



# Helmholtz Digital Services for Science - Collaboration made easy.

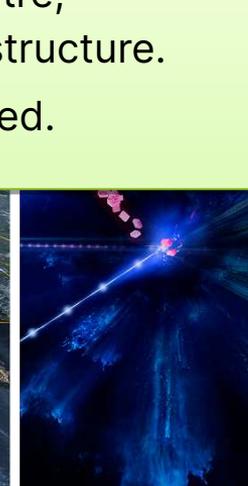
Uwe Jandt  
for the HIFIS-Team

DMA-ST1 Synergy Workshop  
Hamburg, DESY, 2023-11-09

# Incubator Platforms



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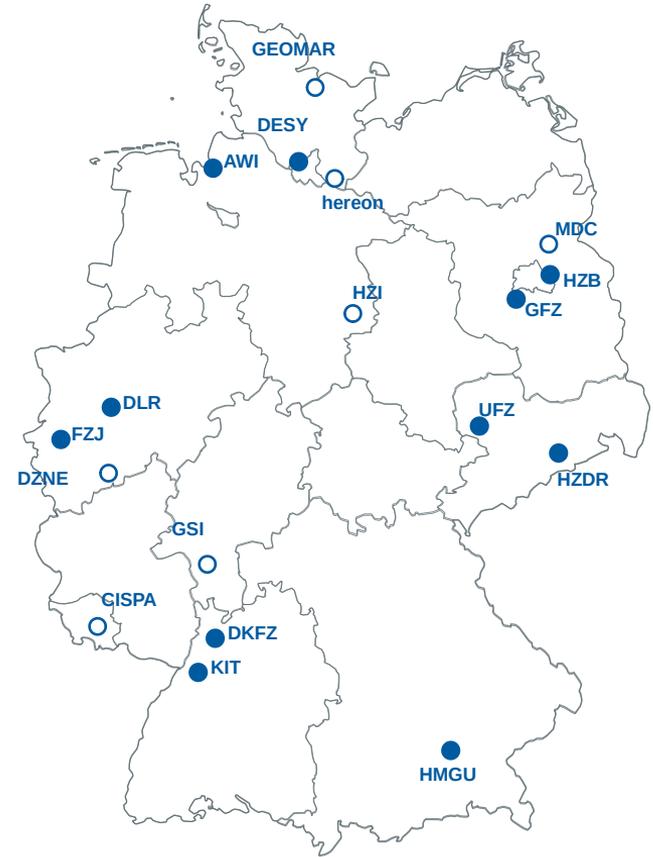
Energy	Earth and Environment	Health	Aeronautics, Space	Matter	Information
<p><b>Exploiting Synergies:</b> Cross-disciplinary, cross-centre, sharing of competences and infrastructure. Continuous funding envisioned.</p>					
					

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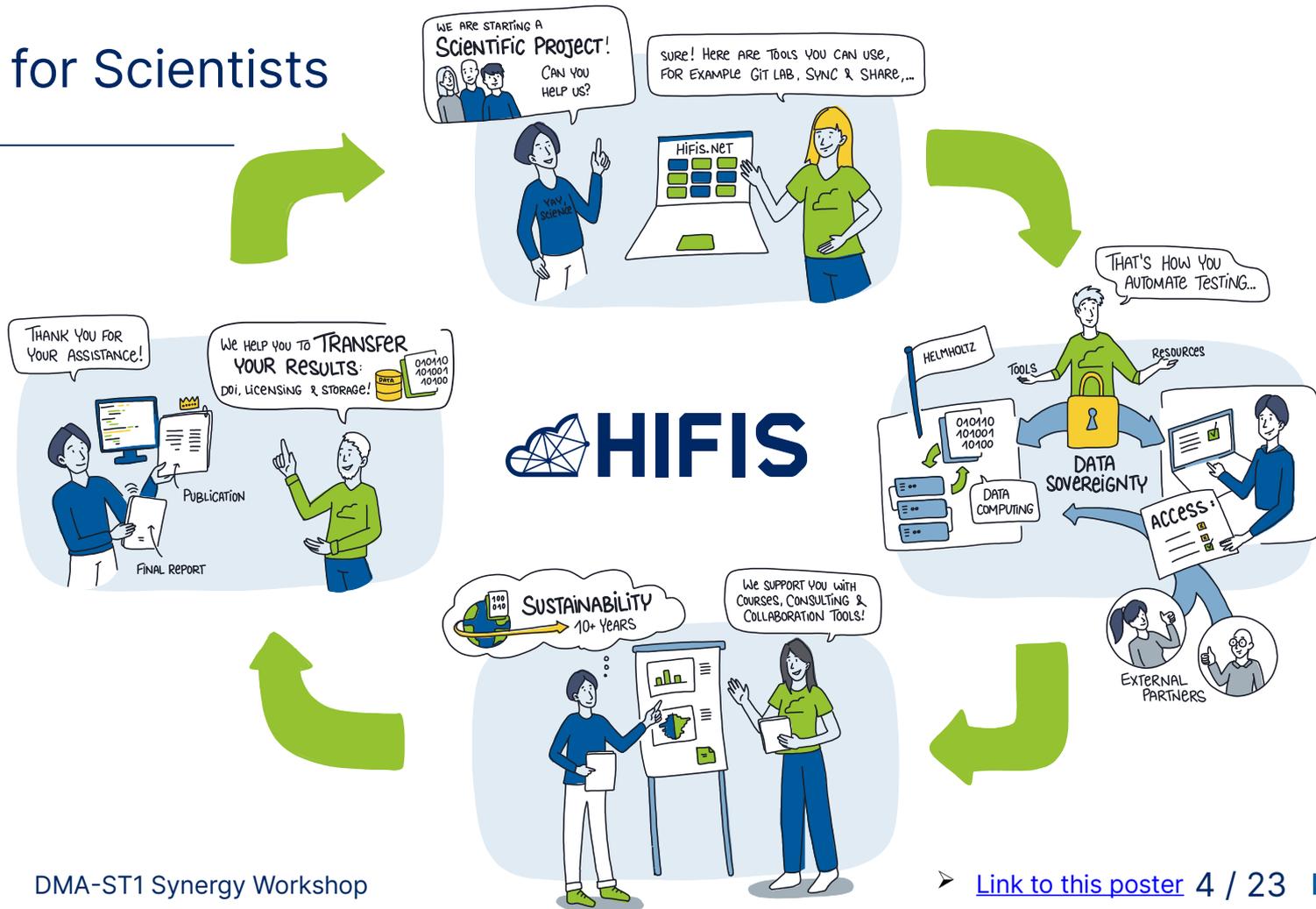
Energy	Earth and Environment	Health	Aeronautics, Space	Matter	Information
<p><b>Exploiting Synergies:</b> Cross-disciplinary, cross-centre, sharing of competences and infrastructure. Continuous funding envisioned.</p>					
<p><b>5 Platforms:</b> HIFIS, Helmholtz AI, Helmholtz Imaging, Helmholtz Metadata Collaboration, HIDA</p>					

# HIFIS Team

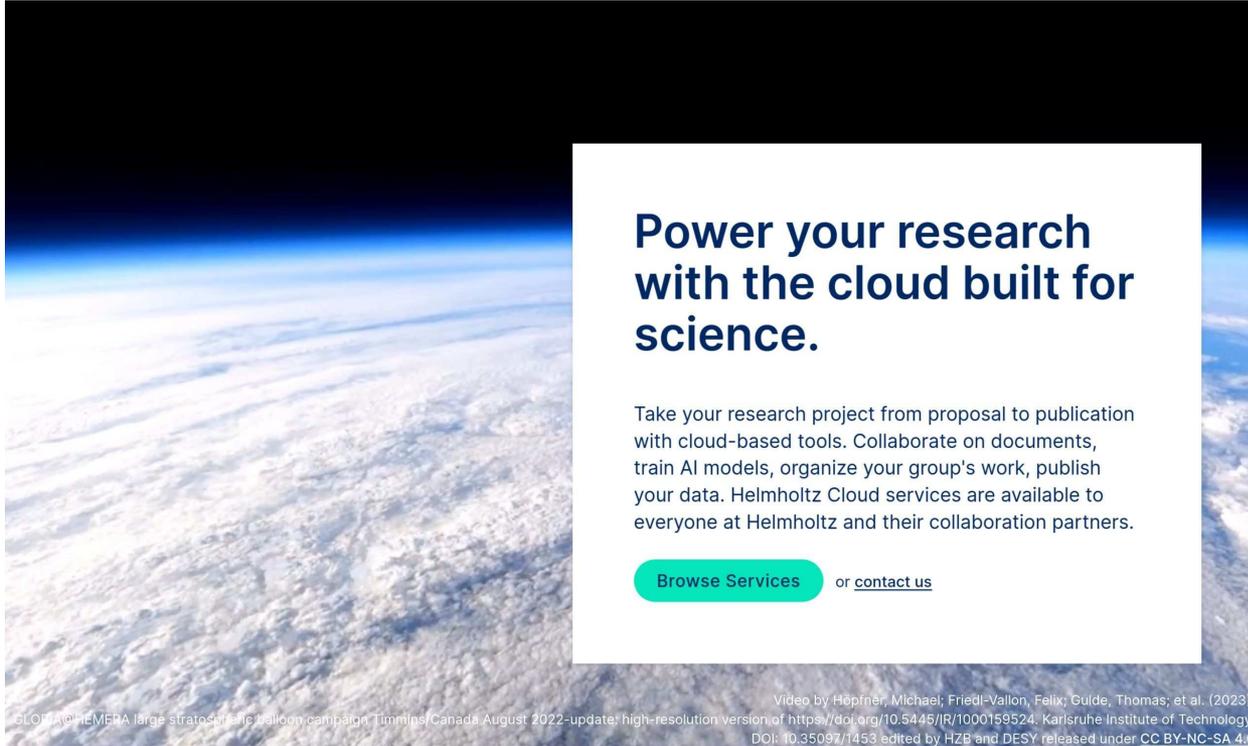
- 11 Centres for all-Helmholtz & Partners
- 3 Organisational Clusters: Backbone, Cloud, Software



# HIFIS for Scientists



# 1.) Infrastructure & Cloud Services

A wide-angle aerial photograph of Earth from space, showing the curvature of the planet, the blue atmosphere, and the white clouds over a brownish landmass.

**Power your research with the cloud built for science.**

Take your research project from proposal to publication with cloud-based tools. Collaborate on documents, train AI models, organize your group's work, publish your data. Helmholtz Cloud services are available to everyone at Helmholtz and their collaboration partners.

[Browse Services](#) or [contact us](#)

Video by Hefner, Michael; Friedl-Vallon, Felix; Gulde, Thomas; et al. (2023): GLOFAS@HEMERA large stratospheric balloon campaign Timmins/Canada August 2022-update: high-resolution version of <https://doi.org/10.5445/IR/1000159524>. Karlsruhe Institute of Technology. DOI: 10.35097/1453 edited by HZB and DESY released under CC BY-NC-SA 4.0

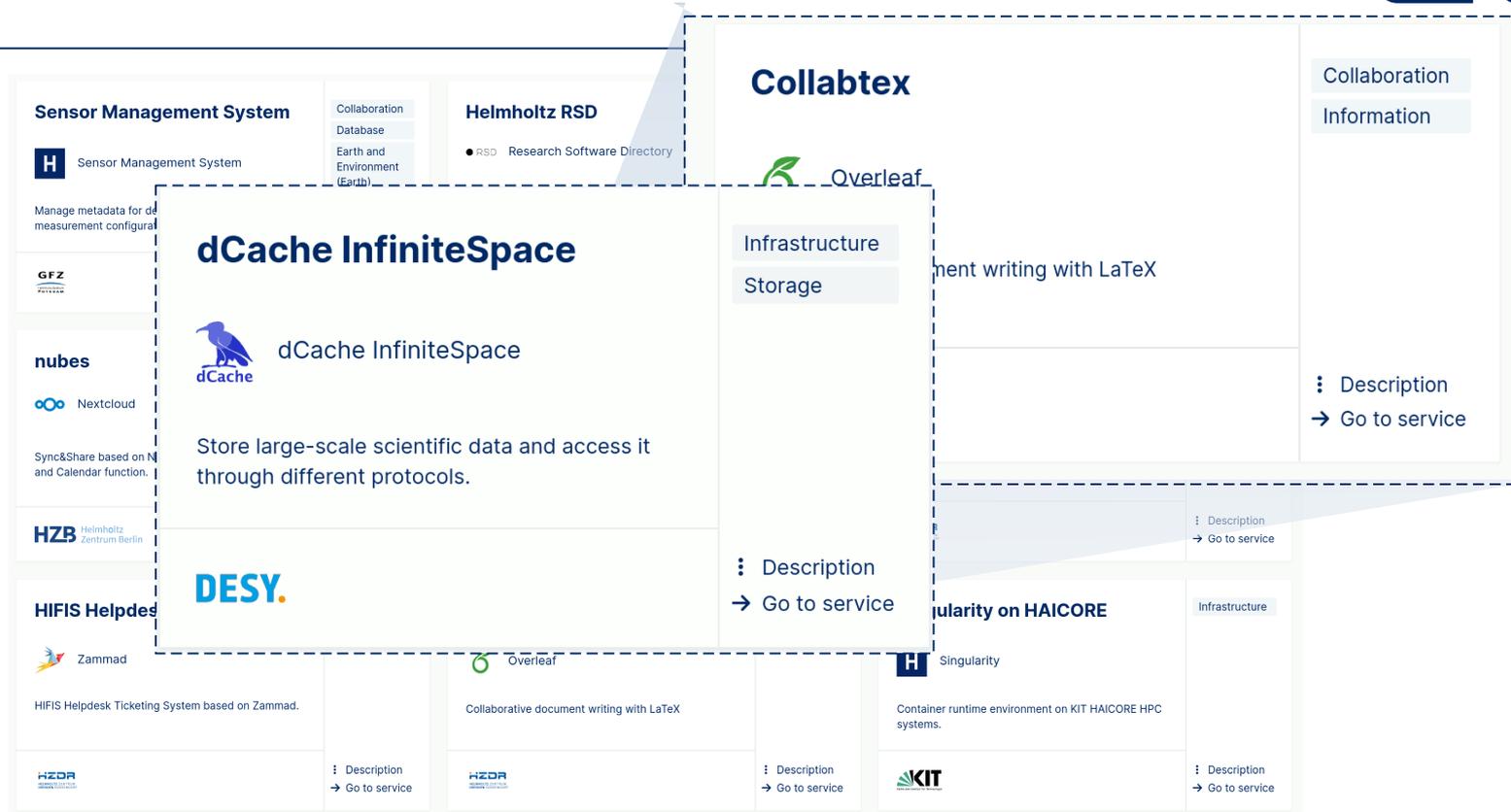
# 1.) Infrastructure & Cloud Services

<b>Sensor Management System</b>  Sensor Management System Manage metadata for devices, platforms & measurement configurations.  : Description → Go to service	Collaboration Database Earth and Environment (Earth) Science	<b>Helmholtz RSD</b> • RSD Research Software Directory Promote and discover research software developed in the Helmholtz Association.  : Description → Go to service	Database Science	<b>LimeSurvey</b>  LimeSurvey CE An Open source on-line statistical survey web application. <b>HELMHOLTZ MUNICH</b> : Description → Go to service	Collaboration Survey
<b>nubes</b>  Nextcloud Sync&Share based on Nextcloud with Office for Web and Calendar function.  : Description → Go to service	Collaboration Sync & Share	<b>Mattermost</b>  Mattermost A hosted chat service for everyone within Helmholtz based on Mattermost.  : Description → Go to service	Chat Collaboration	<b>Helmholtz Codebase</b>  GitLab A web-based DevOps lifecycle tool that provides a Git-repository manager.  : Description → Go to service	Collaboration Infrastructure
<b>HIFIS Helpdesk</b>  Zammad HIFIS Helpdesk Ticketing System based on Zammad.  : Description → Go to service	Collaboration	<b>Collabtex</b>  Overleaf Collaborative document writing with LaTeX  : Description → Go to service	Collaboration Information	<b>Singularity on HAICORE</b>  Singularity Container runtime environment on KIT HAICORE HPC systems.  : Description → Go to service	Infrastructure

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# 1.) Infrastructure & Cloud Services



The screenshot displays a grid of service cards on the HELMHOLTZ Cloud platform. A dashed blue box highlights a central area containing the following services:

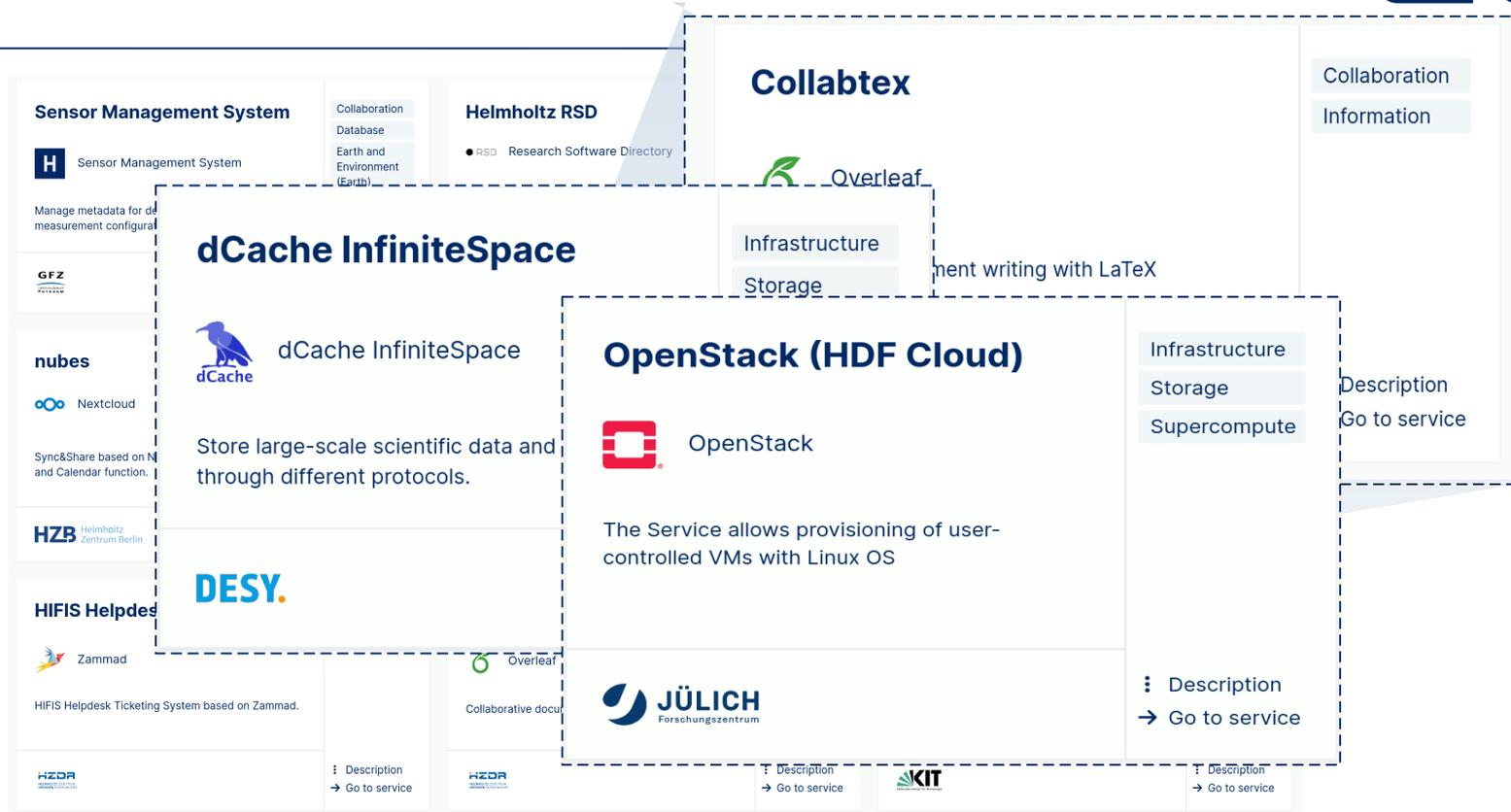
- Sensor Management System**: Manage metadata for data measurement configurations. Includes a 'Collaboration Database' for Earth and Environment (Earth).
- Helmholtz RSD**: Research Software Directory.
- dCache InfiniteSpace**: Store large-scale scientific data and access it through different protocols. Includes a 'Collaboration Database' for Earth and Environment (Earth).
- Collabtex**: Collaborative document writing with LaTeX. Includes 'Infrastructure' and 'Storage' categories.
- Overleaf**: Collaborative document writing with LaTeX.
- DESY**: A service card with a description and 'Go to service' link.

Other visible services include:

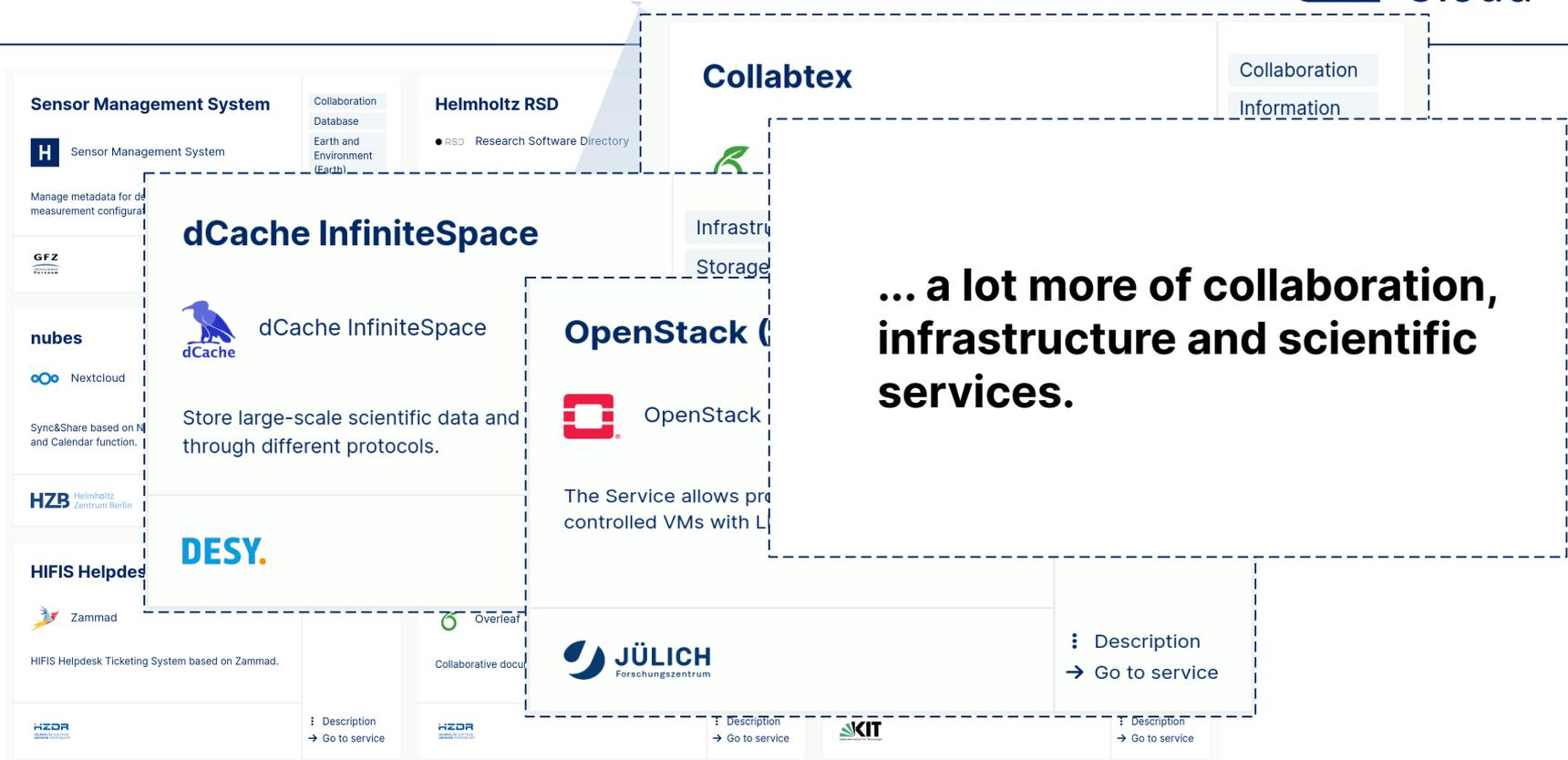
- nubes**: Sync&Share based on Nextcloud and Calendar function.
- HZB**: Helmholtz Zentrum Berlin.
- HIFIS Helpdesk**: HIFIS Helpdesk Ticketing System based on Zammad.
- Singularity**: Container runtime environment on KIT HAICORE HPC systems.

Each service card typically includes a logo, a brief description, and a 'Description' link with a 'Go to service' arrow.

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The screenshot displays a grid of service cards for Helmholtz Cloud. A dashed blue box highlights a central area containing the following services:

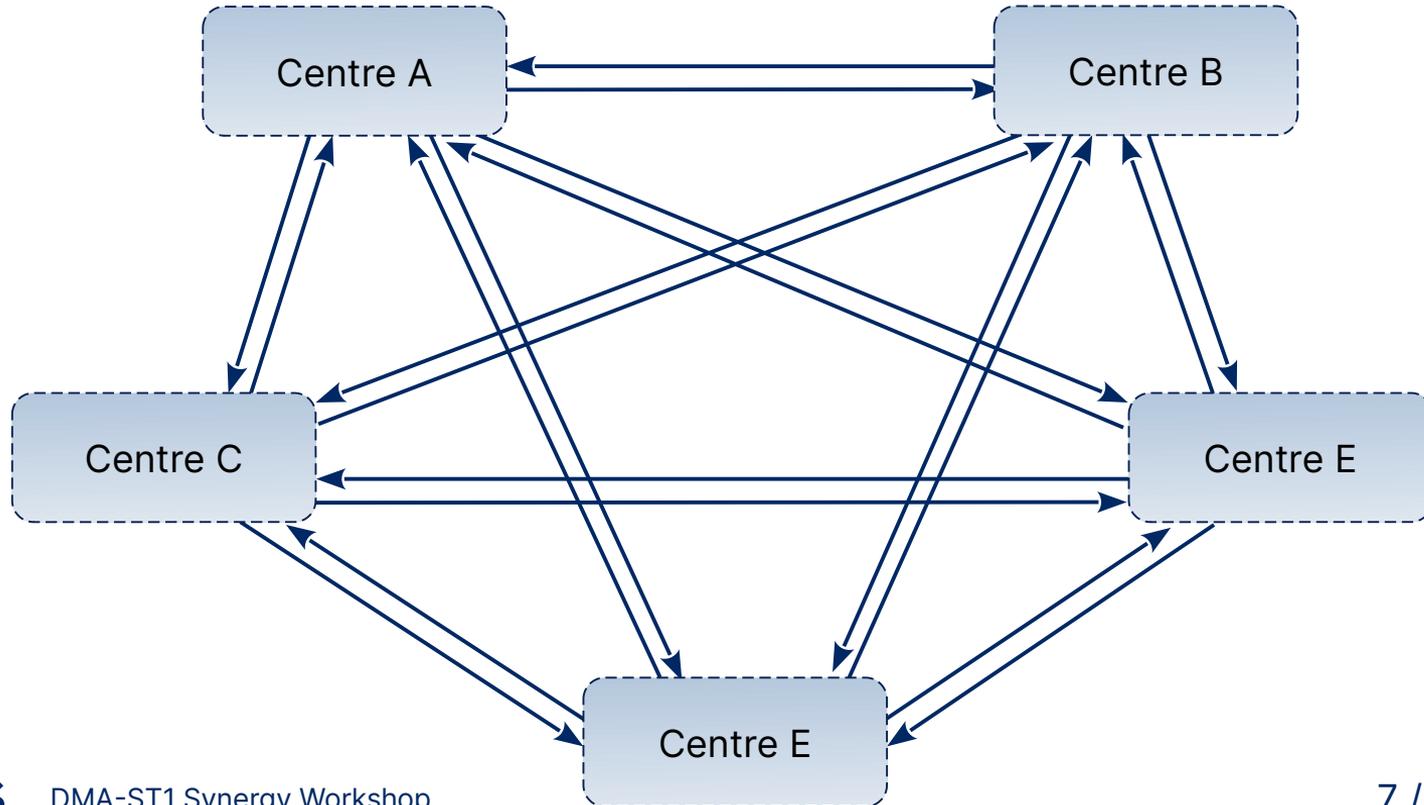
- Collabtex**: Collaboration Information
- dCache InfiniteSpace**: Store large-scale scientific data and through different protocols.
- OpenStack**: The Service allows pro... controlled VMs with L...
- JÜLICH Forschungszentrum**: Collaborative docu...

Other visible services include:

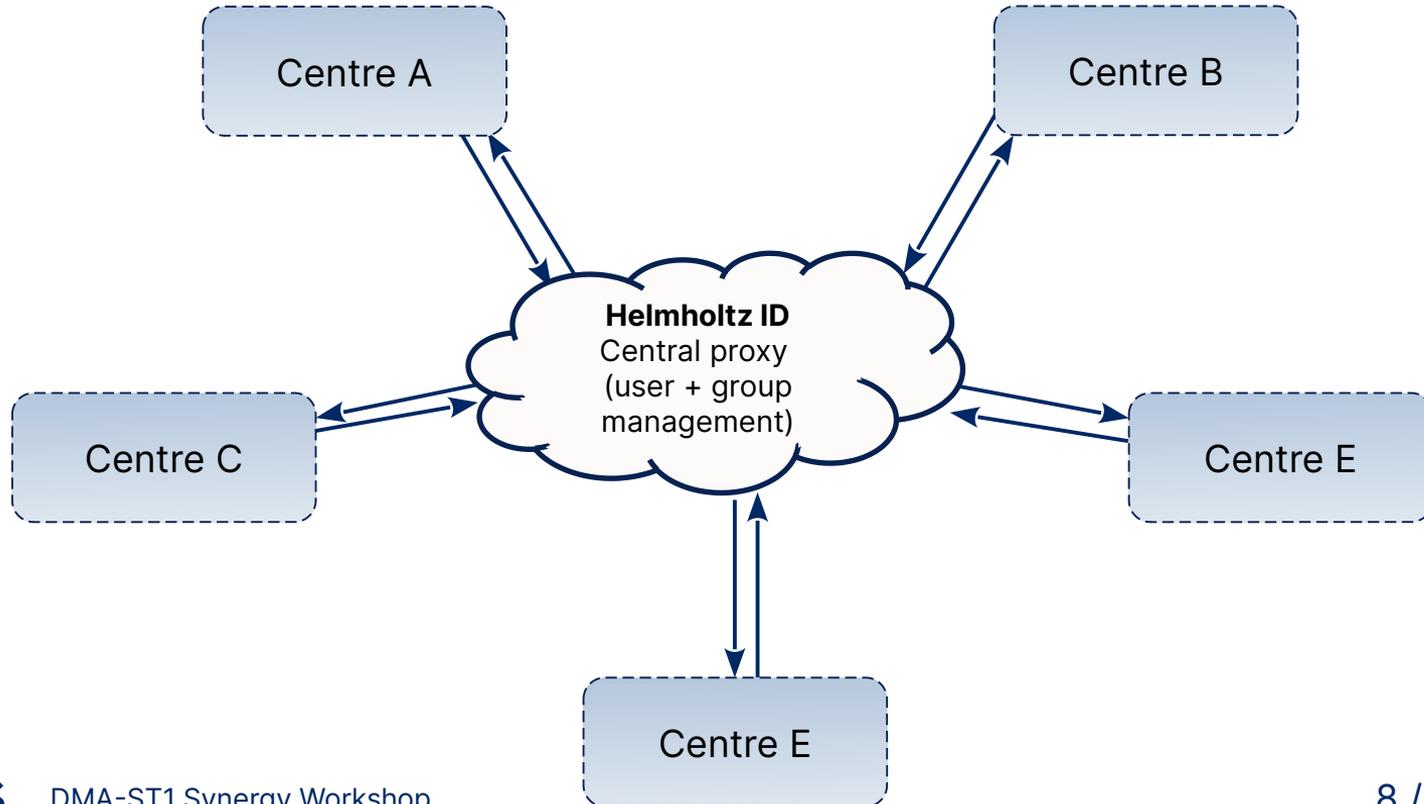
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Each service card includes a logo, a title, a brief description, and a 'Description' / 'Go to service' link. A large text overlay in the center of the highlighted area reads: **... a lot more of collaboration, infrastructure and scientific services.**

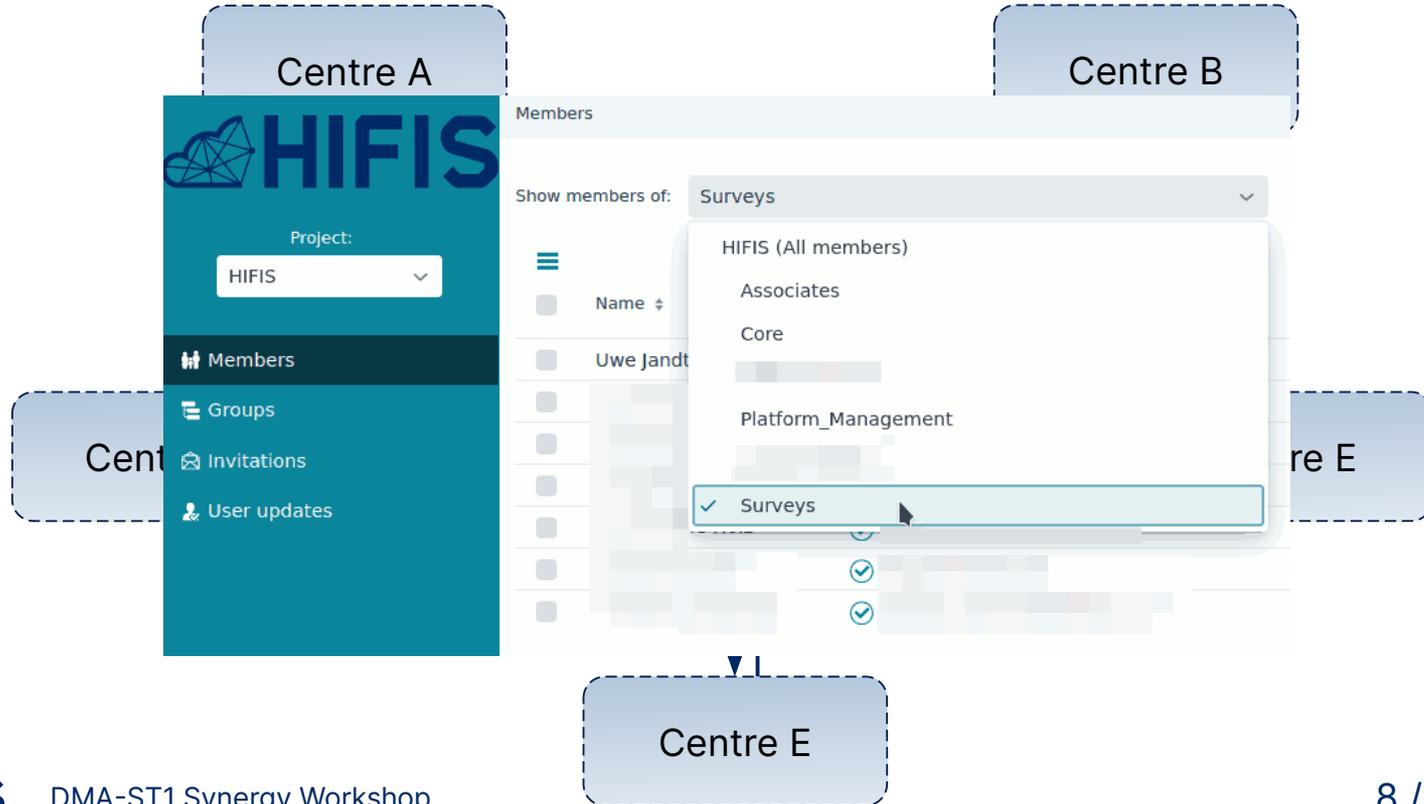
# 1.) AAI: Unified User & Group Management



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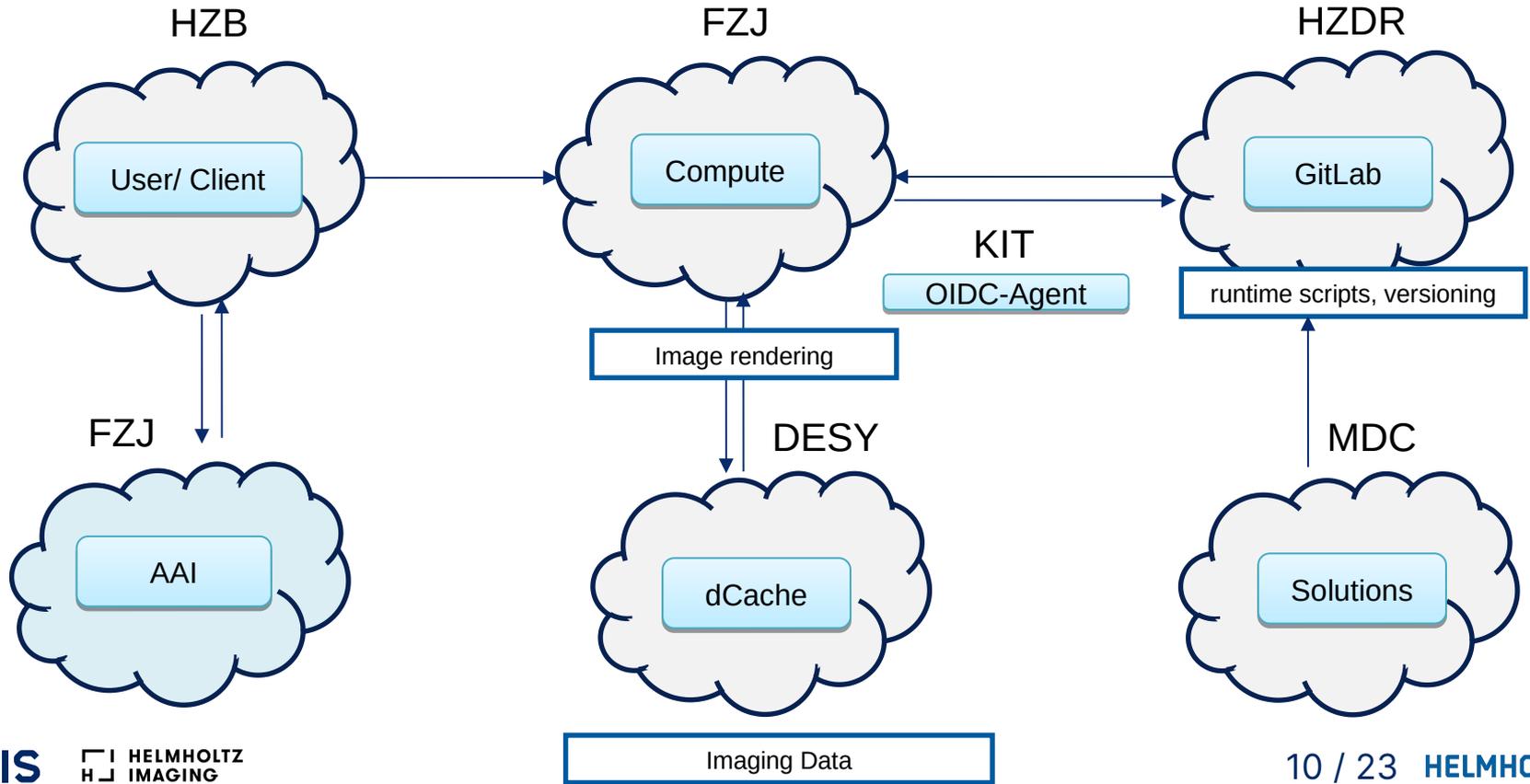


# Example: Distributed Cloud Services 4 Science

- **6 Sites involved:**
  - 3 Cloud Services Sites,
  - 2 Component provider,
  - 1 using centre
- **Thanks to AAI, transparent access possible:**
  - After first login, no further credentials required
  - Efficient and transparent transfer of data from service to service between sites (Code, data)



# Example: Distributed Cloud Services 4 Science



# Example: Distributed Cloud Services 4 Science

HZB



FZJ



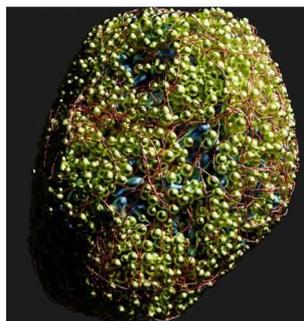
FZJ

```

06:33:35 INFO - Exporting mesh to /opt/results/4_low_c3_mitochondria_mask.stl..
06:33:48 INFO - Finished pixel-to-mesh
06:33:48 INFO album version 0.9.2
06:33:49 INFO - Starting pixel-to-mesh
06:34:04 INFO - Exporting mesh to /opt/results/5_low_c3_golgi_corrected.stl..
06:34:08 INFO - Finished pixel-to-mesh
##### c3_SWOR_KDIR/results
##### rsync -avP $WORKDIR/results/*.stl $WORKDIR/dCache/STLS
sending incremental file list
1_low_c3_microtubules.stl      83,725,584 100% 643.07MB/s
2_low_c3_granules.stl        260,632,884 100% 91.92MB/s
3_low_c3_nucleus_mask.stl    21,124,284 100% 4.69MB/s
4_low_c3_mitochondria_mask.stl 165,540,784 100% 69.70MB/s
5_low_c3_golgi_corrected.stl 29,621,984 100% 8.77MB/s
sent 560,782,035 bytes received 111 bytes 38,674,636.76 bytes/sec
total size is 560,644,700 speedup is 1.00
##### album run de.mdc-berlin:blender-import-meshes:0.1.0-SNAPSHOT --input $WORKDIR/res
/its --output rendering $WORKDIR/results/results_mesh.png --output_blend $WORKDIR/results
/results_mesh_blend --decimate_ratio 0.42
    
```

KIT

DESY

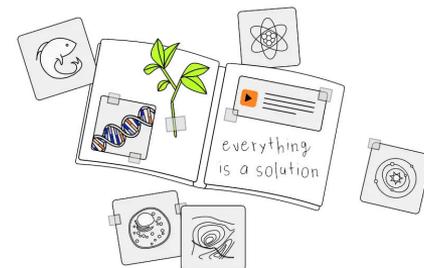


HZDR

```

221
222 echo -e "#### for TIF in *.tif\n#### do\n#### album run
de.mdc-berlin:pixel-to-mesh:0.1.0-SNAPSHOT --gauss_sigma 1
--gauss_threshold 1 --mesh_threshold 0.2 --input $TIF --output
$WORKDIR/results/\`basename $TIF .tif\`.stl\n#### done"
225
226
227 for TIF in *.tif
228 do
229 album run de.mdc-berlin:pixel-to-mesh:0.1.0-SNAPSHOT --gauss_sigma 1
--gauss_threshold 1 --mesh_threshold 0.2 --mesh_step_size 2 --input $TIF
--output $WORKDIR/results/\`basename $TIF .tif\`.stl
232 done
233
234 trap 'read -p "#### $BASH_COMMAND"' DEBUG
235
236 # Run STL to Blender conversion and copy stl files to dCache directory
237
238 cd $WORKDIR/results
239 rsync -avP $WORKDIR/results/*.stl $WORKDIR/dCache/STLS
240
    
```

MDC



# 1.) Infrastructure for good scientific practices in RSE

Supporting the whole software development lifecycle



**Dependabot**

Security: Automate dependency updates

Deployed and made available with

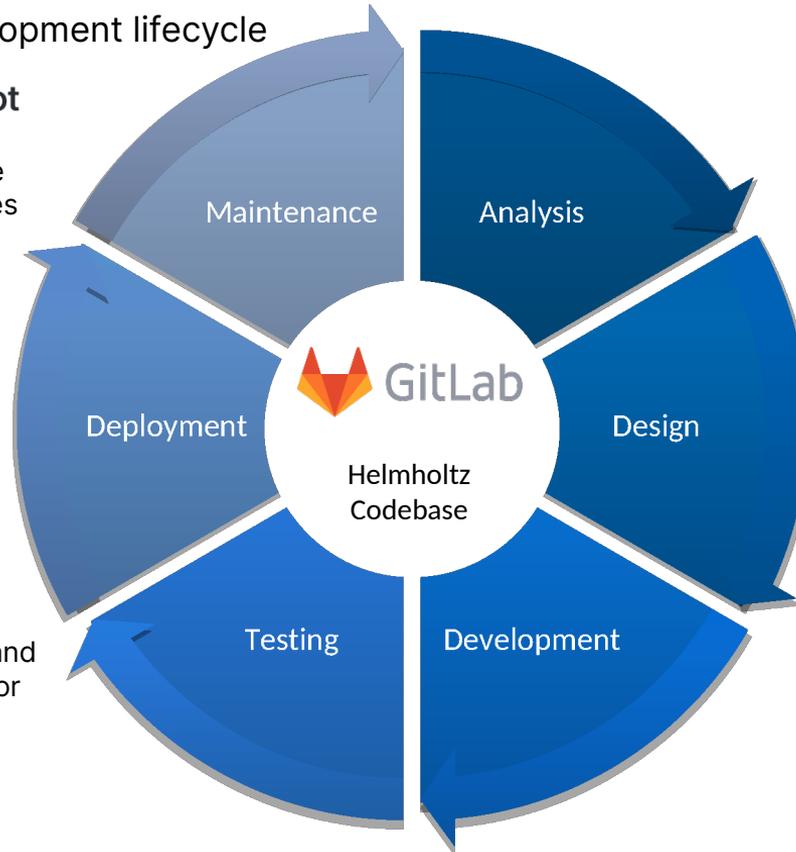


ANSIBLE

<https://github.com/hifis-net>



Continuous Integration and Deployment available for everyone by default



**Kroki**  
Diagram creation



Team communication

# 1.) Procedures & Legal Aspects

## Processes

- Management of the service portfolio
- Brokering of (cloud) services
- Coordination and partial operation of User Support

## Finance

- HIFIS funding by Helmholtz Association
- Use of services is free of charge
- Provision of services by the centres



## 2.) Helmholtz Software

Best-practices for sustainable Research Software Engineering on multiple levels:

### Education & Training

**Courses, material and workshops** for getting you started or boosting your software engineering practice.

### Community

Build and foster communities to support the **cultural change** when dealing with research software. Maintain a SW Directory

### Consulting

**Contact points** for researchers for questions and problems in the context of RSE.

### Technology

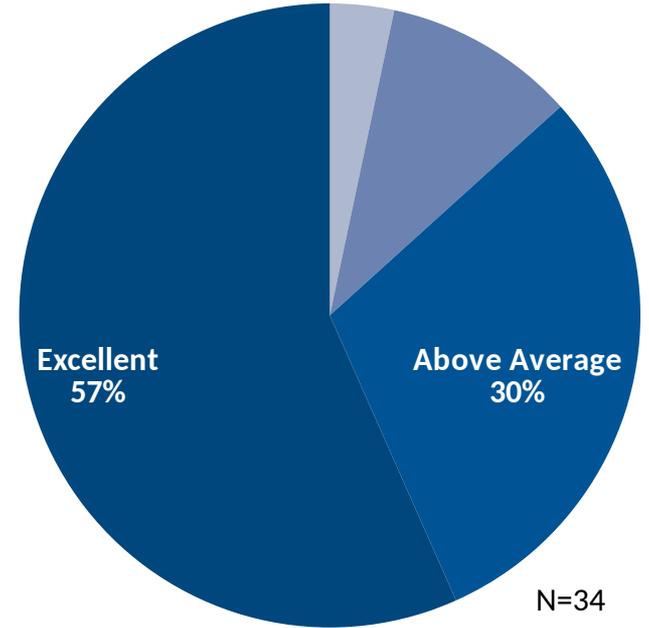
Provide a sustainable, well integrated and easy to use **technology infrastructure** for research software development.

## 2.) Helmholtz Software: Consulting

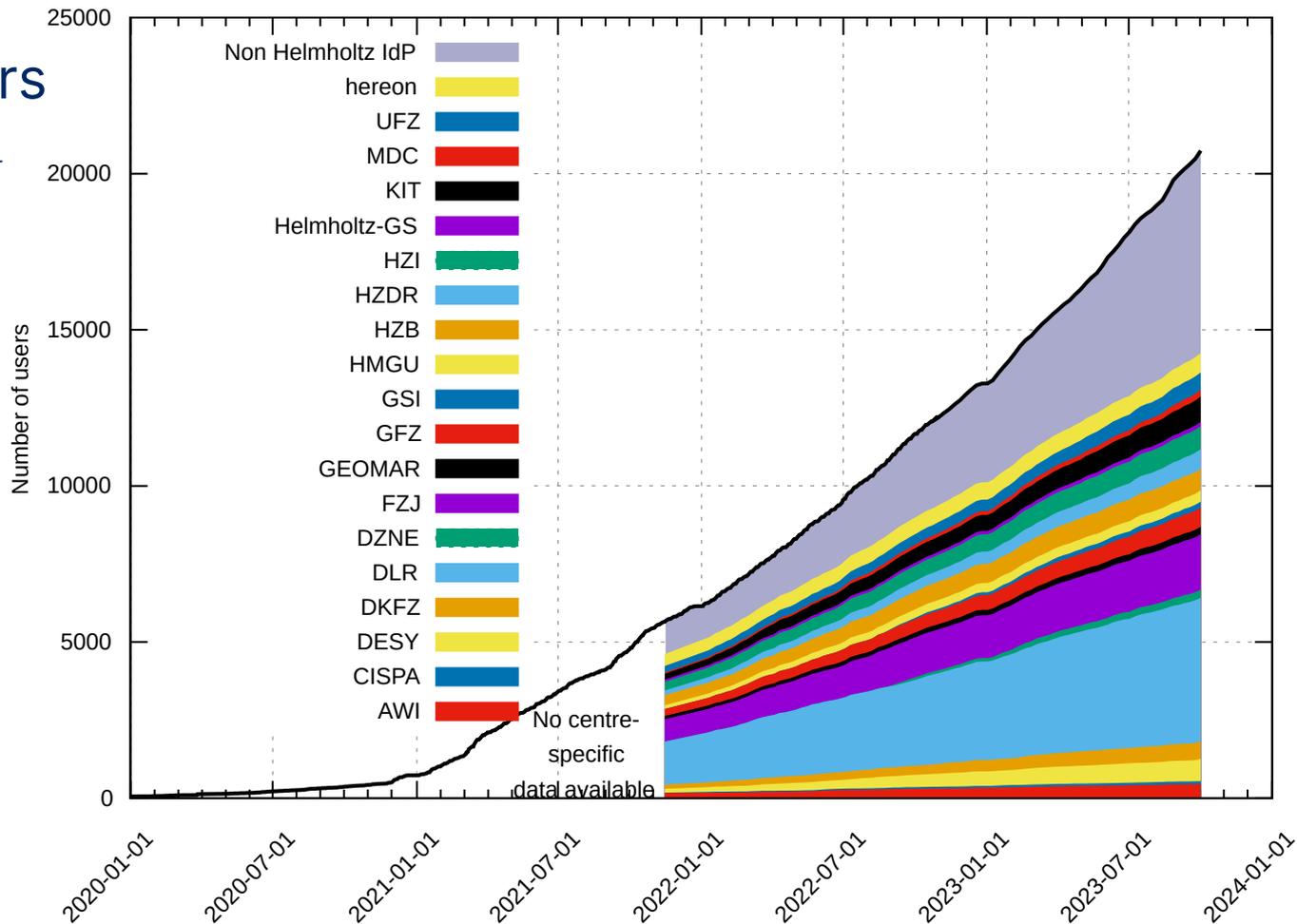
Great idea and a great support especially since there is no other person programming in my research group.  
Very happy that you came up with this!

For us, it would be perfect to have such a consulting service over a longer period of time, e.g. for 6-12 months with regular meetings.

Impact of the consultation on your project or work



# Some Numbers



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>20k users

of which are ~5k non-Helmholtz

18 Centres

One Login

~190

Institutions with  
users in AAI

33

Helmholtz Cloud Services  
from 9 centres

>75

Cross-centre  
Collaborating groups  
(VO)

>1.000

Support tickets in  
2022

~ 15

Crossover Events, incl HIDA:  
Hackathons, Summer Academy...

>1.800

Software course  
participants

>950

Monthly active projects in  
the Helmholtz Codebase

# Overall Benefits for Science & Helmholtz

## HIFIS



### Added value for Science

- Facilitate **scientific research**
- Enable modern **Research Software Engineering**
- Intensify and expand **partnerships**
- **Single Point of Contact** for Helmholtz Digital Services

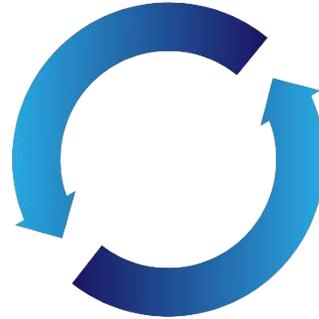
### Collaboration made easy

- **Connecting Helmholtz**: AAI, Backbone
- Trusted **Collaboration** Platform
- Consistent **Communication** Forums
- **Simple Access**, minimal formalities

### Sustainable Services

- **Digital Sovereignty**
- **Resilience** and Cyber Security by Redundancy
- **Standards** for Federated Services
- **Synergy** by Consolidation of Services

So this goes hand in hand...



Several NFDI Consortia

# Evaluation



- **Excellent progress** setting up initial structures and services in all clusters
- **Uptake** of services good and **increasing**
- **Enthusiastic, well working team**, full of motivation and engagement.
- **Building trust** among all 18 centres: HIFIS is a **catalyst** here
- Now turning from build-up to operation phase: **Adapt!**
- HIFIS can be a **role-model** for similar activities elsewhere
- **Strongly recommend to continue the platform!**

# Ongoing Works & Plans

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- **Awareness:** Branding of HIFIS services to make researchers aware what they are using, even beyond Helmholtz.
- **Coverage:** Make HIFIS services commonly accepted and practically used by all Helmholtz centres.
- **Interaction with users:** Increase where possible interaction with end users.
- **Cyber security:** Coordination and increased resilience of core components
- **International collaboration:** Further promote federated technologies and cooperation on resource sharing.
- **Scale Effects:** Exploit increased weight of all Helmholtz vs single centres; improved specialization and consolidated use cases

# Helmholtz Digital Services for Science — Collaboration made easy.

## I. Just try it!

- Most Software and Cloud Services readily available for Helmholtz + Partners
- User-oriented workflows will be integrated continuously

## II. See what's there & Spread the word!

- <https://hifis.net/media>
- <https://helmholtz.cloud>
- <https://hifis.net/newsletter>

## III. Consult us:

- [support@hifis.net](mailto:support@hifis.net)





Thank you!





Thank you!



Questions?