WissKI in Use at NFDI4Objects –
Ontology- and Datamodel Development for Data Integration
and Harmonisation

Dr. Sarah Wagner, FAU Competence Center for Research Data & Information
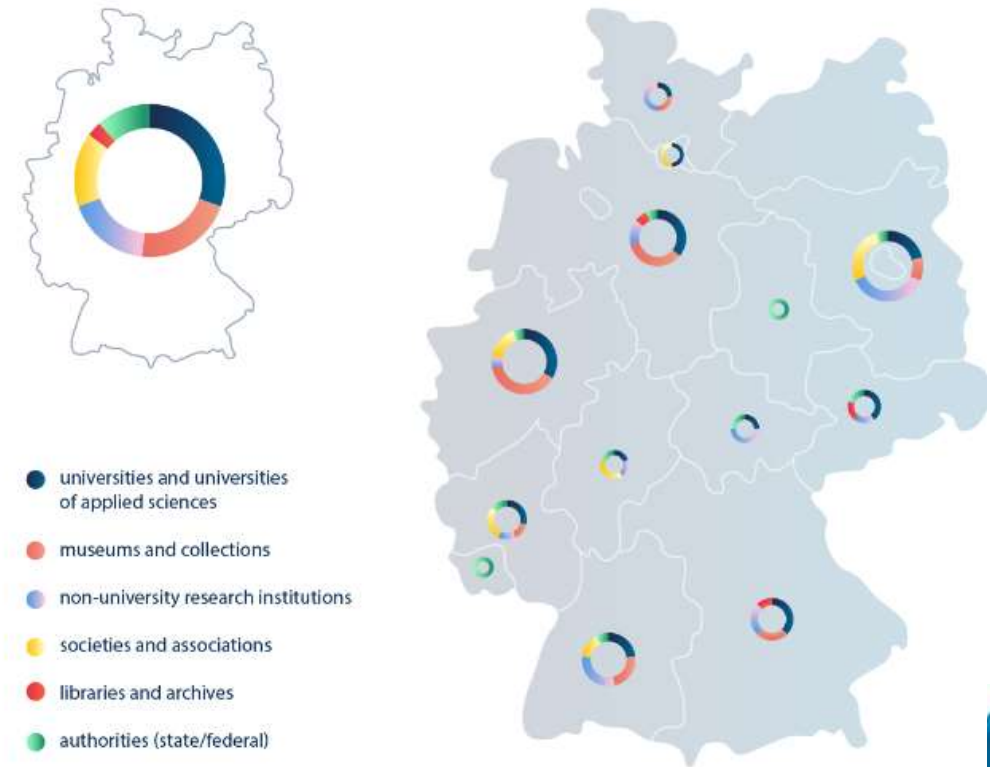sarah.wagner@fau.de
Anja Gerber, Klassik Stiftung Weimar anja.gerber@klassik-stiftung.de

WissKI User Meeting | November 20th 2024

NFDI4Objects

- NFDI: aims to make data from science and research FAIR in a permanent digital repository

- NFDI4O: focuses the tangible heritage of around three million years of human and environmental history

- 14 applicant institutions:
German Archeological Institute, Coin Cabinet of the Berlin State Museums, Mainz University of Applied Sciences, …

- more than 60 Participants, e.g. University of Erlangen-Nuremberg (FAU)

- universities and universities of applied sciences
- museums and collections
- non-university research institutions
- societies and associations
- libraries and archives
- authorities (state/federal)

https://www.nfdi4objects.net/index.php/ueber-uns/konsortium

NFDI4Objects Task Areas

- TA1 Documentation
- TA2 Collecting
- TA3 Analytics and Experiments
- TA4 Protecting
- TA5 Storage, Access, Dissemination
- TA6 Qualification, Integration & Harmonisation
- TA7 Support and Coordination

https://www.nfdi4objects.net/
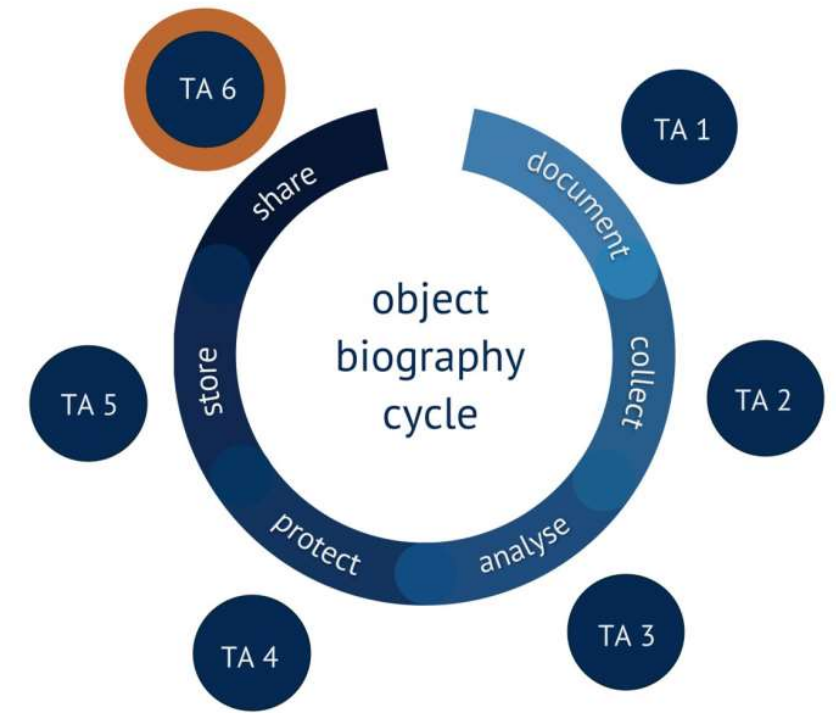
→ Generation of heterogeneous and multidisciplinary research data in TA 1-4, e.g. excavation data, collection and provenance information, different kinds of analyses, restoration and conservation measures

→ Various formats, models, ontologies, authority files, terminologies, …

→ Processes, tools and standards for integration and harmonisation needed → TA6

Task Area 6 Qualification, Integration and Harmonisation

Co-Spokespersons and employees:
Prof. Dr. Kai-Christian Bruhn
Hochschule Mainz
Dr. Dirk Wintergrün
Klassik Stiftung Weimar

Klassik Stiftung Weimar (KSW)
Dr. Dirk Wintergrün
Anja Gerber

FAU Competence Center for Research Data and Information (FAU CDI)
Prof. Dr. Günther Görz
Prof. Dr. Michael Kohlhase
Dr. Sarah Wagner
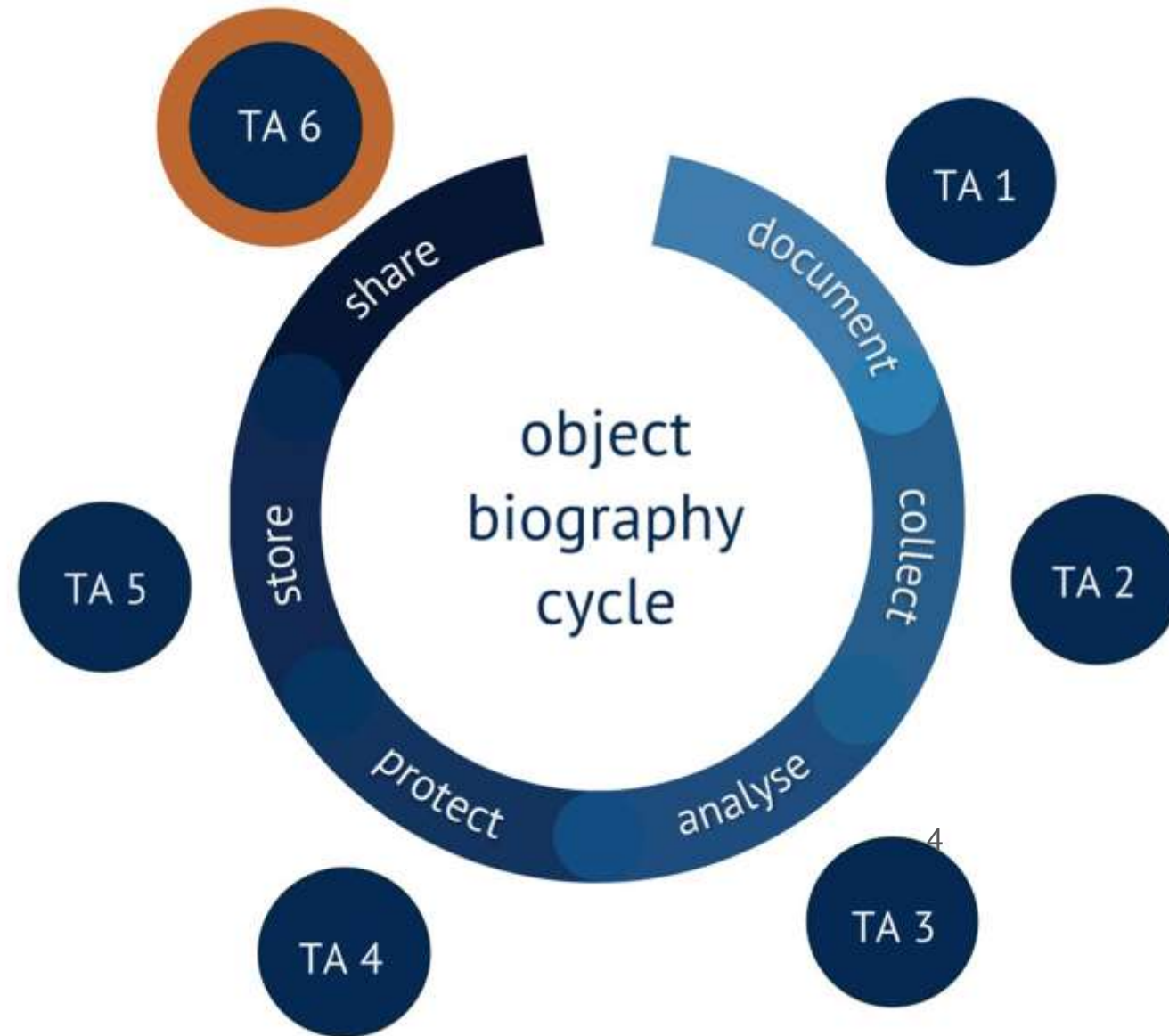
Tasks of KSW & FAU CDI for data integration and harmonisation

- Development of the N4O **Objects Ontology** (based on ISO 21127 CIDOC CRM Version 7.1.3) for the description of the consortium's research data

- Development, implementation and proof of concept of a data model to represent **Object Biographies** (**Maximum Dataset**) using the **N4O Objects Ontology** and the virtual research environment **WissKI**

- Development of a **Minimal Dataset** in cooperation with TA 1-4 to represent and connect the core data of objects using the **N4O Objects Ontology**

Object Biography

Object Biography

- Transfers the concept of biography to objects of cultural heritage
- Compiles any kind of object information (contexts, paths they "traveled", hands they went through, meanings, …)
- Objects (artifacts, living beings, rocks)
- Contexts & Events, e.g. production, usage, collection/museum context, change of ownership, research activities, …)
- Actors, places, time (context specific: who? where? when?)
- Sources (pictorial and written material, data, findings, …)

Fig.: Schematic representation of an object biography © Sarah Wagner, CC-BY 4.0

Use Cases

Object biographies are not simply given and usually have to be **reconstructed in extensive research**. In order to develop and provide a data model, we need Use Cases.

View of the Use Cases (so far) in our WissKI N4O development instance

Selection criteria

- heterogeneous

- significant for a domain or representative of a current debate

- complex biography

- various information and source material available

- collaborations with interested domain experts
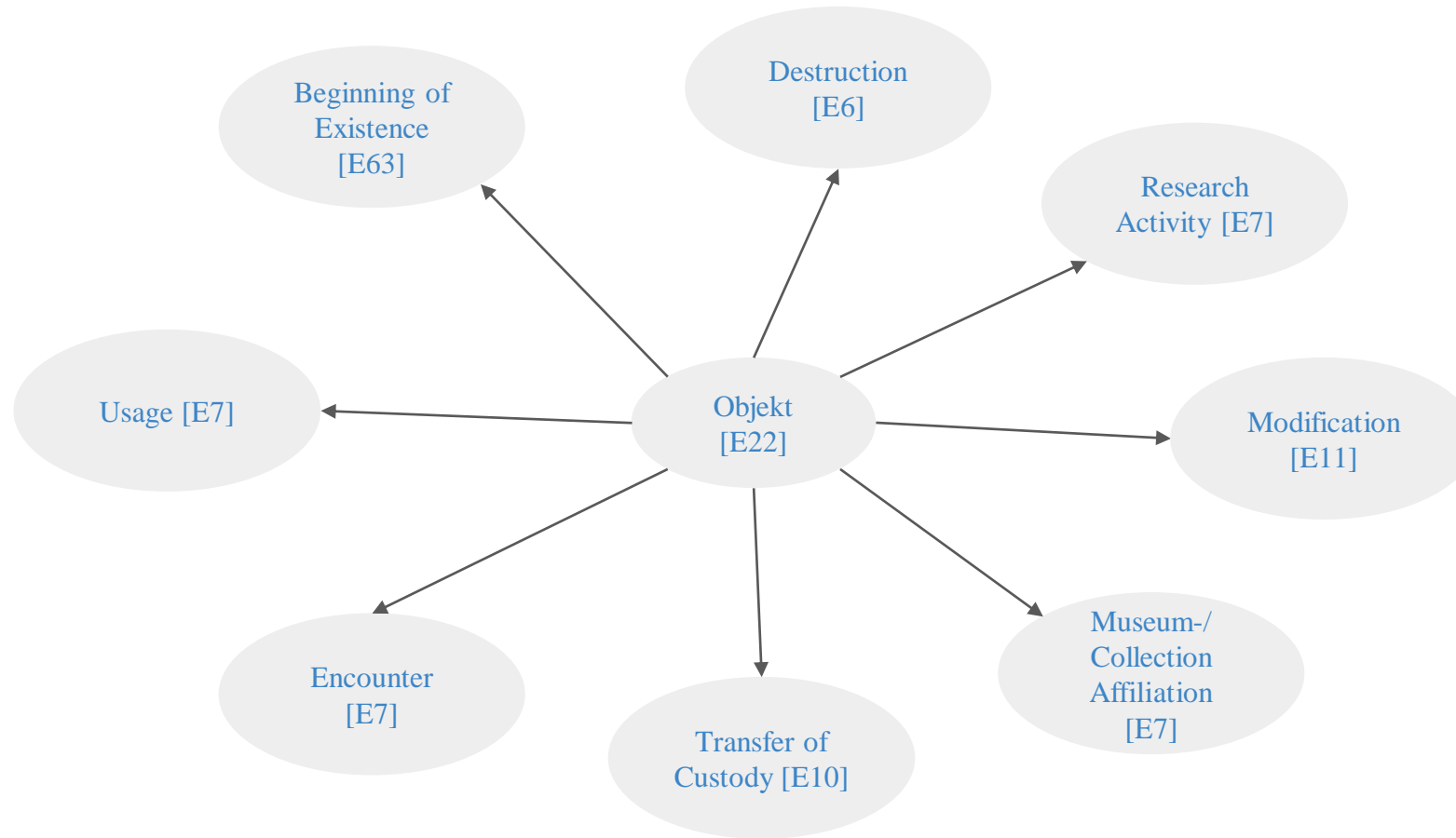
Use Case: The Behaim Globe

Selection criteria

- Oldest existent globe of the earth (1492)

- UNESCO World Document Heritage since 2023

- Complex object in itself (geographical map, inscriptions, miniatures, materiality, ...)

- Long exhibition and research history

- Numerous restorations and modifications

- Many copies and related objects around the world

- Still many open questions, vague information and contradictions to deal with

Behaim Globe, Germanisches Nationalmuseum, Photo: Jürgen Musolf

Use Case: The Behaim Globe

Beginning of Existence [E63]

Destruction [E6]

Research Activity [E7]

Usage [E7]

Objekt [E22]

Modification [E11]

Encounter [E7]

Transfer of Custody [E10]

Museum-/ Collection Affiliation [E7]

E22 Human-Made Object
E63 Beginning of Existence
E65 Creation
E12 Production
E10 Transfer of Custody
E11 Modification
E5 Event
E7 Activity
E6 Destruction

Main events and contexts in the biography of an object that we defined so far

Use Case: The Behaim Globe
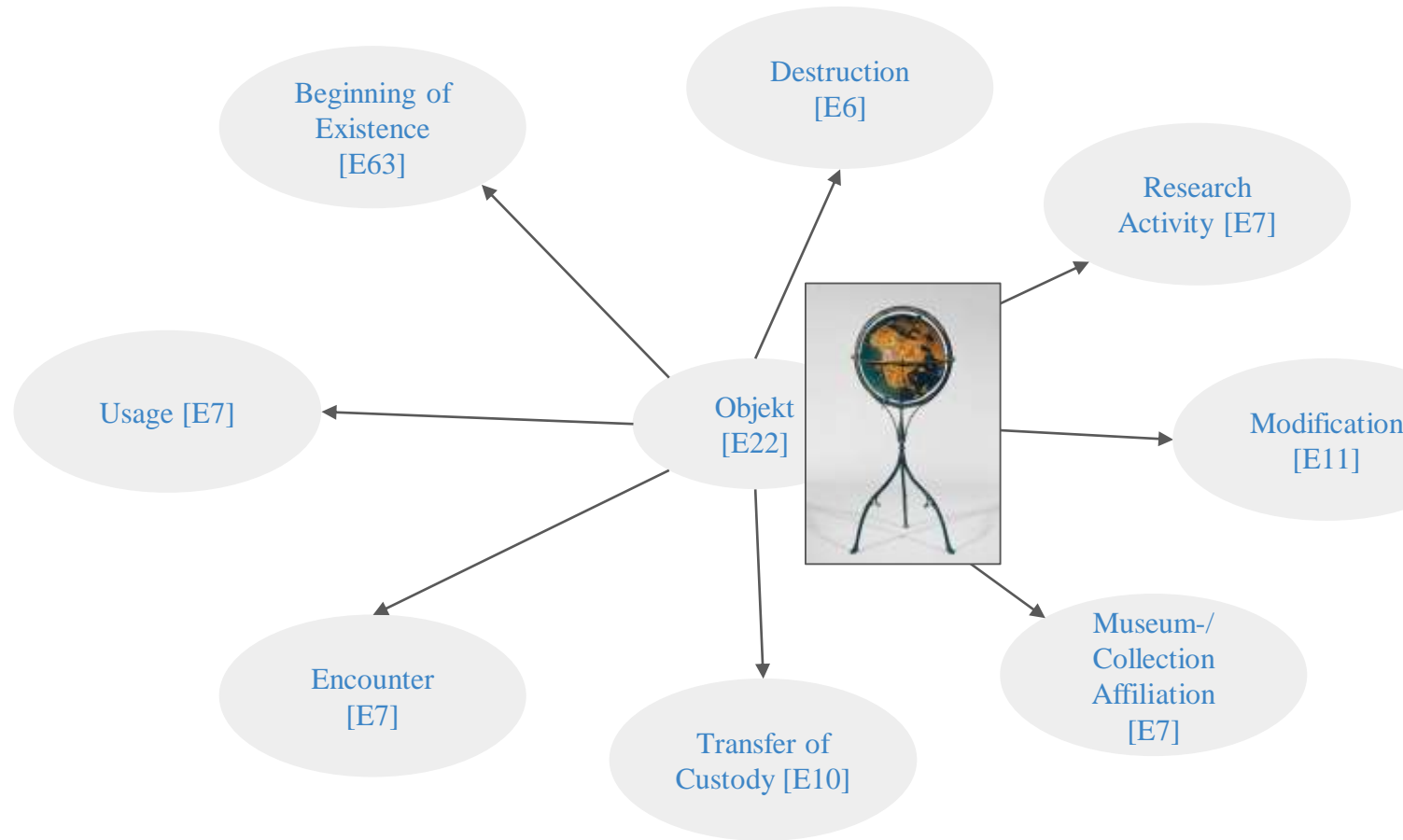
- 1492 commission/initiative
- 1492-94 production
- 1494-1601/1730 installation at Nuremberg town hall
- after 1494 addition to the dedication inscription
- after 1507 addition of Behaim's death notice
- 1510 addition of the horizon ring; replacement of the tripod
- 1730, 1778, 1842, 1853, 1854, planiglobe facsimiles
- latest 1730-1906 custody of the Behaim family
- 1823 restoration of the inscriptions
- 1892 copy for Bibliothèque nationale de France
- 1906 loan from Behaim family to GNM
- …

Beginning of Existence [E63]

Destruction [E6]

Research Activity [E7]

Usage [E7]

Objekt [E22]

Modification [E11]

Encounter [E7]

Transfer of Custody [E10]

Museum-/ Collection Affiliation [E7]

Use Case: The Behaim Globe

Object of research since its existence; numerous publications, material-scientific analyses, imaging procedures
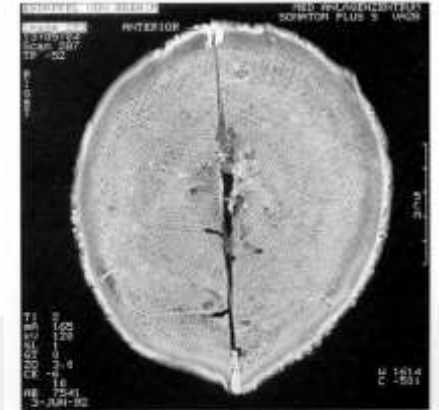
Many manufactures and sources of ideas; production ca. 1492-94

As object of representation in the Nuremberg Town Hall, ca. 1492/94-latest 1730

Many modifications and restorations over the centuries, e.g. already in 1510, when the horizon ring was added

Since 1906 object in the collection of scientific objects at GNM; numerous changing exhibition contexts, photo campaigns etc.

Numerous transfers between the actors, e.g. on loan to the GNM since 1906, withdrawn in 1928; officially acquired by the GNM in 1937 with the involvement of the Nazi regime.

Beginning of Existence [E63]

Destruction [E6]

Research Activity [E7]

Usage [E7]

Objekt [E22]

Modification [E11]

Encounter [E7]

Transfer of Custody [E10]

Museum-/ Collection Affiliation [E7]

Implementation of the data model in WissKI

Detail of the WissKI Pathbuilder with the Object Biography data model

Pathbuilders in N4O WissKI

Object Biography of the Behaim Globe in WissKI

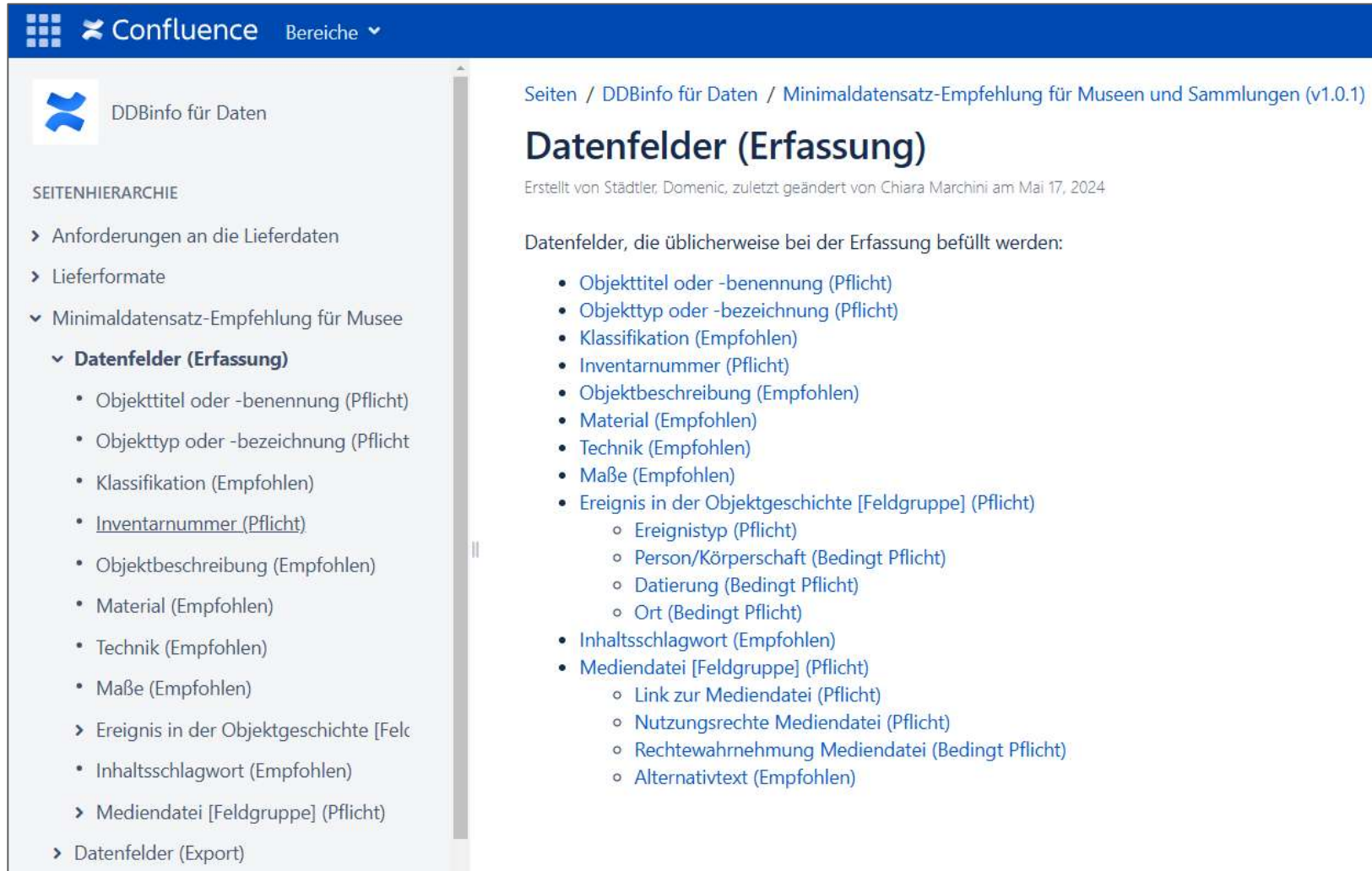View of the Behaim Globe in WissKI, detail (!)

Please note: a new webdesign is currently under development, because the mass of information can no longer be adequately displayed with current themes.

Object Biography – Chances using the concept for object documentation

- Allows the integration of heterogeneous, multidisciplinary and scattered object information (within NFDI4O and beyond).

- Focus on detailed representation of provenance information and

- information provenance.

- Creates a meta-perspective on objects (until now, object documentation is coming from the current collection's perspective).

- Takes equal account of attributions of actors and groups outside the collection, the museum or the scientific context (societies of origin, popular culture, etc.).

Minimal Dataset

Minimal Dataset for Museums and Collections by DDB

Minimal Dataset by Deutsche Digitale Bibliothek (German digital library), https://zenodo.org/records/13771750

Minimal Dataset for Museums and Collections by DDB

https://wiki.deutsche-digitale-bibliothek.de/display/DFD/Ressourcen+und+Links

Minimal Dataset for Museums and Collections by DDB in WissKI

https://wiki.deutsche-digitale-bibliothek.de/display/DFD/Ressourcen+und+Links?preview=/129008331/186056726/Annotierte_Folien_WissKI_neu%20(1).pdf

Minimal Dataset for Museums and Collections by DDB in N4O WissKI

Detail of the WissKI Pathbuilder with the Minimal Dataset implementation using the N4O Objects Ontology

Pathbuilders in N4O WissKI

Minimal Dataset by DDB as starting point for the "Minimal Metadata-Set" for N4O

- Determine the minimum required data fields of N4O Task Areas 1-4 ("Documentation", "Collecting", "Experiments & Analytics" and "Protecting") for integration and connection in the N4O Knowledge Graph (TA5)

- Via a (open) Temporary Working Group (TWG): https://www.nfdi4objects.net/portal/twgs/development-of-a-common-nfdi4objects-objects-ontology-n4o-oo-and-a-minimal-metadata-set-n4o-mmds/

- Stay tuned and subscribe to the TWG mailing list: https://www.listserv.dfn.de/sympa/info/n4o_twg_objectsontology_mmds

- Want to contribute? Join the TWG Rocket Chat: https://n4o-chat.nfdi.de/channel/TWG_ObjectsOntology_and_MinimalMetadataSet

References and Resources

- Current state of the N4O Objects Ontology and Data Models (Object Biography, Minimal Dataset): https://github.com/nfdi4objects/n4o-ontology
- N4O Knowledge Graph: https://github.com/nfdi4objects/n4o-graph
- Terminologies in NFDI4Objects: https://github.com/nfdi4objects/n4o-terminologies
- AG Minimaldatensatz (2024): Minimaldatensatz-Empfehlung für Museen und Sammlungen (v1.0.1). Zenodo. https://doi.org/10.5281/zenodo.12759620
- Gerber, Anja/Wagner, Sarah (2024): NFDI4Objects Core Ontology und Objektbiografien https://zenodo.org/records/10591898
- Gerber, Anja/von Hagel, Frank, AG Minimaldatensatz. (2024): Die Minimaldatensatz-Empfehlung für Museen und Sammlungen. NFDI4Objects Community Meeting, Mainz. Zenodo. https://doi.org/10.5281/zenodo.13771750
- Wagner, Sarah (2024): Digitale Objektbiografien für NFDI4Objects. 15. Jahrestagung für Universitätssammlungen 2024, Neue Rollen, neue Ziele? Universitätssammlungen im Spannungsfeld von Forschung, Finanzen und Politik, Zürich. Zenodo. https://doi.org/10.5281/zenodo.11471183
- Gerber, Anja/Wagner, Sarah (2024): NFDI4Objects Core Ontology und Objektbiografien https://zenodo.org/records/10591898
- Wagner, Sarah (2024): Digitale Objektbiografien für NFDI4Objects. 15. Jahrestagung für Universitätssammlungen 2024, Neue Rollen, neue Ziele? Universitätssammlungen im Spannungsfeld von Forschung, Finanzen und Politik, Zürich. Zenodo. https://doi.org/10.5281/zenodo.11471183
- Görz, Günther: Behaim Datenbank und Quellensammlung: https://behaim.wisski.data.fau.de
- Kopytoff, Igor (1986): The Cultural Biography of Things, in: The Social Life of Things. Hg. v. Arjun Appadurai, Cambridge, S. 64-91.
- Peter Braun (2015): Objektbiographie. Ein Arbeitsbuch. Weimar.
- Wagner, Sarah/Stört, Diana/Knittel, Meike (2024): Die Berliner Kunstkammer als Wissensgraph – Quellengestützte Erschließung von Sammlungs- und Objektinformationen mit Semantic Web Technologien. In: Sammler*innen | Sammlung | Netz: Die Netzimplikationen von Sammlungspraxis und Sammlungsforschung, Hg. v. Jörn Münkner, Joëlle Weis, Maximilian Görmar, Göttingen, S. 63-84, https://www.wallstein-verlag.de/openaccess/9783835353923-oa.pdf
- Becker, Marcus/Dolezel, Eva/Knittel, Meike/Stört, Diana/Wagner, Sarah (2023): Die Berliner Kunstkammer. Sammlungsgeschichte in Objekt[...] vom 16. bis 21. Jahrhundert, Petersberg, S. 16-21, https://books.ub.uni-heidelberg.de/arthistoricum/catalog/book/1461/version/2222