



Reference Architecture for FAIR Data Infrastructures

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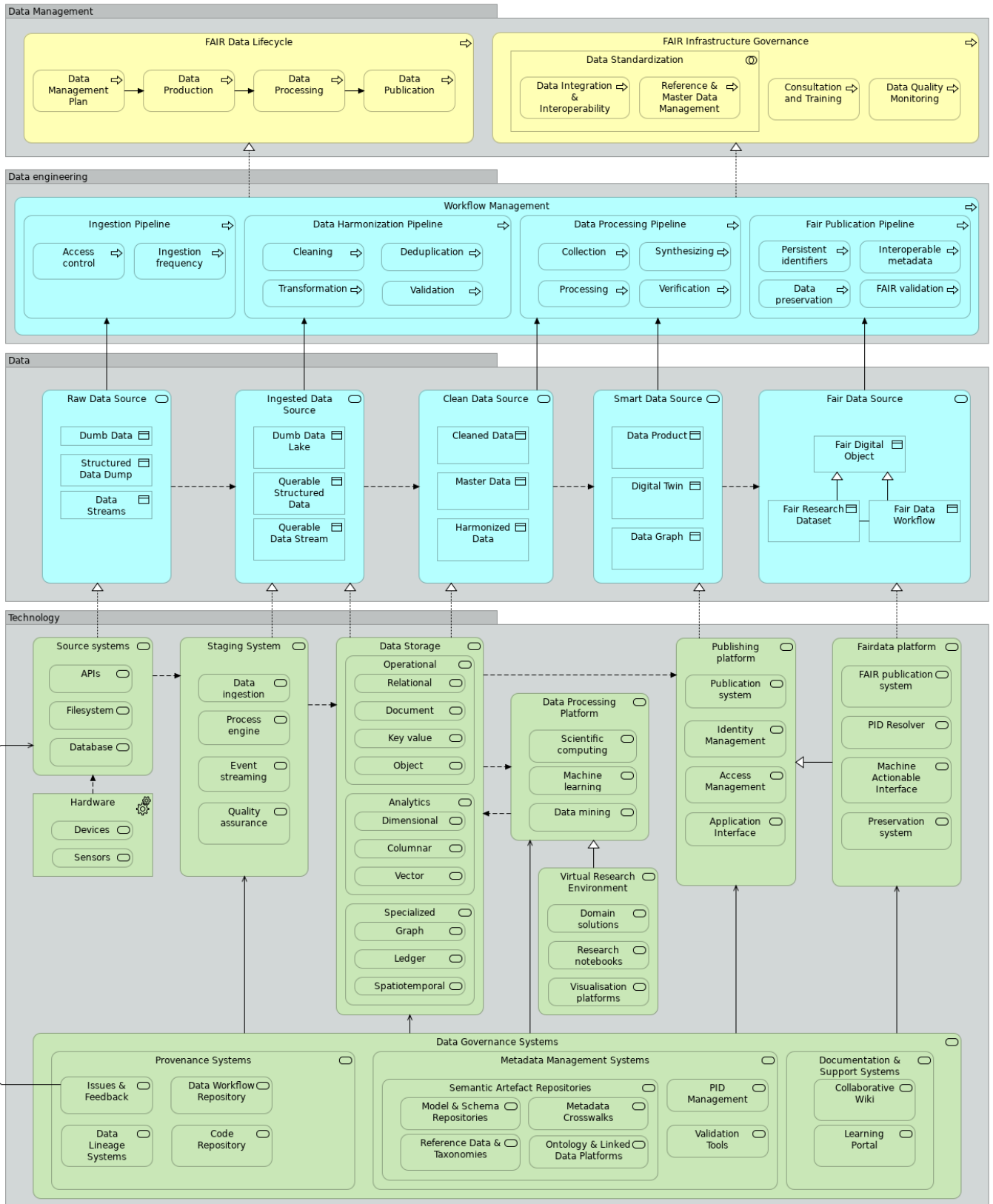
Purpose

Reference Architecture for FAIR Data Infrastructures

Views

Default View

No viewpoint



Documentation

Reference Architecture for FAIR Data Infrastructures

Elements

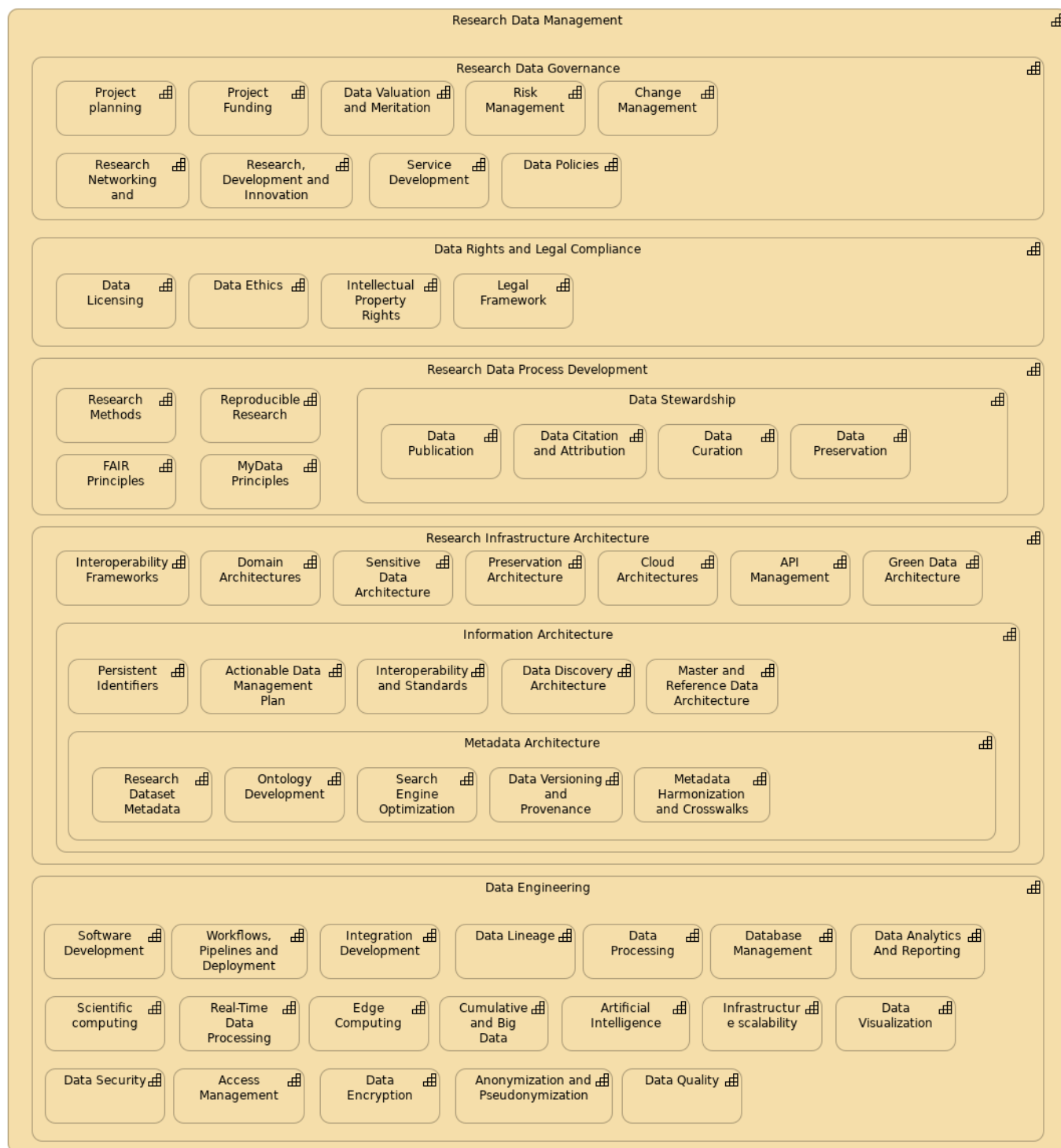
Element	Type
Access control	Application Process
Access Management	Technology Service
Analytics	Technology Service
APIs	Technology Service
Application Interface	Technology Service
Clean Data Source	Application Service
Cleaned Data	Data Object
Cleaning	Application Process
Code Repository	Technology Service
Collaborative Wiki	Technology Service
Collection	Application Process
Columnar	Technology Service
Consultation and Training	Business Process
Data Governance Systems	Technology Service
Data Graph	Data Object
Data Harmonization Pipeline	Application Process
Data ingestion	Technology Service
Data Integration & Interoperability	Business Process
Data Lineage Systems	Technology Service
Data Management Plan	Business Process
Data mining	Technology Service
Data preservation	Application Process
Data Processing	Business Process
Data Processing Pipeline	Application Process
Data Processing Platform	Technology Service
Data Product	Data Object
Data Production	Business Process
Data Publication	Business Process
Data Quality Monitoring	Business Process
Data Standardization	Business Collaboration
Data Storage	Technology Service
Data Streams	Data Object
Data Workflow Repository	Technology Service
Database	Technology Service
Deduplication	Application Process
Devices	Technology Service
Digital Twin	Data Object
Dimensional	Technology Service
Document	Technology Service

Element	Type
Documentation & Support Systems	Technology Service
Domain solutions	Technology Service
Dumb Data	Data Object
Dumb Data Lake	Data Object
Event streaming	Technology Service
FAIR Data Lifecycle	Business Process
Fair Data Source	Application Service
Fair Data Workflow	Data Object
Fair Digital Object	Data Object
FAIR Infrastructure Governance	Business Process
Fair Publication Pipeline	Application Process
FAIR publication system	Technology Service
Fair Research Dataset	Data Object
FAIR validation	Application Process
Fairdata platform	Technology Service
Filesystem	Technology Service
Graph	Technology Service
Hardware	Equipment
Harmonized Data	Data Object
Identity Management	Technology Service
Ingested Data Source	Application Service
Ingestion frequency	Application Process
Ingestion Pipeline	Application Process
Interoperable metadata	Application Process
Issues & Feedback	Technology Service
Key value	Technology Service
Learning Portal	Technology Service
Ledger	Technology Service
Machine Actionable Interface	Technology Service
Machine learning	Technology Service
Master Data	Data Object
Metadata Crosswalks	Technology Service
Metadata Management Systems	Technology Service
Model & Schema Repositories	Technology Service
Object	Technology Service
Ontology & Linked Data Platforms	Technology Service
Operational	Technology Service
Persistent identifiers	Application Process
PID Management	Technology Service
PID Resolver	Technology Service
Preservation system	Technology Service
Process engine	Technology Service
Processing	Application Process
Provenance Systems	Technology Service

Element	Type
Publication system	Technology Service
Publishing platform	Technology Service
Quality assurance	Technology Service
Queryable Data Stream	Data Object
Queryable Structured Data	Data Object
Raw Data Source	Application Service
Reference & Master Data Management	Business Process
Reference Data & Taxonomies	Technology Service
Relational	Technology Service
Research notebooks	Technology Service
Scientific computing	Technology Service
Semantic Artefact Repositories	Technology Service
Sensors	Technology Service
Smart Data Source	Application Service
Source systems	Technology Service
Spatiotemporal	Technology Service
Specialized	Technology Service
Staging System	Technology Service
Structured Data Dump	Data Object
Synthesizing	Application Process
Transformation	Application Process
Validation	Application Process
Validation Tools	Technology Service
Vector	Technology Service
Verification	Application Process
Virtual Research Environment	Technology Service
Visualisation platforms	Technology Service
Workflow Management	Application Process

FAIR Data Capabilities

No viewpoint



Elements

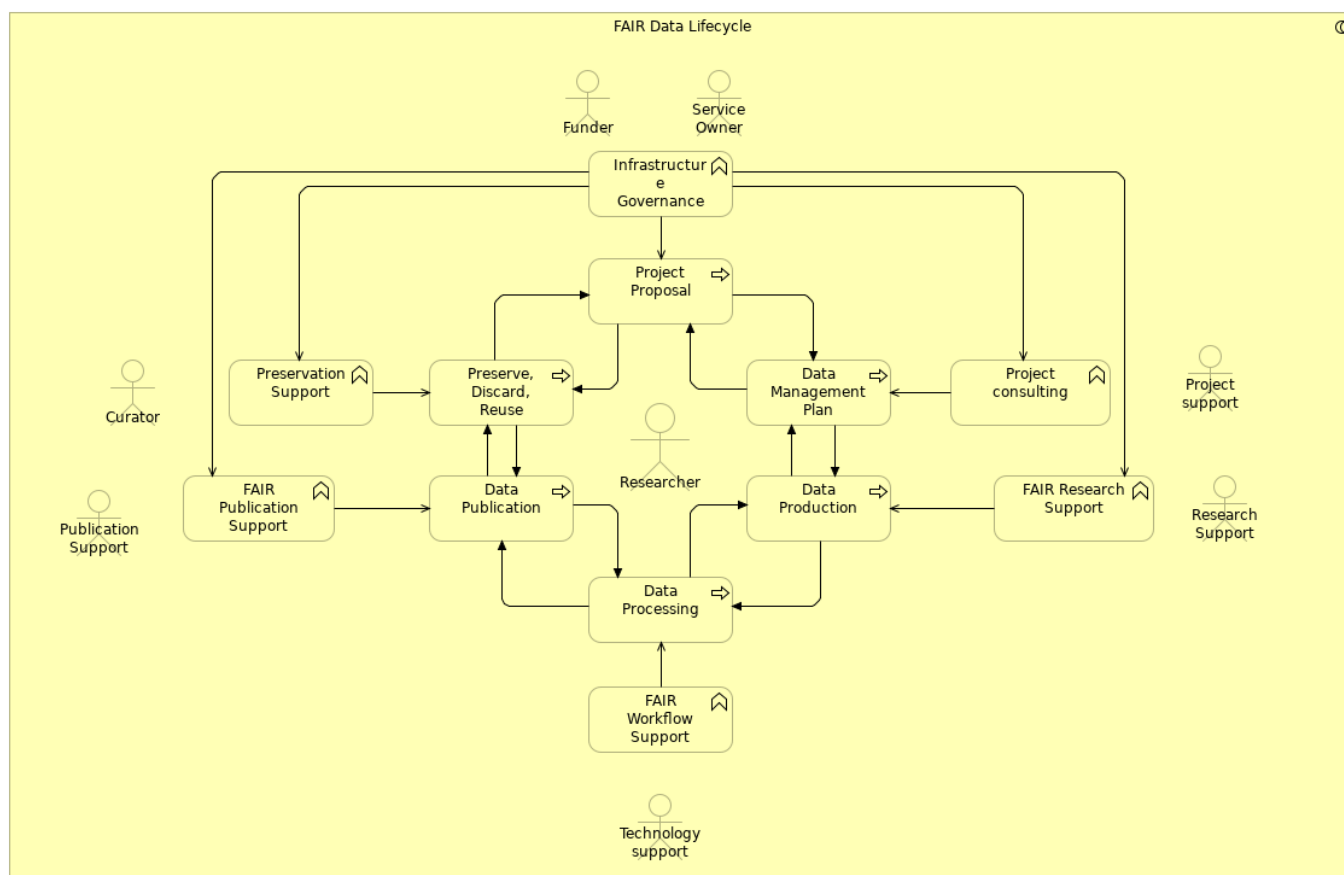
Element	Type
Access Management	Capability
Actionable Data Management Plan	Capability
Anonymization and Pseudonymization	Capability
API Management	Capability
Artificial Intelligence	Capability

Element	Type
Change Management	Capability
Cloud Architectures	Capability
Cumulative and Big Data	Capability
Data Analytics And Reporting	Capability
Data Citation and Attribution	Capability
Data Curation	Capability
Data Discovery Architecture	Capability
Data Encryption	Capability
Data Engineering	Capability
Data Ethics	Capability
Data Licensing	Capability
Data Lineage	Capability
Data Policies	Capability
Data Preservation	Capability
Data Processing	Capability
Data Publication	Capability
Data Quality	Capability
Data Rights and Legal Compliance	Capability
Data Security	Capability
Data Stewardship	Capability
Data Valuation and Meritation	Capability
Data Versioning and Provenance	Capability
Data Visualization	Capability
Database Management	Capability
Domain Architectures	Capability
Edge Computing	Capability
FAIR Principles	Capability
Green Data Architecture	Capability
Information Architecture	Capability
Infrastructure scalability	Capability
Integration Development	Capability
Intellectual Property Rights	Capability
Interoperability and Standards	Capability
Interoperability Frameworks	Capability
Legal Framework	Capability
Master and Reference Data Architecture	Capability
Metadata Architecture	Capability
Metadata Harmonization and Crosswalks	Capability
MyData Principles	Capability
Ontology Development	Capability
Persistent Identifiers	Capability
Preservation Architecture	Capability
Project Funding	Capability
Project planning	Capability

Element	Type
Real-Time Data Processing	Capability
Reproducible Research	Capability
Research Data Governance	Capability
Research Data Management	Capability
Research Data Process Development	Capability
Research Dataset Metadata	Capability
Research Infrastructure Architecture	Capability
Research Methods	Capability
Research Networking and Collaboration	Capability
Research, Development and Innovation	Capability
Risk Management	Capability
Scientific computing	Capability
Search Engine Optimization	Capability
Sensitive Data Architecture	Capability
Service Development	Capability
Software Development	Capability
Workflows, Pipelines and Deployment	Capability


FAIR Data Lifecycle

No viewpoint



Elements

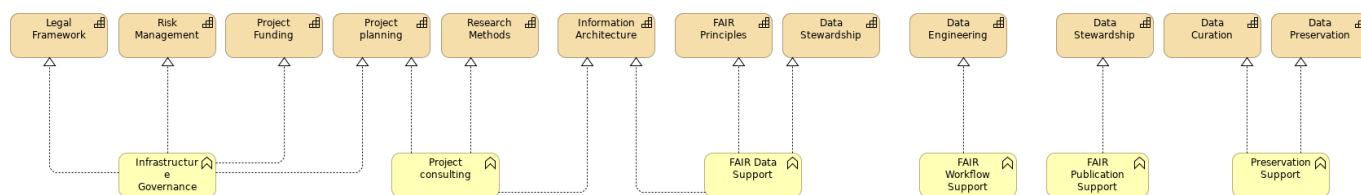
Element	Type
Curator	Business Actor
Data Management Plan	Business Process
Data Processing	Business Process
Data Production	Business Process
Data Publication	Business Process
FAIR Data Lifecycle	Business Collaboration
FAIR Publication Support	Business Function
FAIR Research Support	Business Function
FAIR Workflow Support	Business Function
Funder	Business Actor
Infrastructure Governance	Business Function
Preservation Support	Business Function
Preserve, Discard, Reuse	Business Process
Project consulting	Business Function
Project Proposal	Business Process
Project support	Business Actor
Publication Support	Business Actor
Research Support	Business Actor
Researcher	Business Actor



Element	Type
Service Owner	Business Actor
Technology support	Business Actor

Functions and Capabilities

No viewpoint

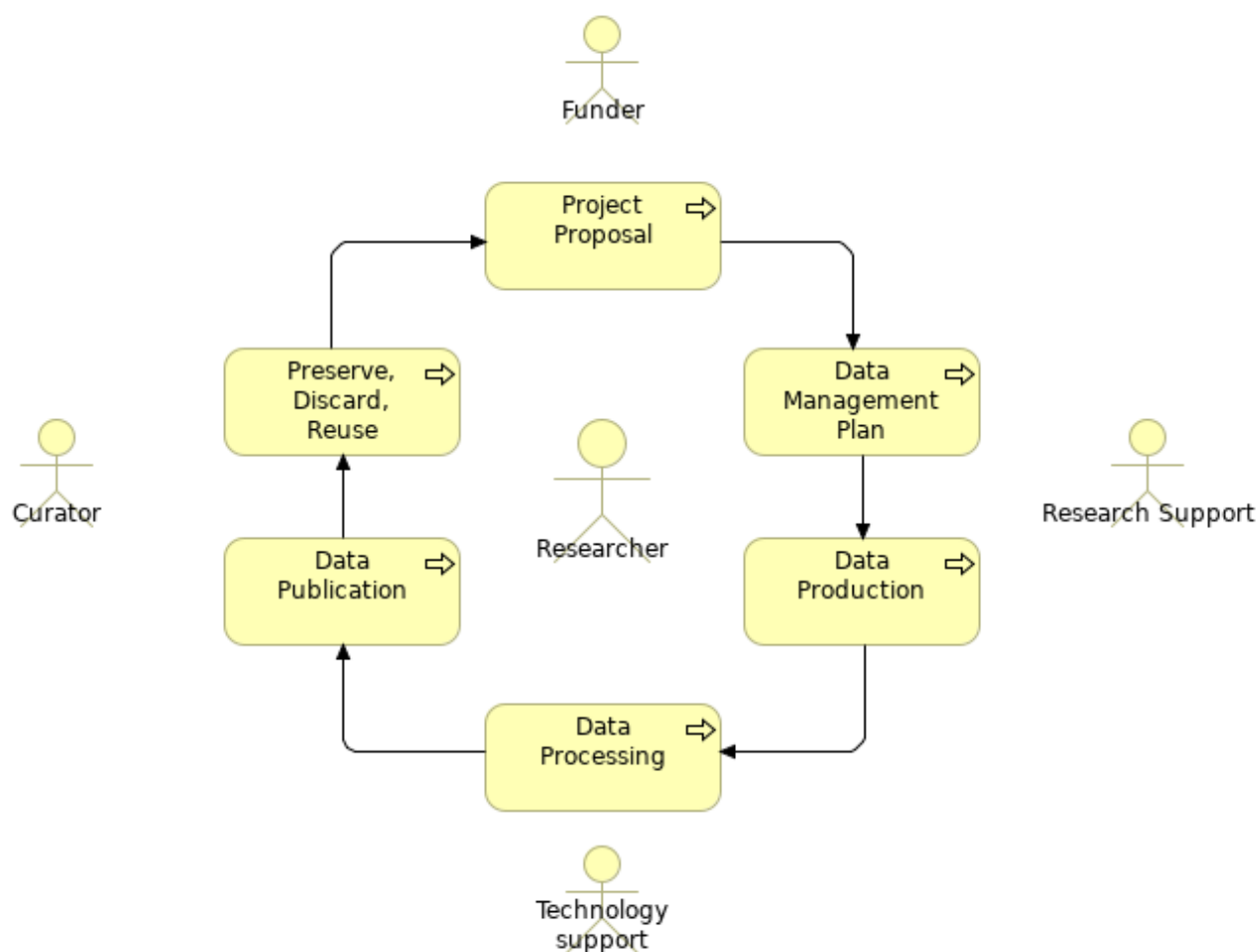


Elements

Element	Type
Data Curation	Capability
Data Engineering	Capability
Data Preservation	Capability
Data Stewardship	Capability
Data Stewardship	Capability
FAIR Data Support	Business Function
FAIR Principles	Capability
FAIR Publication Support	Business Function
FAIR Workflow Support	Business Function
Information Architecture	Capability
Infrastructure Governance	Business Function
Legal Framework	Capability
Preservation Support	Business Function
Project consulting	Business Function
Project Funding	Capability
Project planning	Capability
Research Methods	Capability
Risk Management	Capability

Research Data Lifecycle

No viewpoint

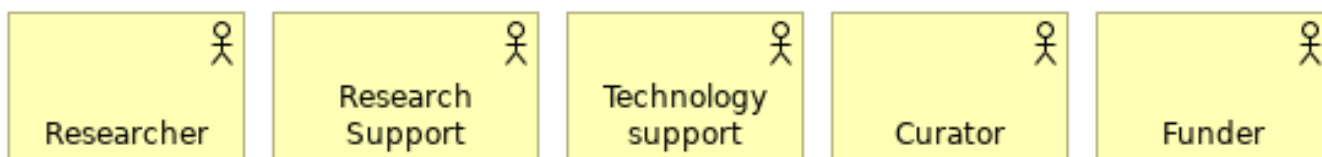


Elements

Element	Type
Curator	Business Actor
Data Management Plan	Business Process
Data Processing	Business Process
Data Production	Business Process
Data Publication	Business Process
Funder	Business Actor
Preserve, Discard, Reuse	Business Process
Project Proposal	Business Process
Research Support	Business Actor
Researcher	Business Actor
Technology support	Business Actor

Roles

No viewpoint



Elements

Element	Type
Curator	Business Actor
Funder	Business Actor
Research Support	Business Actor
Researcher	Business Actor
Technology support	Business Actor

Value streams

No viewpoint



Elements

Element	Type
Value Stream	Value Stream

Strategy Layer

Access Management

Type	Capability
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The ability to manage user access and permissions across datasets and systems, ensuring that only authorized users can interact with sensitive data.

Access Management (copy)

Type	Capability
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The ability to manage user access and permissions across datasets and systems, ensuring that only authorized users can interact with sensitive data.

Actionable Data Management Plan

Type	Capability
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Capability to create machine-readable data management plans, share and update them through interfaces. Ability to actively utilize the machine-readable features of the data management plan to facilitate the researcher's work throughout the research process.

Actionable Data Management Plan (copy)

Type	Capability
-------------	------------

Capability to create machine-readable data management plans, share and update them through interfaces. Ability to actively utilize the machine-readable features of the data management plan to facilitate the researcher's work throughout the research process.

Anonymization and Pseudonymization

Type	Capability
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Anonymization and Pseudonymization (copy)

Type	Capability
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API Management

Type	Capability
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Skills in developing and managing APIs (Application Programming Interfaces) that enable efficient and secure access to datasets and research tools.

API Management (copy)

Type	Capability
-------------	------------

Skills in developing and managing APIs (Application Programming Interfaces) that enable efficient and secure access to datasets and research tools.

Artificial Intelligence

Type	Capability
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Expertise in leveraging machine learning and artificial intelligence to gain insights from large datasets, including the ability to apply advanced analytics techniques for pattern recognition, prediction, and data mining.

Artificial Intelligence (copy)

Type	Capability
-------------	------------

Expertise in leveraging machine learning and artificial intelligence to gain insights from large datasets, including the ability to apply advanced analytics techniques for pattern recognition, prediction, and data mining.

Change Management

Type	Capability
-------------	------------

The knowledge to plan and manage changes in data infrastructure, governance policies, or technology systems to adapt to evolving research needs.

Change Management (copy)

Type	Capability
-------------	------------

The knowledge to plan and manage changes in data infrastructure, governance policies, or technology systems to adapt to evolving research needs.

Cloud Architectures

Type	Capability
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The ability to leverage cloud computing resources to build scalable, flexible, and cost-effective data infrastructures for research.

Cloud Architectures (copy)

Type	Capability
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The ability to leverage cloud computing resources to build scalable, flexible, and cost-effective data infrastructures for research.

Cumulative and Big Data

Type	Capability
-------------	------------

Expertise in transfer, storage, and processing of large data volumes. Knowledge in applying data compression techniques to manage large volumes of data without sacrificing data quality or performance. Skills in managing and processing datasets that grow incrementally over time. Expertise in handling and processing large datasets, including the infrastructure and computational techniques required to manage them effectively.

Cumulative and Big Data (copy)

Type	Capability
-------------	------------

Expertise in transfer, storage, and processing of large data volumes. Knowledge in applying data compression techniques to manage large volumes of data without sacrificing data quality or performance. Skills in managing and processing datasets that grow incrementally over time. Expertise in handling and processing large datasets, including the infrastructure and computational techniques required to manage them effectively.

Data Analytics And Reporting

Type	Capability
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Skills in applying analytical techniques to interpret large datasets and generate insights that inform research findings and reporting.

Data Analytics And Reporting (copy)

Type	Capability
-------------	------------

Skills in applying analytical techniques to interpret large datasets and generate insights that inform research findings and reporting.

Data Citation and Attribution

Type	Capability
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Knowledge in assigning proper citations and credit for datasets, ensuring that data creators are appropriately acknowledged in research outputs.

Data Citation and Attribution (copy)

Type	Capability
-------------	------------

Knowledge in assigning proper citations and credit for datasets, ensuring that data creators are appropriately acknowledged in research outputs.

Data Curation

Type	Capability
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Skills in managing and preserving datasets over time, including the selection, organization, and validation of research data for long-term use.

Data Curation (copy)

Type	Capability
-------------	------------

Skills in managing and preserving datasets over time, including the selection, organization, and validation of research data for long-term use.

Data Discovery Architecture

Type	Capability
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Skills in designing infrastructures that allow researchers and other stakeholders to find and access relevant datasets

Data Discovery Architecture (copy)

Type	Capability
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Skills in designing infrastructures that allow researchers and other stakeholders to find and access relevant datasets

Data Encryption

Type	Capability
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Skills in applying encryption techniques to protect data at rest and in transit, ensuring its confidentiality and integrity.

Data Encryption (copy)

Type	Capability
-------------	------------

Skills in applying encryption techniques to protect data at rest and in transit, ensuring its confidentiality and integrity.

Data Engineering

Type	Capability
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Data Engineering

Type	Capability
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Skills needed to build, optimize, and manage the systems and pipelines that store, process, and analyze research data.

Data Engineering (copy)

Type	Capability
-------------	------------

Skills needed to build, optimize, and manage the systems and pipelines that store, process, and analyze research data.

Data Ethics

Type	Capability
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Expertise in ensuring that data collection, use, and dissemination uphold ethical standards, particularly when handling sensitive or personal data.

Data Ethics (copy)

Type	Capability
-------------	------------

Expertise in ensuring that data collection, use, and dissemination uphold ethical standards, particularly when handling sensitive or personal data.

Data Licensing

Type	Capability
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Understanding various types of data licenses (e.g., open, restricted) and applying them to protect intellectual property while enabling appropriate data sharing.

Data Licensing (copy)

Type	Capability
-------------	------------

Understanding various types of data licenses (e.g., open, restricted) and applying them to protect intellectual property while enabling appropriate data sharing.

Data Lineage

Type	Capability
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Expertise in defining data workflows that preserves the history and lineage of the data to maintain accountability and transparency in data use.

Data Lineage (copy)

Type	Capability
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Expertise in defining data workflows that preserves the history and lineage of the data to maintain accountability and transparency in data use.

Data Policies

Type	Capability
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Knowledge of creating and enforcing institutional data policies that govern the collection, storage, sharing, and use of data.

Data Policies (copy)

Type	Capability
-------------	------------

Knowledge of creating and enforcing institutional data policies that govern the collection, storage, sharing, and use of data.

Data Preservation

Type	Capability
-------------	------------

Expertise to protect data from being lost or destroyed using national guidelines and research domain specific best practices

Data Processing

Type	Capability
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The capability to design, optimize, and run data processing workflows that clean, transform, and analyze raw data for domain-specific research purposes.

Data Processing (copy)

Type	Capability
-------------	------------

The capability to design, optimize, and run data processing workflows that clean, transform, and analyze raw data for domain-specific research purposes.

Data Publication

Type	Capability
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Data Quality

Type	Capability
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Expertise in ensuring the accuracy, completeness, and consistency of data throughout its lifecycle, including the identification and resolution of data quality issues.

Data Quality (copy)

Type	Capability
-------------	------------

Expertise in ensuring the accuracy, completeness, and consistency of data throughout its lifecycle, including the identification and resolution of data quality issues.

Data Rights and Legal Compliance

Type	Capability
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The knowledge and practices required to ensure that research data is managed and shared according to applicable laws, licenses, regulations and ethical guidelines.

Data Rights and Legal Compliance (copy)

Type	Capability
-------------	------------

The knowledge and practices required to ensure that research data is managed and shared according to applicable laws, licenses, regulations and ethical guidelines.

Data Security

Type	Capability
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Expertise in implementing security measures, including encryption, access controls, and monitoring, to protect research data from unauthorized access or breaches.

Data Security (copy)

Type	Capability
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Expertise in implementing security measures, including encryption, access controls, and monitoring, to protect research data from unauthorized access or breaches.

Data Stewardship

Type	Capability
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Data Stewardship

Type	Capability
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The capability to oversee data throughout its lifecycle, ensuring it remains accurate, accessible, and aligned with institutional policies. Skills in managing the various stages of the data lifecycle (collection, generation, gathering, processing, analysis, publication, sharing, preservation, archiving, disposal, reuse).

Data Stewardship (copy)

Type	Capability
-------------	------------

The capability to oversee data throughout its lifecycle, ensuring it remains

accurate, accessible, and aligned with institutional policies. Skills in managing the various stages of the data lifecycle (collection, generation, gathering, processing, analysis, publication, sharing, preservation, archiving, disposal, reuse).

Data Valuation and Meritation

Type	Capability
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Expertise in creating policies and evaluating the value of data based on its quality, relevance, and potential for reuse within research contexts and across domains.

Data Valuation and Meritation (copy)

Type	Capability
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Expertise in creating policies and evaluating the value of data based on its quality, relevance, and potential for reuse within research contexts and across domains.

Data Versioning and Provenance

Type	Capability
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Expertise in creating metadata for tracking changes to datasets over time and ensuring a record of their origin, modifications, and history.

Data Versioning and Provenance (copy)

Type	Capability
-------------	------------

Expertise in creating metadata for tracking changes to datasets over time and ensuring a record of their origin, modifications, and history.

Data Visualization

Type	Capability
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Skills in visualizing large datasets and generating insightful reports, allowing researchers to easily interpret and communicate their findings.

Data Visualization (copy)

Type	Capability
-------------	------------

Skills in visualizing large datasets and generating insightful reports, allowing researchers to easily interpret and communicate their findings.

Database Management

Type	Capability
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The capability to design, implement, and maintain efficient and secure databases that store and organize research data.

Database Management (copy)

Type	Capability
-------------	------------

The capability to design, implement, and maintain efficient and secure databases that store and organize research data.

Domain Architectures

Type	Capability
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Knowledge of designing domain specific data architectures tailored to particular research area, ensuring that reasearch area specific needs are met.

Domain Architectures (copy)

Type	Capability
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Knowledge of designing domain specific data architectures tailored to particular research area, ensuring that reasearch area specific needs are met.

Edge Computing

Type	Capability
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Skills in processing data at the edge of the network, close to the data source, reducing latency and enhancing the efficiency of real-time data analysis.

Edge Computing (copy)

Type	Capability
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Skills in processing data at the edge of the network, close to the data source, reducing latency and enhancing the efficiency of real-time data analysis.

FAIR Principles

Type	Capability
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Expertise in applying the principles of Findability, Accessibility, Interoperability, and Reusability to research data management practices.

FAIR Principles (copy)

Type	Capability
-------------	------------

Expertise in applying the principles of Findability, Accessibility, Interoperability, and Reusability to research data management practices.

Green Data Architecture

Type	Capability
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Knowledge of designing energy-efficient data systems that minimize environmental impact, promoting sustainability in research infrastructures.

Green Data Architecture (copy)

Type	Capability
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Knowledge of designing energy-efficient data systems that minimize environmental impact, promoting sustainability in research infrastructures.

Information Architecture

Type	Capability
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Expertise needed to design FAIR information architectures that enhances data usability, findability, accessibility and interoperability.

Information Architecture (copy)

Type	Capability
-------------	------------

Expertise needed to design FAIR information architectures that enhances data usability, findability, accessibility and interoperability.

Infrastructure scalability

Type	Capability
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Competencies in designing and maintaining infrastructures that can scale up to accommodate growing data volumes and increased complexity.

Infrastructure scalability (copy)

Type	Capability
-------------	------------

Competencies in designing and maintaining infrastructures that can scale up to accommodate growing data volumes and increased complexity.

Integration Development

Type	Capability
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The ability to integrate disparate data systems and tools, ensuring seamless interaction and data exchange across platforms and applications.

Integration Development (copy)

Type	Capability
-------------	------------

The ability to integrate disparate data systems and tools, ensuring seamless interaction and data exchange across platforms and applications.

Intellectual Property Rights

Type	Capability
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Skills in understanding, protecting and managing intellectual property rights related to data ownership and usage within the framework of research.

Intellectual Property Rights (copy)

Type	Capability
-------------	------------

Skills in understanding, protecting and managing intellectual property rights related to data ownership and usage within the framework of research.

Interoperability

Type	Capability
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Interoperability and Standards

Type	Capability
-------------	------------

Knowledge of relevant data standards within specific fields and understanding and applying of generic data standards (such as W3C standards, ISO, etc.) to ensure that datasets can be exchanged and understood across different systems and disciplines.

Interoperability and Standards (copy)

Type	Capability
-------------	------------

Knowledge of relevant data standards within specific fields and understanding and applying of generic data standards (such as W3C standards, ISO, etc.) to ensure that datasets can be exchanged and understood across different systems and disciplines.

Interoperability Frameworks

Type	Capability
-------------	------------

Expertise in designing and implementing architectures that ensure seamless data exchange and compatibility between different systems, platforms, and formats. Ensuring that data management systems can interact with other systems, allowing secure data exchange and cross-collaboration. Capability to co-develop data specifications supporting interoperability within and across research domains. Readiness to apply recommendations and standards, and participate in national and international standardization organizations.

Interoperability Frameworks (copy)

Type	Capability
-------------	------------

Expertise in designing and implementing architectures that ensure seamless data exchange and compatibility between different systems, platforms, and formats. Ensuring that data management systems can interact with other systems, allowing secure data exchange and cross-collaboration. Capability to co-develop data specifications supporting interoperability within and across research domains. Readiness to apply recommendations and standards, and participate in national and international standardization organizations.

Legal Framework

Type	Capability
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Knowledge of relevant laws and regulations governing data use, such as GDPR, copyright law, and privacy policies, ensuring compliance in the research domain.

Legal Framework (copy)

Type	Capability
-------------	------------

Knowledge of relevant laws and regulations governing data use, such as GDPR, copyright law, and privacy policies, ensuring compliance in the research domain.

Master and Reference Data Architecture

Type	Capability
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The ability to ensure the consistency, accuracy, and integrity of master data across multiple systems, datasets and research projects. Expertise in organizing and managing reference datasets, which provide consistent data for use across research projects and domains.

Master and Reference Data Architecture (copy)

Type	Capability
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The ability to ensure the consistency, accuracy, and integrity of master data across multiple systems, datasets and research projects. Expertise in organizing and managing reference datasets, which provide consistent data for use across research projects and domains.

Master Data Management (copy)

Type	Capability
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The ability to ensure the consistency, accuracy, and integrity of master data across multiple datasets and research projects.

Metadata Architecture

Type	Capability
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Expertise needed to develop and manage metadata that support the effective discovery, interpretation, use and reuse of research data.

Metadata Architecture (copy)

Type	Capability
-------------	------------

Expertise needed to develop and manage metadata that support the effective discovery, interpretation, use and reuse of research data.

Metadata Harmonization and Crosswalks

Type	Capability
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Skills in building harmonizing architectures and reconciling and mapping different metadata schemas across disciplines, promoting interoperability and cross-disciplinary research.

Metadata Harmonization and Crosswalks (copy)

Type	Capability
-------------	------------

Skills in building harmonizing architectures and reconciling and mapping different metadata schemas across disciplines, promoting interoperability and cross-disciplinary research.

MyData

Type	Capability
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MyData Principles

Type	Capability
-------------	------------

Skills in managing personal data with a user-centric approach, allowing individuals to control the usage, sharing, and storage of their data.

MyData Principles (copy)

Type	Capability
-------------	------------

Skills in managing personal data with a user-centric approach, allowing individuals to control the usage, sharing, and storage of their data.

Ontology Development

Type	Capability
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Knowledge of creating and managing ontologies and linked data to facilitate understanding, data categorization and interoperability.

Ontology Development (copy)

Type	Capability
-------------	------------

Knowledge of creating and managing ontologies and linked data to facilitate understanding, data categorization and interoperability.

Persistent Identifiers

Type	Capability
-------------	------------

The ability to assign and manage unique, permanent identifiers (e.g., DOI, ORCID) to datasets, ensuring long-term findability and reference. The use of persistent identifiers enhances data management and enables, for example, the formation of knowledge graphs and supports the repeatability and automation of research.

Persistent Identifiers (copy)

Type	Capability
-------------	------------

The ability to assign and manage unique, permanent identifiers (e.g., DOI, ORCID) to datasets, ensuring long-term findability and reference. The use of persistent identifiers enhances data management and enables, for example, the formation of knowledge graphs and supports the repeatability and automation of research.

Preservation Architecture

Type	Capability
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Expertise in designing infrastructure for the long-term storage and preservation of datasets, ensuring their availability for future use.

Preservation Architecture (copy)

Type	Capability
-------------	------------

Expertise in designing infrastructure for the long-term storage and preservation of datasets, ensuring their availability for future use.

Project Funding

Type	Capability
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Skills in identifying funding opportunities, writing grant applications, and securing financial support for research projects and data infrastructure.

Project Funding (copy)

Type	Capability
-------------	------------

Skills in identifying funding opportunities, writing grant applications, and securing financial support for research projects and data infrastructure.

Project planning

Type	Capability
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The capability to define research objectives, timelines, resources and requirements, ensuring efficient execution and alignment with institutional goals and funding agencies requirements.

Project planning (copy)

Type	Capability
-------------	------------

The capability to define research objectives, timelines, resources and requirements, ensuring efficient execution and alignment with institutional goals and funding agencies requirements.

Real-Time Data Processing

Type	Capability
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Expertise in processing streaming data in real-time, useful in fields like sensor data analysis or financial research.

Real-Time Data Processing (copy)

Type	Capability
-------------	------------

Expertise in processing streaming data in real-time, useful in fields like sensor data analysis or financial research.

Reproducible Research

Type	Capability
-------------	------------

The ability to design research workflows and processes that allow for data and research findings to be consistently reproduced by others, promoting transparency.

Reproducible Research (copy)

Type	Capability
-------------	------------

The ability to design research workflows and processes that allow for data and research findings to be consistently reproduced by others, promoting transparency.

Research Data Governance

Type	Capability
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Planning data management to support the research process. Capability to comprehensively develop support processes and services toward interoperable data management planning and guidance. Requires collaboration between organizations providing support services at both local and national levels.

Research Data Governance encompasses the skills and knowledge required to establish and enforce policies, procedures, and frameworks that govern the management of research data. It ensures that data is handled responsibly, ethically, and in compliance with legal and institutional standards. Key areas include risk management, policy development, data valuation, and fostering collaborations within and outside institutions. Governance ensures that data is used effectively, securely, and sustainably, supporting long-term research goals and data stewardship.

Research Data Governance (copy)

Type	Capability
-------------	------------

Planning data management to support the research process. Capability to comprehensively develop support processes and services toward interoperable data management planning and guidance. Requires collaboration between organizations providing support services at both local and national levels.

Research Data Governance encompasses the skills and knowledge required to establish and enforce policies, procedures, and frameworks that govern the management of research data. It ensures that data is handled responsibly, ethically, and in compliance with legal and institutional standards. Key areas include risk management, policy development, data valuation, and fostering collaborations within and outside institutions. Governance ensures that data is used effectively, securely, and sustainably, supporting long-term research goals and data stewardship.

Research Data Management

Type	Capability
-------------	------------

Capability to produce and manage data throughout the research process, ensuring sufficient information on the origin and lifecycle of the data. Research data is managed throughout its lifecycle, ensuring its controlled collection, creation, sharing, storage, archiving, destruction, and publication.

Research Data Management

Type	Capability
-------------	------------

Research Data Management (copy)

Type	Capability
-------------	------------

Capability to produce and manage data throughout the research process, ensuring sufficient information on the origin and lifecycle of the data. Research data is managed throughout its lifecycle, ensuring its controlled collection, creation,

sharing, storage, archiving, destruction, and publication.

Research Data Process Development

Type	Capability
-------------	------------

Expertise to design, optimize, and implement processes that support the full lifecycle of research data.

Research Data Process Development (copy)

Type	Capability
-------------	------------

Expertise to design, optimize, and implement processes that support the full lifecycle of research data.

Research Dataset Metadata

Type	Capability
-------------	------------

Skills in creating and managing metadata (DCAT, DataCite, etc.) that accurately describes research datasets, improving their accessibility and reusability.

Research Dataset Metadata (copy)

Type	Capability
-------------	------------

Skills in creating and managing metadata (DCAT, DataCite, etc.) that accurately describes research datasets, improving their accessibility and reusability.

Research Infrastructure Architecture

Type	Capability
-------------	------------

Expertise needed to design, build, and maintain the physical and digital architectures that support research data management in different research domains

Research Infrastructure Architecture (copy)

Type	Capability
-------------	------------

Expertise needed to design, build, and maintain the physical and digital architectures that support research data management in different research domains

Research Methods

Type	Capability
-------------	------------

Understanding a variety of quantitative and qualitative research methodologies and how data management is embedded within these methods.

Research Methods (copy)

Type	Capability
-------------	------------

Understanding a variety of quantitative and qualitative research methodologies and how data management is embedded within these methods.

Research Networking and Collaboration

Type	Capability
-------------	------------

Capability to leverage national and international collaboration to advance data management. Skills to foster partnerships between researchers, institutions, and other stakeholders to facilitate the exchange of knowledge and data.

Research Networking and Collaboration (copy)

Type	Capability
-------------	------------

Capability to leverage national and international collaboration to advance data management. Skills to foster partnerships between researchers, institutions, and other stakeholders to facilitate the exchange of knowledge and data.

Research, Development and Innovation

Type	Capability
-------------	------------

Capability to commercialize research results, especially research data.

Research, Development and Innovation (copy)

Type	Capability
-------------	------------

Capability to commercialize research results, especially research data.

Risk Management

Type	Capability
-------------	------------

Ability to identify, assess, and mitigate risks related to research data handling, storage, sharing, and legal compliance.

Risk Management (copy)

Type	Capability
-------------	------------

Ability to identify, assess, and mitigate risks related to research data handling, storage, sharing, and legal compliance.

Scientific computing

Type	Capability
-------------	------------

Skills in leveraging high-performance computing (HPC) and other advanced computing systems to process and analyze large, complex datasets.

Scientific computing (copy)

Type	Capability
-------------	------------

Skills in leveraging high-performance computing (HPC) and other advanced computing systems to process and analyze large, complex datasets.

Search Engine Optimization

Type	Capability
-------------	------------

The ability to optimize metadata and dataset descriptions to ensure that research data is easily discoverable through search engines.

Search Engine Optimization (copy)

Type	Capability
-------------	------------

The ability to optimize metadata and dataset descriptions to ensure that research data is easily discoverable through search engines.

Sensitive Data Architecture

Type	Capability
-------------	------------

Skills in building data infrastructures that securely store and manage sensitive or confidential information, adhering to privacy regulations.

Sensitive Data Architecture (copy)

Type	Capability
-------------	------------

Skills in building data infrastructures that securely store and manage sensitive or confidential information, adhering to privacy regulations.

Service Development

Type	Capability
-------------	------------

Expertise in developing and enhancing research data services, ensuring they are accessible, user-friendly, and aligned with the needs of researchers and institutions.

Service Development (copy)

Type	Capability
-------------	------------

Expertise in developing and enhancing research data services, ensuring they are accessible, user-friendly, and aligned with the needs of researchers and institutions.

Software Development

Type	Capability
-------------	------------

Generic expertise in software development and programming languages

Software Development (copy)

Type	Capability
-------------	------------

Generic expertise in software development and programming languages

User Management

Type	Capability
-------------	------------

Value Stream

Type	Value Stream
-------------	--------------

Workflows, Pipelines and Deployment

Type	Capability
-------------	------------

Expertise in designing and automating data workflows and pipelines to efficiently process and move data from source to storage and analysis. Skills in using container technologies (e.g., Docker, Kubernetes) to deploy scalable, portable data processing environments.

Workflows, Pipelines and Deployment (copy)

Type	Capability
-------------	------------

Expertise in designing and automating data workflows and pipelines to efficiently process and move data from source to storage and analysis. Skills in using container technologies (e.g., Docker, Kubernetes) to deploy scalable, portable data processing environments.

Business Layer

Business Actor

Type	Business Actor
-------------	----------------

Business Collaboration

Type	Business Collaboration
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Business Event

Type	Business Event
-------------	----------------

Business Interaction

Type	Business Interaction
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Business Process

Type	Business Process
-------------	------------------

Business Process

Type	Business Process
-------------	------------------

Consultation and Training

Type	Business Process
-------------	------------------

Curator

Type	Business Actor
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Data Integration & Interoperability

Type	Business Process
-------------	------------------

The process of combining data from different sources and ensuring it works together in a seamless, interoperable manner, allowing systems to share and interpret data effectively.

Data Management Plan

Type	Business Process
-------------	------------------

Encompasses the creation and maintenance of the research plan and data management plan, including preparing for data acquisition, selecting formats and storage solutions, and anticipating sharing and dissemination strategies to guide data management throughout the research lifecycle.

Data Preservation

Type	Business Collaboration
-------------	------------------------

Data Processing

Type	Business Process
-------------	------------------

Encompasses actions taken to refine and analyze raw or acquired data by researchers, using tools and programs, to yield processed data ready for observations and conclusions.

Data Production

Type	Business Process
-------------	------------------

Focuses on the creation, collection, or acquisition of raw research data, either generated internally or sourced externally, through experimental or computational methods.

Data Publication

Type	Business Process
-------------	------------------

Covers the external dissemination of both raw and processed research data, ensuring access for the wider community while adhering to policies on public sharing, use, and reuse.

Data Quality Monitoring

Type	Business Process
-------------	------------------

The process of ensuring that data meets defined standards of accuracy, consistency, and reliability, critical for effective decision-making and analysis.

Data Standardization

Type	Business Collaboration
-------------	------------------------

Collaborative process for developing common standards for data and ensuring that data across different systems or organizations conforms to agreed format and structure.

Director

Type	Business Actor
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FAIR Data Lifecycle

Type	Business Collaboration
-------------	------------------------

FAIR Data Lifecycle

Type	Business Process
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The process that encompasses all phases of research data management, from planning, collection, processing, preservation, to sharing and reuse adhering to FAIR and CARE principles.

FAIR Data Support

Type	Business Function
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FAIR Infrastructure Governance

Type	Business Process
-------------	------------------

The structured process of managing and regulating the infrastructure required for ensuring that data adheres to FAIR principles.

FAIR Publication Support

Type	Business Function
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FAIR Research Support

Type	Business Function
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FAIR Workflow Support

Type	Business Function
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FAIR Workflow Support

Type	Business Function
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Funder

Type	Business Actor
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Infrastructure Governance

Type	Business Function
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Preservation Support

Type	Business Function
-------------	-------------------

Preserve, Discard, Reuse

Type	Business Process
-------------	------------------

Defines the processes for long-term data management, including archival or disposal of research data, ensuring compliance with records management practices and safe data handling at the end of its lifecycle.

Project consulting

Type	Business Function
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Project Proposal

Type	Business Process
-------------	------------------

Establishes the strategic direction and decisions for an organization's research data program, integrating it with broader data governance strategies to align with organizational goals.

Project support

Type	Business Actor
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Publication Support

Type	Business Actor
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Reference & Master Data Management

Type	Business Process
-------------	------------------

The process of managing key data entities (reference and master data) that are critical for the operation of the research infrastructure. This process includes definition of common terminologies, taxonomies and codelists using standards and best practices from the research domain.

Research Data Infrastructure

Type	Business Process
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Research Data Infrastructure

Type	Business Service
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Research Data Management

Type	Business Collaboration
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Research Support

Type	Business Actor
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Researcher

Type	Business Actor
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Service Owner

Type	Business Actor
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Technology support

Type	Business Actor
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Application Layer

Access control

Type	Application Process
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The process of managing how the raw data sources are accessed

Clean Data Source

Type	Application Service
-------------	---------------------

A source of data that has been cleaned to remove errors, inconsistencies, and redundancies, ensuring higher quality.

Cleaned Data

Type	Data Object
-------------	-------------

Data that has undergone a cleaning process to remove errors, inconsistencies, and duplicate entries, ensuring higher quality and usability.

Cleaning

Type	Application Process
-------------	---------------------

The process of detecting and correcting (or removing) corrupt or inaccurate records from a dataset, improving data quality.

Collection

Type	Application Process
-------------	---------------------

The process of gathering and storing data from different sources for further analysis or processing.

Data Cleaning Component

Type	Application Component
-------------	-----------------------

A system or software component responsible for the cleaning and preprocessing of raw data before it is used for analysis or further processing.

Data Graph

Type	Data Object
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A structured representation of data in a graph format, showing relationships between entities, typically used in graph databases or semantic web applications.

Data Harmonization Component

Type	Application Component
-------------	-----------------------

A software system or module designed to ensure that data from different sources conforms to a common format or structure, enabling interoperability and consistency.

Data Harmonization Pipeline

Type	Application Process
-------------	---------------------

A structured process that ensures data is cleaned, harmonized and transformed into more usable format for ease of use across different systems or databases.

Data Ingestion Component

Type	Application Component
-------------	-----------------------

A system or tool responsible for collecting and integrating data from various sources into a central repository for analysis or further processing.

Data preservation

Type	Application Process
-------------	---------------------

The process of maintaining and safeguarding data to ensure its long-term accessibility and usability.

Data Processing Component

Type	Application Component
-------------	-----------------------

A system or tool that applies transformations, aggregations, and calculations to raw data, preparing it for analysis or reporting.

Data Processing Pipeline

Type	Application Process
-------------	---------------------

A sequence of operations to collect, process and transform data into a well-defined format ensuring fit-for-purpose quality, often through a combination of software applications and processes.

Data Product

Type	Data Object
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A product or output that is generated from processing or analyzing raw data, designed to provide insights, services, or solutions.

Data Streams

Type	Data Object
-------------	-------------

Continuous flows of data generated by various sources, often in real-time, used for monitoring, analysis, and decision-making.

Deduplication

Type	Application Process
-------------	---------------------

The process of identifying and removing duplicate records from a dataset to ensure uniqueness and data quality.

Digital Twin

Type	Data Object
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A digital replica of a physical entity, process, or system used for simulation, analysis, and monitoring.

Dumb Data

Type	Data Object
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Data that lacks context, structure, or meaningful metadata, making it difficult to use or interpret effectively.

Dumb Data Lake

Type	Data Object
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A storage repository that holds a vast amount of raw data in its native format, typically without any preprocessing or structuring.

FAIR Data

Type	Data Object
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Data that is Findable, Accessible, Interoperable, and Reusable, adhering to the FAIR principles.

Fair Data Source

Type	Application Service
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A data source that adheres to the FAIR principles (Findable, Accessible, Interoperable, and Reusable), ensuring data quality and compliance with FAIR standards.

Fair Data Workflow

Type	Data Object
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A set of processes and procedures designed to handle data in a manner that adheres to FAIR principles.

Fair Digital Object

Type	Data Object
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A FAIR digital object is a unit composed of data that is a sequence of bits, or a set of sequences of bits, each of the sequences being structured (typed) in a way that is interpretable by one or more computer systems, and having as essential elements an assigned globally unique and persistent identifier (PID), a type definition for the object as a whole and a metadata description (which itself can be another FAIR digital object) of the properties of the object, making the whole findable, accessible, interoperable and reusable both by humans and computers for the reliable interpretation and processing of the data represented by the object (TSIG FDO WG).

Fair Publication Component

Type	Application Component
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A system or tool that manages the process of publishing data in a manner that conforms to FAIR principles, ensuring that data is Findable, Accessible,

Interoperable, and Reusable.

Fair Publication Pipeline

Type	Application Process
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The structured workflow for publishing data in a manner that adheres to FAIR principles (Findable, Accessible, Interoperable, and Reusable).

Fair Research Dataset

Type	Data Object
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A research dataset that complies with FAIR principles, making it easily discoverable and usable by others.

FAIR validation

Type	Application Process
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The process of verifying whether data adheres to FAIR principles, ensuring it is findable, accessible, interoperable, and reusable.

FAIR Validation Component

Type	Application Component
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A tool or system that checks whether data adheres to FAIR principles, ensuring compliance and quality of data publication.

Harmonized Data

Type	Data Object
-------------	-------------

Data that has been standardized and integrated from multiple sources to ensure consistency and compatibility across datasets.

Ingested Data

Type	Data Object
-------------	-------------

Data that has been collected and integrated into a system for further processing or analysis.

Ingested Data Source

Type	Application Service
-------------	---------------------

A data source that has been collected and integrated into a system for analysis or further processing.

Ingestion frequency

Type	Application Process
-------------	---------------------

The rate at which new data is collected and integrated into a system or database for further processing.

Ingestion Pipeline

Type	Application Process
-------------	---------------------

A sequence of steps that facilitate the input and integration of data into a system for cleaning, processing and further analysis.

Ingestion Pipeline Component

Type	Application Component
-------------	-----------------------

A module or system responsible for managing the sequence of steps involved in the collection and integration of data from various sources into a central system.

Interoperable metadata

Type	Application Process
-------------	---------------------

Metadata that is structured in a way that allows it to be used and understood across different systems, promoting data sharing and reuse.

Master Data

Type	Data Object
-------------	-------------

Critical business data that is essential for operations, often shared across multiple systems and processes within an organization.

Persistent identifiers

Type	Application Process
-------------	---------------------

Unique and persistent identifiers assigned to data or digital objects to ensure their long-term accessibility and referenceability, such as URN, DOI and ORCID

Processing

Type	Application Process
-------------	---------------------

The sequence of actions applied to data to analyze, enrich and convert the data to support the intended use case

Queryable Data Stream

Type	Data Object
-------------	-------------

A data stream that can be queried or accessed in real-time for analysis or monitoring purposes.

Queryable Structured Data

Type	Data Object
-------------	-------------

Structured data that can be easily queried, analyzed, and used in various applications and systems.

Raw Data

Type	Data Object
-------------	-------------

Unprocessed data that has been collected directly from the source without any transformation, cleaning, or aggregation.

Raw Data Source

Type	Application Service
-------------	---------------------

A source of unprocessed or untransformed data, typically collected directly from the origin systems or devices.

Smart Data

Type	Data Object
-------------	-------------

Data that has been enriched with additional context or metadata to enhance its value and facilitate advanced analysis or decision-making.

Smart Data Source

Type	Application Service
-------------	---------------------

A data source that has been enriched with additional context, metadata and documentation to enable efficient data reuse and more advanced analysis or decision-making. This is typically domain specific or fit-for-purpose enterprise level data that is well documented and ready to be used within a bounded context using the documentation and tools provided with the data.

Structured Data Dump

Type	Data Object
-------------	-------------

A collection of structured data exported from a system or database, typically used for backup, analysis, or migration purposes.

Synthesizing

Type	Application Process
-------------	---------------------

The process of combining different data sources to generate new insights or data products.

Transformation

Type	Application Process
-------------	---------------------

The process of converting data from one format, structure, or model to another for compatibility or analysis purposes.

Validation

Type	Application Process
-------------	---------------------

The process of checking the accuracy and integrity of data to ensure it meets the required standards and specifications.

Verification

Type	Application Process
-------------	---------------------

The process of confirming that data or processes meet defined requirements and specifications, typically in quality assurance.

Workflow Management

Type	Application Process
-------------	---------------------

The process of organizing and optimizing the flow of tasks and information in a data processing pipeline or system.

Technology & Physical Layer

Technology Service

Type	Technology Service
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Access Management

Type	Technology Service
-------------	--------------------

Services and tools that manage user access to systems and data, ensuring proper authentication and authorization. Access can be managed on service, API or dataset level using Resource Entitlement Management Systems.

Analytics

Type	Technology Service
-------------	--------------------

Data storage that integrates data from multiple sources, optimized for reporting and analysis.

APIs

Type	Technology Service
-------------	--------------------

Application Programming Interfaces that allow different software applications to communicate and interact with each other, enabling integration and functionality sharing.

Application Interface

Type	Technology Service
-------------	--------------------

The point of interaction between different software applications, enabling them to communicate and exchange data.

Code Repository

Type	Technology Service
-------------	--------------------

A storage location for software code, enabling version control, collaboration, and management of codebases.

Collaborative Wiki

Type	Technology Service
-------------	--------------------

A web-based platform that allows multiple users to create, edit, and share content collaboratively in real-time.

Columnar

Type	Technology Service
-------------	--------------------

Database where data is stored in columns instead of rows to optimize certain types of queries, analytic workflows and data manipulation operations.

Data Governance Systems

Type	Technology Service
-------------	--------------------

Software systems designed to manage, monitor, and enforce data governance policies and practices within an organization.

Data ingestion

Type	Technology Service
-------------	--------------------

The process of importing, transferring, loading, and processing data for later use or storage in a database or data warehouse.

Data Lineage Systems

Type	Technology Service
-------------	--------------------

The documentation of the origin, lineage, and history of data, ensuring its authenticity and traceability throughout its lifecycle.

Data mining

Type	Technology Service
-------------	--------------------

The practice of examining large datasets to discover patterns, trends, and insights that can inform decision-making.

Data Processing Platform

Type	Technology Service
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A software platform that provides tools and infrastructure for processing, analyzing, and managing large volumes of data.

Data Storage

Type	Technology Service
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Systems and formats used to store data, including different types of databases, data warehouses, data lakes, cloud storage solutions and transaction formats. The list is endless and the high level categorization is mainly used to exemplify that there are different types of data storage and transaction formats to suit different needs.

Data Workflow Repository

Type	Technology Service
-------------	--------------------

A system that stores and manages workflows related to data processing, ensuring efficient and repeatable data operations.

Database

Type	Technology Service
-------------	--------------------

An organized collection of structured information or data, typically stored electronically in a computer system.

Devices

Type	Technology Service
-------------	--------------------

Hardware tools and equipment used for data collection, processing, and storage, such as sensors, computers, and mobile devices.

Dimensional

Type	Technology Service
-------------	--------------------

Relational database that uses a dimensional data model to organize data. This model uses fact tables and dimension tables using different schema models such as star model, snowflake, galaxy or data cube schema. A dimensional database is the optimal type of database for data warehousing.

Document

Type	Technology Service
-------------	--------------------

A type of database designed to store, retrieve, and manage document-oriented information, typically in formats like JSON or XML.

Documentation & Support Systems

Type	Technology Service
-------------	--------------------

Software tools and systems that provide documentation, help resources, and support for users managing data systems and infrastructure.

Domain solutions

Type	Technology Service
-------------	--------------------

Specialized software or systems designed to address specific needs or challenges within a particular domain or industry.

Event streaming

Type	Technology Service
-------------	--------------------

The continuous flow of data generated by events, typically processed in real-time for immediate analysis and response.

FAIR publication system

Type	Technology Service
-------------	--------------------

A system designed to publish data in accordance with FAIR principles, ensuring data is findable, accessible, interoperable, and reusable.

Fairdata platform

Type	Technology Service
-------------	--------------------

FAIR data infrastructure designed to manage, store, and provide access to FAIR data, ensuring compliance with FAIR principles.

Filesystem

Type	Technology Service
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A method and data structure that an operating system uses to control how data is stored and retrieved on storage devices.

Graph

Type	Technology Service
-------------	--------------------

A type of database that uses graph structures with nodes, edges, and properties to store and represent data, enabling data integration and efficient querying of relationships. Different types of graph databases like RDF, property graph and in-memory graph databases offer diverse functionalities suitable for specialized applications to support different use cases that use high variety, interconnected and dynamic data from multiple sources.

Identity Management

Type	Technology Service
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Services and systems that manage user identities and control access to resources based on authenticated identities.

Issues & Feedback

Type	Technology Service
-------------	--------------------

Systems and processes that collect, manage, and respond to user-reported issues and feedback regarding data systems and services.

Key value

Type	Technology Service
-------------	--------------------

A type of NoSQL database that stores data as a collection of key-value pairs, allowing for simple and fast data retrieval based on unique keys.

Learning Portal

Type	Technology Service
-------------	--------------------

An online platform that provides educational resources, training materials, and learning modules for users and stakeholders.

Ledger

Type	Technology Service
-------------	--------------------

Immutable record-keeping system that is permanent and immune to data corruption and provides strong guarantees about the lineage of data. Ledgers can be both centralized or decentralized.

Machine Actionable Interface

Type	Technology Service
-------------	--------------------

Interfaces that allow machines to interpret and act upon data or commands without

human intervention, facilitating automation and integration.

Machine learning

Type	Technology Service
-------------	--------------------

A subset of artificial intelligence that involves the development of algorithms that can learn from and make predictions or decisions based on data.

Metadata Crosswalks

Type	Technology Service
-------------	--------------------

Tools or processes that map metadata elements from one schema or standard to another, enabling interoperability and data integration across different systems.

Metadata Management Systems

Type	Technology Service
-------------	--------------------

Systems that manage metadata, ensuring it is properly collected, stored, and accessible for data governance and usage.

Model & Schema Repositories

Type	Technology Service
-------------	--------------------

Structured representations of data that define the organization, relationships, and constraints of data elements within a system or application.

Notebooks

Type	Technology Service
-------------	--------------------

Object

Type	Technology Service
-------------	--------------------

A storage architecture that manages data as objects, each containing the data itself, metadata, and a unique identifier, suitable for large-scale unstructured data.

Ontology & Linked Data Platforms

Type	Technology Service
-------------	--------------------

Formal representations of knowledge (Classes, properties and instances) as a set of concepts and the relationships between them, used to model domain knowledge and integrating data from multiple sources to semantically interoperable data model.

Operational

Type	Technology Service
-------------	--------------------

Data storage systems designed to update data in real-time

PID Management

Type	Technology Service
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Process and systems for managing Persistent Identifiers (PIDs) to ensure unique, long-lasting references to digital objects or data.

PID Resolver

Type	Technology Service
-------------	--------------------

A system or service that resolves Persistent Identifiers (PIDs) to their corresponding digital objects or data locations.

Preservation system

Type	Technology Service
-------------	--------------------

Systems and processes designed to maintain and protect digital data over time, ensuring its accessibility and integrity for future use.

Process engine

Type	Technology Service
-------------	--------------------

Software that manages and executes business processes, often using defined workflows to coordinate tasks and data flows.

Property graph

Type	Technology Service
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Provenance Systems

Type	Technology Service
-------------	--------------------

Systems that track the origins, movement, and transformations of data. These include data lineage systems as well as the provenance of code and the deployment and usage of the systems used to manage the data.

Publication system

Type	Technology Service
-------------	--------------------

Systems that manage the dissemination and distribution of data, content, or research outputs to end-users or the public.

Publishing platform

Type	Technology Service
-------------	--------------------

Software systems that facilitate the publishing and distribution of data, content, or services to end-users.

Quality assurance

Type	Technology Service
-------------	--------------------

Processes and systems designed to ensure that data and data-related processes meet defined quality standards and requirements.

Reference Data & Taxonomies

Type	Technology Service
-------------	--------------------

Standardized sets of data and classification systems that provide a consistent framework for data categorization and analysis across different systems.

Relational

Type	Technology Service
-------------	--------------------

Research notebooks

Type	Technology Service
-------------	--------------------

Interactive notebooks, digital tools or platforms designed to support and enhance scientific research, experimentation, and analysis. They function as a dynamic environment where researchers can record, execute, and visualize code, document processes, and share results in an integrated and collaborative manner.

Scientific computing

Type	Technology Service
-------------	--------------------

The use of advanced computing capabilities such as parallel processing or quantum computing to understand and solve complex scientific problems through simulations, modeling, and data analysis.

Semantic Artefact Repositories

Type	Technology Service
-------------	--------------------

Semantic artifact repositories enable both humans and machines to access, understand, and use this structured knowledge. Semantic artifacts are formal, machine readable and actionable representations of knowledge, used to capture and structure information in a domain. Examples include ontologies, terminologies, taxonomies, thesauri, vocabularies, metadata schemas, data models and data mappings.

Sensors

Type	Technology Service
-------------	--------------------

Devices that detect and measure physical properties, converting them into data that can be analyzed and used for monitoring and decision-making.

Source systems

Type	Technology Service
-------------	--------------------

Original systems where data is created or initially stored, serving as the primary data sources for data integration and processing.

Spatiotemporal

Type	Technology Service
-------------	--------------------

Designed to efficiently store, query, and process spatial and temporal data, such as observations, time series, geoinformation, historical locations and events etc.

Specialized

Type	Technology Service
-------------	--------------------

Data storage system designed and optimized for different use cases. This type of data storages can also be hybrid, multimodal and used both in operational or analytic use cases.

Staging System

Type	Technology Service
-------------	--------------------

A system used to temporarily store data before it is processed and moved to a final destination, often used as a first step in data cleaning, data warehousing and integration platforms.

Technology Service

Type	Technology Service
-------------	--------------------

Technology Service

Type	Technology Service
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Validation Tools

Type	Technology Service
-------------	--------------------

Data quality management tools that monitor and validate metadata to identify discrepancies, missing fields, or inconsistencies.

Vector

Type	Technology Service
-------------	--------------------

Data structures used to store and manipulate mathematical vectors, often used in machine learning and data analysis applications.

Virtual Research Environment

Type	Technology Service
-------------	--------------------

A specialized data processing platform that provides researchers with tools, resources, and collaborative spaces to conduct and manage research activities.

Visualisation platforms

Type	Technology Service
-------------	--------------------

Tools or systems designed to create, manage, and interact with visual representations of data. These platforms facilitate the transformation of complex datasets into graphical or visual forms such as charts, graphs, maps, dashboards, and interactive visuals. The goal of these platforms is to make data more understandable, accessible, and actionable, allowing users to explore, analyze, and communicate insights effectively.

Relations

Serving relation

Type	Serving relation
Source	Infrastructure Governance
Target	FAIR Research Support

Access relation

Type	Access relation
Source	Raw Data Source
Target	Data Streams

Association relation

Type	Association relation
Source	Documentation & Support Systems
Target	Learning Portal

Composition relation

Type	Composition relation
Source	Semantic Artefact Repositories
Target	Reference Data & Taxonomies

Composition relation

Type	Composition relation
Source	Analytics
Target	Relational

Composition relation

Type	Composition relation
Source	Research Data Management
Target	MyData

Composition relation

Type	Composition relation
Source	FAIR Data Lifecycle
Target	Data Production

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Data Engineering

Composition relation

Type	Composition relation
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Source	Data Rights and Legal Compliance
Target	Intellectual Property Rights

Specialization relation

Type	Specialization relation
Source	Fair Data Workflow
Target	Fair Digital Object

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Risk Management (copy)

Composition relation

Type	Composition relation
Source	Fair Publication Pipeline
Target	Interoperable metadata

Serving relation

Type	Serving relation
Source	Research Support
Target	Project consulting

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Infrastructure scalability (copy)

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Change Management

Realization relation

Type	Realization relation
Source	FAIR Data Support
Target	Research Data Management

Composition relation

Type	Composition relation
Source	Operational
Target	Object

Composition relation

Type	Composition relation
Source	Metadata Architecture (copy)
Target	Data Versioning and Provenance (copy)

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Anonymization and Pseudonymization

Realization relation

Type	Realization relation
Source	Project consulting
Target	Information Architecture

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	Data Citation and Attribution (copy)

Composition relation

Type	Composition relation
Source	Virtual Research Environment
Target	Notebooks

Composition relation

Type	Composition relation
Source	Data Processing Pipeline
Target	Collection

Assignment relation

Type	Assignment relation
Source	FAIR Data Lifecycle
Target	FAIR Publication Support

Composition relation

Type	Composition relation
Source	Metadata Architecture (copy)
Target	Search Engine Optimization (copy)

Serving relation

Type	Serving relation
Source	Data Management Plan
Target	Project Proposal

Access relation

Type	Access relation
Source	Clean Data Source
Target	Cleaned Data

Composition relation

Type	Composition relation
Source	Information Architecture
Target	API Management

Composition relation

Type	Composition relation
Source	FAIR Data Lifecycle
Target	Data Processing

Composition relation

Type	Composition relation
Source	Semantic Artefact Repositories
Target	Metadata Crosswalks

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Service Development (copy)

Composition relation

Type	Composition relation
Source	Metadata Architecture (copy)
Target	Research Dataset Metadata (copy)

Specialization relation

Type	Specialization relation
Source	Validation
Target	Data Harmonization Pipeline

Composition relation

Type	Composition relation
Source	Analytics
Target	Dimensional

Flow relation

Type	Flow relation
Source	Data Processing Platform

Target	Data Storage
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Serving relation

Type	Serving relation
Source	Research Support
Target	FAIR Research Support

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Information Architecture

Composition relation

Type	Composition relation
Source	Data Processing Pipeline
Target	Processing

Association relation

Type	Association relation
Source	Publishing platform
Target	Publication system

Composition relation

Type	Composition relation
Source	Workflow Management
Target	Data Processing Pipeline

Assignment relation

Type	Assignment relation
Source	FAIR Data Lifecycle
Target	Project consulting

Realization relation

Type	Realization relation
Source	Data Storage
Target	Ingested Data Source

Triggering relation

Type	Triggering relation
Source	Data Processing
Target	Data Publication

Composition relation

Type	Composition relation
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Source	Research Data Management
Target	Research Data Process Development

Composition relation

Type	Composition relation
Source	Data Storage
Target	Columnar

Access relation

Type	Access relation
Source	Ingested Data Source
Target	Queryable Data Stream

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Master Data Management (copy)

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Quality

Realization relation

Type	Realization relation
Source	Project consulting
Target	Project planning

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Information Architecture (copy)

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Data Rights and Legal Compliance

Composition relation

Type	Composition relation
Source	Operational
Target	Graph

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Access Management (copy)

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance (copy)
Target	Data Ethics (copy)

Association relation

Type	Association relation
Source	Publishing platform
Target	Identity Management

Association relation

Type	Association relation
Source	Metadata Management Systems
Target	Semantic Artefact Repositories

Composition relation

Type	Composition relation
Source	Research Data Management (copy)
Target	Data Engineering (copy)

Realization relation

Type	Realization relation
Source	FAIR Workflow Support
Target	Scientific computing

Triggering relation

Type	Triggering relation
Source	Data Publication
Target	Preserve, Discard, Reuse

Flow relation

Type	Flow relation
Source	Data Storage
Target	Data Processing Platform

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Change Management (copy)

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Cloud Architectures

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Data Valuation and Meritation

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Processing

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Real-Time Data Processing

Realization relation

Type	Realization relation
Source	FAIR Workflow Support
Target	Data Lineage

Composition relation

Type	Composition relation
Source	Specialized
Target	Ledger

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance
Target	Sensitive Data Architecture

Serving relation

Type	Serving relation
Source	Technology support
Target	FAIR Workflow Support

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle

Target	Research Support
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Association relation

Type	Association relation
Source	Provenance Systems
Target	Data Workflow Repository

Flow relation

Type	Flow relation
Source	Source systems
Target	Staging System

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Service Development

Specialization relation

Type	Specialization relation
Source	Fairdata platform
Target	Publishing platform

Realization relation

Type	Realization relation
Source	FAIR Workflow Support
Target	Data Engineering

Association relation

Type	Association relation
Source	Data Governance Systems
Target	Documentation & Support Systems

Composition relation

Type	Composition relation
Source	FAIR Data Lifecycle
Target	Data Management Plan

Serving relation

Type	Serving relation
Source	FAIR Research Support
Target	FAIR Workflow Support

Realization relation

Type	Realization relation
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Source	Fairdata platform
Target	Fair Data Source

Realization relation

Type	Realization relation
Source	FAIR Data Support
Target	Data Stewardship

Composition relation

Type	Composition relation
Source	Research Data Management (copy)
Target	Data Rights and Legal Compliance (copy)

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Interoperability Frameworks

Association relation

Type	Association relation
Source	Metadata Management Systems
Target	Data Governance Systems

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Software Development

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Publication Support

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Actionable Data Management Plan

Triggering relation

Type	Triggering relation
Source	Business Event
Target	Business Process

Association relation

Type	Association relation
Source	Fairdata platform
Target	FAIR publication system

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Persistent Identifiers (copy)

Realization relation

Type	Realization relation
Source	Preservation Support
Target	Data Preservation

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Data Valuation and Meritation (copy)

Association relation

Type	Association relation
Source	Staging System
Target	Data ingestion

Access relation

Type	Access relation
Source	Fair Data Source
Target	Fair Digital Object

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Project planning

Composition relation

Type	Composition relation
Source	Metadata Architecture
Target	Metadata Harmonization and Crosswalks

Access relation

Type	Access relation
Source	Ingested Data Source
Target	Dumb Data Lake

Serving relation

Type	Serving relation
Source	Project support
Target	Project consulting

Composition relation

Type	Composition relation
Source	Research Data Management
Target	User Management

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Lineage (copy)

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Anonymization and Pseudonymization (copy)

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance (copy)
Target	Data Licensing (copy)

Serving relation

Type	Serving relation
Source	Infrastructure Governance
Target	Project consulting

Composition relation

Type	Composition relation
Source	Data Storage
Target	Technology Service

Realization relation

Type	Realization relation
Source	FAIR Data Support
Target	Information Architecture

Association relation

Type	Association relation
Source	Data Storage

Target	Key value
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Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Preservation Architecture (copy)

Access relation

Type	Access relation
Source	Raw Data Source
Target	Dumb Data

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Software Development (copy)

Association relation

Type	Association relation
Source	Metadata Management Systems
Target	PID Management

Association relation

Type	Association relation
Source	Virtual Research Environment
Target	Domain solutions

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Domain Architectures (copy)

Flow relation

Type	Flow relation
Source	Clean Data Source
Target	Smart Data Source

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Interoperability Frameworks (copy)

Composition relation

Type	Composition relation
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Source	Data Engineering
Target	API Management

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Technology support

Serving relation

Type	Serving relation
Source	FAIR Research Support
Target	Data Production

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Cumulative and Big Data

Serving relation

Type	Serving relation
Source	Publication Support
Target	FAIR Publication Support

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Analytics And Reporting (copy)

Composition relation

Type	Composition relation
Source	FAIR Infrastructure Governance
Target	Consultation and Training

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Research Networking and Collaboration (copy)

Composition relation

Type	Composition relation
Source	Metadata Architecture (copy)
Target	Metadata Harmonization and Crosswalks (copy)

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Data Discovery Architecture (copy)

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Interoperability and Standards

Composition relation

Type	Composition relation
Source	Fair Publication Pipeline
Target	FAIR validation

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Research Infrastructure Architecture

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Sensitive Data Architecture (copy)

Serving relation

Type	Serving relation
Source	FAIR Publication Support
Target	Data Publication

Composition relation

Type	Composition relation
Source	Workflow Management
Target	Data Harmonization Pipeline

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Scientific computing

Triggering relation

Type	Triggering relation
Source	Data Publication
Target	Data Processing

Composition relation

Type	Composition relation
Source	Operational
Target	Document

Association relation

Type	Association relation
Source	Publishing platform
Target	Access Management

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Green Data Architecture

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance
Target	Data Policies

Realization relation

Type	Realization relation
Source	Data Storage
Target	Clean Data Source

Association relation

Type	Association relation
Source	Documentation & Support Systems
Target	Collaborative Wiki

Triggering relation

Type	Triggering relation
Source	Project Proposal
Target	Preserve, Discard, Reuse

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Visualization

Composition relation

Type	Composition relation
Source	Fair Research Dataset

Target	Fair Digital Object
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Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance
Target	Data Ethics

Realization relation

Type	Realization relation
Source	Project consulting
Target	Interoperability

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Persistent Identifiers

Assignment relation

Type	Assignment relation
Source	Research Data Management
Target	Data Production

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Master and Reference Data Architecture

Composition relation

Type	Composition relation
Source	Data Harmonization Pipeline
Target	Transformation

Triggering relation

Type	Triggering relation
Source	Clean Data Source
Target	Data Processing Pipeline

Triggering relation

Type	Triggering relation
Source	Raw Data Source
Target	Ingestion Pipeline

Composition relation

Type	Composition relation
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Source	Semantic Artefact Repositories
Target	Ontology & Linked Data Platforms

Composition relation

Type	Composition relation
Source	Data Stewardship
Target	Data Citation and Attribution

Serving relation

Type	Serving relation
Source	FAIR Research Support
Target	Project consulting

Composition relation

Type	Composition relation
Source	Specialized
Target	Columnar

Assignment relation

Type	Assignment relation
Source	Research Data Management
Target	Data Management Plan

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Metadata Architecture

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Sensitive Data Architecture

Composition relation

Type	Composition relation
Source	Data Stewardship
Target	Data Publication

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Data Discovery Architecture

Association relation

Type	Association relation
Source	Fairdata platform
Target	Machine Actionable Interface

Serving relation

Type	Serving relation
Source	FAIR Publication Support
Target	Preservation Support

Realization relation

Type	Realization relation
Source	Staging System
Target	Ingested Data Source

Serving relation

Type	Serving relation
Source	Infrastructure Governance
Target	FAIR Publication Support

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	Research Methods

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Lineage

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	Reproducible Research

Assignment relation

Type	Assignment relation
Source	Research Data Management
Target	Project Proposal

Association relation

Type	Association relation
Source	Staging System
Target	Quality assurance

Realization relation

Type	Realization relation
Source	Hardware
Target	Sensors

Flow relation

Type	Flow relation
Source	Staging System
Target	Data Storage

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	Data Curation

Composition relation

Type	Composition relation
Source	Cumulative and Big Data
Target	Real-Time Data Processing

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Artificial Intelligence

Assignment relation

Type	Assignment relation
Source	Data Standardization
Target	Reference & Master Data Management

Composition relation

Type	Composition relation
Source	Metadata Architecture
Target	Search Engine Optimization

Triggering relation

Type	Triggering relation
Source	Data Processing
Target	Data Production

Composition relation

Type	Composition relation
Source	Graph

Target	Property graph
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Association relation

Type	Association relation
Source	Data Storage
Target	Vector

Association relation

Type	Association relation
Source	Source systems
Target	APIs

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Quality (copy)

Flow relation

Type	Flow relation
Source	Smart Data Source
Target	Fair Data Source

Composition relation

Type	Composition relation
Source	Data Storage
Target	Ledger

Triggering relation

Type	Triggering relation
Source	Preserve, Discard, Reuse
Target	Data Publication

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Curator

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Integration Development (copy)

Association relation

Type	Association relation
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Source	Fairdata platform
Target	Preservation system

Association relation

Type	Association relation
Source	Provenance Systems
Target	Code Repository

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Project planning (copy)

Realization relation

Type	Realization relation
Source	Workflow Management
Target	FAIR Infrastructure Governance

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Database Management

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Preservation Architecture

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Processing (copy)

Association relation

Type	Association relation
Source	Data Storage
Target	Analytics

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Database Management (copy)

Composition relation

Type	Composition relation
Source	Data Stewardship
Target	Data Curation

Composition relation

Type	Composition relation
Source	Data Harmonization Pipeline
Target	Cleaning

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Scientific computing

Composition relation

Type	Composition relation
Source	Ingestion Pipeline
Target	Ingestion frequency

Serving relation

Type	Serving relation
Source	Curator
Target	Preservation Support

Serving relation

Type	Serving relation
Source	Data Governance Systems
Target	Data Storage

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance
Target	Legal Framework

Composition relation

Type	Composition relation
Source	FAIR Infrastructure Governance
Target	Data Quality Monitoring

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Green Data Architecture (copy)

Realization relation

Type	Realization relation
Source	Project consulting
Target	Research Methods

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Artificial Intelligence (copy)

Serving relation

Type	Serving relation
Source	Data Governance Systems
Target	Fairdata platform

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	API Management (copy)

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	Data Stewardship

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Access Management

Composition relation

Type	Composition relation
Source	Data Stewardship
Target	Data Preservation

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Funder

Association relation

Type	Association relation
Source	Source systems

Target	Filesystem
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Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Security (copy)

Composition relation

Type	Composition relation
Source	Operational
Target	Key value

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Edge Computing (copy)

Access relation

Type	Access relation
Source	Smart Data Source
Target	Digital Twin

Composition relation

Type	Composition relation
Source	Information Architecture
Target	Interoperability Frameworks

Realization relation

Type	Realization relation
Source	FAIR Data Support
Target	Interoperability

Composition relation

Type	Composition relation
Source	Virtual Research Environment
Target	Research notebooks

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Metadata Architecture

Composition relation

Type	Composition relation
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Source	Metadata Architecture
Target	Research Dataset Metadata

Association relation

Type	Association relation
Source	Fair Data Workflow
Target	Fair Research Dataset

Composition relation

Type	Composition relation
Source	Metadata Architecture
Target	Master and Reference Data Architecture

Flow relation

Type	Flow relation
Source	Raw Data Source
Target	Ingested Data Source

Triggering relation

Type	Triggering relation
Source	Data Management Plan
Target	Project Proposal

Composition relation

Type	Composition relation
Source	Metadata Architecture
Target	Ontology Development

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance (copy)
Target	Legal Framework (copy)

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	Data Curation (copy)

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Domain Architectures

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Reproducible Research

Realization relation

Type	Realization relation
Source	Workflow Management
Target	FAIR Data Lifecycle

Association relation

Type	Association relation
Source	Publishing platform
Target	Application Interface

Flow relation

Type	Flow relation
Source	Data Storage
Target	Publishing platform

Serving relation

Type	Serving relation
Source	Data Processing
Target	Data Publication

Triggering relation

Type	Triggering relation
Source	Smart Data Source
Target	Data Processing Pipeline

Specialization relation

Type	Specialization relation
Source	Virtual Research Environment
Target	Data Processing Platform

Composition relation

Type	Composition relation
Source	Research Data Management (copy)
Target	Research Infrastructure Architecture (copy)

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Data Policies

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance
Target	MyData

Triggering relation

Type	Triggering relation
Source	Researcher
Target	FAIR Data Lifecycle

Access relation

Type	Access relation
Source	Smart Data Source
Target	Data Product

Composition relation

Type	Composition relation
Source	Virtual Research Environment
Target	Visualisation platforms

Serving relation

Type	Serving relation
Source	Infrastructure Governance
Target	Research Data Infrastructure

Specialization relation

Type	Specialization relation
Source	Fair Research Dataset
Target	Fair Digital Object

Serving relation

Type	Serving relation
Source	Infrastructure Governance
Target	Preservation Support

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	Data Citation and Attribution

Association relation

Type	Association relation
Source	Provenance Systems

Target	Issues & Feedback
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Association relation

Type	Association relation
Source	Source systems
Target	Database

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Researcher

Composition relation

Type	Composition relation
Source	Research Data Management (copy)
Target	Research Data Governance (copy)

Triggering relation

Type	Triggering relation
Source	Data Production
Target	Data Processing

Association relation

Type	Association relation
Source	Data Processing Platform
Target	Machine learning

Composition relation

Type	Composition relation
Source	Metadata Architecture
Target	Data Versioning and Provenance

Composition relation

Type	Composition relation
Source	Fair Publication Pipeline
Target	Data preservation

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance (copy)
Target	Intellectual Property Rights (copy)

Composition relation

Type	Composition relation
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Source	Analytics
Target	Vector

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Data Curation

Access relation

Type	Access relation
Source	Raw Data Source
Target	Structured Data Dump

Composition relation

Type	Composition relation
Source	Specialized
Target	Vector

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Workflows, Pipelines and Deployment

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Research Networking and Collaboration

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Master and Reference Data Architecture (copy)

Flow relation

Type	Flow relation
Source	Hardware
Target	Source systems

Composition relation

Type	Composition relation
Source	Data Storage
Target	Document

Association relation

Type	Association relation
Source	Metadata Management Systems
Target	Reference Data & Taxonomies

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Metadata Architecture (copy)

Triggering relation

Type	Triggering relation
Source	Researcher
Target	Project Proposal

Association relation

Type	Association relation
Source	Staging System
Target	Event streaming

Assignment relation

Type	Assignment relation
Source	FAIR Data Lifecycle
Target	FAIR Research Support

Triggering relation

Type	Triggering relation
Source	Ingested Data Source
Target	Data Harmonization Pipeline

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Analytics And Reporting

Access relation

Type	Access relation
Source	Clean Data Source
Target	Harmonized Data

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Project support

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	Reproducible Research (copy)

Triggering relation

Type	Triggering relation
Source	Data Management Plan
Target	Data Production

Realization relation

Type	Realization relation
Source	FAIR Workflow Support
Target	Workflows, Pipelines and Deployment

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Research, Development and Innovation

Realization relation

Type	Realization relation
Source	Infrastructure Governance
Target	Data Valuation and Meritation

Composition relation

Type	Composition relation
Source	FAIR Data Lifecycle
Target	Data Publication

Composition relation

Type	Composition relation
Source	Data Storage
Target	Analytics

Association relation

Type	Association relation
Source	Fairdata platform
Target	PID Resolver

Realization relation

Type	Realization relation
Source	Publishing platform

Target	Smart Data Source
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Serving relation

Type	Serving relation
Source	FAIR Workflow Support
Target	FAIR Publication Support

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Data Policies (copy)

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Reproducible Research

Association relation

Type	Association relation
Source	Metadata Management Systems
Target	Metadata Crosswalks

Realization relation

Type	Realization relation
Source	Preservation Support
Target	Data Curation

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Risk Management

Realization relation

Type	Realization relation
Source	FAIR Publication Support
Target	Data Stewardship

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Interoperability Frameworks

Realization relation

Type	Realization relation
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Source	Infrastructure Governance
Target	Risk Management

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	Sensitive Data Architecture

Composition relation

Type	Composition relation
Source	Workflow Management
Target	Ingestion Pipeline

Association relation

Type	Association relation
Source	Data Storage
Target	Object

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	MyData Principles (copy)

Composition relation

Type	Composition relation
Source	Data Engineering
Target	MyData

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	Data Stewardship (copy)

Composition relation

Type	Composition relation
Source	Metadata Architecture (copy)
Target	Ontology Development (copy)

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Data Rights and Legal Compliance

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Encryption (copy)

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	Research Methods (copy)

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Sensitive Data Architecture

Composition relation

Type	Composition relation
Source	Research Data Management (copy)
Target	Research Data Process Development (copy)

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Information Architecture

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture (copy)
Target	Cloud Architectures (copy)

Association relation

Type	Association relation
Source	Provenance Systems
Target	Data Lineage Systems

Composition relation

Type	Composition relation
Source	Operational
Target	Relational

Serving relation

Type	Serving relation
Source	Data Governance Systems
Target	Publishing platform

Composition relation

Type	Composition relation
Source	FAIR Infrastructure Governance
Target	Data Integration & Interoperability

Association relation

Type	Association relation
Source	Data Processing Platform
Target	Scientific computing

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	Data Policies

Composition relation

Type	Composition relation
Source	Data Processing Pipeline
Target	Synthesizing

Composition relation

Type	Composition relation
Source	Research Data Management
Target	Research Data Governance

Realization relation

Type	Realization relation
Source	Hardware
Target	Devices

Composition relation

Type	Composition relation
Source	Research Data Process Development (copy)
Target	FAIR Principles (copy)

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Project Funding

Association relation

Type	Association relation
Source	Virtual Research Environment

Target	Data Processing Platform
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Composition relation

Type	Composition relation
Source	Virtual Research Environment
Target	null

Access relation

Type	Access relation
Source	Fair Data Source
Target	Fair Data Workflow

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Infrastructure scalability

Realization relation

Type	Realization relation
Source	Source systems
Target	Raw Data Source

Composition relation

Type	Composition relation
Source	Metadata Management Systems
Target	Semantic Artefact Repositories

Composition relation

Type	Composition relation
Source	Ingestion Pipeline
Target	Access control

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	MyData Principles

Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	MyData Principles

Composition relation

Type	Composition relation
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Source	Research Data Management
Target	Research Methods

Access relation

Type	Access relation
Source	Fair Data Source
Target	Fair Research Dataset

Serving relation

Type	Serving relation
Source	Data Standardization
Target	FAIR Infrastructure Governance

Assignment relation

Type	Assignment relation
Source	Data Standardization
Target	Data Integration & Interoperability

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Research, Development and Innovation (copy)

Realization relation

Type	Realization relation
Source	Infrastructure Governance
Target	Project planning

Composition relation

Type	Composition relation
Source	Specialized
Target	Spatiotemporal

Realization relation

Type	Realization relation
Source	FAIR Data Support
Target	FAIR Principles

Serving relation

Type	Serving relation
Source	FAIR Workflow Support
Target	Data Processing

Realization relation

Type	Realization relation
Source	Infrastructure Governance
Target	Project Funding

Composition relation

Type	Composition relation
Source	Fair Data Workflow
Target	Fair Digital Object

Triggering relation

Type	Triggering relation
Source	Preserve, Discard, Reuse
Target	Project Proposal

Composition relation

Type	Composition relation
Source	Data Rights and Legal Compliance
Target	Data Licensing

Composition relation

Type	Composition relation
Source	FAIR Infrastructure Governance
Target	Reference & Master Data Management

Access relation

Type	Access relation
Source	Ingested Data Source
Target	Queryable Structured Data

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Integration Development

Triggering relation

Type	Triggering relation
Source	Data Production
Target	Data Management Plan

Triggering relation

Type	Triggering relation
Source	Fair Data Source
Target	Fair Publication Pipeline

Composition relation

Type	Composition relation
Source	Data Harmonization Pipeline
Target	Deduplication

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Interoperability and Standards (copy)

Composition relation

Type	Composition relation
Source	Research Data Governance
Target	Data Policies

Serving relation

Type	Serving relation
Source	Issues & Feedback
Target	Source systems

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Edge Computing

Composition relation

Type	Composition relation
Source	Research Data Governance (copy)
Target	Project Funding (copy)

Association relation

Type	Association relation
Source	Provenance Systems
Target	Data Governance Systems

Serving relation

Type	Serving relation
Source	Project consulting
Target	Data Management Plan

Composition relation

Type	Composition relation
Source	Semantic Artefact Repositories

Target	Model & Schema Repositories
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Association relation

Type	Association relation
Source	Data Processing Platform
Target	Data mining

Access relation

Type	Access relation
Source	Smart Data Source
Target	Data Graph

Composition relation

Type	Composition relation
Source	Research Infrastructure Architecture
Target	API Management

Association relation

Type	Association relation
Source	Data Storage
Target	Document

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Real-Time Data Processing (copy)

Association relation

Type	Association relation
Source	Fairdata platform
Target	Publishing platform

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Cumulative and Big Data (copy)

Serving relation

Type	Serving relation
Source	Project consulting
Target	FAIR Research Support

Serving relation

Type	Serving relation
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Source	Data Governance Systems
Target	Staging System

Aggregation relation

Type	Aggregation relation
Source	FAIR Data Lifecycle
Target	Service Owner

Realization relation

Type	Realization relation
Source	Infrastructure Governance
Target	Interoperability Frameworks

Composition relation

Type	Composition relation
Source	Metadata Management Systems
Target	Validation Tools

Serving relation

Type	Serving relation
Source	FAIR Research Support
Target	Data Management Plan

Composition relation

Type	Composition relation
Source	Workflow Management
Target	Fair Publication Pipeline

Association relation

Type	Association relation
Source	Staging System
Target	Process engine

Access relation

Type	Access relation
Source	Clean Data Source
Target	Master Data

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Scientific computing (copy)

Serving relation

Type	Serving relation
Source	Preservation Support
Target	Preserve, Discard, Reuse

Association relation

Type	Association relation
Source	Data Storage
Target	Graph

Composition relation

Type	Composition relation
Source	Fair Publication Pipeline
Target	Persistent identifiers

Flow relation

Type	Flow relation
Source	Ingested Data Source
Target	Clean Data Source

Association relation

Type	Association relation
Source	Metadata Management Systems
Target	Ontology & Linked Data Platforms

Composition relation

Type	Composition relation
Source	Information Architecture
Target	MyData Principles

Realization relation

Type	Realization relation
Source	Infrastructure Governance
Target	Legal Framework

Composition relation

Type	Composition relation
Source	Information Architecture (copy)
Target	Actionable Data Management Plan (copy)

Triggering relation

Type	Triggering relation
Source	Project Proposal
Target	Data Management Plan

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Security

Composition relation

Type	Composition relation
Source	Analytics
Target	Columnar

Composition relation

Type	Composition relation
Source	Data Engineering
Target	Data Encryption

Composition relation

Type	Composition relation
Source	Data Engineering (copy)
Target	Data Visualization (copy)

Serving relation

Type	Serving relation
Source	Data Governance Systems
Target	Data Processing Platform

Serving relation

Type	Serving relation
Source	Infrastructure Governance
Target	Project Proposal

Composition relation

Type	Composition relation
Source	Specialized
Target	Graph

Composition relation

Type	Composition relation
Source	Data Storage
Target	Specialized

Composition relation

Type	Composition relation
Source	Data Engineering (copy)

Target	Workflows, Pipelines and Deployment (copy)
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Composition relation

Type	Composition relation
Source	Research Data Process Development
Target	FAIR Principles