



19
April 23

IT for Science Forum

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The speakers



Ronald Maier

Ronald Maier has been [Vice-Rector for Digitalisation and Knowledge Transfer](#) at the University of Vienna since 1 October 2019. He is Professor of Information Systems at the University of Innsbruck.



Ulf Busch

Ulf Busch has been CIO of the University of Vienna since 2010. He is the Head of [Zentraler Informatikdienst](#).



Leopold Haimberger

Leopold Haimberger is Professor of Meteorology and Vice Dean for Infrastructure at the Faculty for Geosciences, Geography and Astronomy.

The speakers



Simon Engelberger

Simon Engelberger studied zoology at the University of Vienna. Since 2020 he is the Collections Manager in charge of the University of Vienna Zoological Collection.



János Békési

János Békési is at the ZID since 2017, supervising UNIDAM, a digital asset management system realized with Easydb, and several services for researchers mainly in the digital humanities.



Thomas Rattei

Thomas Rattei is Head of the Division of Computational Systems Biology and Vice-Head of the Department of Microbiology and Ecosystem Science.

The speakers



Ulrich Kiermayr

Ulrich Kiermayr is Head of Communication Networks & Infrastructure and Vice Head of [Zentraler Informatikdienst](#).



Eva Karall

Eva Karall is Head of E-Learning at [Zentraler Informatikdienst](#). The staff unit is responsible for the technical support and further development of the e-learning platform [Moodle](#) and tools for digital teaching (BigBlueButton, [Zoom](#)) as well as the [u:stream](#) services at the University of Vienna.



Michaela Bociurko, Moderator

Michaela Bociurko is Head of IT Communications and Marketing at [Zentraler Informatikdienst](#).

Sara Curtis, Moderator

Sara Curtis is a member of the IT Communications and Marketing team at [Zentraler Informatikdienst](#).



The topics

Opening

- Ronald Maier
- Ulf Busch



Innovative IT solutions in selected scientific projects

- IT for Meteorology and Climate Science, Leopold Haimberger
- Digitalisation of zoological specimens, [...] held by the zoological collection of the University of Vienna, Simon Engelberger, János Békési
- DataLife – Data Infrastructure for Life Sciences, Thomas Rattei



IT services of the ZID for science and research

- Supporting projects in all stages, Ulrich Kiermayr
- Overleaf – Collaborative Online LaTeX Editor, Eva Karall



Summary and Outlook

- Ronald Maier





Opening

- Ronald Maier
- Ulf Busch



Innovative IT solutions in selected scientific projects

- IT for Meteorology and Climate Science
- Digitalisation of zoological specimens, historical photographs and other archival materials held by the zoological collection of the University of Vienna (UVZC)
- DataLife – Data Infrastructure for Life Sciences



IT for Meteorology and Climate Science

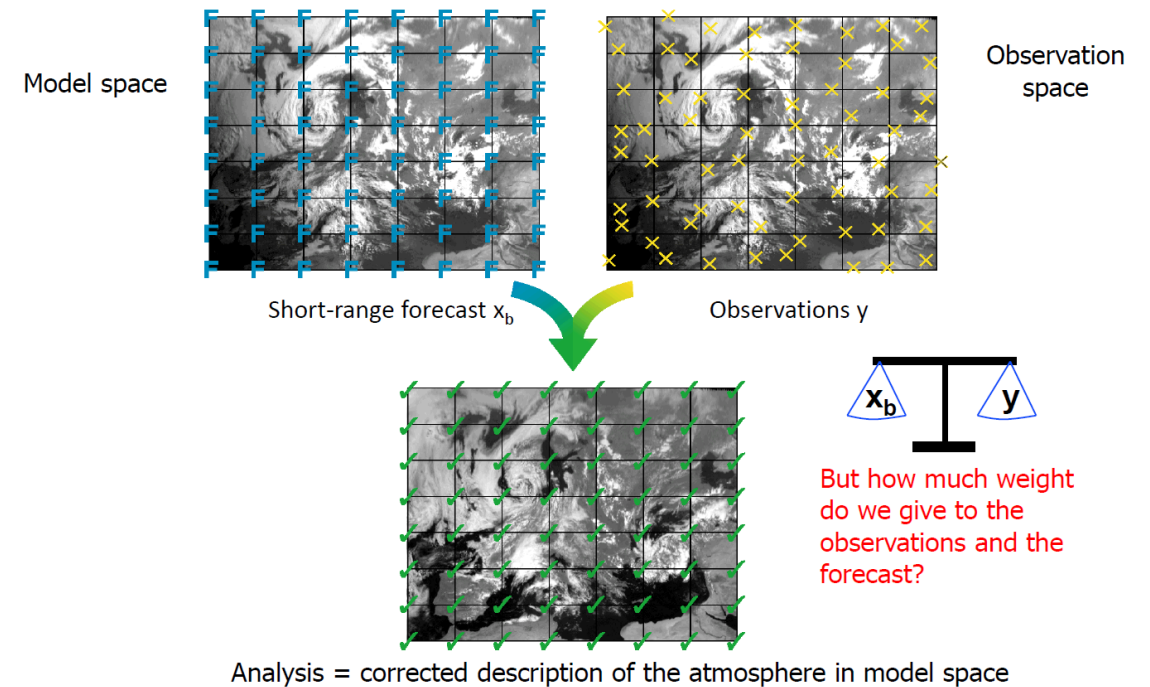
Presentation by Leopold Haimberger

Outline

- **Our research topics**

- Data assimilation
 - How to get satellite and weather observations onto a model grid
- Climate Data Analysis and Climate Modeling
- Ensemble forecasts
- Monitoring trace substances

- **Our computing environment**
- **Contributing to FAIR data**
- **Towards cloud computing**
- **Challenges**



Our local resources

Bare metal @ Department – SRVX – JET – VSC Nodes

SRVX1	SRVX8	JET	VSC 4 / 5
<ul style="list-style-type: none"> • Arsenal • 4x CPU • Development Node • Teaching Node • Storage Node <ul style="list-style-type: none"> • 400 TB (users) • 400 TB (scratch) 	<ul style="list-style-type: none"> • Arsenal • 2x CPU • 1x GPU • Visual Node (VNC) • Storage Node <ul style="list-style-type: none"> • SSD RAID (11TB) 	<ul style="list-style-type: none"> • Arsenal • 2x Login • 7x Compute CPU • Computing/Post Processing Cluster • Storage 1.5 PB Global Storage • Scheduler (slurm) • Planned: Extend num. Nodes + Storage 	<ul style="list-style-type: none"> • Arsenal • VSC4 - 5x CPU • VSC5 – 11x CPU • VSC5 – 1x GPU • Computing Cluster • Shared HOME (200GB) • Shared DATA (100TB) • Scheduler (slurm) • Projects can be requested (resources)

- HPC software stacks (FORTRAN, MPI, OpenMP, Python)
- Jupyter hubs on local servers and VSC
- Both for research and teaching

Main External computing facilities

ECMWF+Copernicus

- reliable partner since decades
- HPC and 100 PB data archive

K-computer (Japan)

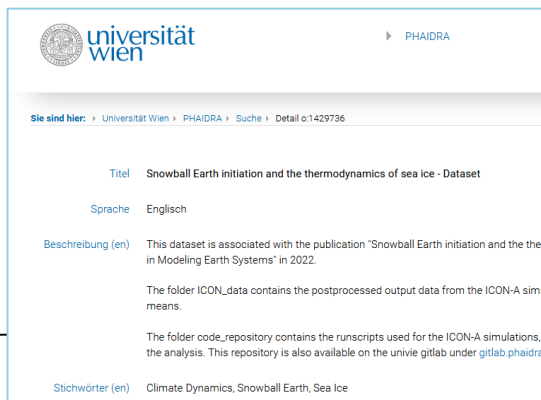
1000 member forecast ensemble

PHAIDRA, GitLab and Mattermost, Confluence – Don't switch it off!

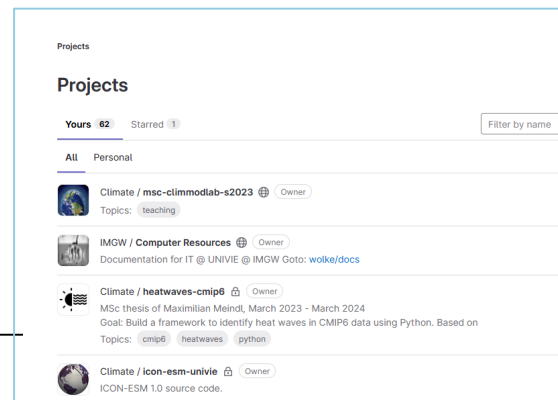
- Phaidra for long-term archiving of climate model data and analysis scripts
- GitLab for code development and project management (incl. external collaborators)
- Mattermost for fast internal communication
- Departmental Wiki pages for internal administration and communication



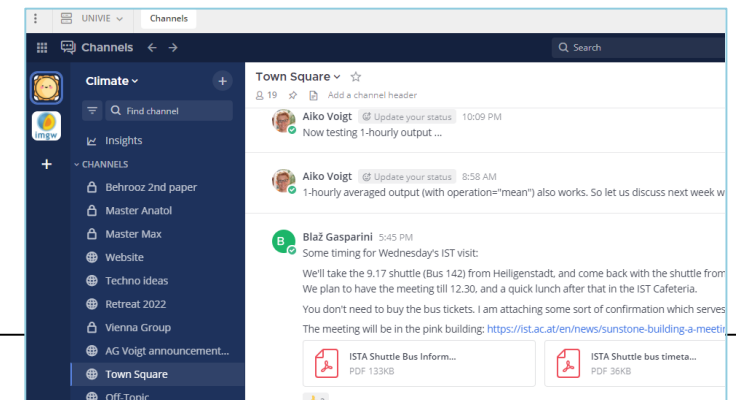
PHAIDRA



GitLab



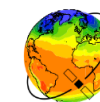
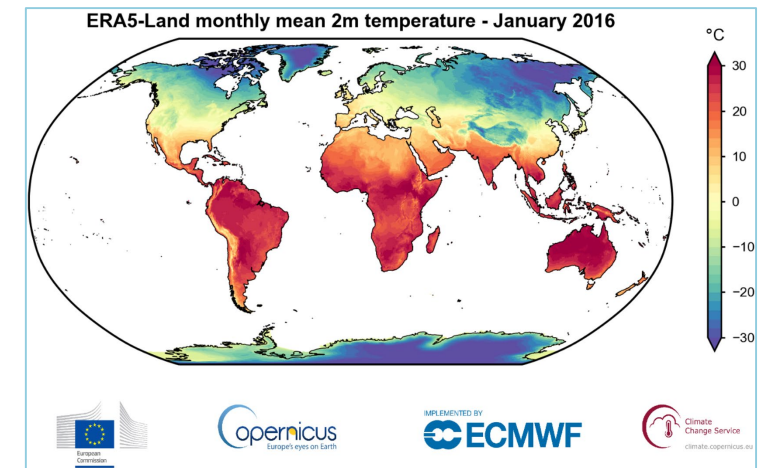
Mattermost



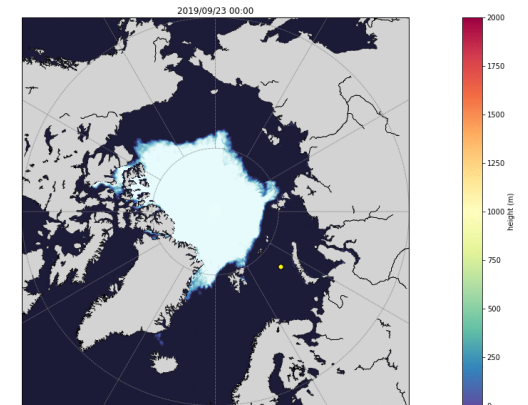
Copernicus Climate Reanalysis – ERA5

- Gridded 3D atmospheric data set of the past 80 years (1940-)
- Ideal to learn about the state and evolution of recent climate
- Quality-certified, free download via Copernicus
- ~10 PB, 3000 cites/year, hugely popular
- We have copied small fraction, would like to have more, already uses 15% of our disk space.

cds.climate.copernicus.eu/




ESMValTool
Earth System Model Evaluation Tool

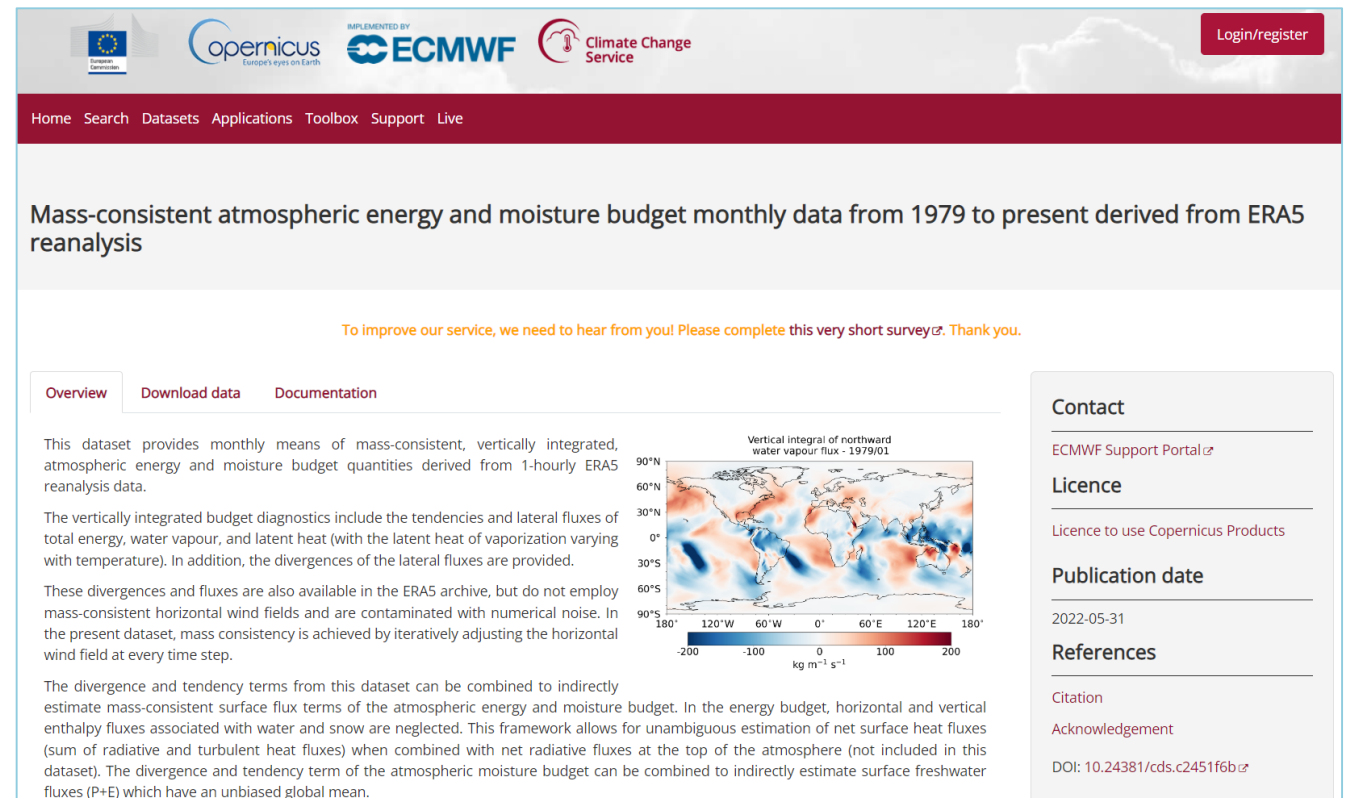


Wikimedia commons

<https://flexteam.univie.ac.at/research/>

Publishing@Copernicus


- Data store has all ingredients of a FAIR data repository
- Very liberal license
- Copernicus takes care of data lifecycle
- **But where is the  logo?**
- Should we have published it on PHAIDRA?

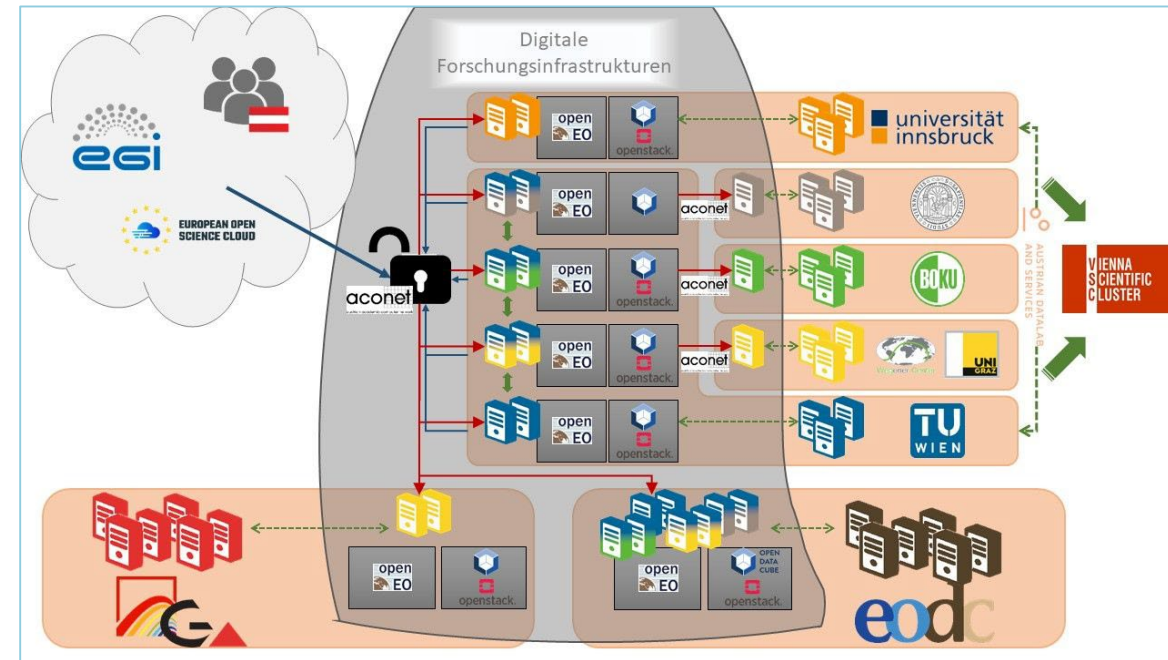


The screenshot shows the Copernicus dataset page for "Mass-consistent atmospheric energy and moisture budget monthly data from 1979 to present derived from ERA5 reanalysis". The page includes a navigation bar with "Home", "Search", "Datasets", "Applications", "Toolbox", "Support", and "Live". A "Login/register" button is in the top right. The main content area features a survey prompt: "To improve our service, we need to hear from you! Please complete this very short survey. Thank you." Below this are tabs for "Overview", "Download data", and "Documentation". The "Overview" tab is active, displaying a text description of the dataset and a world map titled "Vertical integral of northward water vapour flux - 1979/01". The map shows a color scale from -200 to 200 kg m⁻¹ s⁻¹. On the right side, there is a "Contact" section with links to the "ECMWF Support Portal", a "Licence" section with a link to "Licence to use Copernicus Products", a "Publication date" section showing "2022-05-31", and a "References" section with links for "Citation", "Acknowledgement", and "DOI: 10.24381/cds.c2451f6b".


Bundle Geoscience IT resources in Austria – Cloud4GEO

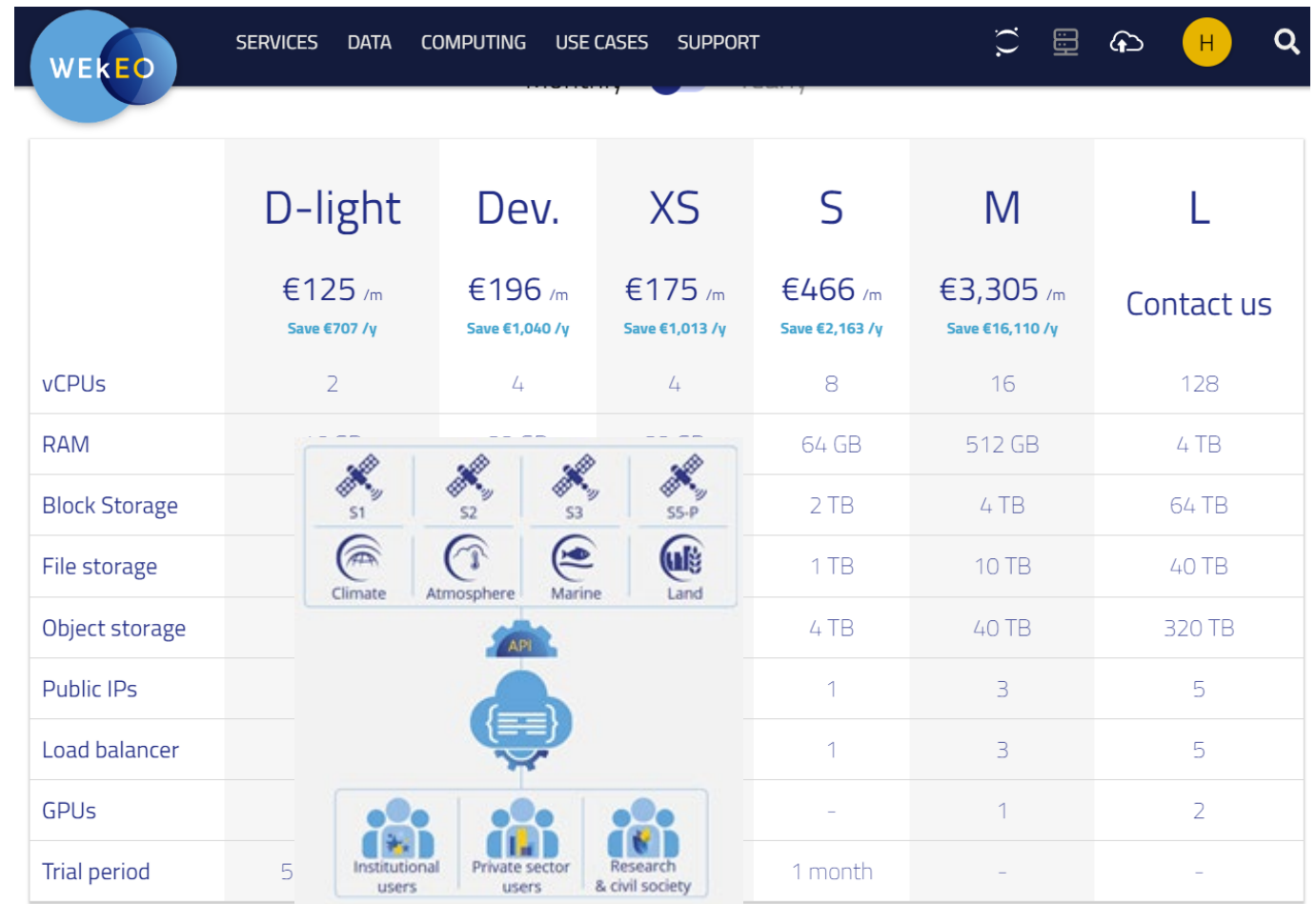
- **Create** a powerful distributed cloud for geospatial data processing
- Single Sign-on
- Focus on interoperability: Open Standards
- Link to EOSC and EGI, Copernicus
 - not only as user, but also
 - share our data there (also compute)
- FAIR gives credit, attracts users!
- Data are „near“: high bandwidths, low latency
- Expensive to build and maintain

 Bundesministerium
Bildung, Wissenschaft
und Forschung



Are there other choices?

- Run our codes where the data are.
- Copernicus DIAS (e.g. WEkEO <https://www.wekeo.eu/about>)
- Free Trial
- Access via JupyterHub, VM
- Provides **harmonised, high bandwidth** data access to many PB of EO data
- Data free, only computing costs
- Some teething troubles, but improving.
- Next Generation:  **PHIDIAS**
Prototype of HPL/Data Infrastructure for On-demand Services



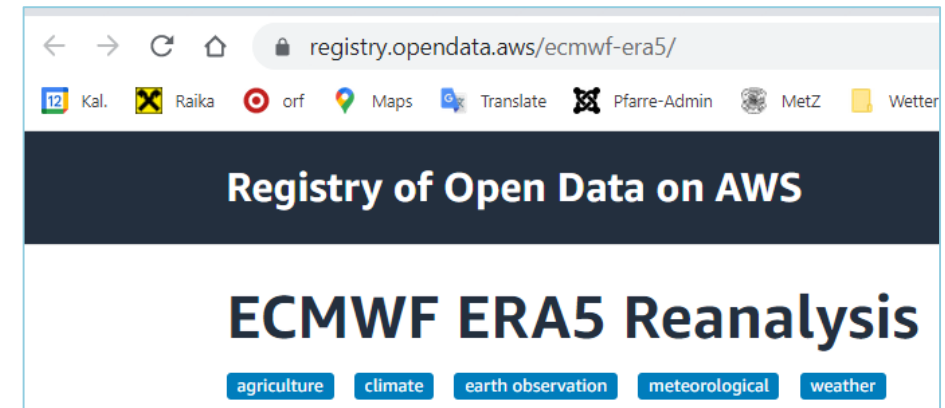
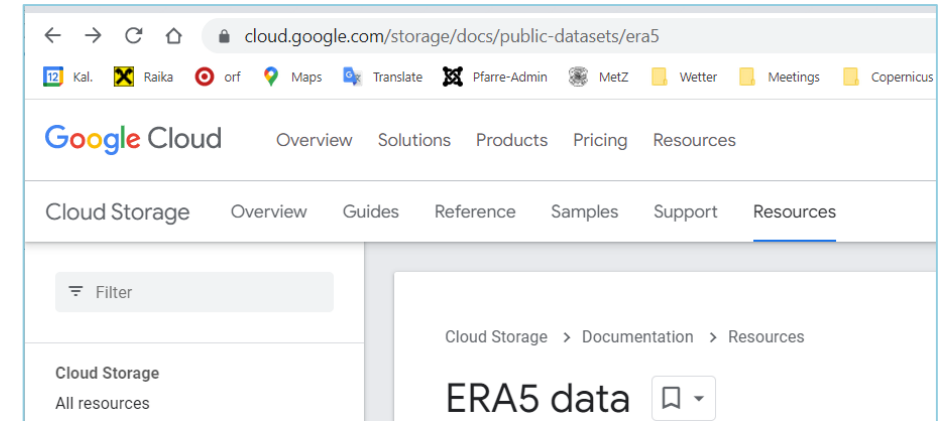
The screenshot shows the WEkEO pricing page with a navigation bar (SERVICES, DATA, COMPUTING, USE CASES, SUPPORT) and a search icon. The main content is a table of service plans with various specifications and prices.

	D-light	Dev.	XS	S	M	L
	€125 /m <i>Save €707 /y</i>	€196 /m <i>Save €1,040 /y</i>	€175 /m <i>Save €1,013 /y</i>	€466 /m <i>Save €2,163 /y</i>	€3,305 /m <i>Save €16,110 /y</i>	Contact us
vCPUs	2	4	4	8	16	128
RAM				64 GB	512 GB	4 TB
Block Storage				2 TB	4 TB	64 TB
File storage				1 TB	10 TB	40 TB
Object storage				4 TB	40 TB	320 TB
Public IPs				1	3	5
Load balancer				1	3	5
GPUs				-	1	2
Trial period	5			1 month	-	-

The table includes a central diagram showing data sources (S1, S2, S3, S5-P) for Climate, Atmosphere, Marine, and Land, connected via an API to a cloud icon, which is then accessed by Institutional users, Private sector users, and Research & civil society.

Business likes FAIR data!

- Copernicus' aim is to support companies with climate and monitoring data
- Well received by small companies in Europe ...
- but also the big fishes ...
- **Google and Amazon hold copies of ERA5**



Make money with climate data

- Well supported cloud environment
- 23 USD/TB/month
- 70,000 USD for 300 TB per year

We will not buy from them!

Google Cloud

Pricing tables

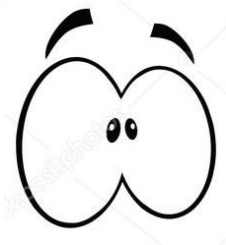
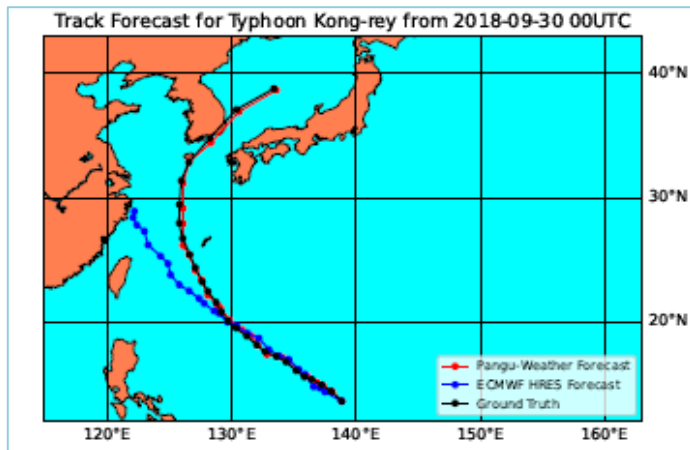
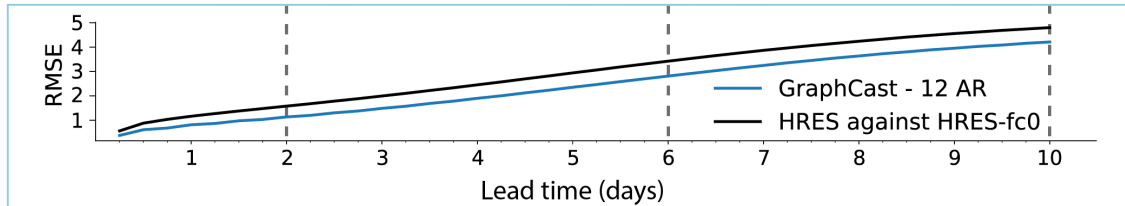
★ **Important:** [Pricing updates](#) for Cloud Storage took effect on Oct. 1, 2022 and on Apr. 1, 2023.

The pricing tables below show what charges apply when using Cloud Storage.

	North America	South America	Europe	Middle East	Asia	Indonesia	Australia
Location							
			Standard storage (per GB per Month)	Nearline storage (per GB per Month)	Coldline storage (per GB per Month)	Archive storage (per GB per Month)	
			Warsaw (europe-central2)	\$0.023	\$0.013	\$0.006	\$0.0025

What Google does with ERA5

Train AI (GNN) for weather forecasting

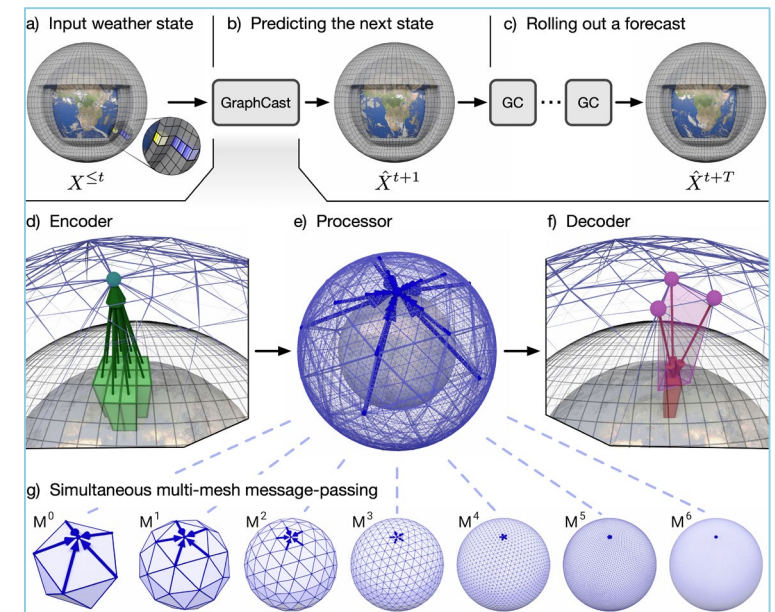


„We also thank ECMWF for providing invaluable datasets for the research community“

Bi et al. 2022

GraphCast: Learning skillful medium-range global weather forecasting

Remi Lam^{*1}, Alvaro Sanchez-Gonzalez^{*1}, Matthew Willson^{*1}, Peter Wirnsberger^{*1}, Meire Fortunato^{*1}, Alexander Pritzel^{*1}, Suman Ravuri¹, Timo Ewalds¹, Ferran Alet¹, Zach Eaton-Rosen¹, Weihua Hu¹, Alexander Merose², Stephan Hoyer², George Holland¹, Jacklynn Stott¹, Oriol Vinyals¹, Shakir Mohamed¹ and Peter Battaglia¹
^{*}equal contribution, ¹DeepMind, ²Google



Conclusions

- We like the UNIVIE RDM tools a lot!
- Power of FAIR EO data quickly unfolding
 - Data assimilation plays an important role
 - We are small players, but let the big picture shine a little more
- Frequent quick scans through large amounts of data
- We need affordable „near“ cloud computing service
 - Build one for EO in Austria – ongoing
 - Tap into European resources – just starting
- Strong winds of change – AI challenge
 - Do we invest wisely, can we adapt quickly enough?



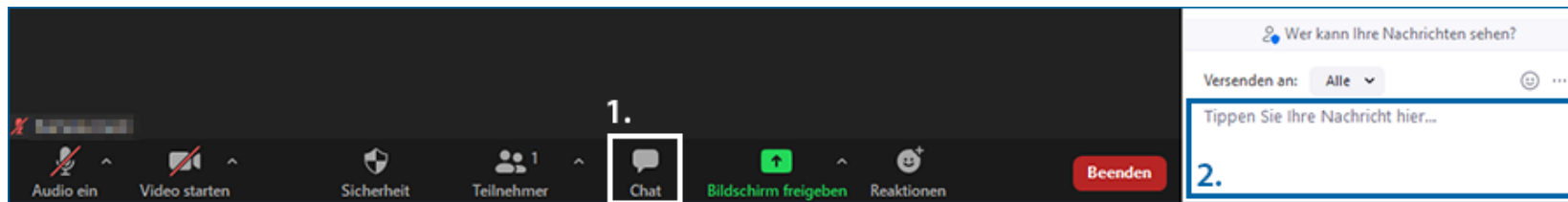
© Image by Suez Canal Authority / AP



© Image by <https://www.flickr.com/photos/jnandreae/>

Questions about IT for Meteorology and Climate Science?

- Please ask your questions as a chat comment.



© Image by storyset on Freepik





Digitalisation of zoological specimens, historical photographs and other archival materials held by the zoological collection of the University of Vienna (UVZC)










Presentation by Simon Engelberger and János Békési

AV Media

Recherche

  S. Engelberger DE










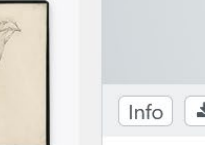


Schnellzugriff


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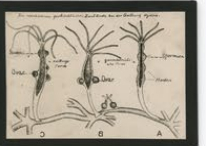








Suche

Ressourcen Suche 696 Datensätze in 23 Pools und 1 Objekttyp.

Filter Sortierung: Inventarnummer

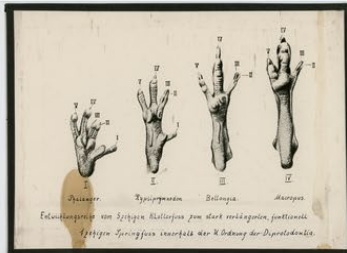













251 - 500 aus 696 Datensätzen
1 Datensätze ausgewählt

Detail


Images Phase 1



Info 

P-319
Images #49881
Phase 1 Images

Dateien

-  **P-319.tif**
tif image, 5746 x 4299 @ 24 bit, 70.70 MB, 600 DPI, EPSON sRGB

Images Phase 1

Mgmt. Attrib. Content Temp **Related**

235 / 250

AV Media: Standards

- Standard: Audiovisual Core (Audubon Core), AC
- Controlled Vocabularies
 - AC
 - Art & Architecture Thesaurus® (AAT)

Images Phase 1

LS-B148
Images #20285
Phase 1 Images

Mgmt. Agents Content Taxon Temp Related Docu

Inventarnummer
LS-B148

Media Type
Image

Media Subtype Literal
Drawing

MaterialienTechniken
lantern slide

Dimensions
9 x 12 cm

Metadata Date
Mi, 29.03.2023 18:23

Metadata Language

Images Phase 1

LS-B148
Images #20285
Phase 1 Images

Dateien

- B148.tif
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- LS-B148_0002.tif
tif image, 8685 x 11517 @ 24 bit, 440.74 MB, 2400 DPI, EPSON sRGB

Images Phase 1

Mgmt. Agents Content Taxon Temp Related Docu

Creator
Kasper, Adolf
1863 - 1935

Role
draftsman (artist)

System-ID #20285 UUID 755d575f-6439-4ab0-bb3b-a2471bdb4baa Pool Phase 1 Images
Objektyp Images Maske Images Phase 1 Letzte Änderung 29.03.2023 18:23 Version 13

Images Phase 1

LS-B148
Images #20285
Phase 1 Images

Images Phase 1

Mgmt. Agents Content Taxon Temp Related Docu

TempDeterminationNames
Salamandra maculosa

DeterminationNamesContainer

Taxon Entry

DeterminationNames

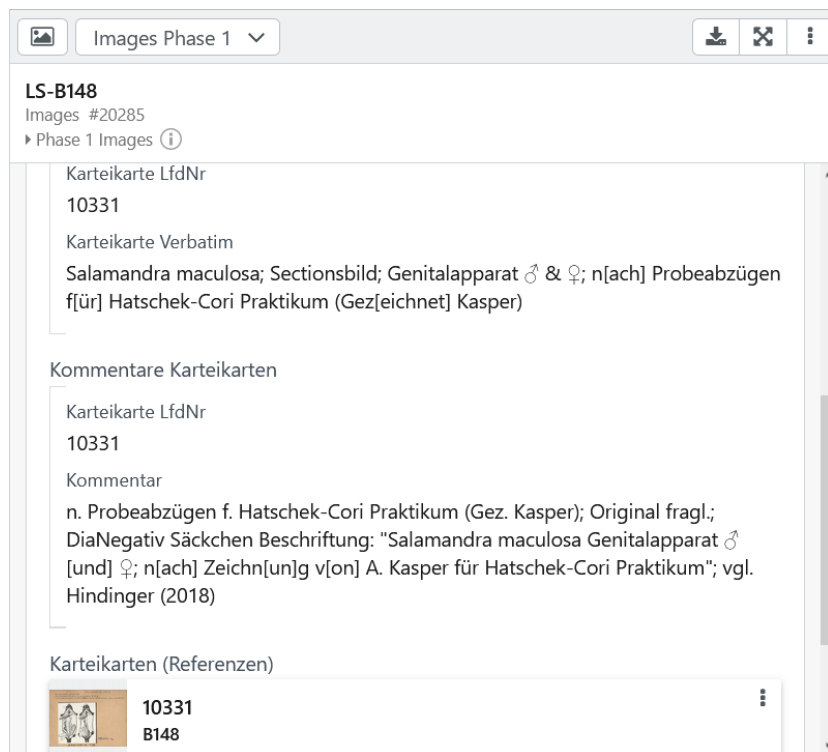
DeterminationName
Salamandra maculosa Laurenti, 1768

Accepted
Ja

Det.name (Karteikarte)
Salamandra maculosa

AV Media: Interlinks

- Linked with digitised Card Files



Images Phase 1

LS-B148
Images #20285
Phase 1 Images

Karteikarte LfdNr
10331


Karteikarte Verbatim
Salamandra maculosa; Sectionsbild; Genitalapparat ♂ & ♀; n[ach] Probeabzügen f[ür] Hatschek-Cori Praktikum (Gez[eichnet] Kasper)

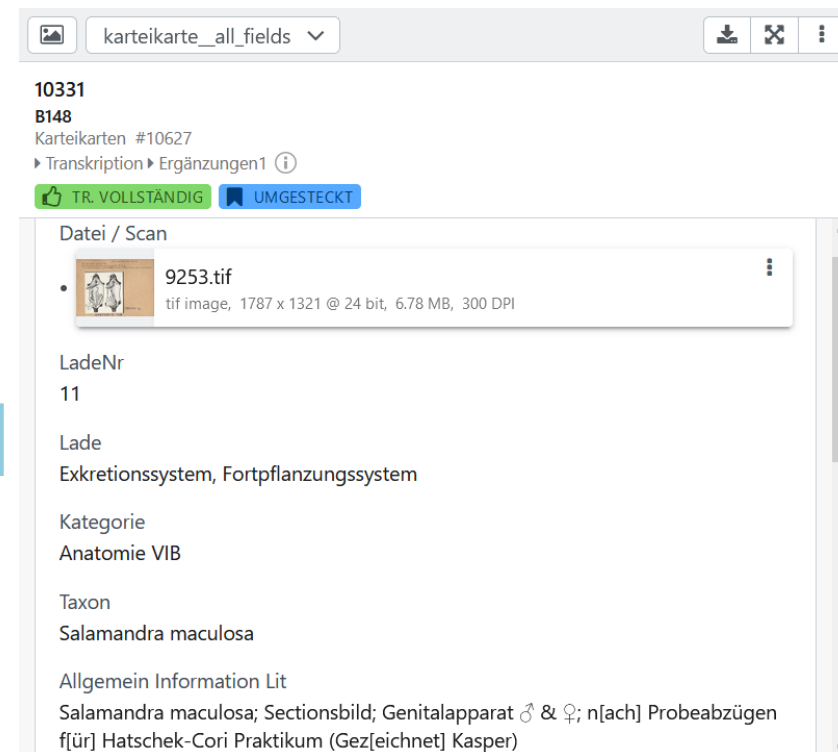
Kommentare Karteikarten

Karteikarte LfdNr
10331

Kommentar
n. Probeabzügen f. Hatschek-Cori Praktikum (Gez. Kasper); Original fragl.; DiaNegativ Säckchen Beschriftung: "Salamandra maculosa Genitalapparat ♂ [und] ♀; n[ach] Zeichn[un]g v[on] A. Kasper für Hatschek-Cori Praktikum"; vgl. Hindinger (2018)

Karteikarten (Referenzen)

 10331
B148




karteikarte_all_fields

10331
B148
Karteikarten #10627
Transkription Ergänzungen1

TR. VOLLSTÄNDIG UMGESTECKT

Datei / Scan

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LadeNr
11

Lade
Exkretionssystem, Fortpflanzungssystem

Kategorie
Anatomie VIB

Taxon
Salamandra maculosa

Allgemein Information Lit
Salamandra maculosa; Sectionsbild; Genitalapparat ♂ & ♀; n[ach] Probeabzügen f[ür] Hatschek-Cori Praktikum (Gez[eichnet] Kasper)

AV Media: Linked bibliographic data

- Linked with YARM Reference Manager

Images Phase 1

LS-B148
Images #20285
Phase 1 Images

Images Phase 1

Mgmt. Agents Content Taxon Temp **Related** Docu

Associated References YARM

Associated Reference YARM

Hatschek, B., Cori, C.I. (1896) Elementarcurs der Zootomie in fünfzehn Vorlesungen. Gustav Fischer, Jena, viii + 104 pp., xviii pls.
<https://archive.org/details/elementarcursder00hats/page/n3/mode/2up?view=theater>
Elementarcurs der Zootomie in fünfzehn Vorlesungen

Date and Time Digitized
Mi, 20.07.2022 10:53

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Objektyp Images Maske Images Phase 1 Letzte Änderung 29.03.2023 18:23 Version 13



Reference details

ID: 734 Book Whole Year: 1896

Non-Art
Library: Secondary

Author(s): Hatschek, Berthold; Cori, Carl Isidor

Title: Elementarcurs der Zootomie in fünfzehn Vorlesungen
Physical description: xviii pls.

Volume: --- Issue: --- Page/Pages: viii + 104

Publisher: Gustav Fischer
Place: Jena Edition: ---

Language: Unknown Original language: Unknown

Groups: Zoologie

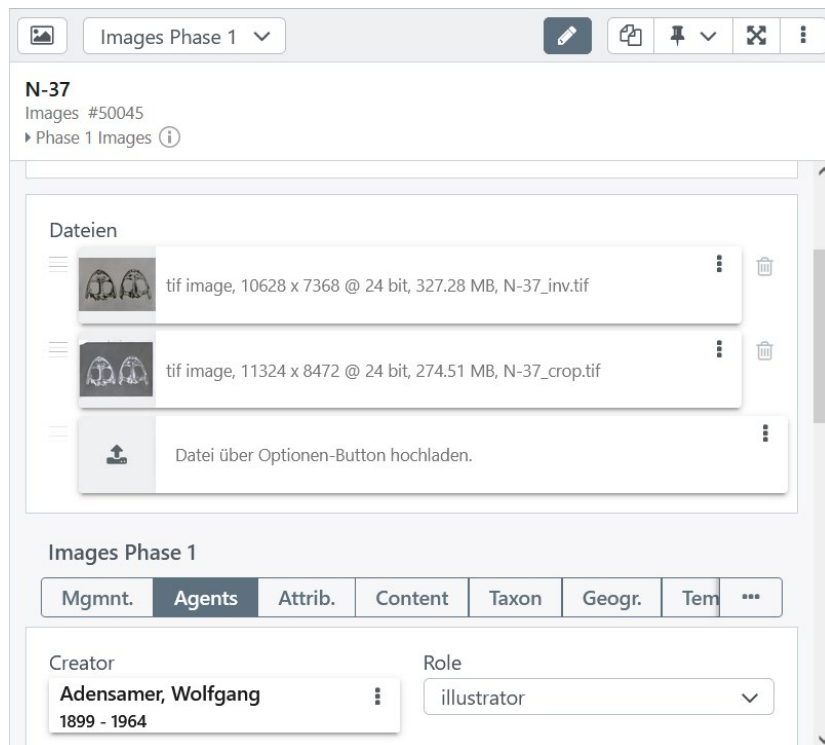
Created at: 2022-07-20 05:48:20 (Simon)
Updated at: 2023-01-19 09:29:55 (Simon)

Edit

Delete

AV Media: Person IDs

- Controlled list of persons
- Including wikidataID for all persons



Images Phase 1

N-37
Images #50045
Phase 1 Images

Dateien

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- tif image, 11324 x 8472 @ 24 bit, 274.51 MB, N-37_crop.tif

Images Phase 1

Mgmt. Agents Attrib. Content Taxon Geogr. Tem ...

Creator: Adensamer, Wolfgang (1899 - 1964)
Role: illustrator



Adensamer, Wolfgang
1899 - 1964
Person #51682

Biographische Daten

Geburtstag	Geburtsmonat	Geburtsjahr
24	5	1899
Sterbetag	Sterbemonat	Sterbejahr
4	4	1964

Daten vollständig

Literatur

OID_L_web

- <https://www.wikidata.org/wiki/Q107163002>

Thesis

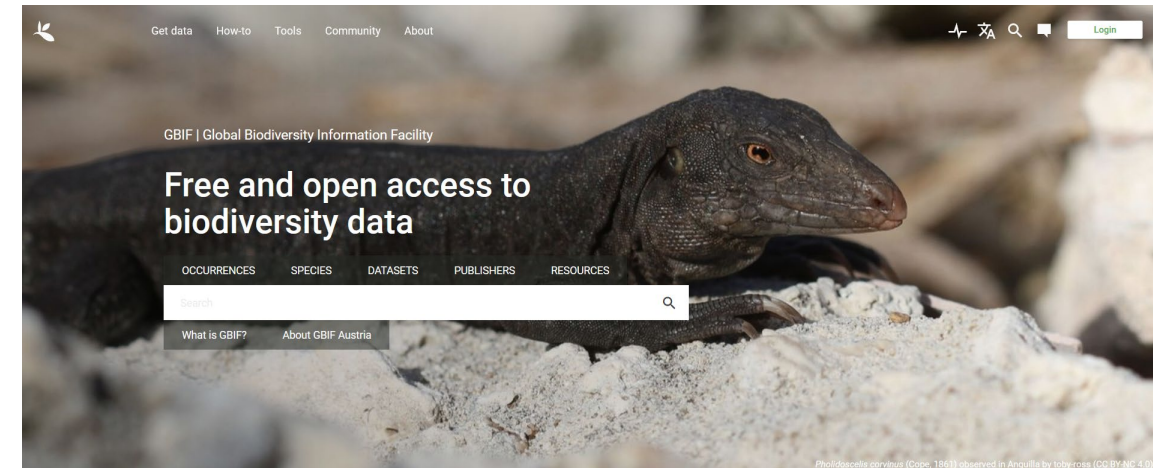
UW-Archiv, PH RA 5817: Aus Zoologie: "Über den Bau der Mundteile von Scutigera immaculata Newp.", 1924.01.09-1924.01.16 (<https://scopeq.cc.univie.ac.at/Query/detail.aspx?id=259980>)

Future steps

- DWCA export (xml/csv)
- AC export (xml/csv)

- Link with GBIF Taxonomic Backbone
(Global Biodiversity Facility, <https://www.gbif.org/>)

- Automated export of DWCA dataset to GBIF



© Image by <https://www.gbif.org/>

ZID-related: Infrastructure

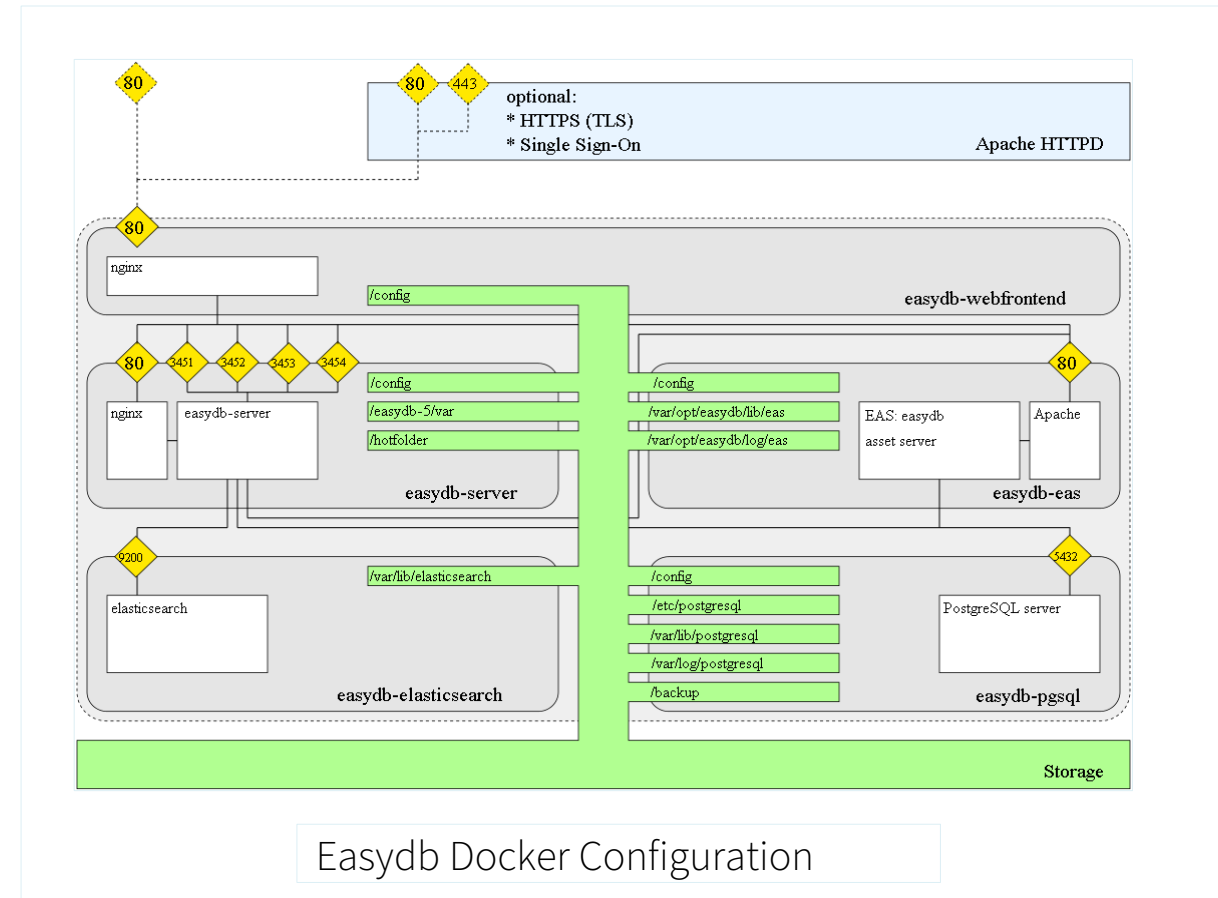
- Virtual machine in ZID virtual infrastructure (with backup and monitoring)
 - Presently 4 CPUs, 12 GB RAM and 1 TB storage
- Several Docker containers comprise easydb functionality
- File system storage
- Update by pulling new docker images (every 2–3 weeks)
- Mirrored development instance for tests and try-outs (plugins)



© Image by storystet on Freepik

ZID-related: Components/containers

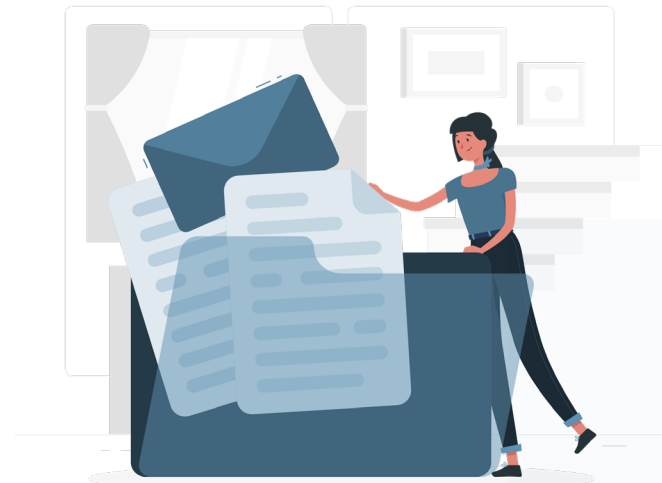
- File server („Eas“) in C
- Elasticsearch
- Postgresql
- Base server in Python
- Web frontend in Coffeescript/Javascript



ZID-related: Access and data

Access by other means than by browsers

- Plugins for web frontend (Coffeescript)
- Plugins for server and/or API (Python)



© Image by storyset on Freepik

Current data

- 16,000 images
- 54 object types (mainly imported helper objects, 7 main objects)
- 56,000 objects (e.g. taxon or YARM entries) in total

ZID-related: easydb

Data model J.Bekesi US

Object types & masks Settings (object type)

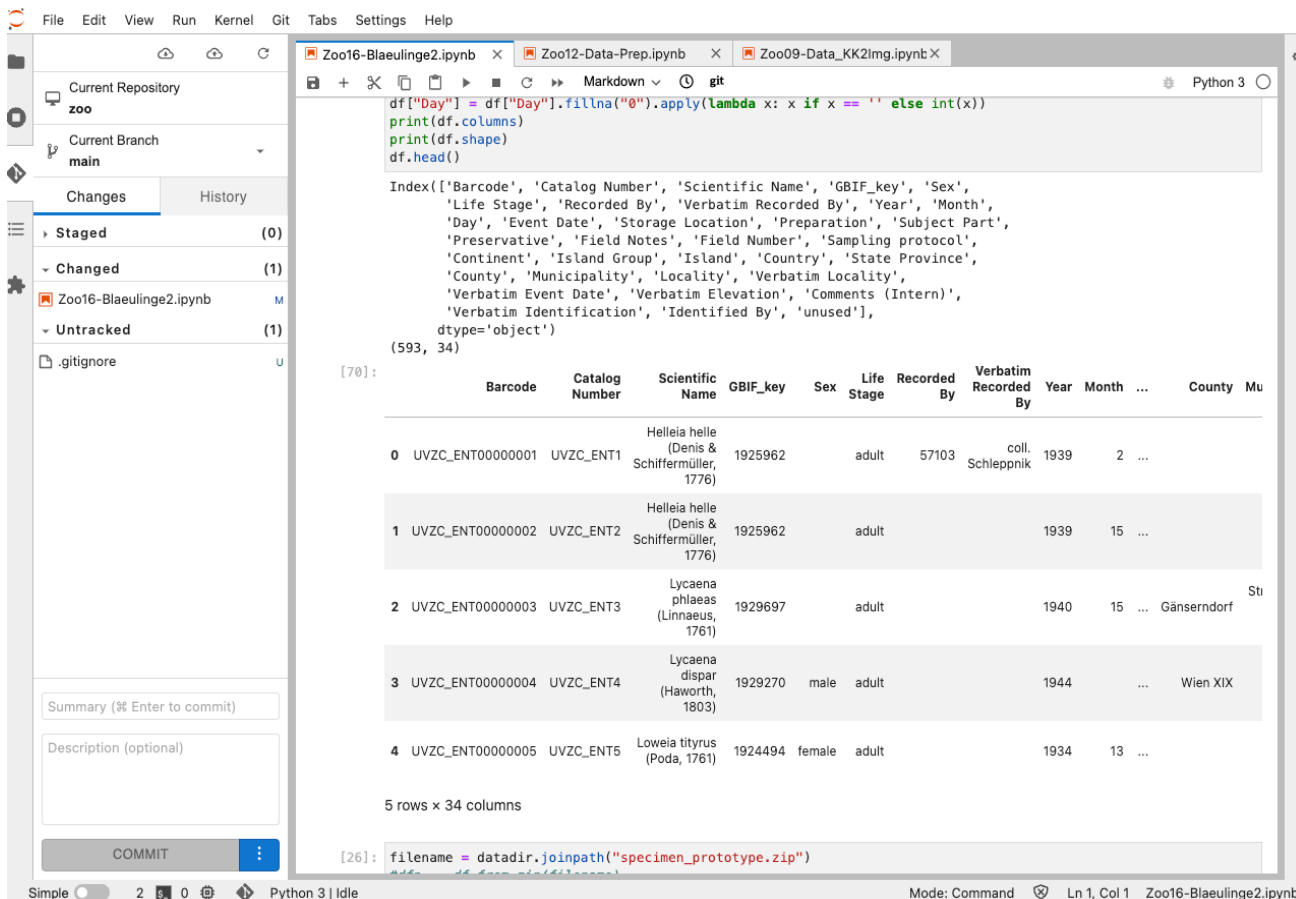
Current Development Object Type Columns

Object type	Internal name	Field name	Data type	Options
Specimen specimen Search, Tags, Pools, 1 file field	files	Files (Images)	DE	Select
			US	NONE
TaxonAccepted taxon_accepted Search, Pools, 2 masks	dwc_catalog_nu	Catalog Number	DE	Select
			US	NONE NO DUPLICATE VALUES
Wandtafeln wall_panels Search, Pools, 2 masks, 1 file field	dwc_event_datr	Event Date	DE	Select
			US	NONE
Secondary object type	dwc_verbatim_r	Verbatim Event Date	DE	Select
			US	NONE
ac:subjectPart ac_subject_part	dwc_year	Year	DE	Select
			US	NONE
ac:subtype ac_subtype 2 masks	dwc_month	Month	DE	Select
			US	NONE
ac:timeOfDay ac_timeofday	dwc_day	Day	DE	Select
			US	NONE
cdwa:catalogLevel cdwa_catalog_level	dwc_field_note:	Field Notes	DE	Select
			US	NONE
dc:language dc_language 2 masks				
dc:type dc_type 2 masks				
ddwc:preservative ddwc_preservative				
Dimensionen dimensions				
dwc:associatedTaxaRelations dwc_associated_taxa_relations				

Data model

- Specimen object type has about 90 fields

ZID-related: Data refining



The screenshot shows a Jupyter Notebook with the following code and output:

```
df["Day"] = df["Day"].fillna("0").apply(lambda x: x if x == "" else int(x))
print(df.columns)
print(df.shape)
df.head()
```

Index(['Barcode', 'Catalog Number', 'Scientific Name', 'GBIF_key', 'Sex', 'Life Stage', 'Recorded By', 'Verbatim Recorded By', 'Year', 'Month', 'Day', 'Event Date', 'Storage Location', 'Preparation', 'Subject Part', 'Preservative', 'Field Notes', 'Field Number', 'Sampling protocol', 'Continent', 'Island Group', 'Island', 'Country', 'State Province', 'County', 'Municipality', 'Locality', 'Verbatim Locality', 'Verbatim Event Date', 'Verbatim Elevation', 'Comments (Intern)', 'Verbatim Identification', 'Identified By', 'unused'], dtype='object')

(593, 34)

[70]:

	Barcode	Catalog Number	Scientific Name	GBIF_key	Sex	Life Stage	Recorded By	Verbatim Recorded By	Year	Month	...	County	Mu
0	UVZC_ENT00000001	UVZC_ENT1	Helleia helle (Denis & Schiffermüller, 1776)	1925962		adult	57103	coll. Schlepplnik	1939	2	...		
1	UVZC_ENT00000002	UVZC_ENT2	Helleia helle (Denis & Schiffermüller, 1776)	1925962		adult			1939	15	...		
2	UVZC_ENT00000003	UVZC_ENT3	Lycaena phlaeas (Linnaeus, 1761)	1929697		adult			1940	15	...	Gänserndorf	St
3	UVZC_ENT00000004	UVZC_ENT4	Lycaena dispar (Haworth, 1803)	1929270	male	adult			1944	Wien XIX	
4	UVZC_ENT00000005	UVZC_ENT5	Loweia tityrus (Poda, 1761)	1924494	female	adult			1934	13	...		

5 rows x 34 columns

[26]: filename = datadir.joinpath("specimen_prototype.zip")

- Data is **refined/processed** in **Jupyter notebooks** and **exported as CSV files**

ZID-related: Import of metadata

CSV-Importer

Import settings | Import mapping

CSV file: yarm_refs_all_20230131_1635.csv

CSV fieldnames: 1. row

Target fieldname: 2. row

Object type*: YARM Reference

Mask*: yarm_ref__all_fields

File upload type: Direct

Status	Quantity	Show
Rows	2139	
Ready	2139	<input checked="" type="checkbox"/>
Invalid	0	<input checked="" type="checkbox"/>
Processing	0	<input checked="" type="checkbox"/>
Done	0	<input checked="" type="checkbox"/>
Failed	0	<input checked="" type="checkbox"/>
Warning	0	
Insert	2139	
Update	0	
Delete	0	

Table view | Record preview | JSON preview

yarm_id	yarm_link	ref_body	notes
1664	{"url": "https://yarm.phaidra.org/yarm/refs/1664"}	<p>20 Jahre Tropenstation La Gamba, Costa Rica Ed.: Albert, Roland et al. - Wien : Verein zur Förderung der Tropenstation La Gamba, (2013) - p. 160 [maps (inside back cover)]</p>	
1872	{"url": "https://yarm.phaidra.org/yarm/refs/1872"}	<p>Der Anatom Joseph Hyrtl 1810–1894 Ed.: Gasser, Rudolf-Josef; Mitterwenger-Fessl, Christine - Wien : Wilhelm Maudrich, (1991) - p. 202</p>	"Herausgegeben anlässlich der Er- Museums Perchtoldsdorf am 10. f Sonderausstellung der Hyrtl-Bibli Mödling 10. Mai–27. Oktober 1991 Mödling/Perchtoldsdorf, 9.–12. M.
1578	{"url": "https://yarm.phaidra.org/yarm/refs/1578"}	<p>Evolution, Ordnung und Erkenntnis: [Rupert Riedl zum 60. Geburtstag am 22. Februar 1985] Ed.: Ott, Jörg A.; Wagner, Günter P.; Wuketits, Franz M. - Berlin & Hamburg : Paul Parey, (1985) - p. 158</p>	Bibliography of R. Riedl [up to 198
1588	{"url": "https://yarm.phaidra.org/yarm/refs/1588"}	<p>Fauna und Flora der Adria: Ein systematischer Meeresführer für Biologen und Naturfreunde Ed.: Riedl, Rupert - Hamburg & Berlin : Paul Parey, (1963) - p. 640 [viii pls. (Festtafel)]</p>	p. 6: "Von den Tafeln sind 100 (sc Umrißzeichnungen und Lexikonvie [Leopoldine Riedl geb. Frühmann] Mehofer, 31 von Frl. Maria Wimme Herr Anton Dohrner, Dr. Eduard Splechtna, die Nr. 1 und 2 von mir der farbigen Tafelbilder wurden v. Selbster 19 von Ed. Wimmer

1 - 100 of 2,140 records

Reload Save CSV Settings

Insert

- Metadata are imported and/or bulk updated as **CSV files**

URLs and workflow

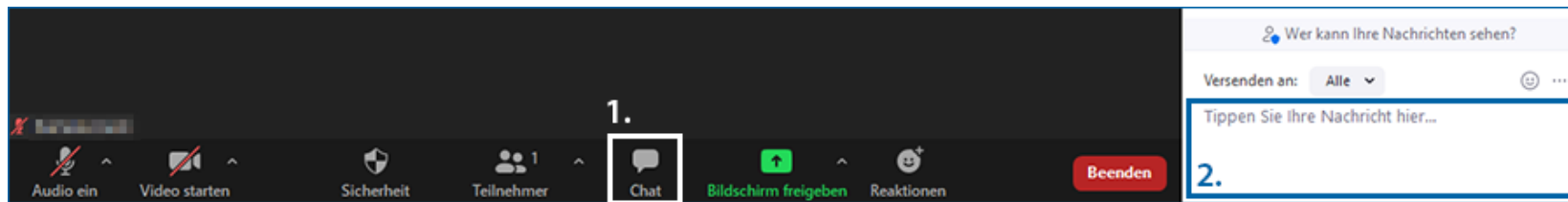
- URLs of interest:
 - Documentation of easydb: <https://docs.easydb.de/en/>
 - General info for easydb: <https://www.programmfabrik.de/en/easydb/>
- Our workflow: Nothing special → e-mail, telephone, feedback loops, try-outs
- Contact:
 - simon.engelberger@univie.ac.at
 - janos.bekesi@univie.ac.at



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DataLife – Data Infrastructure for Life Sciences

Presentation by Thomas Rattei



Data in Life Sciences

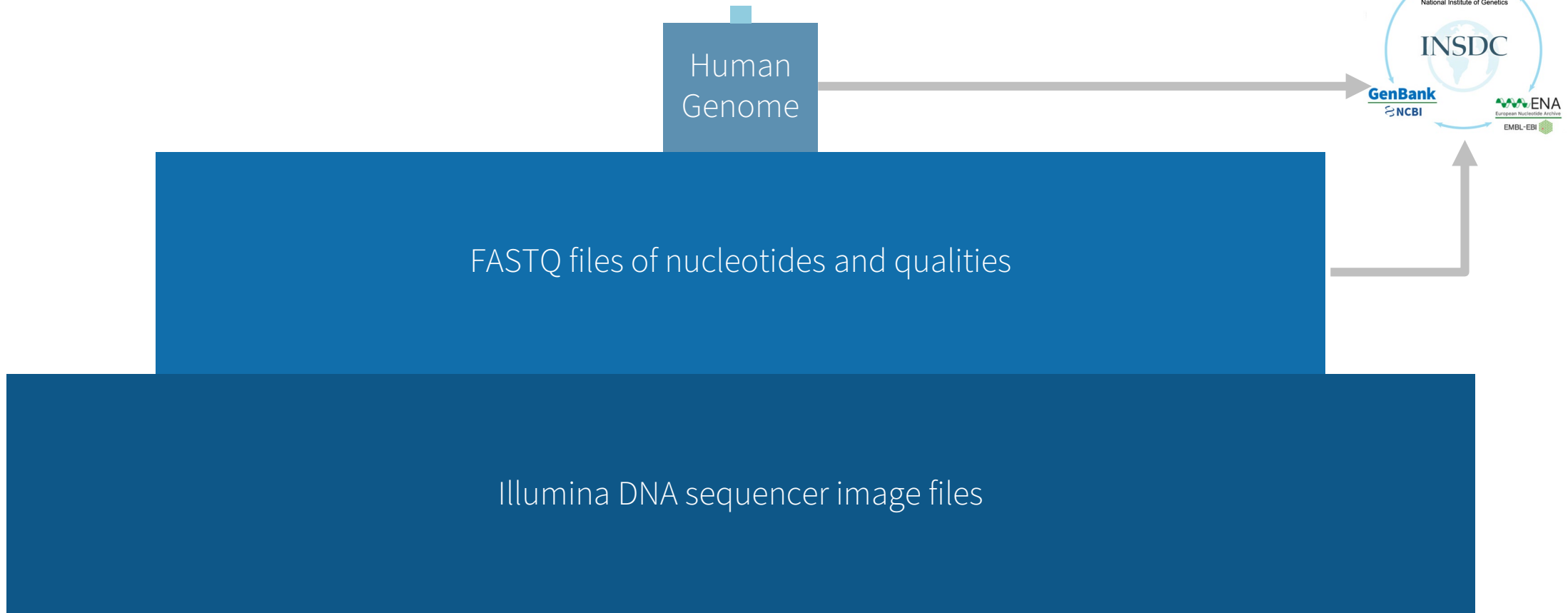
- Huge data collection in short time:
 - Biological and medical imaging
 - Real-time microscopy
 - DNA and RNA Sequencing
 - Chemical analytics
- Interpretation with machine learning and artificial intelligence
 - Transformation of data into features
 - Real-time access to large data for training
 - Compute-intensive learning



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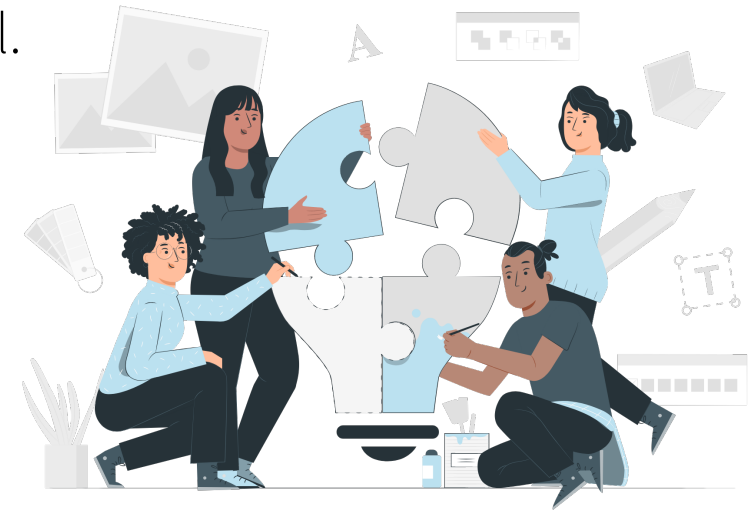
Example: Genome data

1 % of the human genome differ between individuals



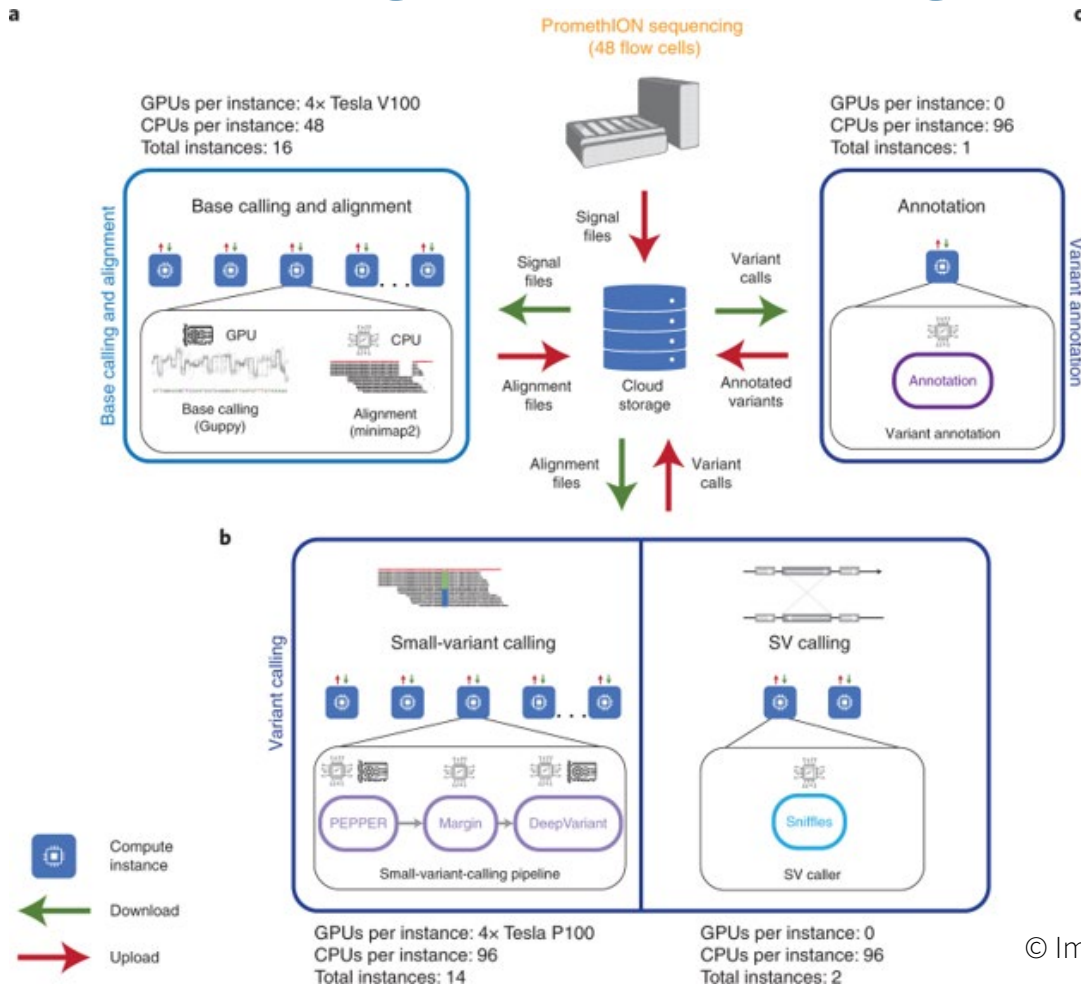
Future needs: data-intensive projects

- FWF Cluster of Excellence „**Microbiomes Drive Planetary Health**”
Centre for Microbiology and Environmental Systems Science et al.
- **ERC Advanced Grants**
 - Manuel Zimmer
 - Michael Wagner
- **Wittgenstein Awards**
 - Christa Schleper
 - Michael Wagner



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Data acquisition, storage and processing



PromethION 48 Specification:

Sequencer:

- H 190 x W 590 x D 430 mm, 25 kg

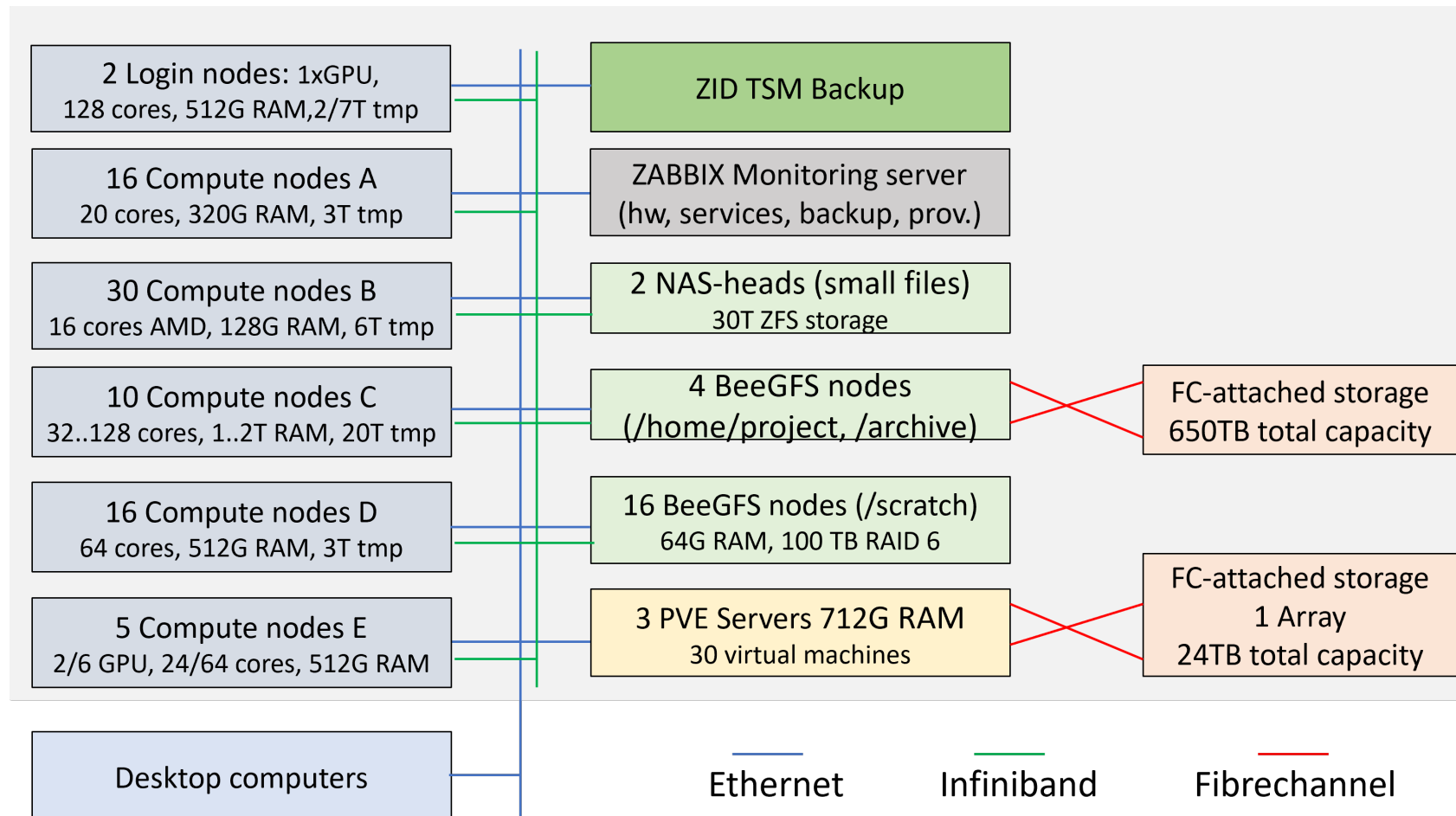
Data Acquisition Unit:

- H 440 x W 178 x D 470mm, 25 kg

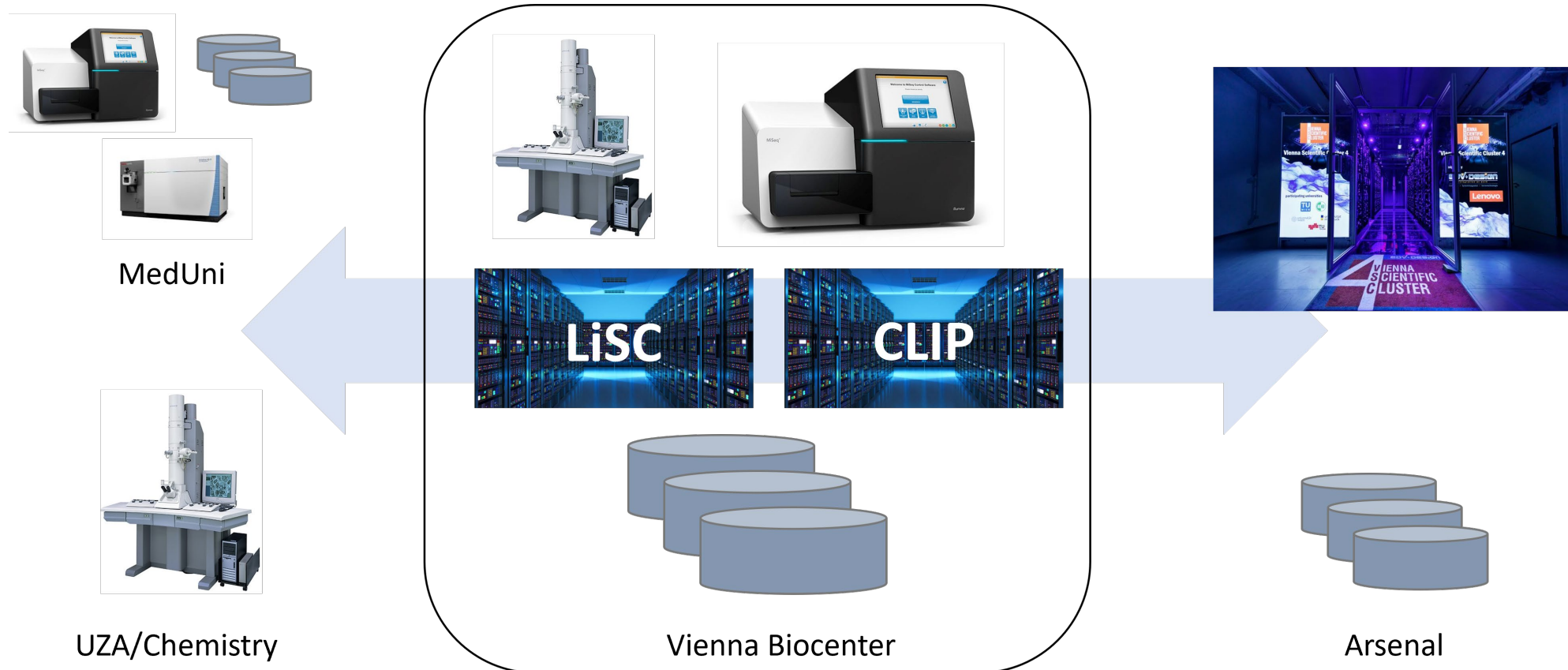
Compute spec:

- 64 TB SSD Storage
- 384 GB RAM
- Intel CPU
- 4 x GV100 basecall accelerators

Now: Life Science Compute Cluster



Next: DataLife project



Funding by BMBWF in “Digital Infrastructures” initiative. Total costs 2.5 mio, ministry contribution 1.8 mio.

Data creation sites

- Ahrends group Metabolomics/Lipidomics (Chemie 1090)
- BioOptics Facility (Max Perutz Labs DBG VBC5)
- EDGE (UZA2 1090)
- EM Facility (IST Austria)
- EM Facility (VBCF)
- FACS Facility (Max Perutz Labs)
- Gerner group Proteomics (Chemie 1090)
- Joint Microbiome Facility / BSF (Anna Spiegel Building CeMM)
- Joint Microbiome Facility / MedUni (AKH 5P)
- Joint Microbiome Facility / CMESS (UBB)
- MassSpec Facility (Max Perutz Labs / VBCF)
- Menche group (Max Perutz Labs (DBG VBC5))
- NGS Facility (VBCF / BSF Anna Spiegel Building CeMM)
- Pharmazie (UZA2 1090)
- Strukturbiologie (Max Perutz Labs (DBG VBC5))
- Zanghellini group Metabolic Modelling (Chemie 1090)
- Zimmer group (UBB)

Data processing sites

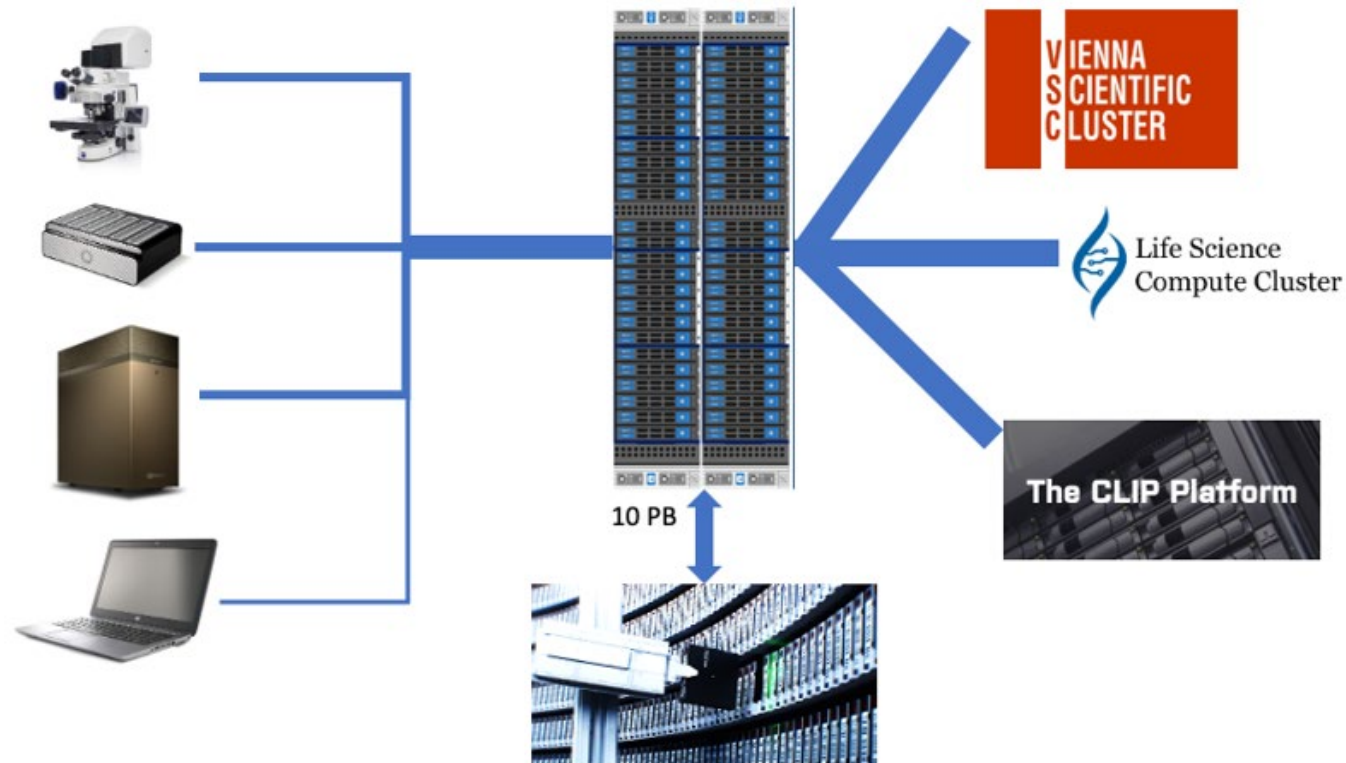
- Vienna Scientific Cluster
- CLIP/CBE of ÖAW
- CIBIV-Cluster at Max Perutz Labs
- Life Science Compute Cluster of University of Vienna (LeWi, CMESS, Chemistry and JMF)
- MedUni Wien Computing facilities
- Laboratory of Computational Biophysics high-performance cluster (Max Perutz Labs)
- Dorothy-Cluster (Max Perutz Labs, Structural Biology)



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High-performance data storage

- GPFS Storage with IBM Active File Management (AFM), partially redundant
- Storage nodes with Flash-Disk ratio of 1:10



Network infrastructure

Data creation sites <-> Storage

- Fast(er) LAN connections

Storage <-> Data processing sites

- Direct dedicated networks with multiple 100 Gbit/s Ethernet RDMA links

Side effects:

- Newly created redundant 100 Gbit/s between UBB and Arsenal via NIG and University Main Building
- Redundant 100 Gbit/s between Medical University resp. MeduniBackup and Arsenal (via NIG, via Campus3A/University Main Building)

DataLife work/time plan

1. Concept (2023)
2. Planning (2023/24)
3. Realization (2023/24)
4. Operation (2025/26)

Two additional FTE:

- Technician (ZID)
- Data Scientist (Vienna Biocenter)



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Data management and harmonisation

Training of user community needed:

- Open Science
- FAIR principles
- Data lifecycles and storage economy
- Data standards

Help by:

- 2 data stewards
- LiSC Servicedesk



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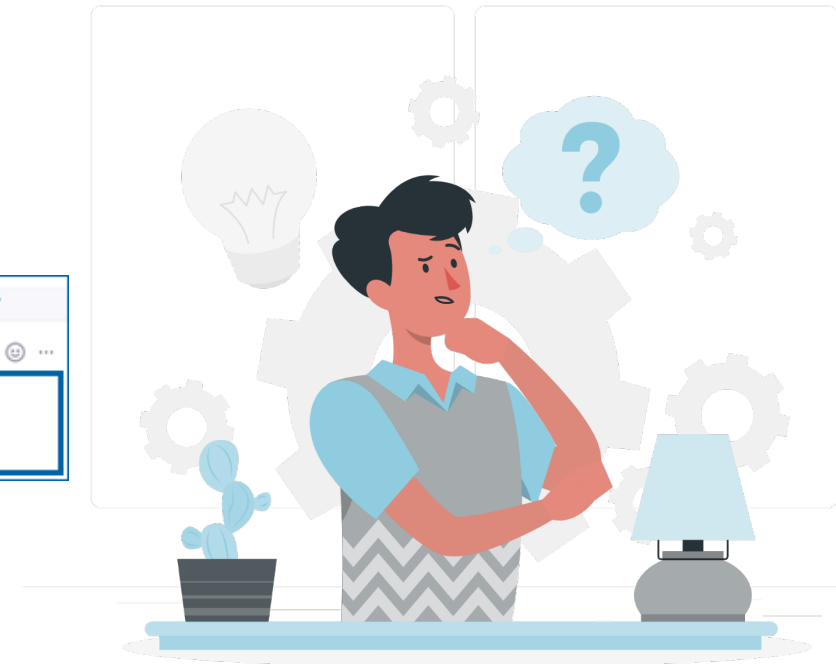
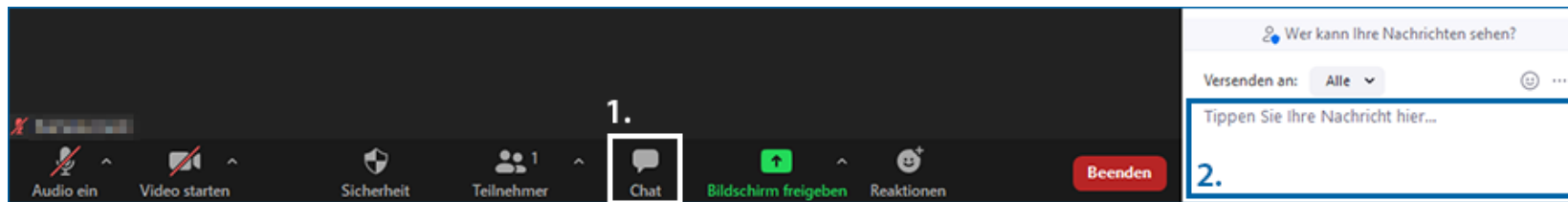
Outlook and further impacts

- Contribution to national and international infrastructure:
 - European Open Science Cloud
 - EURO-Bioimaging
 - ELIXIR
- Formation of ELIXIR Austria node
- Contact: thomas.rattei@univie.ac.at



Questions about DataLife – Data Infrastructure for Life Sciences?

- Please ask your questions as a chat comment.



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IT services of the ZID for science and research

- Supporting projects in all stages – from development to execution
- Overleaf – Collaborative Online LaTeX Editor

Supporting projects in all stages – from development to execution

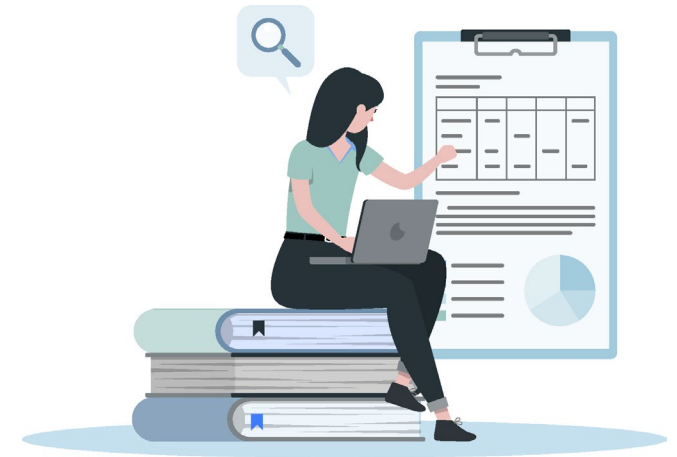
Presentation by Ulrich Kiermayr



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What we can offer

- Support in the project planning phase regarding the needed infrastructure
- Evaluation of options to meet project requirements
- Contact point for external support
- Contracts to use in procurement phase
- Technical support in the realisation of projects
- Monitoring and debugging in case of problems



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Why this is important

- Vienna University's campus network is a complex system
- Constraints we need to meet
- Different options to achieve the goals of the project
- Additional services can be offered by the ZID
- Changes to the infrastructure require time (delivery times, cabling, setup times)
- Changes cost (a lot of) money, has to be taken into account in project proposals
- The infrastructure has to be manageable on a large scale



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What our infrastructure offers today

- 1 Gbit to every system
- 10 Gbit between locations
- 100 Gbit uplink to the internet (including other ACOnet participants like VSC)
- Redundancy in the core network (including several large university locations)



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What is currently in the making

- Connecting large locations (UBB, UZA ...) via 100 Gbit to the core network
- Continuous upgrade to access infrastructure to allow more bandwidth inhouse
- Options for dedicated links between services like VSC



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What can be done

- Increase of bandwidth
- Links to other locations
- 10 Gbit to dedicated systems
- Serverhousing for dedicated systems

Bear in mind: this needs money, people and time – so early planning and budget availability is key to a successful project.



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Contact

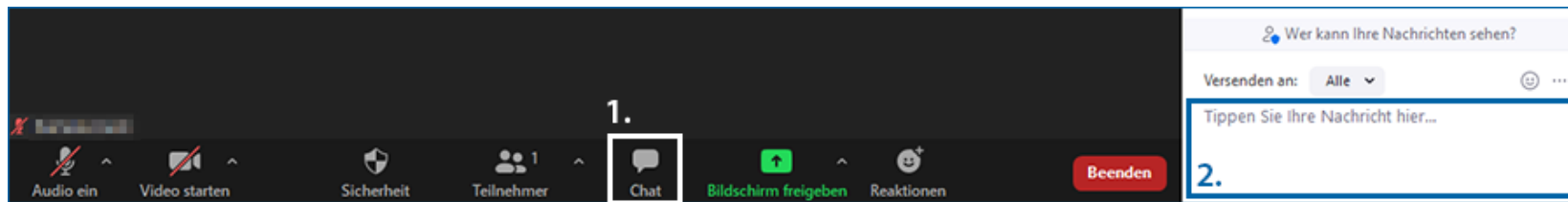
- Via Servicedesk: [Request about the data network](#)
- Via service e-mail address: digital.zid@univie.ac.at
- Directly: ulrich.kiermayr@univie.ac.at, christian.kracher@univie.ac.at



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Questions about Supporting projects in all stages?

- Please ask your questions as a chat comment.



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Overleaf – Collaborative Online LaTeX Editor

Presentation by Eva Karall

Why LaTeX and how does it work?

- Developed by Leslie Lamport in the 1980s, LaTeX came to its name: **L**amport **T**e**X**
- A markup language that facilitates the production of well-formatted documents

This is a simple math expression `\(\sqrt{x^2+1}\)` inside text.



This is a simple math expression $\sqrt{x^2 + 1}$ inside text.

What is Overleaf?


- Overleaf is an online LaTeX editing tool that
 - allows you to create LaTeX documents directly in your web browser
 - “compiles” your LaTeX automatically to show you the results

```
%% ===== slides =====

\begin{graphicsFrame}{Layout ``Body with figure, small right''}{short}
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Random formula
\[
(0,1)\ni t\mapsto\frac{\partial}{\partial t}g(t,\omega)=\int_{0,1-t}\frac{G(dr,\omega)}{1-r}
\]
Another random formula
\begin{equation}\label{eq1}
\int_{(0+, \cdot), 1}\frac{f_{\mathcal{G}}(t, \cdot)}{1-G^{\leftarrow}(t, \cdot)}dt
= f_{\mathcal{G}}(G, X)\quad \text{a.s.}
\end{equation}
And another, even more random formula
\[
\mathbb{P}(X\leq Z-\varepsilon)\leq q
\mathbb{P}(X\leq q_{\mathcal{G}}(\delta)(X)-\varepsilon)<\delta
\]
\end{pre>

```



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Add author here



Layout “Body with figure, small right”

Random formula


$$(0, 1) \ni t \mapsto \frac{\partial}{\partial t} g(t, \omega) = \int_{(0, 1-t)} \frac{G(dr, \omega)}{1-r}$$

Another random formula

$$\int_{(G(0+, \cdot), 1)} \frac{f_{\mathcal{G}}(t, \cdot)}{1-G^{\leftarrow}(t, \cdot)} dt = f_{\mathcal{G}, G, X} \quad \text{a.s.} \quad (1)$$

And another, even more random formula

$$\mathbb{P}(X \leq Z - \varepsilon) \leq \mathbb{P}(X \leq q_{\mathcal{G}, \delta}(X) - \varepsilon) < \delta$$

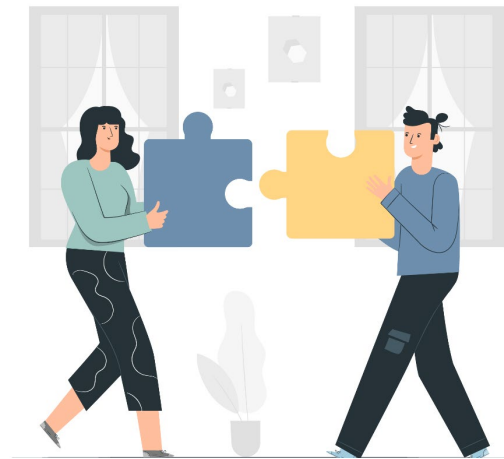


Bildgröße
12,1 x 9,1 cm

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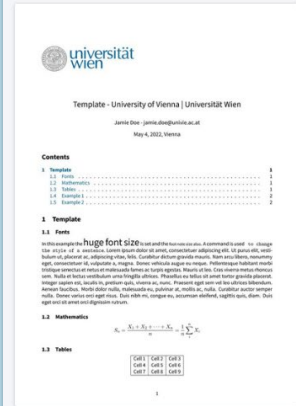


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- Official **University of Vienna templates** available

Featured LaTeX Templates



Template - University of Vienna | Universität Wien
Janine Doe - janine.doe@univie.ac.at
May 4, 2022, Vienna

Contents

- 1. Template
- 1.1. Front
- 1.2. Mathematics
- 1.3. Table

1.1. Front

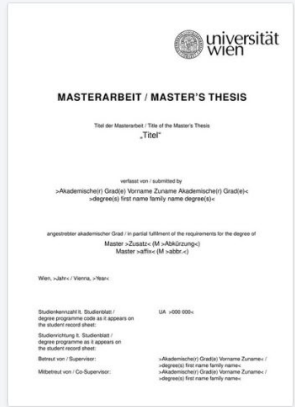
in this example the **huge font size** is used and the horizontal line is removed. To change the style of a section, simply place the section title in the appropriate section. To change the style of a section, simply place the section title in the appropriate section. To change the style of a section, simply place the section title in the appropriate section.

1.2. Mathematics

$$x_1 + x_2 + x_3 + \dots + x_n = \sum_{i=1}^n x_i$$

1.3. Table

1.1.1	1.1.2	1.1.3
1.1.1	1.1.2	1.1.3
1.1.1	1.1.2	1.1.3



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Titel der Masterarbeit / Title of the Master's Thesis
„Tittel“

verfasst von / submitted by
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»degree(s) first name family name degree(s)«

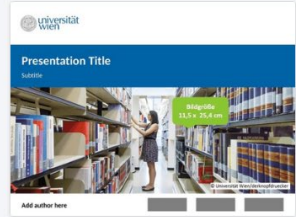
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degree programme code and it appears on the student record sheet

Studienrichtung 2 / Studienrichtung
degree programme code and it appears on the student record sheet

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»degree(s) first name family name«
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»degree(s) first name family name«



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Subtitle

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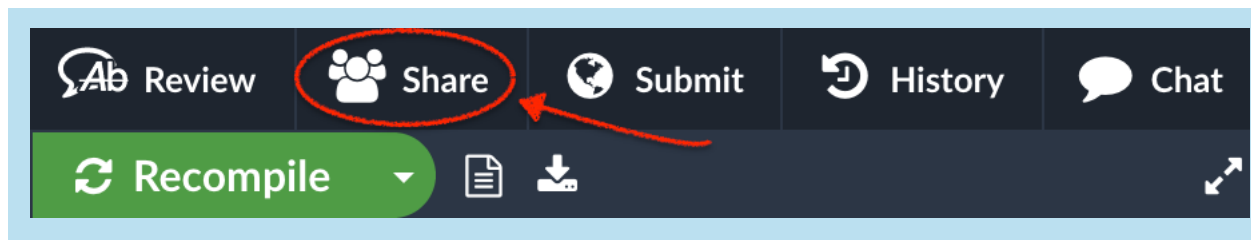
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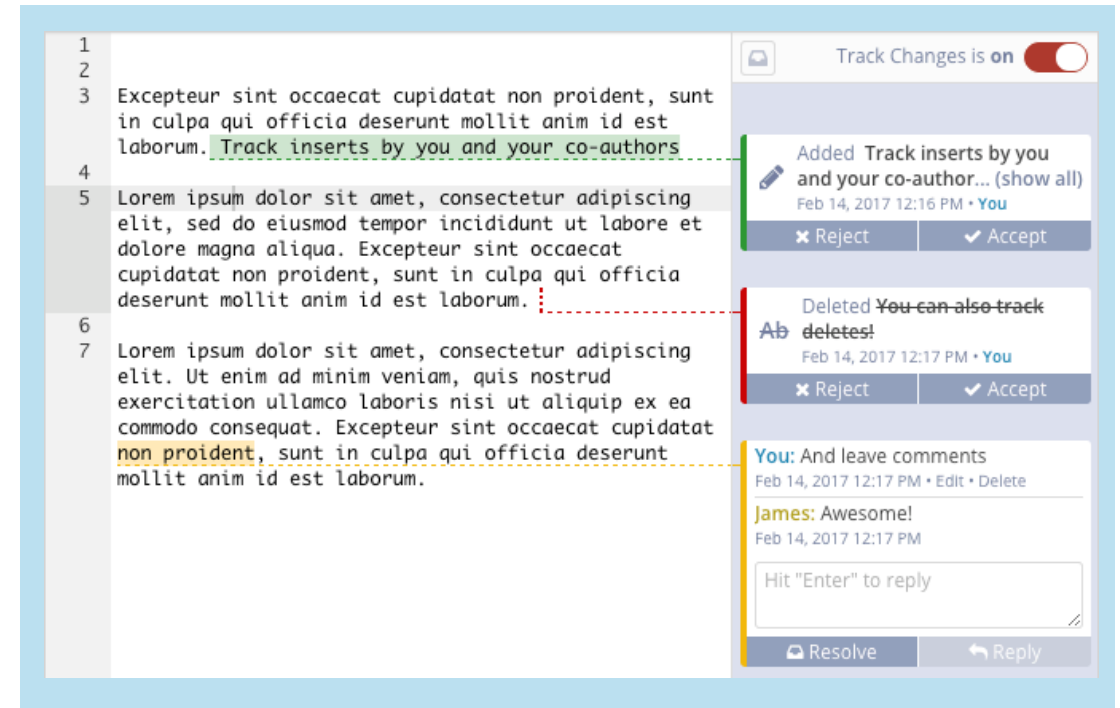
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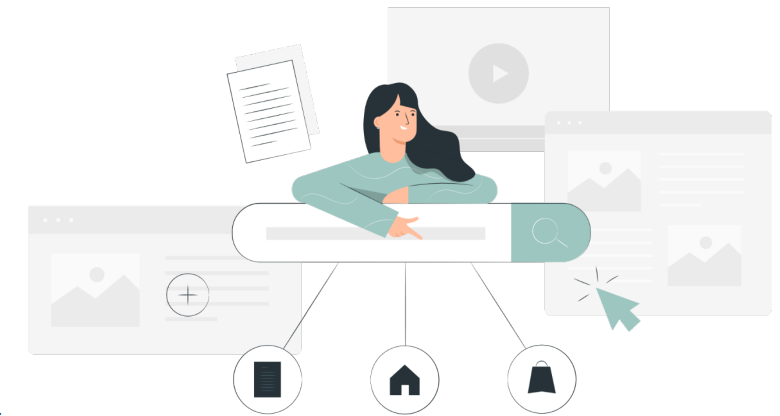


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Screenshot: <https://www.overleaf.com/blog/track-changes-and-comments-in-latex-2017-03-09>

More information

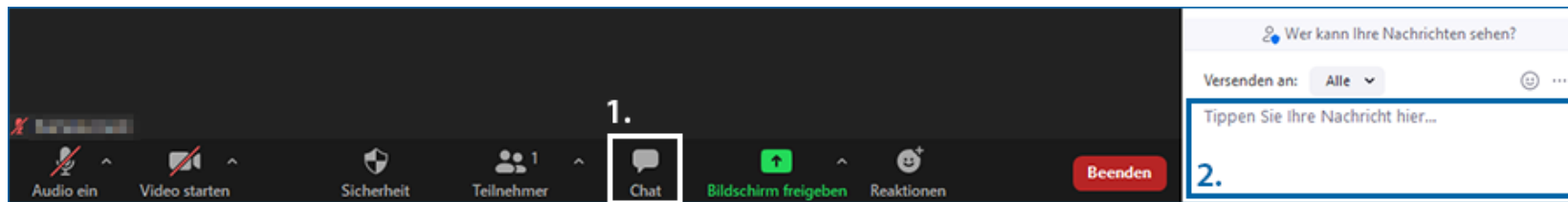
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Outlook

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