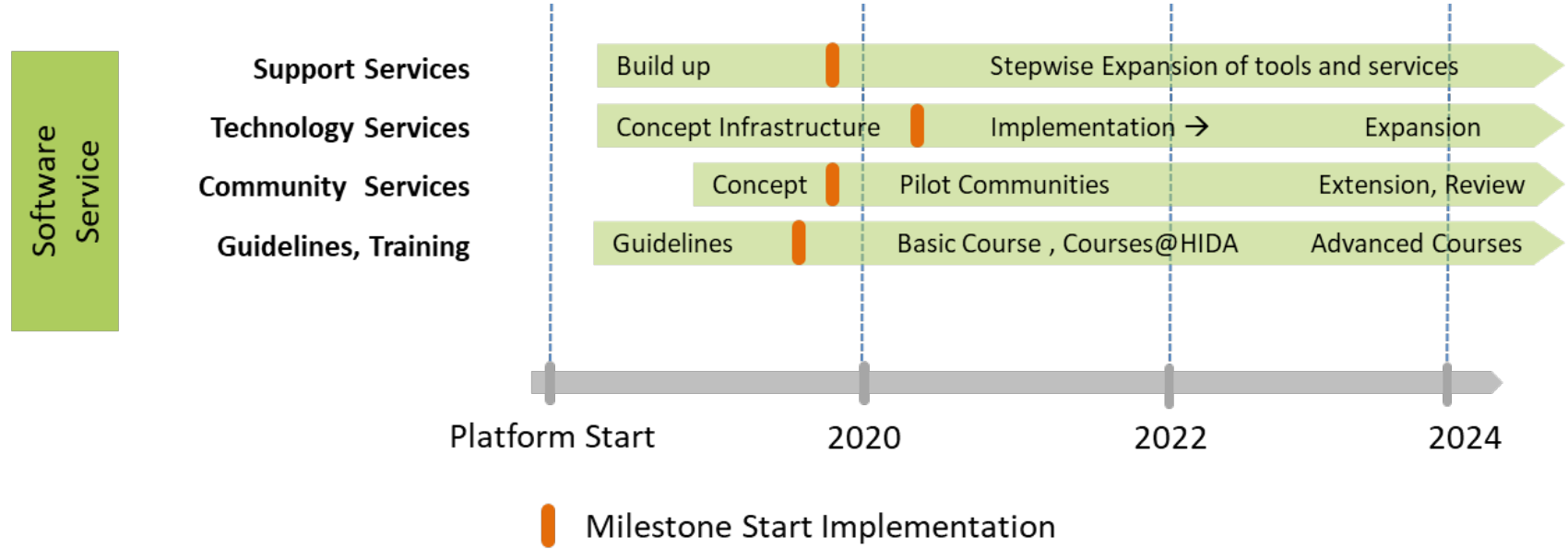
- **Services**
  - Trust and secure relationship
  - National and international compatibility
  - Common Authentication and Authorization Infrastructure (AAI)
  - Backup and data transfer services
  - …

Helmholtz Software Services

Task: Establish & Support a professional Software Development

- SW-Architecture
- Usability
- Licensing
- SW Engineering
- Code Review

Support Services

Technology Services

- Development & Test Infrastructure
- Repository
- Publication Service
- Project Management

Software Services

Helmholtz Software Services

- Exchange Network
- Communities for Scientific Domains
- Communities for Organiations
- Communities for SW-Technology

Community Services

Education &Training

- Basic Courses
- Advanced Courses
- Workshops
- Hackathons
- Guidelines, Handouts

Proposed Work Packages & Time line

Activities (Software Services Competence Cluster)

- **Portfolio & Process evaluation & definition**
  - preparation of a software development practice survey
  - determination of the demand on infrastructure and services
- **Technology Services**
  - inventory of available technologies and services
  - GitLab CI Service at Dresden using HDF Openstack Cloud in Jülich
  - new GitLab interface to zenodo / invenio developed
- **Guidelines & Training**
  - initial training catalogue created
  - first set of ready to use successful Software trainings held
  - memberships of "The Carpentries" (DLR, GFZ, HZDR)
  - software carpentry workshops at DLR
  - common work on a Software Policy for Helmholtz

Summary

Helmholtz Software Services will …

- be an integrated part of the Helmholtz Federated IT-Services – a new platform for a modern research environment

- raise software development at Helmholtz Centres to a new level of quality and protect invested efforts

- be part of an overall Helmholtz ICT strategy

- provide sustainable services to make research software **F**indable, **A**ccessible, **I**nteroperable and **R**eusable

Please visit us at www.hifis.net