

## The PUNCH4NFDI Consortium

# Particles, Universe, NuClei and Hadrons for the NFDI

### TA6 Status Update

Kilian Schwarz, DESY

PUNCH General Meeting , 19.11.2025, Potsdam



With contributions from

- Baida Achkar
- Oliver Freyermuth
- Harry Enke
- Sebastian Wozniewski





# PUNCH4NFDI-TA6-WP2

D-TA6-WP2-1: ➔ good progress

- Requirements from all use cases will lead to Basic/Extended PUNCH AAI
- Requirements have been defined in AAI Requirements Document

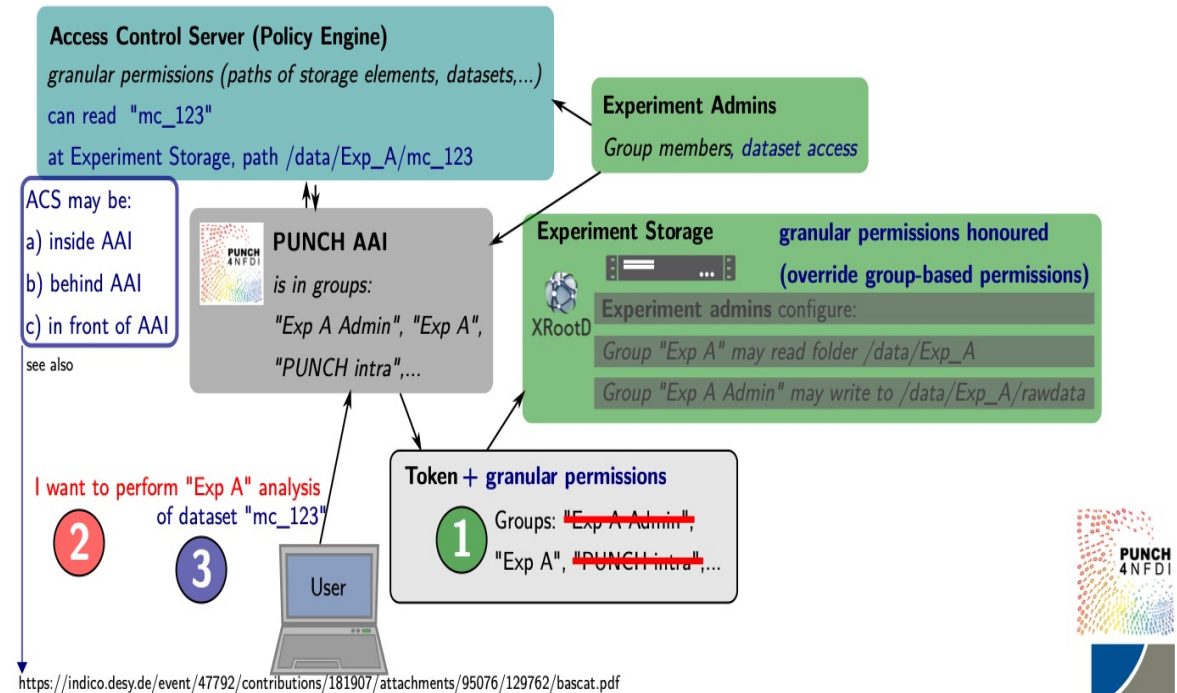
<https://intra.punch4nfdi.de/?md=/docs/TA6/WP2/aai-requirements.md>

# PUNCH4NFDI-TA6-WP2

## Status:

- Development Request submitted to Unity
- Work planned to be finished in December:
  - **DONE:** Defining scopes with wildcards and accepting matching of tokens
  - **IN PROGRESS:** possibility to integrate external services during OAuth flow via script
  - **TODO:**
    - Refresh of token exchange endpoint in accordance with the final RFC
    - Issuing tokens with wildcard scopes and support for their exchange to regular scopes
- Interest in this work by NFDI4Immuno, GHGA, Humanities, IAM4NFDI, and other CAAI operators

## Visualization of Feature Requests: Granular permissions



### Extended AAI Meeting June 4th, fruitful discussion and decisions:

- 1 Go for Policy Engine behind AAI with an API queried by the AAI ('solution A')
- 2 Keep path open to Token Exchange as alternative possibility (i. e. 'solution B')
- 3 Add VO name (punch4nfdi in our case) as path component

Note we stay in a close loop with Helmholtz / HIFIS and the Unity developer team.

# PUNCH4NFDI-TA6-WP3

## Memory-based Computing: First Results

Elsa Buchholz, DZA Görlitz, Email: elsa.buchholz@dzastro.de

Co-contributors: Prof. Dr. Hermann Heßling (DZA Görlitz), Dr.-Ing. Lars Haupt (DZA Görlitz)

The Square Kilometer Array Observatory (SKAO) will take very high-resolution images of the universe, with individual images may reach one petabyte in size. In order to process such large data objects as quickly as possible, a paradigm shift is required: current processors-centric computing should be replaced by memory-based computing. The German Center for Astrophysics (DZA) has access to a memory-based computing prototype with 48 TB of shared memory.

### Status:

- DZA's prototype of a memory-based computing (48 TB) could be configured such that the memory of some of the CPUs are operating as very fast discs (called 'fabric')
- Using a simplistic SQL-like workflow, a large file was analyzed in two ways:
  - a) file mounted over NFS/ethernet
  - b) file in-memory (via mmap from fabric)
- **Result: in-memory workflow ~ 2 orders of magnitude faster than conventional workflow**

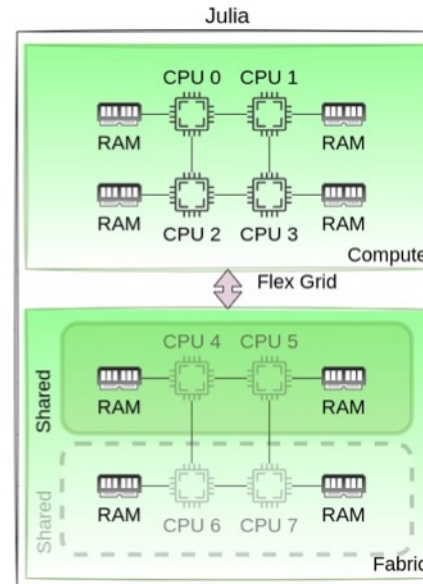


Fig 1: Architecture of the memory-based computing system "Julia". The CPUs on the top are used for compute and the memories of the CPUs at the bottom are combined to shared memories ("fabric").

	Numa 0	Numa 1	Numa 2	Numa 3	Numa 4	Numa 5	Numa 6	Numa 7
Numa 0	92	17	17	17	12	12	12	12
Numa 1	17	93	17	17	12	12	12	12
Numa 2	17	17	92	17	12	12	12	12
Numa 3	17	17	17	92	12	12	12	12
Numa 4	12	12	12	12	92	17	17	17
Numa 5	12	12	12	12	17	93	17	17
Numa 6	12	12	12	12	17	17	93	17
Numa 7	12	12	12	12	17	17	17	92

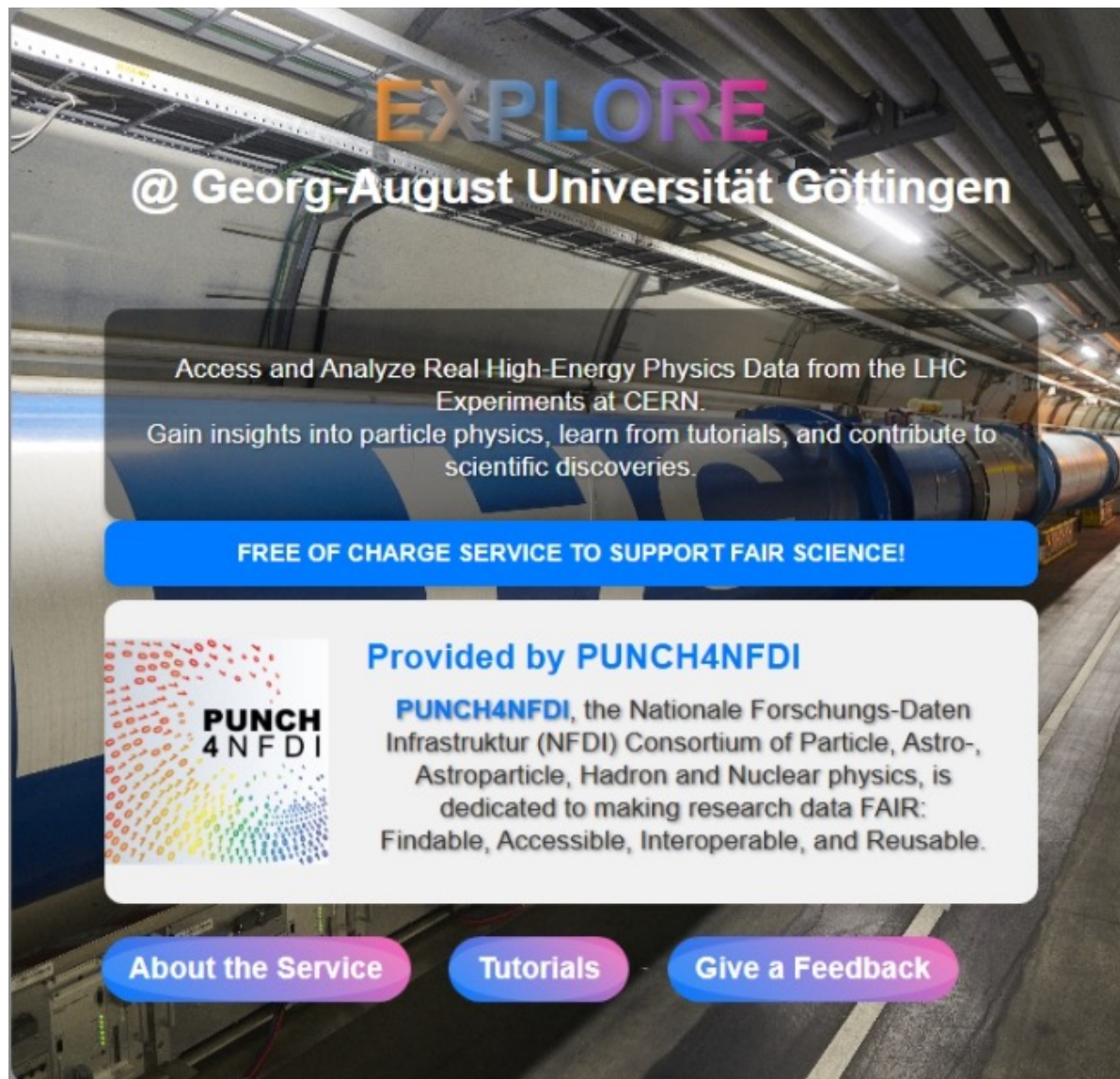
Fig 3: Performance of connections between CPUs in the memory-based computing system: The average bandwidth [GB/s] for random read operations from each NUMA node to all other NUMA nodes are determined using Intel's Memory Latency Checker.

# PUNCH4NFDI-TA6-WP5@GAU

D-TA6-WP5-4: ➔ DONE

- Interfaces to the “HLRN – High Performance Computing in Northern Germany” in Göttingen will be developed to the PUNCH4NFDI communities.
- A fraction of the GoeGrid grid computing cluster in Göttingen will be provided to PUNCH4NFDI and beyond for analysis of the CERN open data to users without explicit CERN or experiment affiliation.
- Baida Achkar will participate in ATLAS Open Data Tutorial at CERN (Nov 24-27, 2025) as tutor and introduce EXPLORE service there



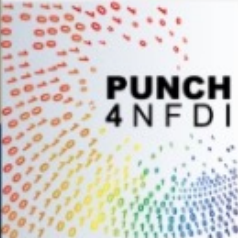


# EXPLORE

## @ Georg-August Universität Göttingen

Access and Analyze Real High-Energy Physics Data from the LHC Experiments at CERN.  
Gain insights into particle physics, learn from tutorials, and contribute to scientific discoveries.

**FREE OF CHARGE SERVICE TO SUPPORT FAIR SCIENCE!**



### Provided by PUNCH4NFDI

**PUNCH4NFDI**, the Nationale Forschungs-Daten Infrastruktur (NFDI) Consortium of Particle, Astro-, Astroparticle, Hadron and Nuclear physics, is dedicated to making research data FAIR: Findable, Accessible, Interoperable, and Reusable.

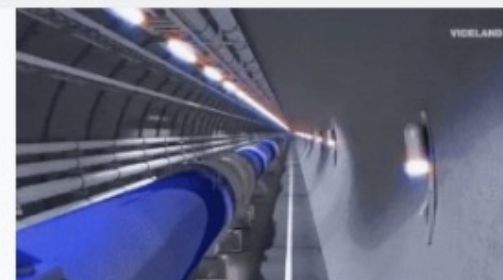
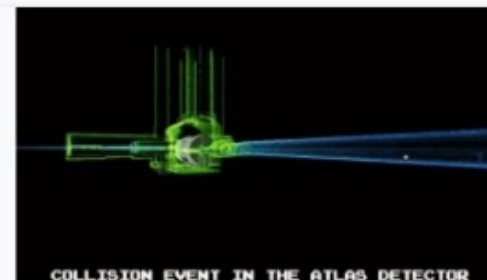
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Are You a Student, Teacher, or High-Energy Physics Enthusiast, with no Affiliation to an LHC-CERN Experiment or Institution?

→ → Register for our service and start exploring High-Energy Physics! 😊

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# PUNCH4NFDI-Service-Survey



we would like to know from you which of the services provided by the consortium are known to you, which ones you use, and what we could improve.

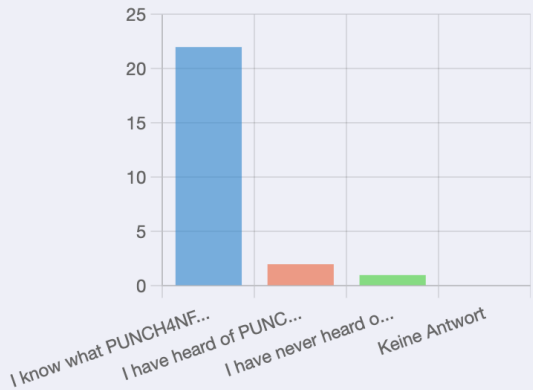
➔ Please participate in the survey (if not already done)

**Preliminary Result of Survey will be presented during PUNCH GM**

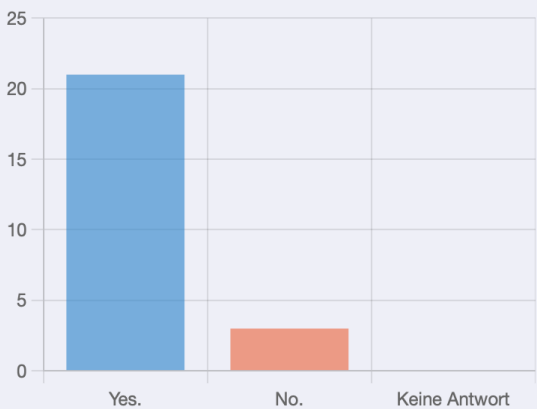
<https://survey.hifis.dkfz.de/721319?lang=en>

# PUNCH4NFDI-Service-Survey

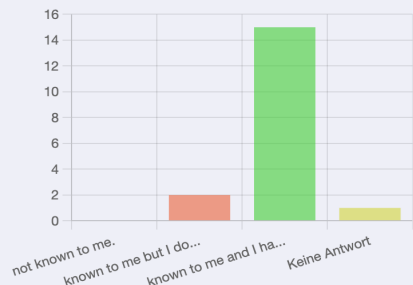
How familiar are you with PUNCH4NFDI?



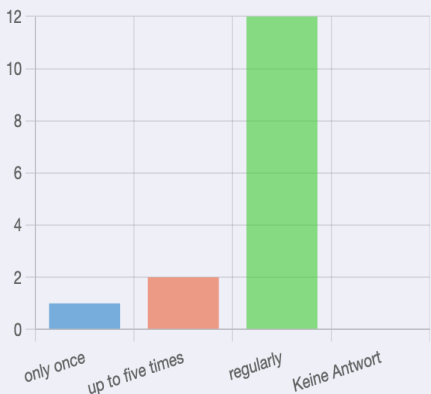
Have you heard of any PUNCH4NFDI service before?



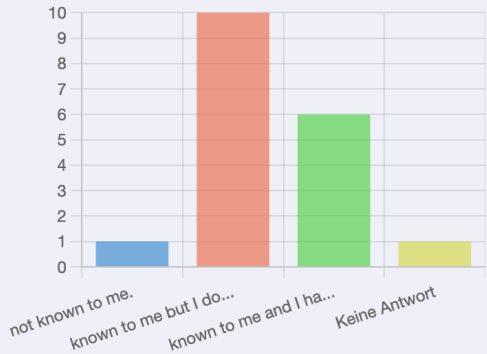
PUNCH-AAI: the Community AAI of PUNCH4NFDI. It provides authentication to users and authorisation info to services of the consortium. The PUNCH-AAI is hosted by HIFIS. This service is ...



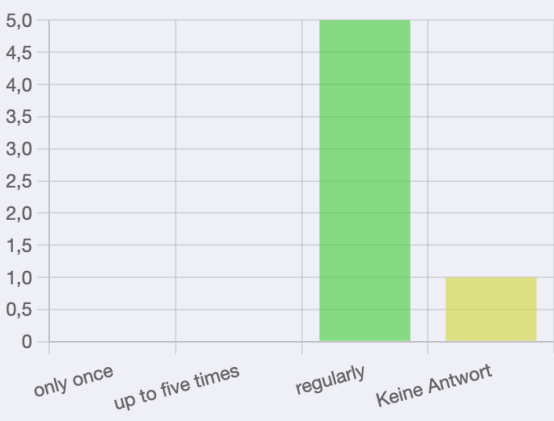
Can you specify how often you have used the service?



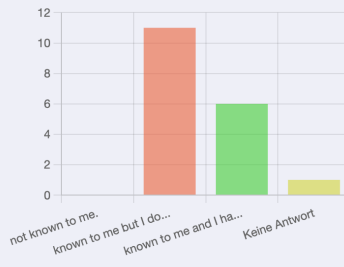
Compute4PUNCH: federated compute resources that can be accessed via the PUNCH-AAI. This service is ...



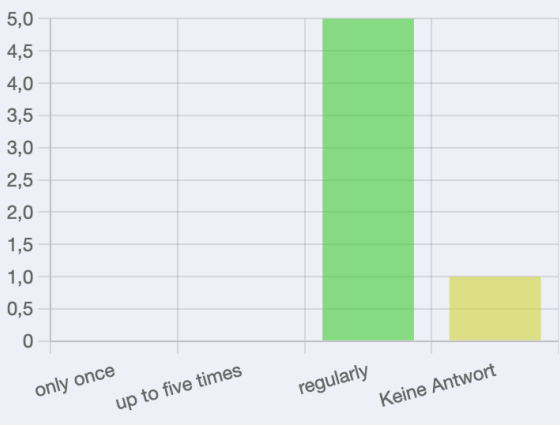
Can you specify how often you have used the service?



REANA: allows scientists to run containerised data analysis pipelines on remote compute clouds. PUNCH4NFDI uses REANA to capture reproducible workflows and facilitate using distributed resources from the PUNCH communities. This service is ...



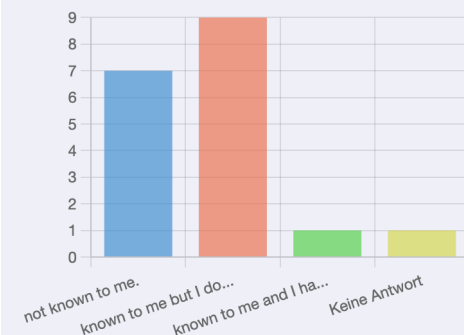
Can you specify how often you have used the service?



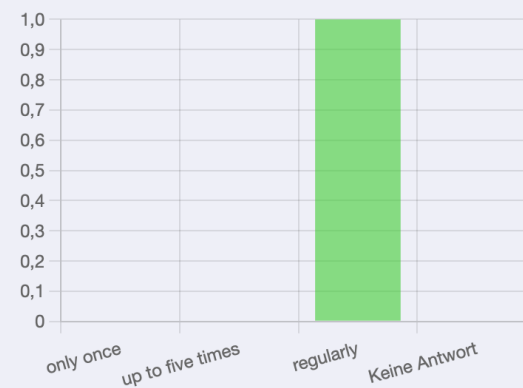


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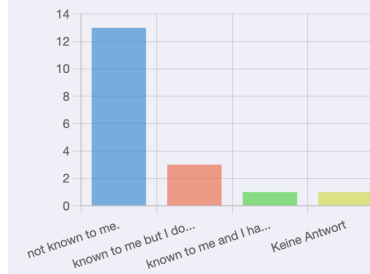
RPR: prototype implementation of PUNCH4NFDI's DRP (Digital Research Product) registry. This service is ...



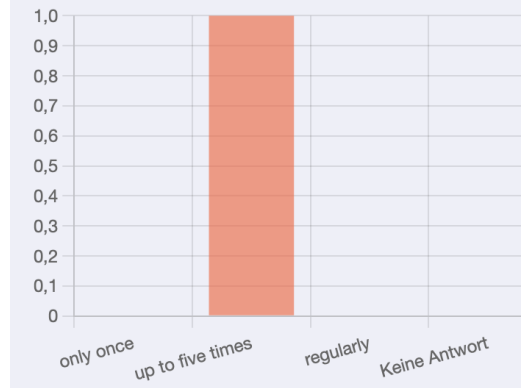
Can you specify how often you have used the service?



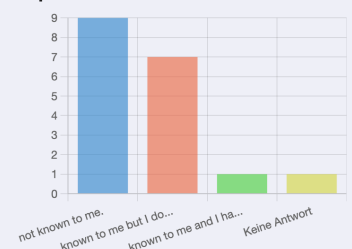
DESTINY (Database for the Effects of STellar encounters on dISks and plaNetary sYstems): is an open-access data portal that provides resources for studying planetary system dynamics. This service is ...



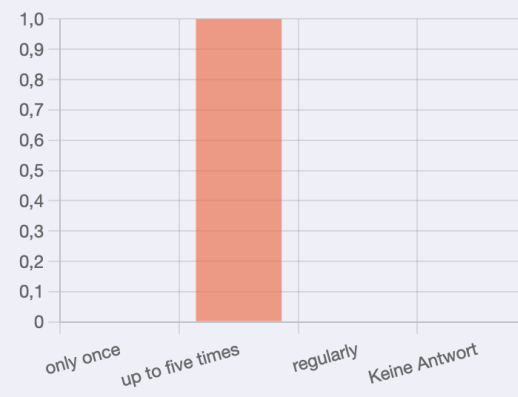
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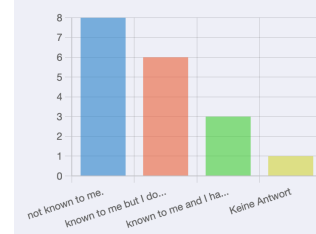
KCDC: is a public data centre for high-energy astroparticle physics, which provides datasets, code snippets, tutorials, publications and other research products, created in the framework of KASCADE or partner astroparticle physics experiments. This service is ...



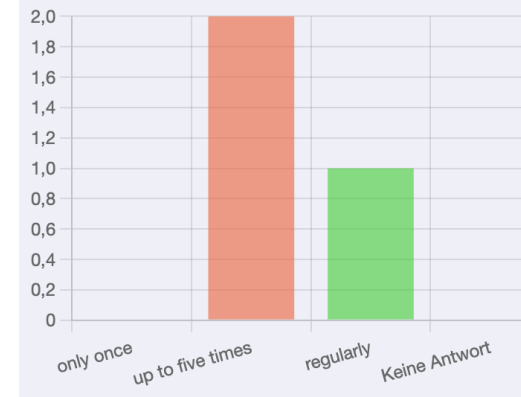
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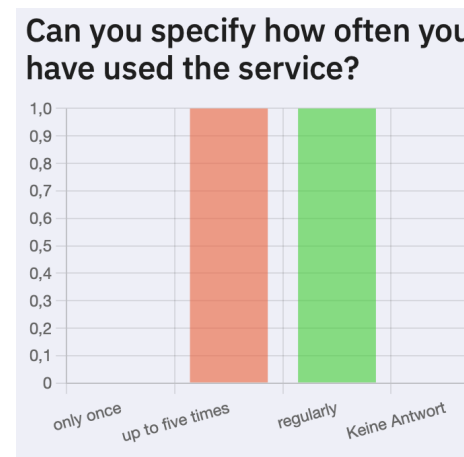
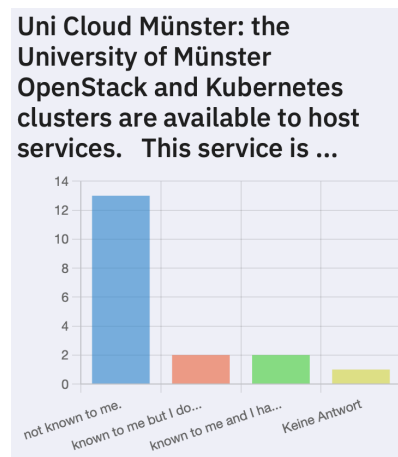
The Research Data Management Organiser (RDMO): an RDMO instance with the newest version is hosted by AIP, supported by PUNCH4NFDI. This is open to all researchers for managing their research data (RDM) and creating Data Management Plans (DMP) for many funding agencies. This service is ...



Can you specify how often you have used the service?



# PUNCH4NFDI-Service-Survey (30 participants so far)



- The majority knows PUNCH4NFDI and knows that PUNCH offers services.
- Known by majority and regularly used by majority: PUNCH AAI
- Known by majority and regulary used by many users: Compute4PUNCH, REANA
- Known by many but not so much used: RPR, KCDC
- Known by some but they seem to use it: RDMO
- Not known by many and not so much used: DESTINY, Uni Cloud Münster

# PUNCH4NFDI-Service-Survey

## Reasons for non usage:

Compute4PUNCH: no need/no use case, other resources available, need bigger compute resources

REANA: no need/no use case, not aware of benefit, need no containers, not active in science

RPR: no need/no use case, not ready yet, do not understand what it is, missing examples, not active in science

DESTINY: not my area of research

KCDC: not interested in astro particle data/not my field

RDMO: not sure how to, no need/no use case, benefits not obvious

Uni Cloud Münster: not my field of research (but basically not answers at all)

## communities:

Particle physics: 13

Astroparticle physics: 7

Astronomy: 9

Nuclear Physics: 2

Hadron Physics: 1

Lattice QCD: 2

Photon Science: 1

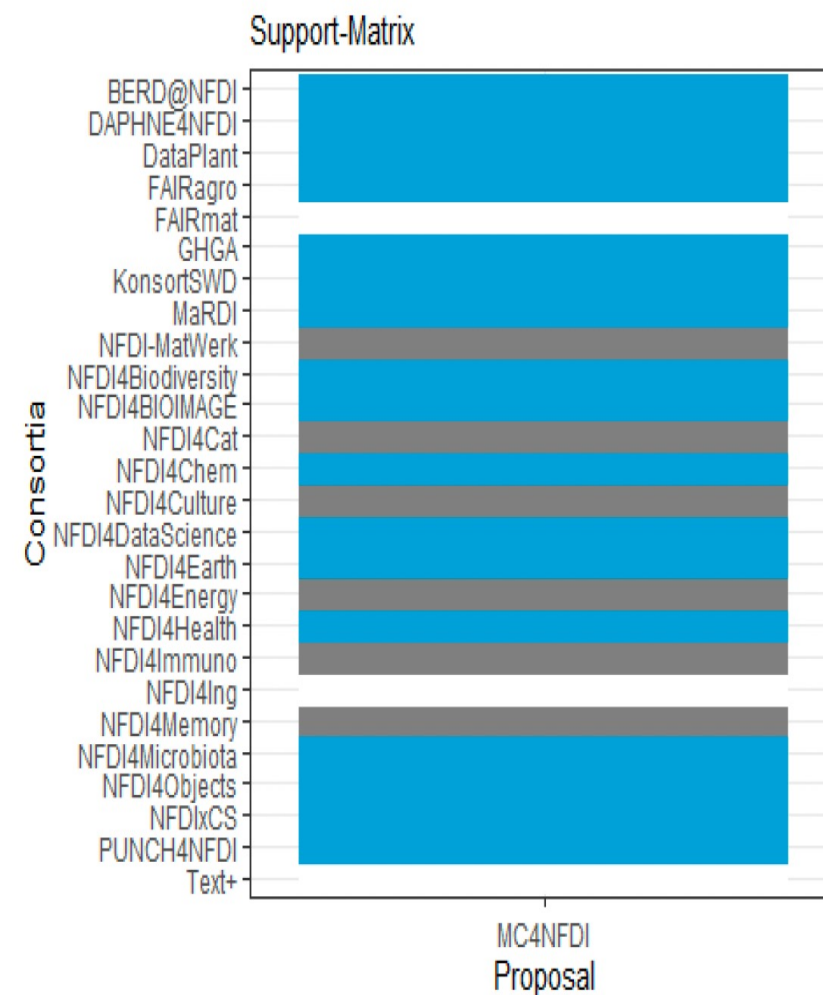
➔ Some feel associated to several communities



# PUNCH4NFDI MultiCloud Participation

Blue = voted in favor; white = voted against, grey = no vote / abstention.

- B4NFDI Application MC4NFDI has been two times rejected by TEC
- Majority of consortia voted for support, though
- One of the major critics was lack of coordination with OA
- Current plan:
  - Be present at OA meeting on November 26 at GWDG
  - Try to contribute to discussion by topical table, poster, PITCH presentations of participating consortia
  - Collect and present our own view on architecture

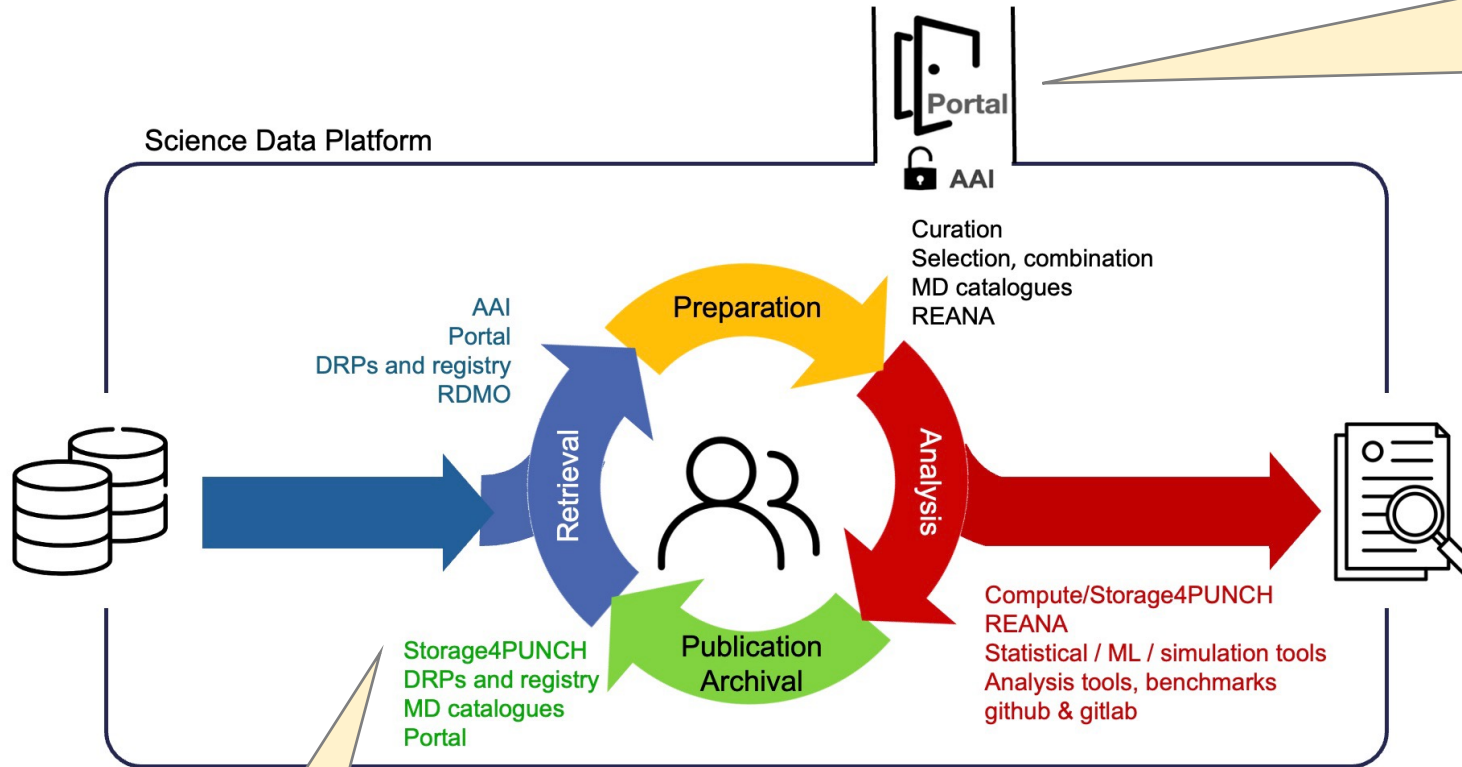


# Towards AUPs and other Policies in PUNCH4NFDI

D-TA6-WP5-8

Harry Enke, Sebastian Wozniowski  
PUNCH Annual Meeting 2025, Potsdam

# AUPs and what else?



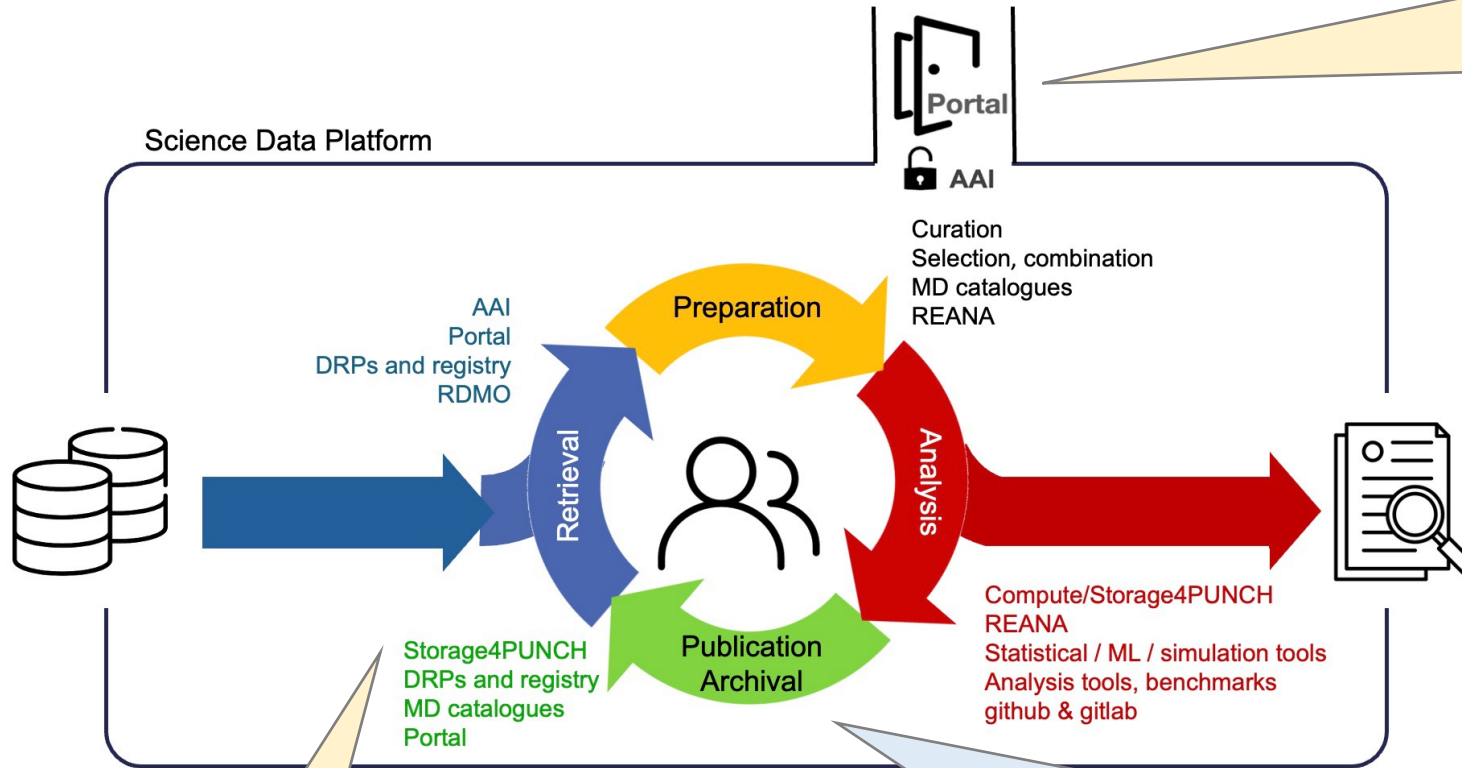
## AUP – Acceptable Use Policy

- Rules related to user / account / resource usage
- Accepted by user upon login via PUNCH AAI
- Preliminary version in place (from Helmholtz AAI)
- **Hardly any response by Resource Providers (RP) to our survey end of 2024 (all agreed?)**
- **Better sync with RPs needed**
- **RPs need to make up their mind about their rules**

In particular, storage usage not yet well represented in AUPs



# AUPs and what else?



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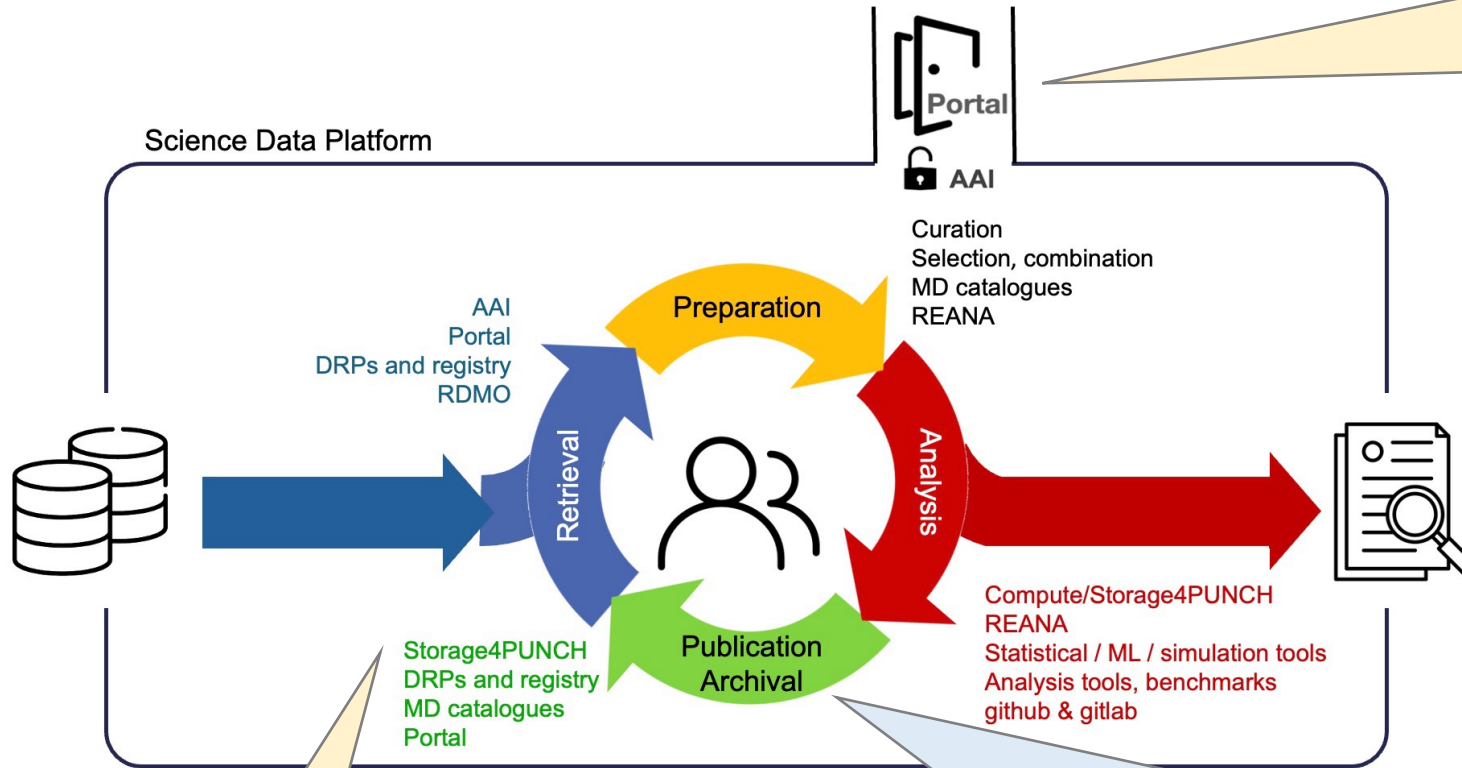
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## Rules for publication of data and/or DRPs

- Defined procedure
- Data availability conditions & data handling within DRPs
- Detachment from user account and ownership; transfer responsibility to PUNCH (Admins?)
- Individual publications vs. 'under PUNCH label'
- Selection of RP
- Licensing (cc0)

# AUPs and what else?



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## Agreements: PUNCH ↔ RP

- Service level
- Availability
- Resilience
- Cooperation in case of malicious users

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- Individual publications vs. 'under PUNCH label'
- Selection of RP
- Licensing (cc0)
- IPR questions (Credits)

In particular, storage usage not yet well represented in AUPs

# Further steps / towards PUNCH2.0 / Structural and organizational questions

- Definition of policies is a continuous task and will extend to PUNCH2.0 (e.g. for new storage providers)
- Important topic but not well represented in PUNCH1 deliverable list – we made it part of TA6 WP5
- More explicitly represented in PUNCH2.0 as D3.1.6 “AUP, AAI requirements”
- Can only work out proposals
- Needs awareness and collaboration of RPs + finalization and implementation at management level
- Volunteers to participate in this effort are highly welcome! Please notify Harry / Sebastian or come to a TA6 meeting.



backup

# Current AUPs (1/2)

<https://intra.punch4nfdi.de/files/TA6/WP5/AUP.PUNCH4NFDI.202312n.pdf>



AUP, PUNCH4NFDI Consortium, 14 December 2023

## Acceptable Use Policy The PUNCH4NFDI Consortium

This policy is effective from 1 January 2024.

### Acceptable Use Policy and Conditions of Use

This “Acceptable Use Policy and Conditions of Use” (AUP) document defines the rules and conditions that govern your access to and use (including transmission, processing, and storage of data) of the resources and services (collectively called “services” in the following) as granted by the PUNCH4NFDI Consortium for scientific use.

By registering as a user you declare that you have read, understood and will abide by the following conditions of use:

1. You shall only use the services in a manner consistent with the purposes and limitations described above; you shall show consideration towards other users including by not causing harm to the services; you have an obligation to collaborate in the resolution of issues arising from your use of the services.
2. You shall only use the services for lawful purposes and not breach, attempt to breach, nor circumvent administrative or security controls.
3. You shall respect intellectual property and confidentiality agreements.
4. You shall protect your access credentials (e.g. passwords, private keys or multi-factor tokens); no intentional sharing is permitted.
5. You shall keep your registered information correct and up to date.
6. You shall promptly report known or suspected security breaches, credential compromise, or misuse to the security contact stated below; and report any compromised credentials to the relevant issuing authorities.
7. Reliance on the services shall only be to the extent specified by any applicable service level agreements. Use without such agreements is at your own risk.
8. Your personal data will be processed in accordance with the privacy statements referenced below.
9. Your use of the services may be restricted or suspended, for administrative, operational, or security reasons, without prior notice and without compensation.

# Current AUPs (2/2) | Survey from Oct 2024

<https://intra.punch4nfdi.de/files/TA6/WP5/AUP.PUNCH4NFDI.202312n.pdf>

10. If you violate these rules, you may be liable for the consequences, which may include your account being suspended and a report being made to your home organisation or to law enforcement.
11. The services are operated on a best-effort basis. Neither the PUNCH4NFDI Consortium nor the relevant service providers shall be held accountable for any loss of data or data integrity of the user's storage space. No guarantee is provided that login is possible at all times.
12. You shall provide appropriate acknowledgement of support or citation for your use of the services provided as required by the stated policies according to <https://results.punch4nfdi.de>.

The administrative contact for this AUP is: [support@punch4nfdi.de](mailto:support@punch4nfdi.de)

The security contact for this AUP is: [support@punch4nfdi.de](mailto:support@punch4nfdi.de)

The privacy statements referred to above are located at:

- the PUNCH4NFDI web site <https://www.punch4nfdi.de>,
- the PUNCH4NFDI results page <https://results.punch4nfdi.de>,
- the PUNCH4NFDI Zenodo section <https://zenodo.org/communities/punch4nfdi>,  
and
- the PUNCH4NFDI intranet page <https://intra.punch4nfdi.de>.

Dear Resource Providers in PUNCH4NFDI,

please find below the current version of the PUNCH4NFDI Acceptable Use Policy (AUP). Users of the PUNCH-AAI and therefore potentially your resources are required to accept this AUP before logging in the first time. Assuming that you as a resource provider expect users to stick to certain rules, we would like to ask for your feedback on this AUP considering the following questions in particular:

- Are there general concerns?
- Do you need additional aspects to be covered, either within this AUP or additional Terms and Conditions to be signed when requesting access to your resources?

Additional items might be related to data lifetime or licensing. Also, since many resources are dedicated, their use might carry special permissions or limitations. Note that data/code publication (typically detached from user accounts) will be covered in a separate PUNCH4NFDI document. But feel free to already comment on this as well if relevant for your resource.

We need to keep the AUPs as lean as possible, to enable a resource allocation and management which is easy to understand and navigated by PUNCH infrastructure users.

Also, if you have already AUP or Terms of Use for your own resources, we kindly ask to provide them to us, so we can collect and document the PUNCH situation.

Please provide your feedback by 15.11.24 if possible.

Kind regards,

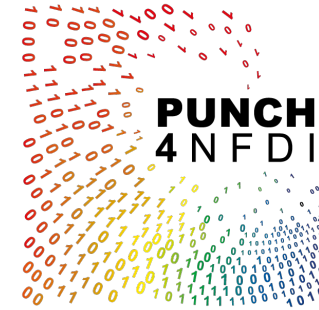
Harry Enke and Sebastian Wozniowski for TA6 WP5

Your feedback is  
still welcome :)



# Acknowledgements

This work was [in part] supported by DFG fund „NFDI 39/1“  
for the PUNCH4NFDI consortium.



Funded by



Deutsche  
Forschungsgemeinschaft  
German Research Foundation