For The National Academies of Sciences, Engineering, and Medicine's Board on Research Data and Information (BRDI)
Accelerating and Deepening Approaches to FAIR Data Sharing
Stakeholder Perspectives: The Current State of Research Data Sharing and FAIR

GOing FAIR
&
Data visiting

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Automating F, A, I and R

Box 2 | The FAIR Guiding Principles

https://www.nature.com/articles/sdata201618

To be Findable:
F1. (meta)data are assigned a globally unique and persistent identifier
F2. data are described with rich metadata (defined by R1 below)
F3. metadata clearly and explicitly include the identifier of the data it describes
F4. (meta)data are registered or indexed in a searchable resource

To be Accessible:
A1. (meta)data are retrievable by their identifier using a standardized communications protocol
A1.1 the protocol is open, free, and universally implementable
A1.2 the protocol allows for an authentication and authorization procedure, where necessary
A2. metadata are accessible, even when the data are no longer available

To be Interoperable:
I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
I2. (meta)data use vocabularies that follow FAIR principles
I3. (meta)data include qualified references to other (meta)data

To be Reusable:
R1. meta(data) are richly described with a plurality of accurate and relevant attributes
R1.1. (meta)data are released with a clear and accessible data usage license
R1.2. (meta)data are associated with detailed provenance
R1.3. (meta)data meet domain-relevant community standards

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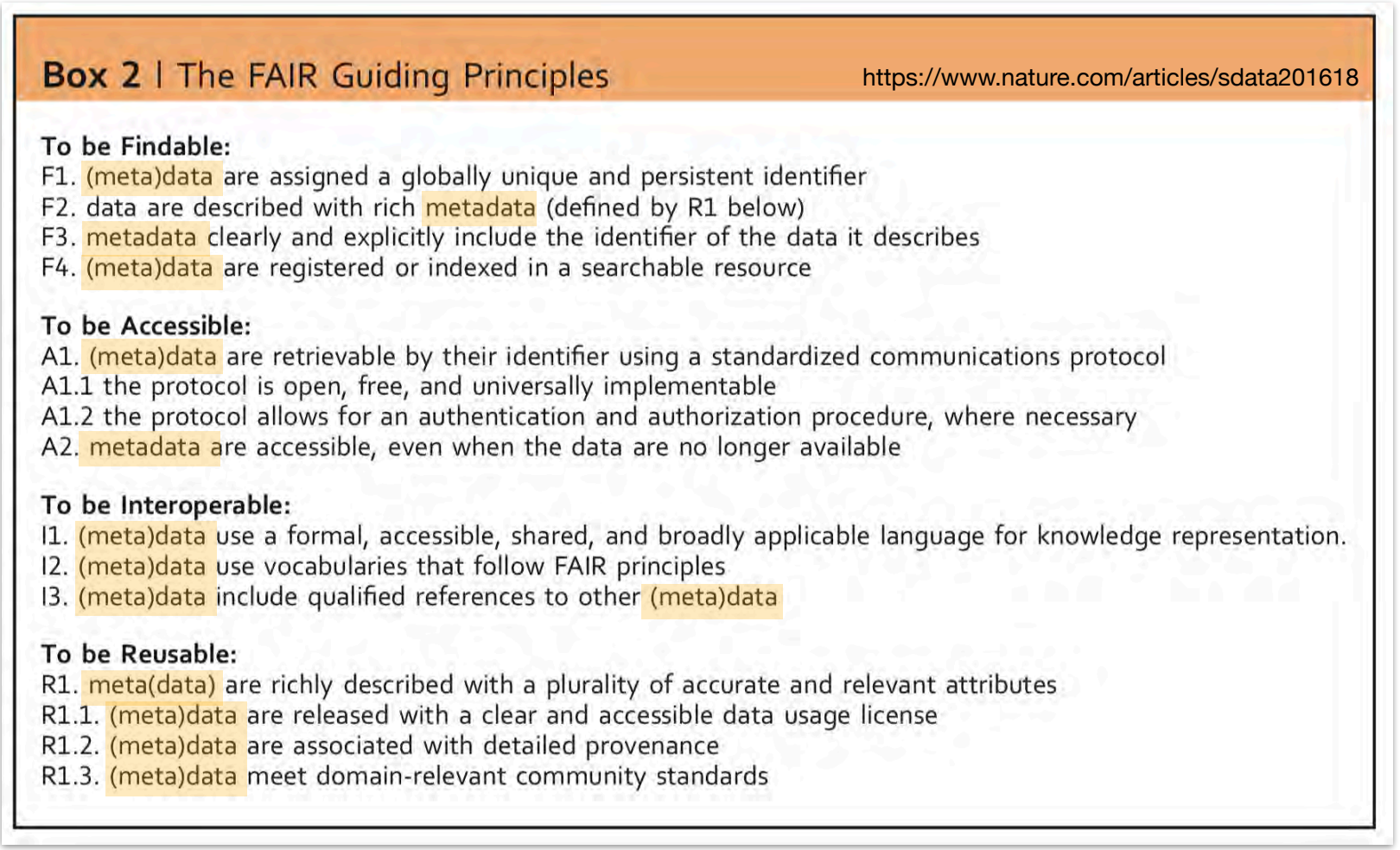

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Machine-actionable metadata

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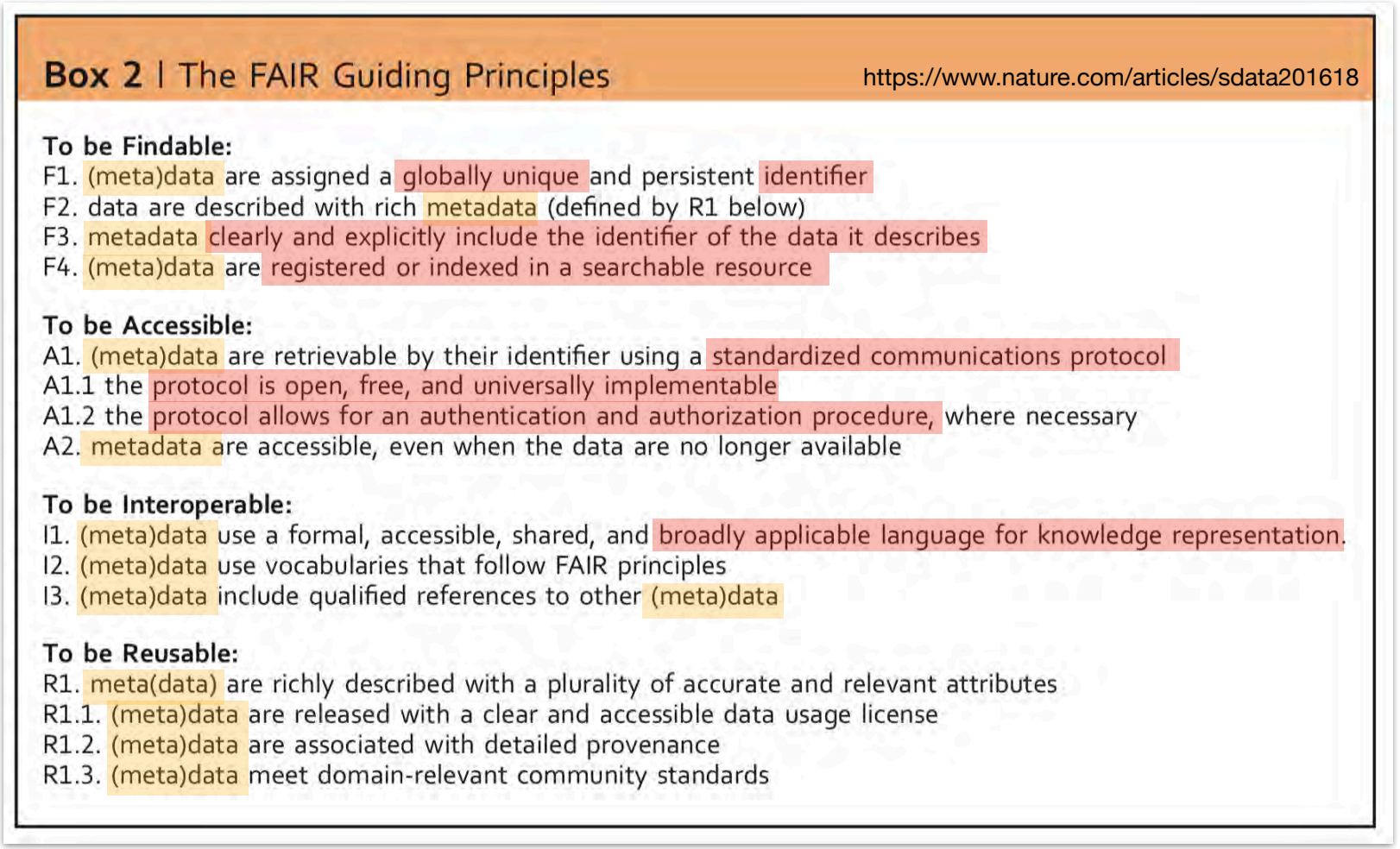

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Machine-actionable metadata

Technical infrastructure (generic services)

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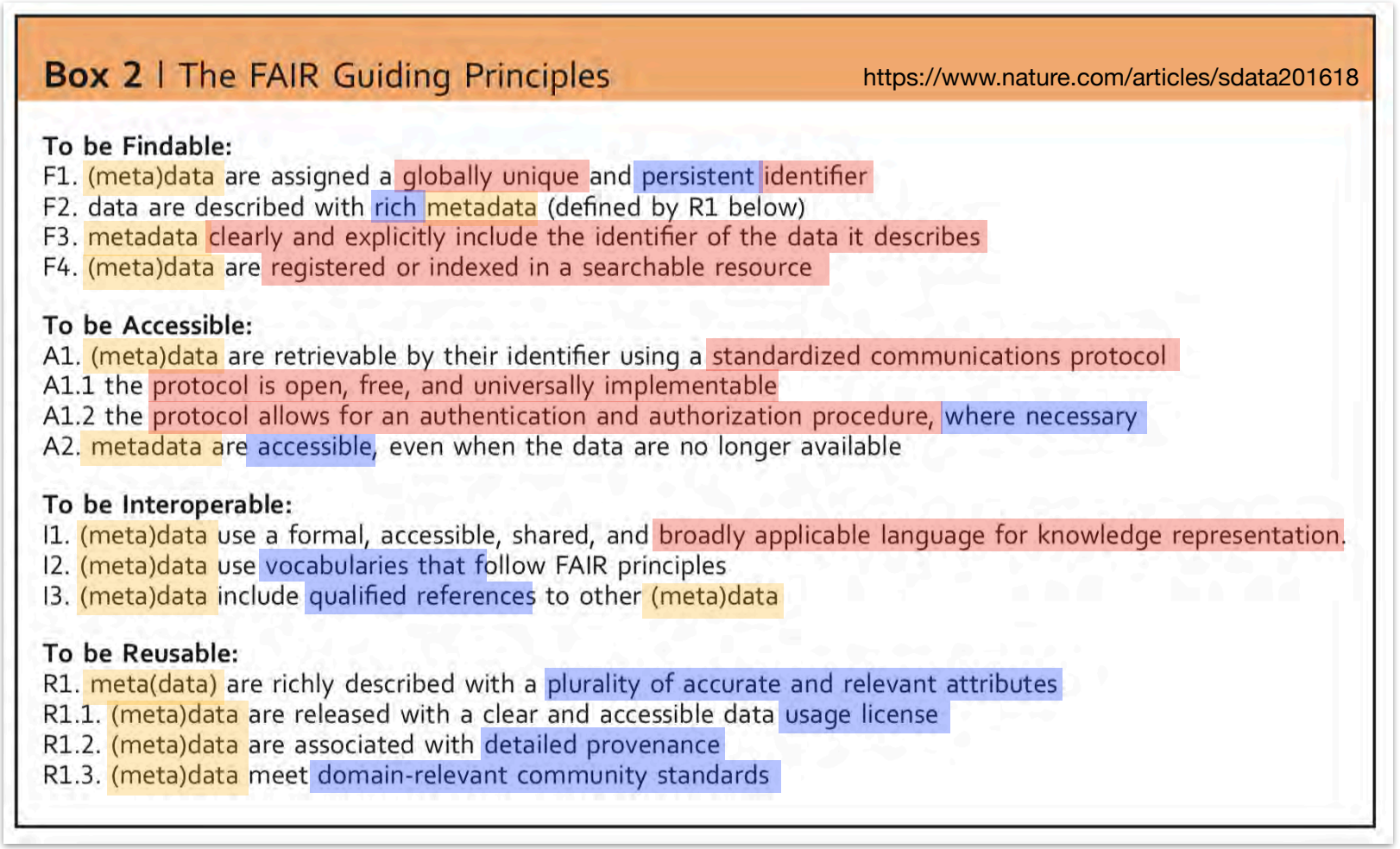

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Machine-actionable metadata

Technical infrastructure (generic services)

Social agreements (domain specific choices)

Three-Point FAIRification Framework

How to GO FAIR

https://www.go-fair.org/how-to-go-fair/

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Since its beginning in early 2018, the GO FAIR community has been working towards implementations of the **FAIR Guiding Principles**. This collective effort has resulted in a three-point framework that formulates the essential steps towards the end goal, a global Internet of FAIR Data and Services where data are **F**indable, **A**ccessible, **I**nteroperable and **R**eusable (**FAIR**) for machines.

A framework guiding FAIRification

The Three-point FAIRification Framework provides practical "how to" guidance to stakeholders seeking to go FAIR.

Moreover, by following this framework, stakeholders can rest assured that their efforts toward FAIRification will be optimally coordinated with the efforts of other stakeholders in the GO FAIR community. The three-point framework maximizes reuse of existing resources, maximizes interoperability, and accelerates convergence on standards and technologies supporting FAIR data and services.

- Typically, the FAIRification process begins when a community of practice considers its domain-relevant metadata requirements and other policy considerations, and formulates these considerations as machine-actionable metadata components. These considerations can be guided in **Metadata for Machines** (M4M) Workshops.

ZonMw

NL Health~Holland
SHARED CHALLENGES, SMART SOLUTIONS

health RI
enabling data driven health

ENVRI
FAIR

GLOBAL PID-R

PARC

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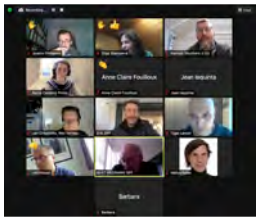
Domain Experts + FAIR Metadata Experts = FAIR Metadata

- Domain-relevant
- Community standards

- Specifications
- Tools

- FAIR (schema/vocabs)
- Domain-specific
- Reusable



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https://datascience.nih.gov/getting-practical-with-the-FAIR-principles

About the Event Series

The Getting Practical with FAIR series, hosted by the NIH Office of Data Science Strategy (ODSS) and the GO FAIR Foundation, provides an opportunity to learn about the theoretical and practical foundations of the FAIR (Findable, Accessible, Interoperable, Reusable) Principles and how they can enhance the discovery, utility and attribution of biological and biomedical research data. The principles, first published in Nature in 2016, created a set of guidelines which seek to enhance the sharing and reuse of data. Through this event series, ODSS and the GO FAIR Foundation will support participants who seek to learn how FAIR works in practice, the skills needed to implement FAIR, and how to make FAIR a more routine aspect of their data management strategy.

Getting Practical with the FAIR Principles

NIH National Institutes of Health Office of Data Science Strategy

GO FAIR foundation

Event 2: Making Metadata FAIR
June 12-13, 2023

Save the dates! Details on this two-day workshop will be announced soon.

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FAIR Implementation Community

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FAIR principle	Question
F1	What globally unique, persistent, resolvable identifiers do you use for metadata records?
F1	What globally unique, persistent, resolvable identifiers do you use for datasets?
F2	Which metadata schemas do you use for findability?
F3	What is the technology that links the persistent identifiers of your data to the metadata description?
F4	In which search engines are your metadata records indexed?
F4	In which search engines are your datasets indexed?
A1.1	Which standardized communication protocol do you use for metadata records?
A1.1	Which standardized communication protocol do you use for datasets?
A1.2	Which authentication & authorisation technique do you use for metadata records?
A1.2	Which authentication & authorisation technique do you use for datasets?
A2	Which metadata longevity plan do you use?
I1	Which knowledge representation languages (allowing machine interoperation) do you use for metadata records
I1	Which knowledge representation languages (allowing machine interoperation) do you use for datasets?
I2	Which structured vocabularies do you use to annotate your metadata records?
I2	Which structured vocabularies do you use to encode your datasets?
I3	Which models, schema(s) do you use for your metadata records?
I3	Which models, schema(s) do you use for your datasets?
R1.1	Which usage license do you use for your metadata records?
R1.1	Which usage license do you use for your datasets?
R1.2	Which metadata schemas do you use for describing the provenance of your metadata records?
R1.2	Which metadata schemas do you use for describing the provenance of your datasets?

http://bit.ly/FIPminiquestionnaire

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FIPs for Convergence

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CEDAR Workbench

SmartAPI

Open Science Framework

AIMe Registry

MOLGENIS

castor

FAIR Solutions

FAIR Orchestration Platforms
https://docs.google.com/document/d/1hcwWeKpOVOm8-nKn_5T-ZfoAI-SI-hHf3esIPGKV88A/edit?usp=sharing

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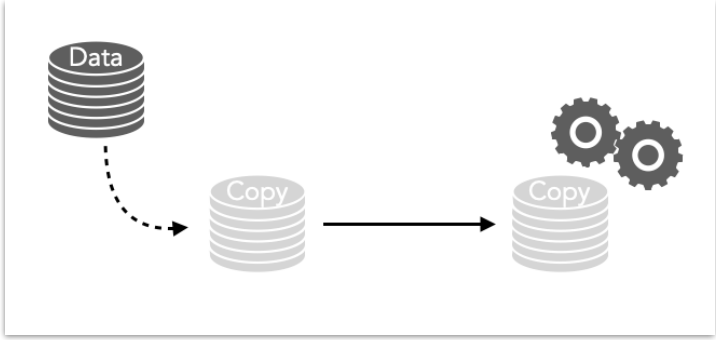
FAIR Science: Data visiting

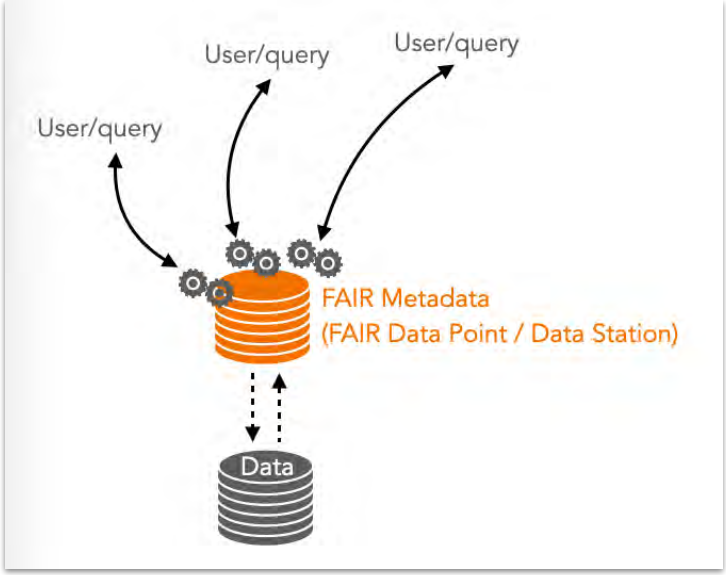
An alternative to "data centers" and "cloud" envrinoments

https://registry.ern-euro-nmd.eu/the-way-forward-is-not-data-sharing-but-data-visiting/



Data Sharing:

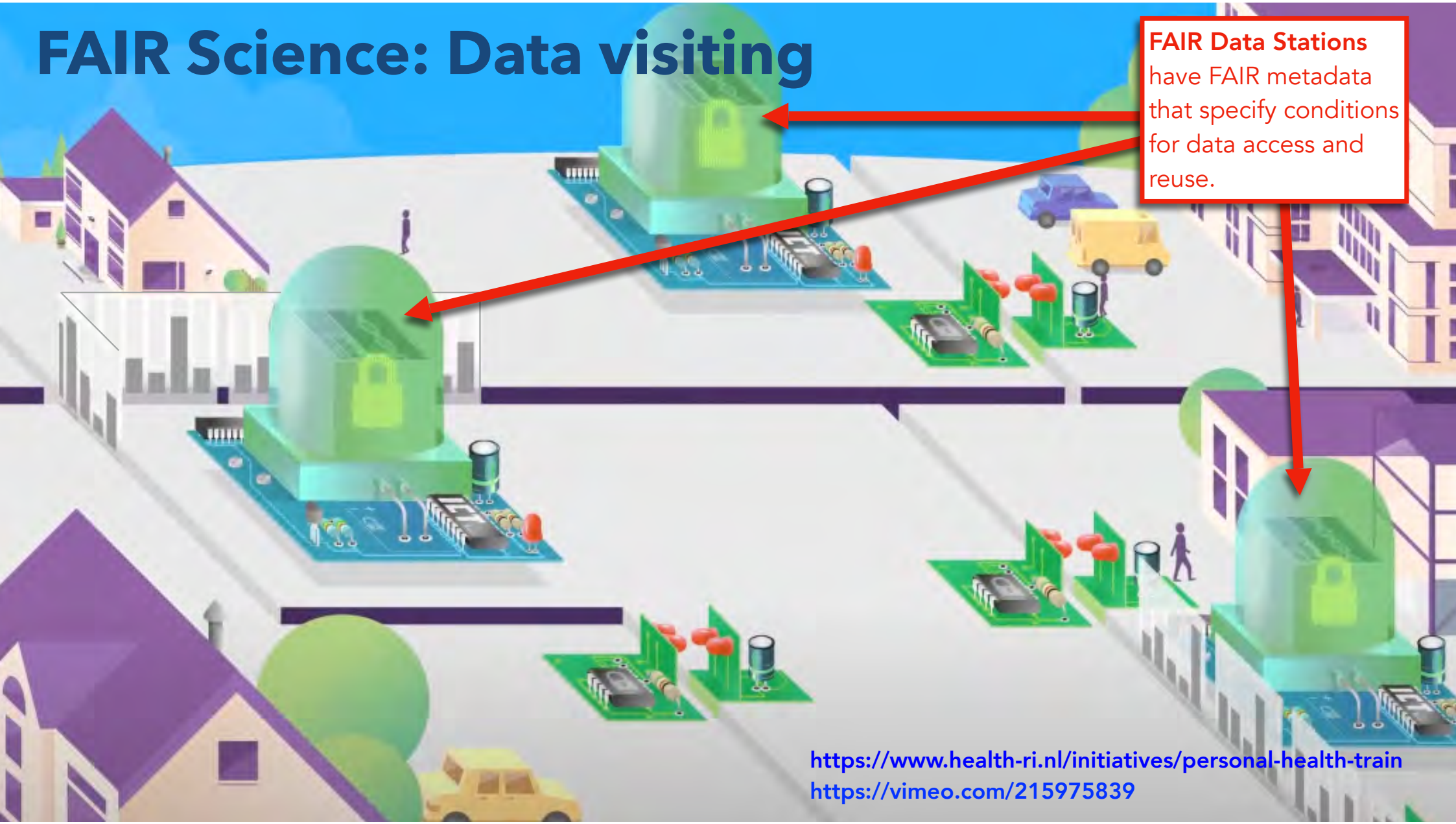
- copy and transport data
- analysis happens elsewhere
- data is out of your control



Data Visitation:

- data stay local (are not copied)
- analysis happens locally
- data access is known

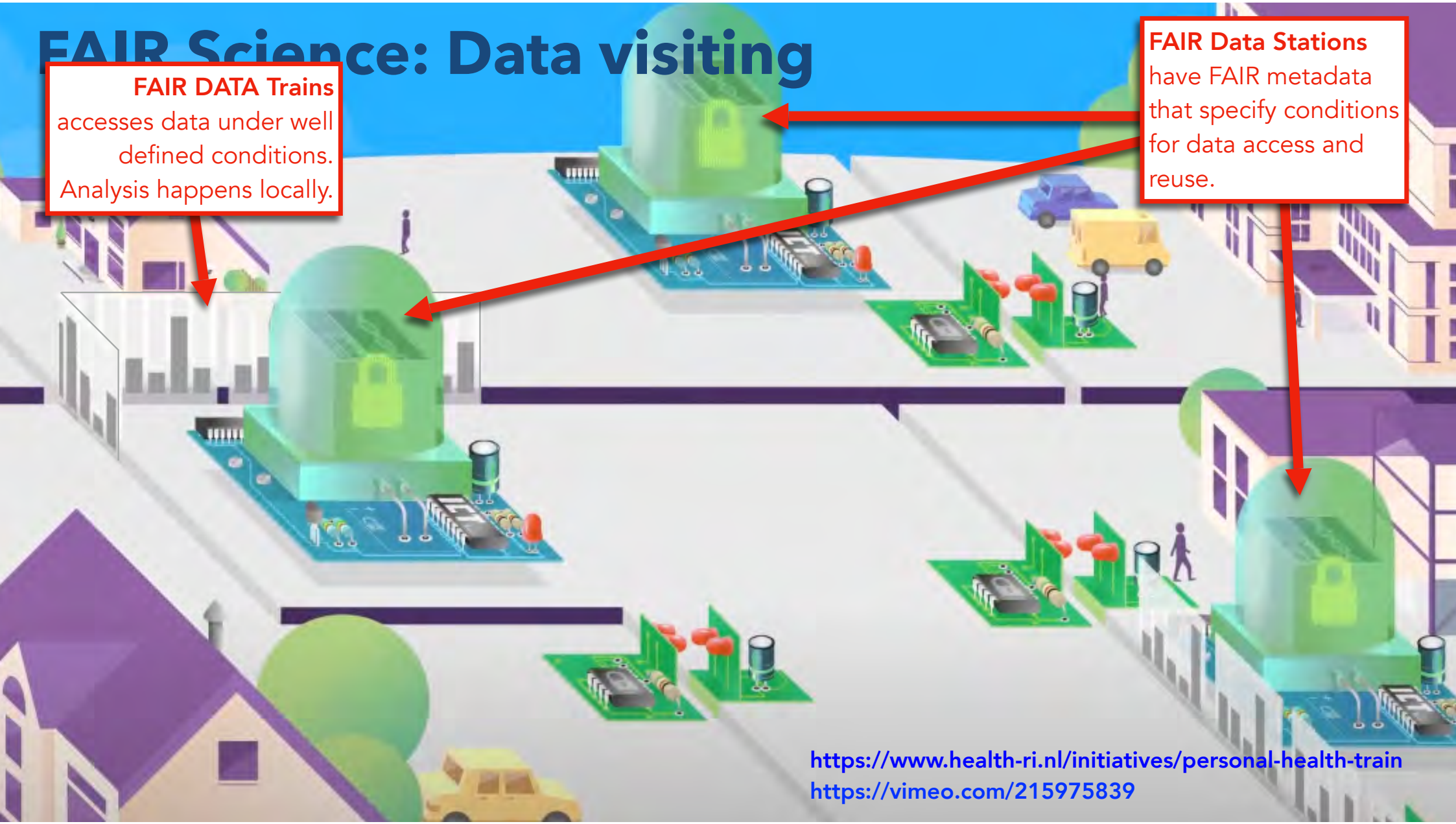
FAIR Science: Data visiting



FAIR Science: Data visiting

FAIR DATA Trains accesses data under well defined conditions. Analysis happens locally.

FAIR Data Stations have FAIR metadata that specify conditions for data access and reuse.



https://www.health-ri.nl/initiatives/personal-health-train
https://vimeo.com/215975839

FAIR Science: Data visiting

Thank you
&
FAIR well