

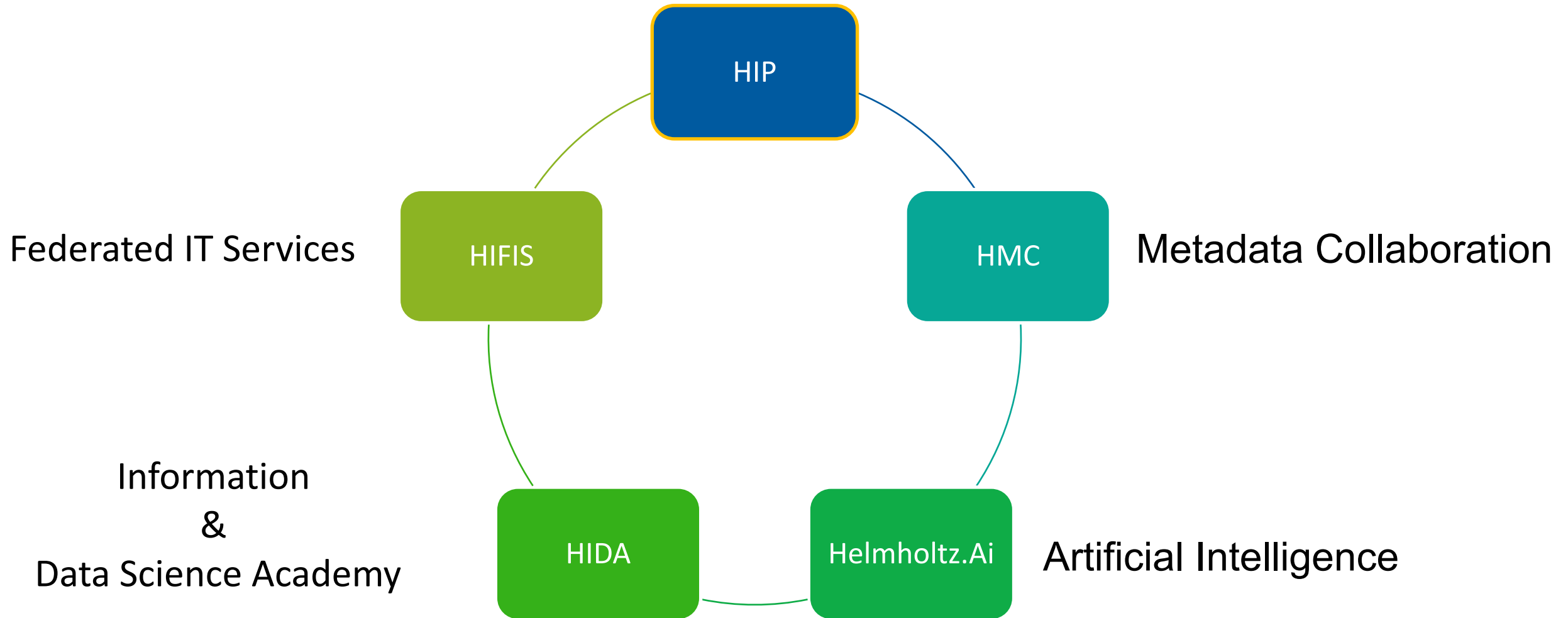
# HIP – HIP - Hurra!

Philipp Heuser

03.08.2020 @ RICs Cafe

# Helmholtz Incubator Projects

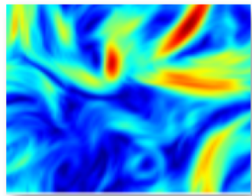
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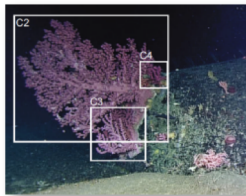
# Helmholtz Imaging Platform

## Imaging at the Helmholtz Association

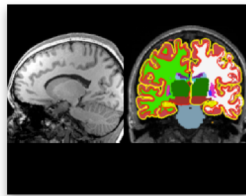
across all fields and centres Imaging is present at Helmholtz



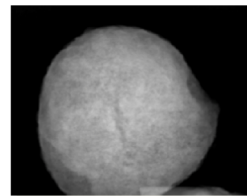
plasma physics



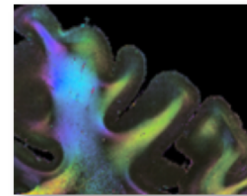
ocean sciences



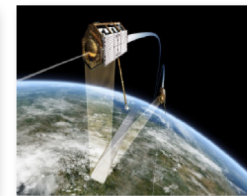
medical diagnostics



material sciences



neuro sciences



global observatories



Energy



Earth & Environm.



Health



Matter



Key-Technologies



Aeronautics,  
Space & Transport

- unique portfolio of imaging modalities
- core competence of research at Helmholtz
- substantial part of the data treasure

Data Aquisition

Data Preparation

Data Management

Data Analysis

# Helmholtz Imaging Platform

## Mission

Unlock the potential of imaging in the Helmholtz Association and beyond

- bring scientists and engineers together
- promote and develop imaging science
- foster synergies across imaging modalities and applications





# Helmholtz Imaging Platform

HIP

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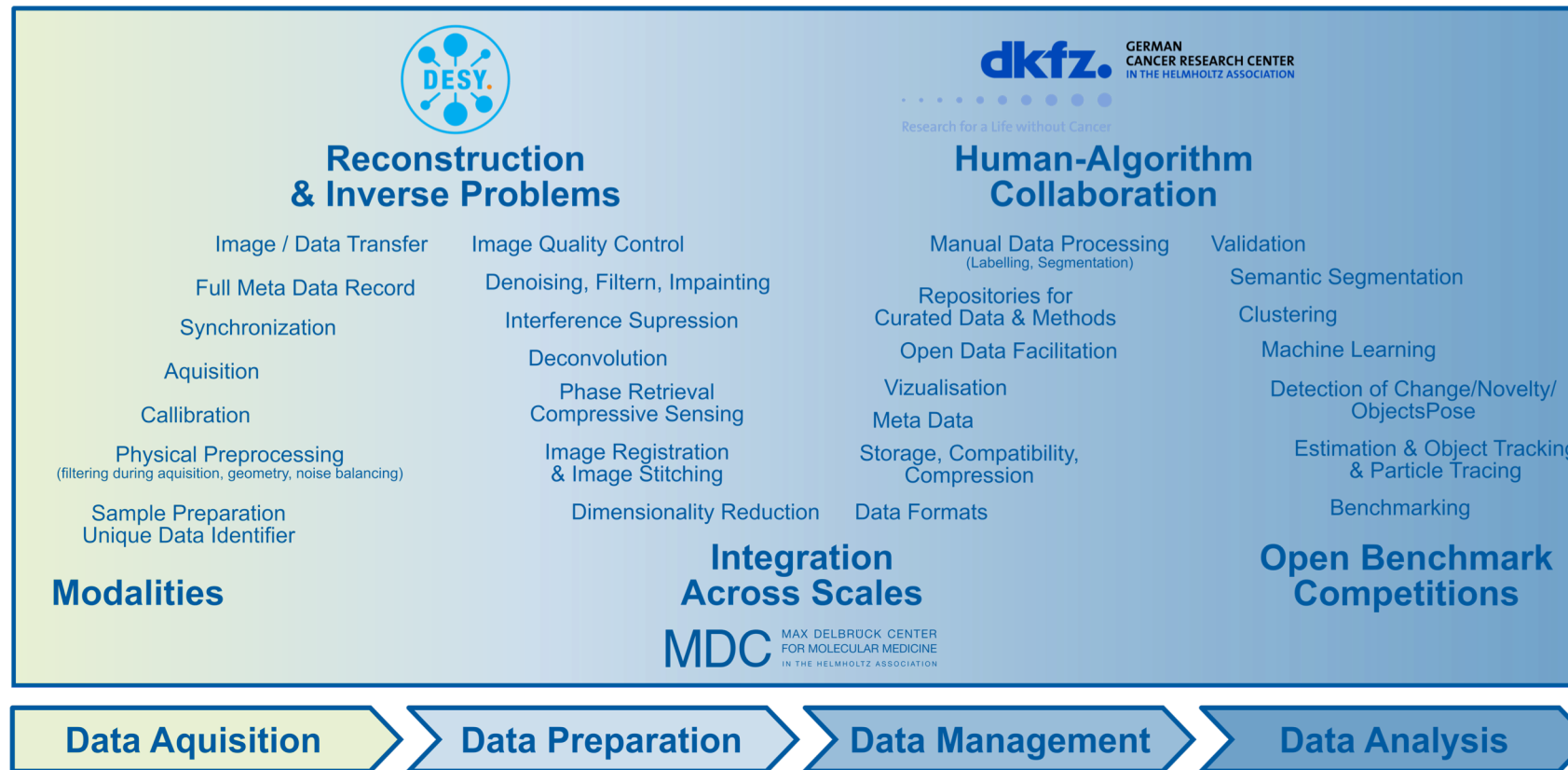
**dkfz.**  
DEUTSCHES  
KREBSFORSCHUNGSZENTRUM  
IN DER HELMHOLTZ-GEMEINSCHAFT

**MDC** MAX-DELBRÜCK-CENTRUM  
FÜR MOLEKULARE MEDIZIN  
IN DER HELMHOLTZ-GEMEINSCHAFT

# Implementation of HIP Core

## Distributed HIP Core

Covering imaging science along the full imaging pipeline



Synergies:

holistic approach to imaging process

e.g.:

- combine feature recognition with inverse problem
- feed back multimodal data into reconstruction
- standardize interfaces & formats

→ HIP Solutions

# Helmholtz Imaging Platform

## HIP Core: Scientific support along the full imaging pipeline

### Reconstruction & Inverse Problems

- HIP Solutions for new imaging modalities and inverse problems
- Benchmark Datasets for different modalities and algorithms
- Modalities DB



### Human-Algorithm Collaboration

- Manual and semi-automatic labelling of image data
- Automatic image analysis
- Validation and benchmarking



GERMAN CANCER RESEARCH CENTER  
IN THE HELMHOLTZ ASSOCIATION

### Human-Algorithm Collaboration

- Manual Data Processing (Labelling, Segmentation)
- Repositories for Curated Data & Methods
- Open Data Facilitation



DEUTSCHES  
KREBSFORSCHUNGSZENTRUM  
IN DER HELMHOLTZ-GEMEINSCHAFT

### Integration Across Scales

- Development of the HIP Solution framework, a common data and algorithmic model for the HGF
- HIP solutions for image data stitching, fusion, and visualization

### Modalities

- Physical Preprocessing (filtering during acquisition, geometry, noise balancing)
- Sample Preparation Unique Data Identifier

Data Acquisition

Data Preparation

Data Management

Data Analysis

MDC

MAX DELBRÜCK CENTER  
FOR MOLECULAR MEDICINE  
IN THE HELMHOLTZ ASSOCIATION

# HIP

## Personnel



MDC  
MAX-DELBRÜCK-CENTRUM  
FÜR MOLEKULARE MEDIZIN  
IN DER HELMHOLTZ-GEMEINSCHAFT

dkfz.  
DEUTSCHES  
KREBSFORSCHUNGSZENTRUM  
IN DER HELMHOLTZ-GEMEINSCHAFT

<b>Core Team</b>	Scientific Coordinator Admin Coordinator +3		
<b>Research</b>	W3 Professor with Uni HH <b>Reconstruction &amp; Inverse Problems</b> 2 Postdoc & 2 PhD	W3 Professor <b>Integration Across Scales</b> 2 Postdoc & 2 PhD	Junior Group <b>Human-Algorithm Interaction</b> 3 Postdoc & 4 PhD In 3 groups
<b>Service Team</b>	David, Franz, Philipp <b>HIP modalities</b> <b>HIP projects</b>	3 FTE <b>HIP solutions</b>	5 FTE <b>HIP helpdesk</b>



Christian Schroer



Volker Gülzow



Sara  
Krause-Solberg



Knut Sanders



Thoralf Niendorf



Klaus Maier-Hein



Lena Maier-Hein

# HIP Projects

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HIP Projects are granted to **cross-disciplinary research teams to promote imaging science**. They initiate cross-cutting research collaborations and identify **innovative research topics at the intersection of imaging and information & data science**.

HIP Projects can apply for a volume of up to **€ 400 000**. Half of the financial volume and at most **€ 200 000** will be funded by the INF. **Maximum running time for HIP Projects is 3 years**.

**First call is published; Deadline 11 Sep 2020; Project Start Nov/Dec 2020**

# Services to the Imaging community

## HIP Solutions

Common platform for solutions created within HIP

- toolbox for imaging
- enable sharing of methods, algorithms, software, ...

HIP Solutions framework:

- centrally hosted website for algorithms and methods and software/data repository
- provide common formats for data, metadata, and annotations (coop. with HMC, FAIR principle):
  - ease exchange of code and results between domains
- unify and generalize software created within HIP and the Helmholtz Association

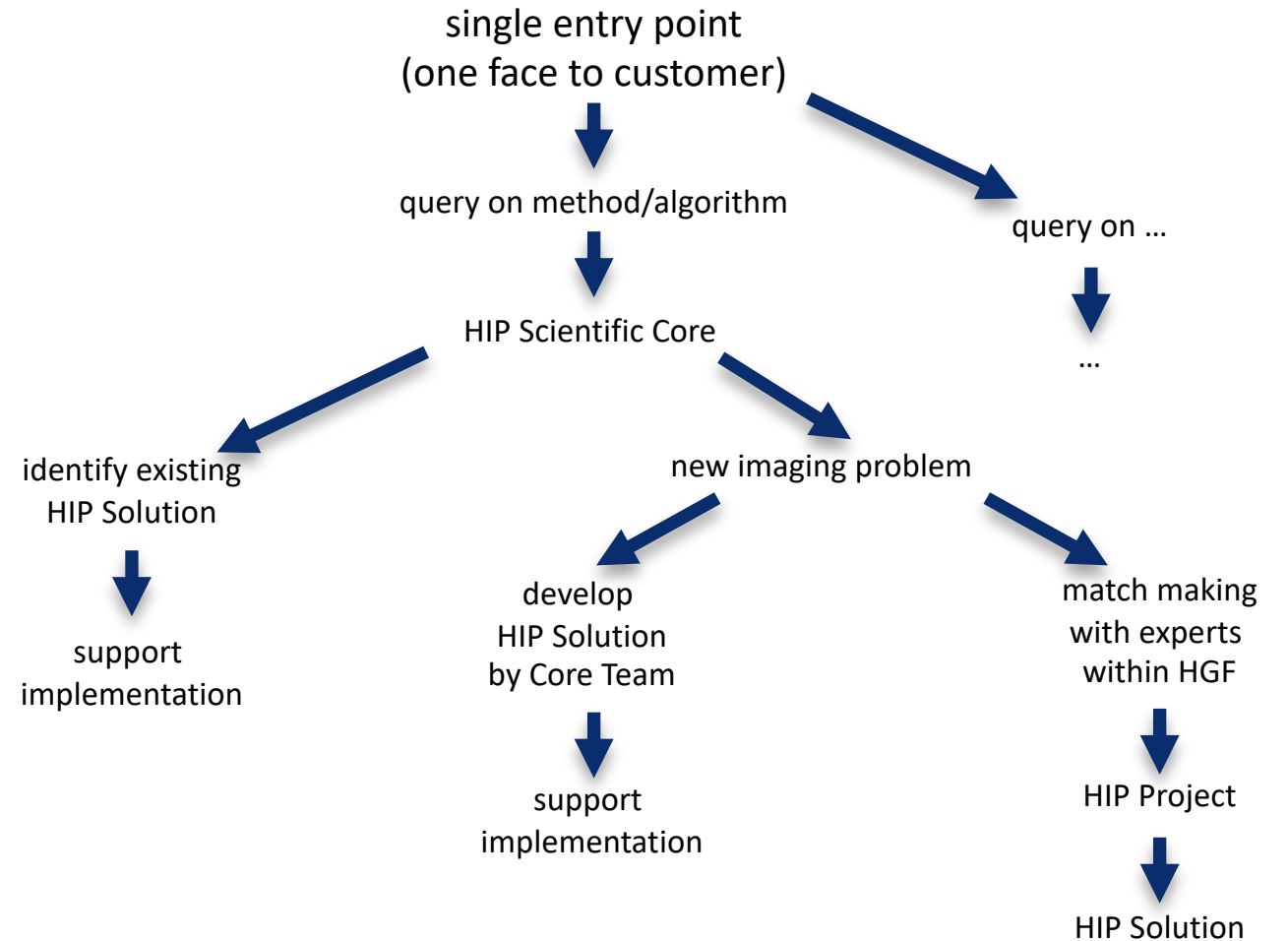


# Services to the Imaging community

## HIP Help Desk

Broker for science and services:

- HIP Network
  - ▶ modalities
  - ▶ imaging experts
  - ▶ application experts
- HIP Solutions (algorithms, tools, ...)
- HIP Projects (partners & experts in HGF)
- HIP Scientific Support
  - ▶ algorithm & software development
  - ▶ annotation
  - ▶ benchmarking





# Helmholtz Imaging Platform

## HIP Service Team @ DESY

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Philipp Heuser, David Schwartz, Franz Rhee



- **HIP modalities** – the Helmholtz imaging modalities DB
- **HIP projects** – support of the HIP projects
- **benchmark datasets** for different modalities and algorithms

# Helmholtz Imaging Platform

HIP Service Team @ DESY



Philipp Heuser, David Schwartz, Franz Rhee

**HIP  
Modalities**

**HIP Project  
Support**

**Benchmark  
Datasets**

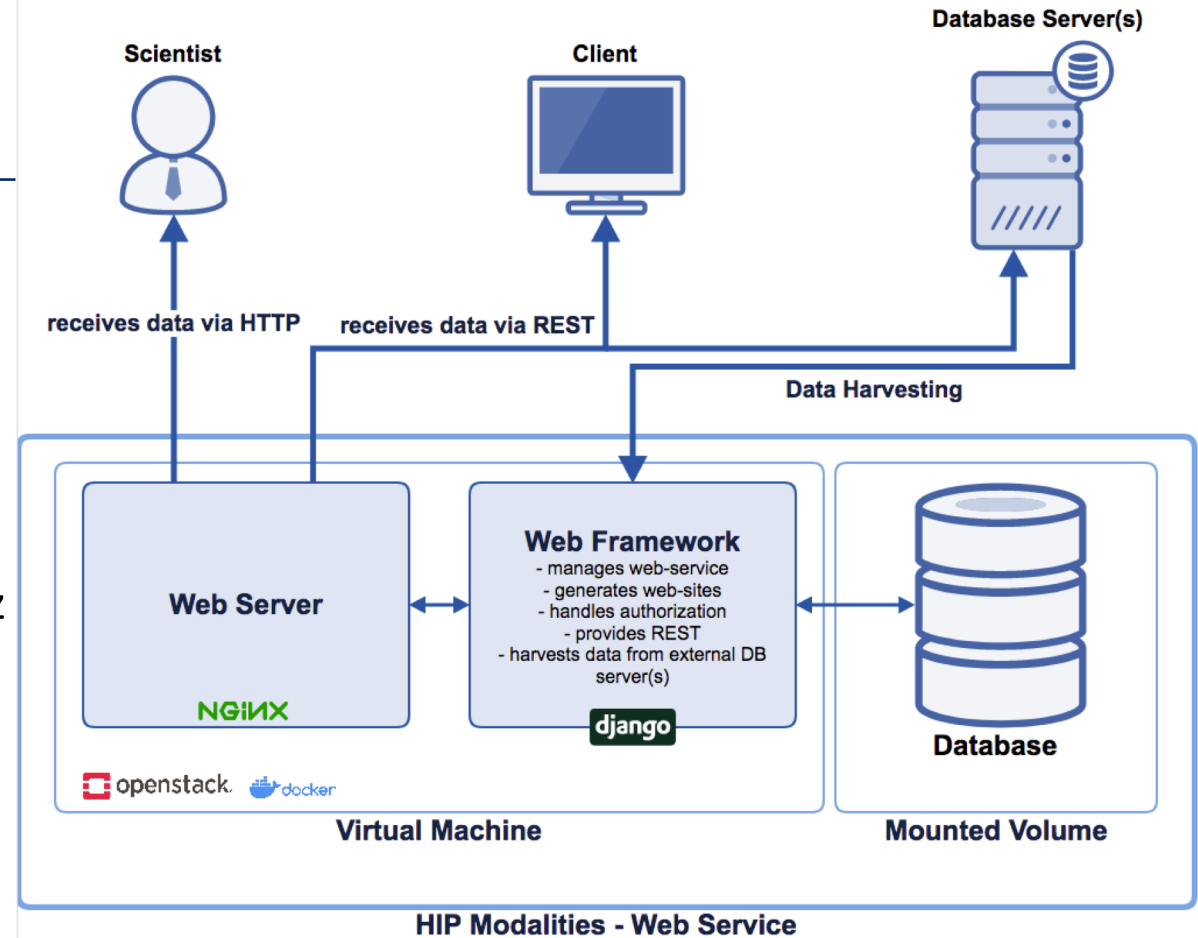
**Develop new  
imaging  
modalities**

# Helmholtz Imaging Platform

## HIP Service Team @ DESY



- a database of all imaging modalities available at Helmholtz
  - ▶ find modalities
  - ▶ domain scientists can search database, contact experts for a given modality, and engage in collaborations to apply the modality to their field of science
  - ▶ we will collect available data from other databases, e.g WayForLight
- **success depends on your input**
- **a survey will come to include your wishes towards such a DB**



# Thanks

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**Website:**

<https://www.helmholtz-imaging.de/>

