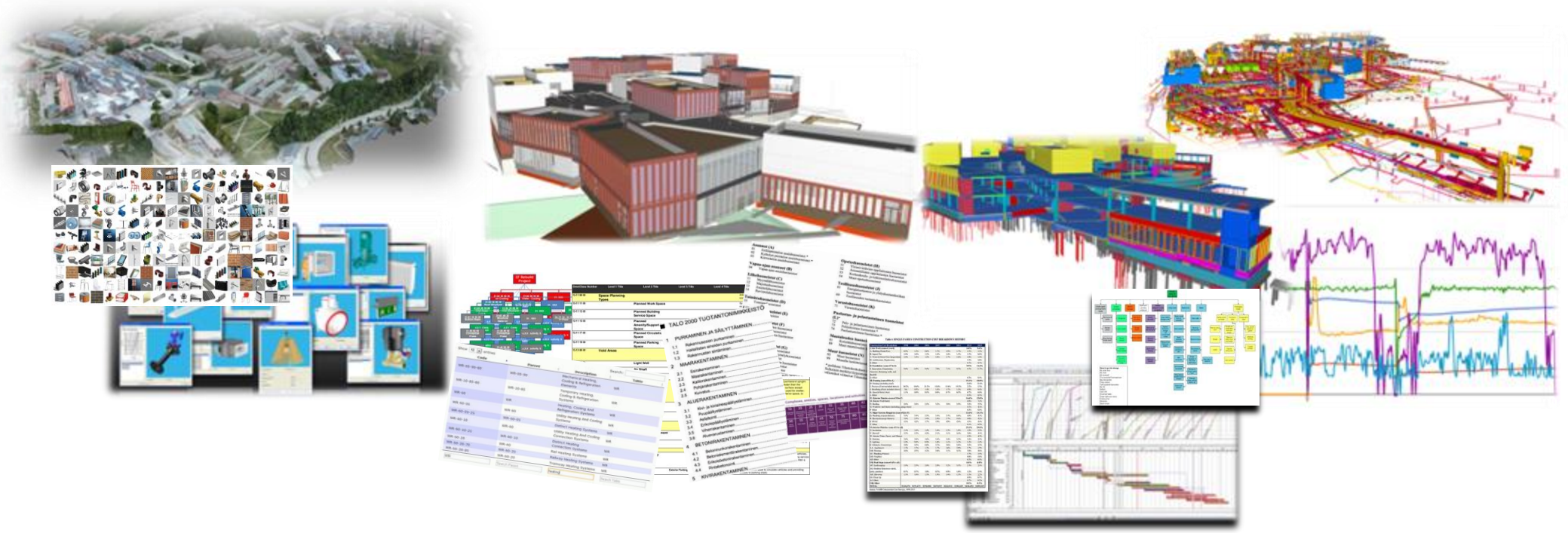

ISO19650 - BIM-based information management

Managing and Sharing Construction Data

Computing in Construction

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Background of ISO 19650

Situation

- increasing use of BIM and other digital tools in building projects
- growing amount of data generated by all disciplines
- larger set of stakeholders producing and consuming building related data
- ensure that information remains valuable over the whole construction lifecycle

Purpose of ISO 19650

- consistent information management framework for the construction lifecycle
- embrace BIM-based design and digital transformation in the built environment sector
- efficient data exchange of among stakeholders
- support for collaboration and communication among stakeholders
- ensure the secure information management and sharing
- reduced risks and errors
- cost and time savings (e.g., >20% cost reduction cited)

Importance of ISO 19650

- the standard is widely accepted and coming to widespread use
- basis of the upcoming Finnish “Guideline for BIM clients” (RYTV)

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History of ISO 19650

ISO 19650 (parts 1-5) was published 2018-2022 with the title:

- *"Organization and digitization of information about buildings and civil engineering works, including building information modelling (BIM) - Information management using building information modelling"*

Basis was the UK's Publicly Available Specification PAS 1192 (2013-2016)

- a 'tried and tested' BIM information standard
- established by the British Standards Institution (BSI) in 2007

PAS 1192 again was based on BS 1192 (1990-2007)

- First edition BS 1192-5:1990 and the second edition, BS 1192-5:1998.
- Third edition 2007
  - *'Collaborative production of architectural, engineering and construction information. Code of practice'*
- Provided a comprehensive code of practice that could be applied to 2D and 3D model-based information systems

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Problems addressed

“Information management begins from scratch in every project”

“Different parties want to manage the information differently”

“Information is always missing”

“Huge number of clashes and remodeling required”

“There are frequent communication errors”

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ISO 19650 – Structure

ISO 19650-1 – Part 1: **Concepts and principles** (2018)

- The concepts and principles of the information management process.

ISO 19650-2 – Part 2: **Delivery phase of assets** (2018)

- The process for the management and collaborative production of information during the delivery phase of assets.

ISO 19650-3 – Part 3: **Operational phase of assets** (2020)

- The process for the management and collaborative production of information during the operational phase of assets.

ISO 19650-4 – Part 4: **Information exchange** (2022)

- Recommended concepts and principles for the exchange of information between parties throughout the lifecycle of an asset.

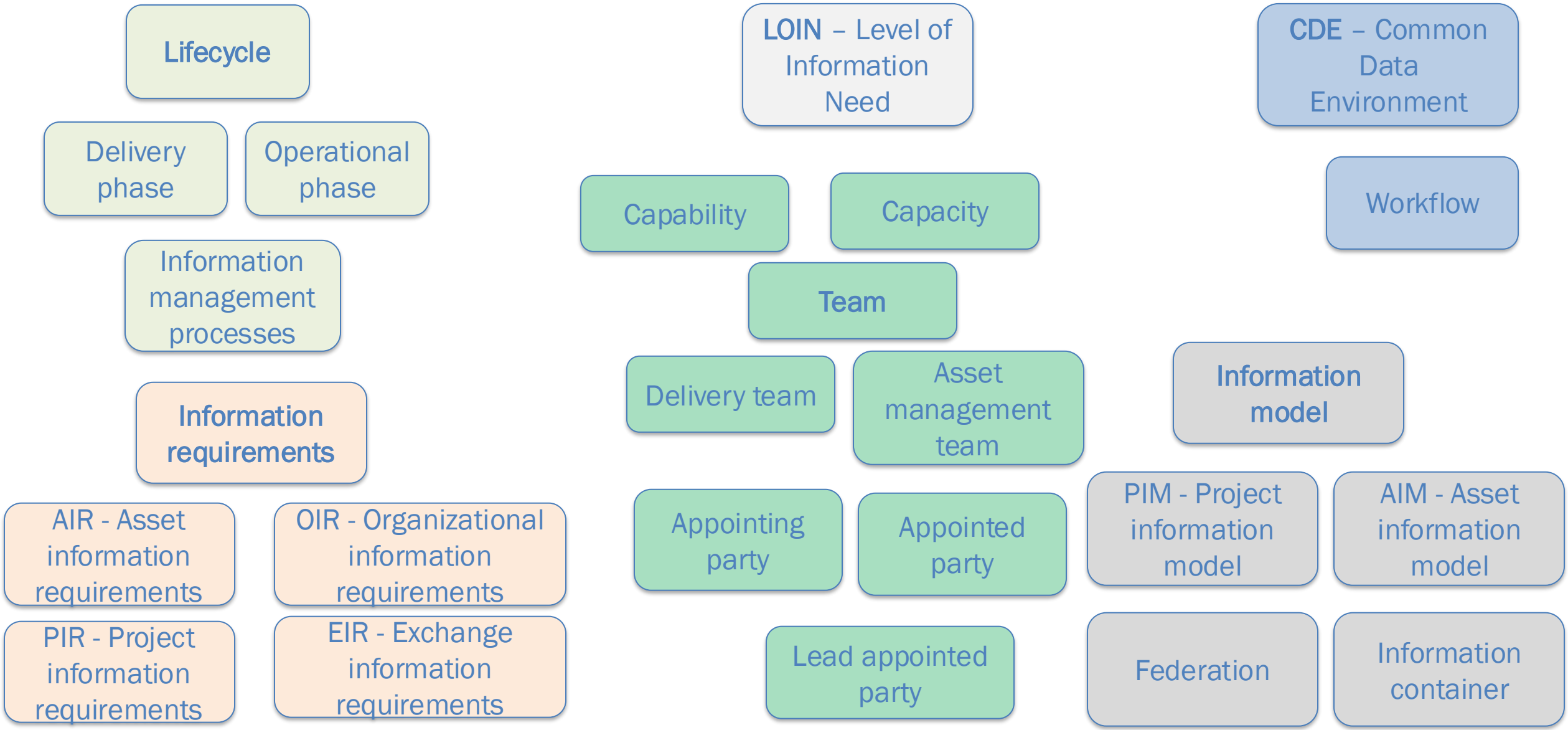
ISO 19650-5 – Part 5: **Security-minded approach to IM** (2020)

- A framework for a security-minded approach to managing information relating to sensitive assets.

ISO 19650-6 – Part 6: **Health and safety** (work in progress)

- Expected to concern the production and management of health and safety information on built environment projects.

ISO 19650-1 – Main concepts



Multiple perspectives

Combine different perspectives in decision making

- in information requirement specification
- in planning for information delivery
- in information exchange

Some recommended perspectives

- Asset owner: Purpose, strategy, lifecycle cost
- Asset user: Fulfilment of the needs of the intended use
- Asset delivery/management: Organization of work and resources
- Asset surroundings: Community’s interests - zoning, permits, politics

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ISO 19650 – Information lifecycle

A = Start of delivery phase (AIM -> PIM)

B = Progressive development of PIM

C = End of delivery phase (PIM -> AIM)

ISO 19650-1 (2018), p. 13

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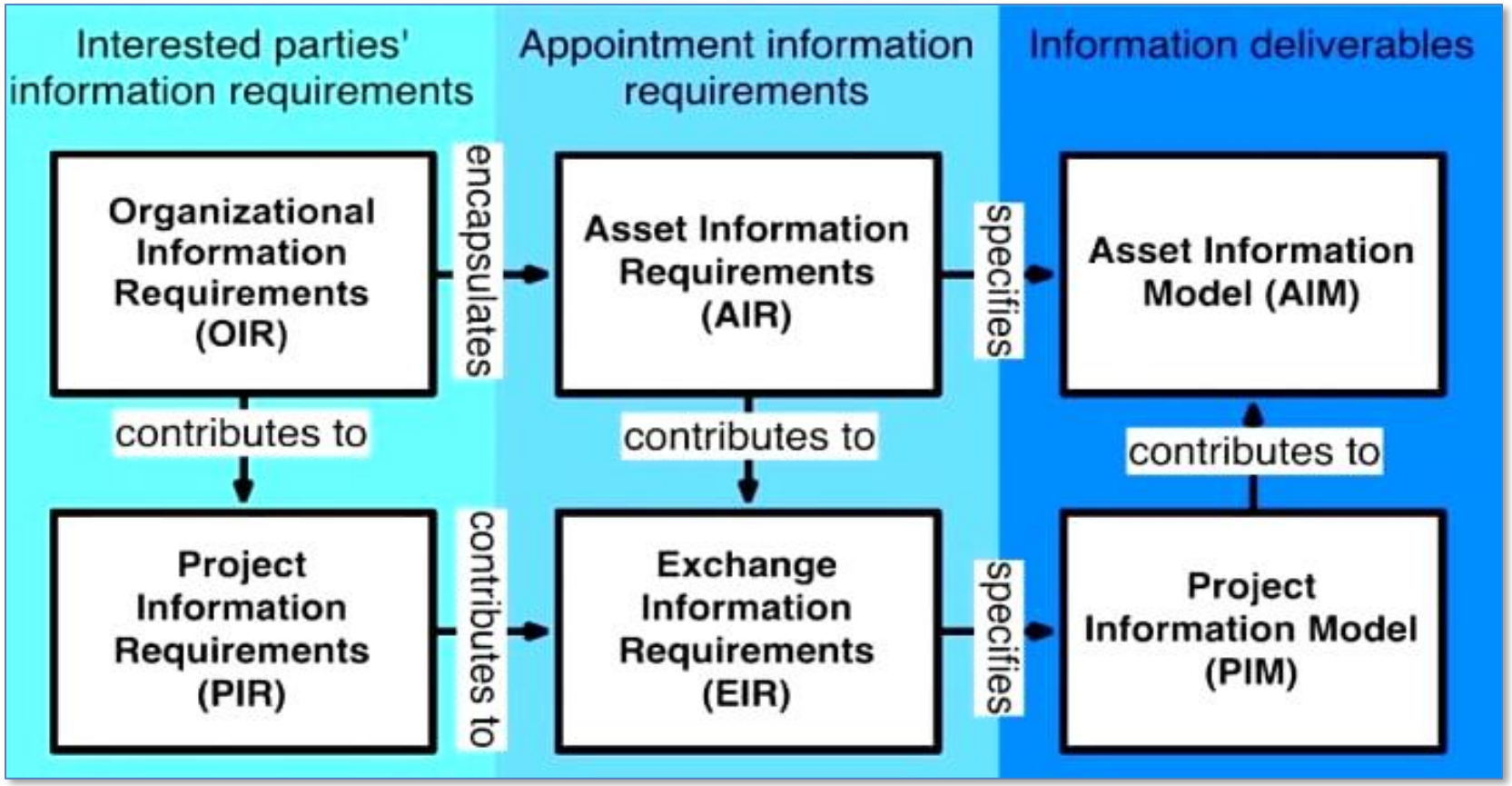
ISO 19650: Delivery phase and operational phase

Delivery phase (construction project)

Operational phase (asset management)

- Lifecycle of a built asset consist of alternating
  - delivery phases
  - operational phases
- How information should be
  - created within each phase, and
  - transferred from one phase to another?

ISO 19650 – Information requirements and models



encapsulates = is the input to
contributes to = is an input to
specifies = determines the content, structure, and methodology

ISO 19650-1 (2018), p. 16

Strategic level (all projects)

- **OIR** – Requirements derived from the strategy of the organization (and affected by regulations)
- **AIR** – Requirements to enable the desired operation and maintenance of the built facility

Project-specific level

- **PIR** – Requirements for what information is needed during design and construction stages
- **EIR** – Requirements for the information exchange formats, contents, and timetables agreed on in contracts

OIR (organizational information requirements) – an example

Goals by 2030	Description	Information requirements
Carbon neutral buildings	A systematic co2 and emission information of all building components	Carbon footprint about each component Emissions of each component
Reused components and recycled materials > 5%	Collection of information relevant to reused components over their remaining lifespan	Reused components must have information about condition, expected remaining lifespan, and tests required during the remaining life
ESG reporting from projects to decision makers	The impact on environment, people and communities. Addressing accountability, ethics, and oversight	Building-level information about energy consumption, water usage, waste generation, biodiversity impact, DEI, employee health, cybersecurity, anti-corruption measures, …

AIR (asset information requirements) – an example

Goals	Description	Information requirements
Buildings need to be connected to city models	To synchronize maintenance and operation to city level activities	BIM models are in the IFC4.3 format BIM models include geographic coordinates
Digital twin of all buildings	Enable BIM-sensor linking to optimize performance of building	Sensors modeled in the HVAC/ELEC BIM models As-designed BIM updated to as-built BIM models
Building logbook (BLB) linked to BIM entities	Enable maintenance operations to utilize BIM data	GUIDs of BIM entities included in BLB sections GUID stability ensured

PIR (project information requirements) – an example

Goals	Description	Information requirements
Enable BIM coordination	BIM models can be coordinated against each other	BIM models use same units, have same project coordinate system, …
BIM models enable efficient construction	Constructibility of components is ensured and components are connected to activities to enable 4D BIM	Resource, calendars, and tasks are provided with connections to components Constructibility information of components is provided

EIR (exchange information requirements)

Combination of OIR, AIR, and PIR requirements

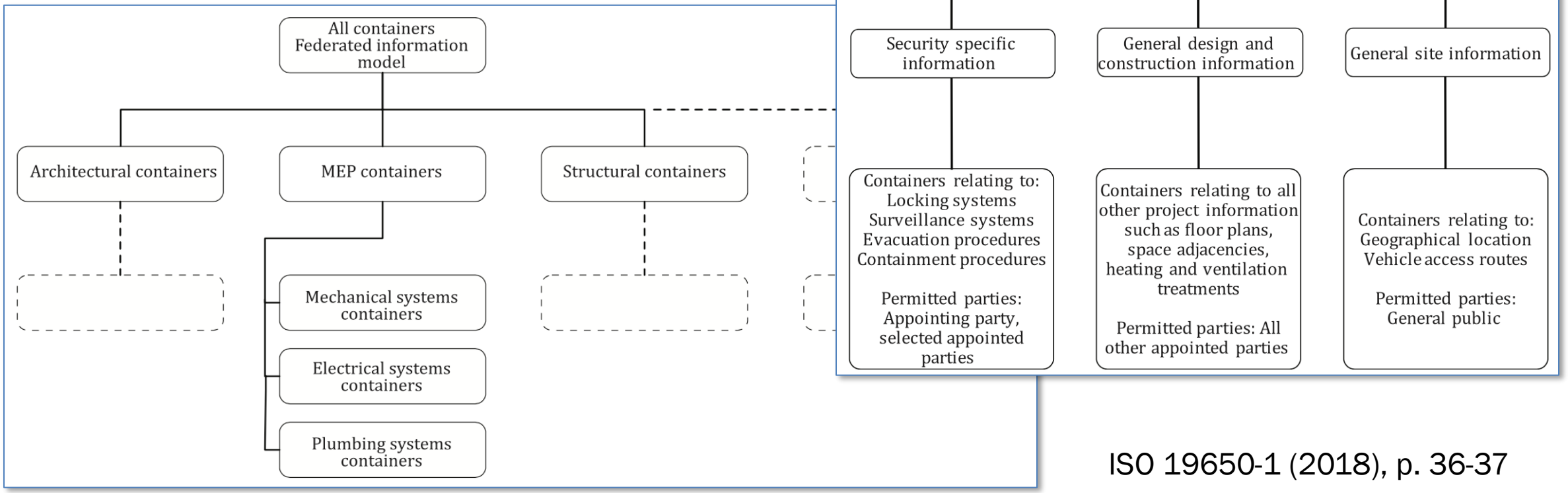
Include details of exchange

- the channel of exchange (CDE, project bank, file transfer, ...)
- the format used (e.g., IFC4.3, JSON, RDF, ...)
- the timetable of exchange

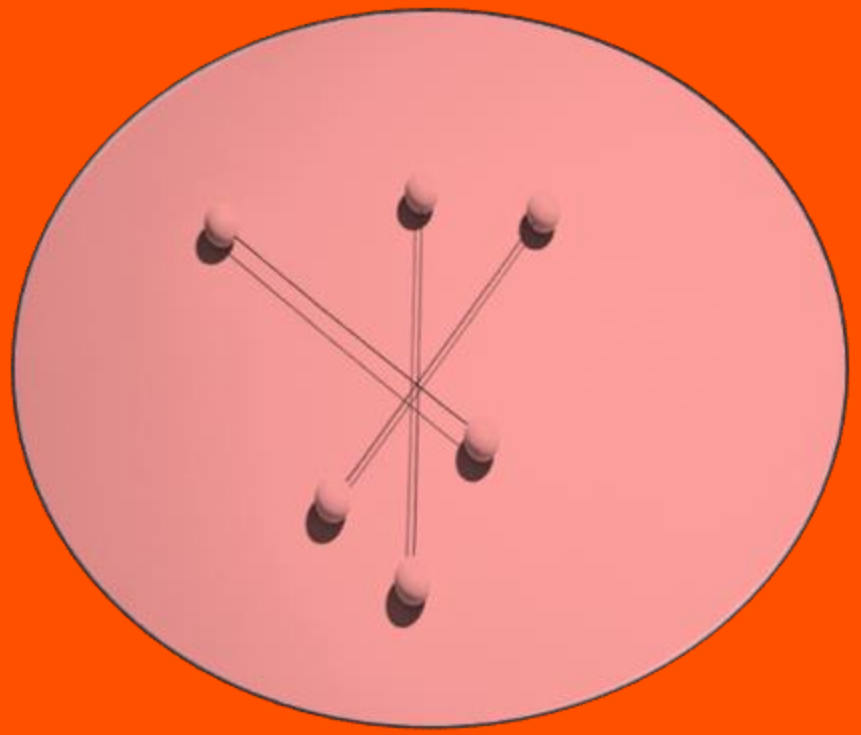
Information model – the results

Information model consists of
- other information models or
- information containers

Information container
- is a named persistent set of information,
- carried in a file, system, or application storage hierarchy



ISO 19650-1 (2018), p. 36-37



Thank you!

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