

BIM for Infrastructure

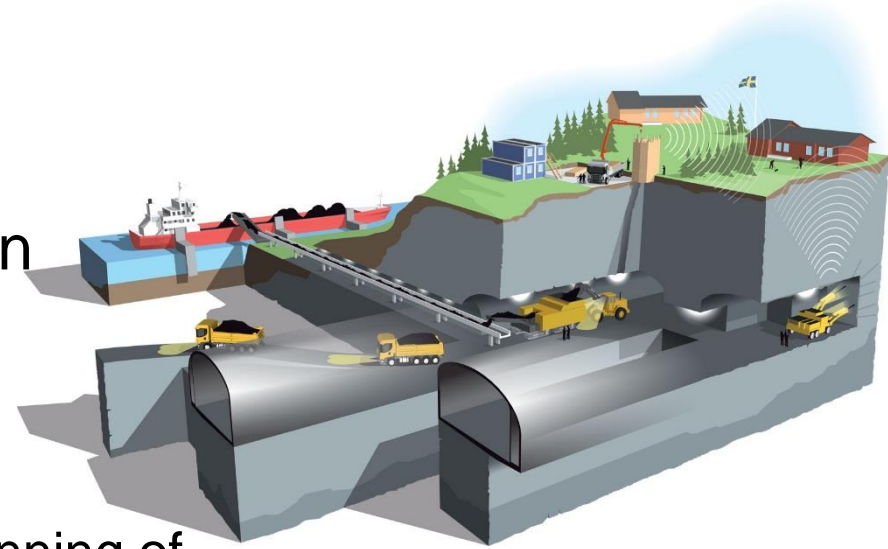
Trafikverkets view on Open standards



TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

Mikael Malmkvist

Innovation Development Manager



- Is responsible for the long-term planning of the transport system for road traffic, rail traffic, maritime shipping, and air traffic
- Is responsible for construction, operation and maintenance of the state road network and national railway network

Budget In total
€ 3.6 – 4
Billion/year

Investment
1579 million €

Operation
869 million €

Consultants
105 – 211
million €

Maintenance
737 million €

**Goods &
services** 316 –
526 million €

Ingemar Lewén
BIM Policy Area



Charlott Andersson
Administration



Henrik Franzén
Measure and monitor



Ante Bergsten
Brajkovic
Education



Mikael Malmkvist
Standardization



Jennie Carlstedt
Management systems



Björn Rangdén
Coordinate BIM



BuildingSMART

OGC

V-Con

BIM Alliance –
Technical Council

BSAB 2.0

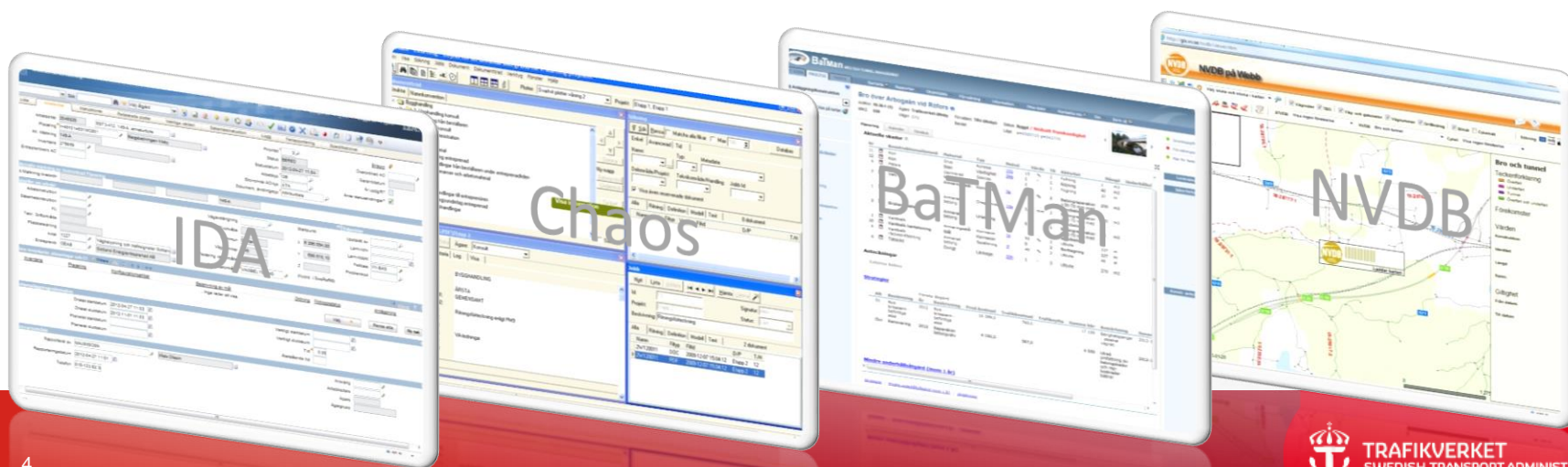
(Smart Built Environment)

(TC 442)

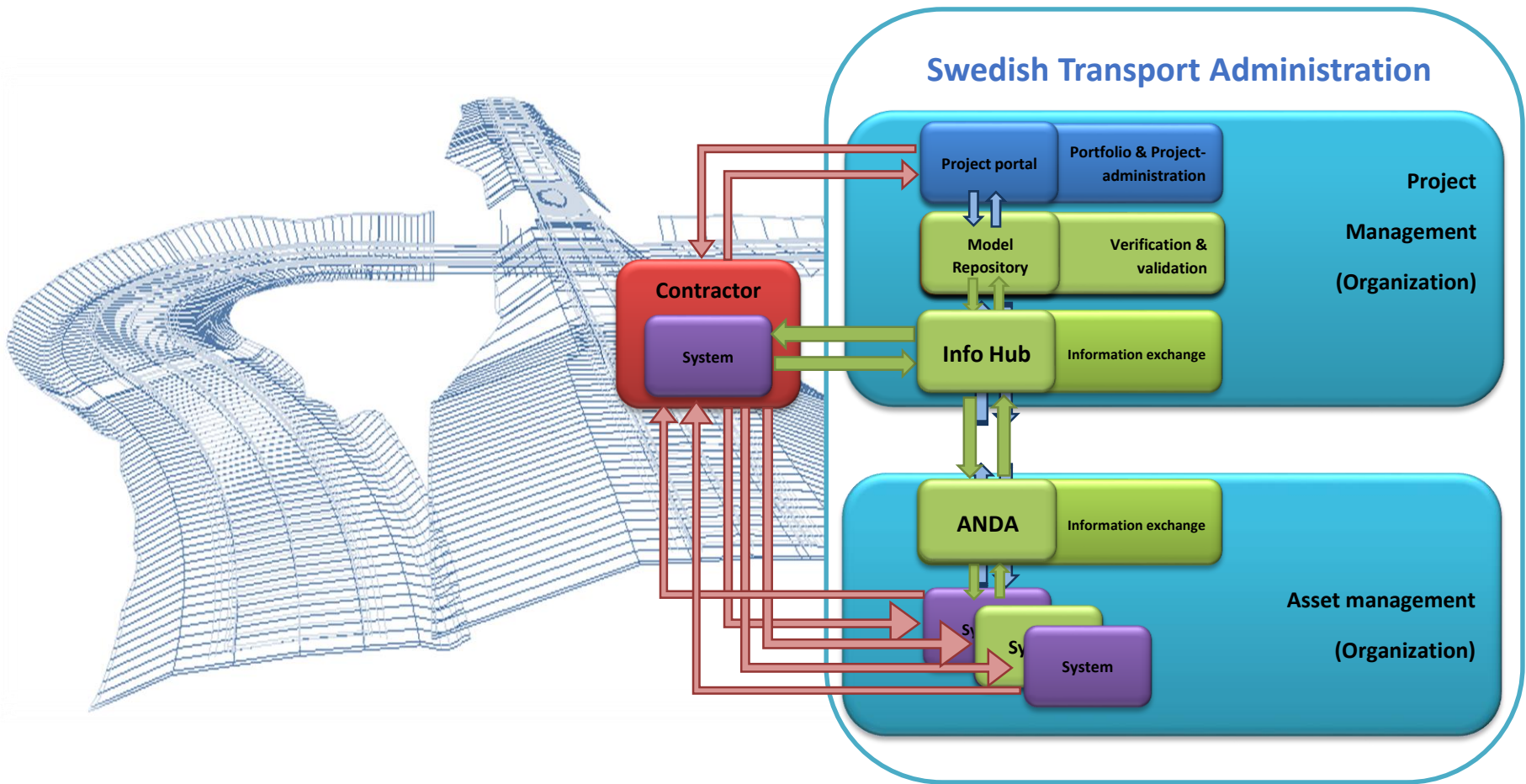
Road map

Trafikverket - Asset Management

- Today, the management of lifecycle data is mostly based on internal standards.
- BIM data exchange and management within public authorities is primarily handled through proprietary software and data structures
 - There is a lack of applicable standards
- The implementation of BIM in the Maintenance process will take place gradually over time
- Standardization needs to handle more than 3D- representations

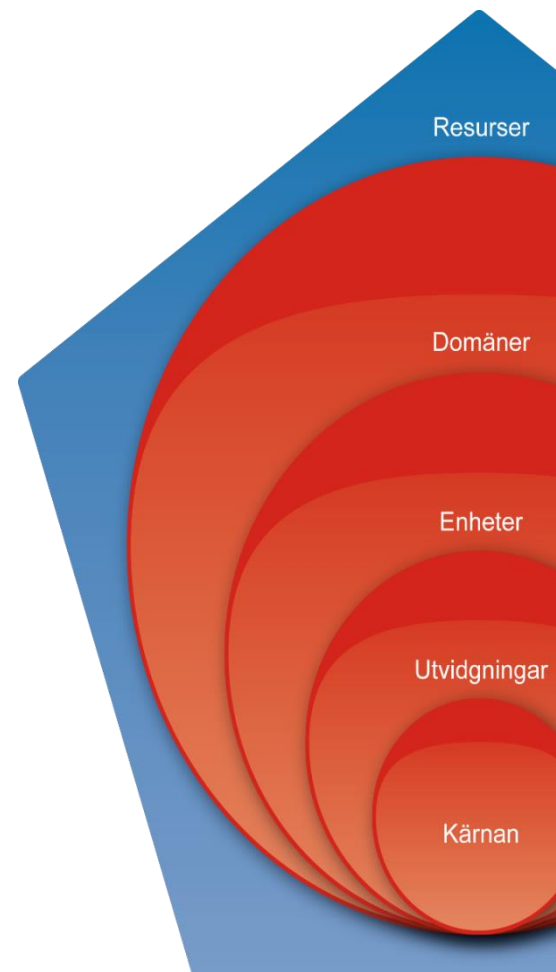


Operational data in a future modularized Trafikverket-environment



Trafikverkets Strategy for standardization

- By outlining the standards relevant to a given life cycle stage Trafikverket can **pin-point the areas** which require development, standardization and harmonization.
- By **co-financing strategic standardization projects** Trafikverket wants to accelerate the development of open neutral standards
- Through **active participation in different industry organizations** Trafikverket wants to achieve a good balance between requirements from the purchaser and industry-conditions
- The active **coordination with various authorities** nationally as well as internationally, is a prerequisite for obtaining open standards that enable BIM in a life cycle perspective



Non formal standardization

Non-formal standards (produced by independent international standards organizations) should be seen as a **first step to formal standardization**.

The benefits of engaging in independent standardization organizations are for example, greater opportunity to **influence** the development of the standard and **shorter implementation** times than is normally the case when it comes to formal standardization.

The benefits of a non formal standardization:

- Shorter implementation times
- Increased knowledge of the standard scope and design
- Guaranteed applicability



International standardization



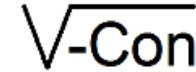
International development



European standardization



European development



Nordic Collaboration



Jernbaneverket



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Vejdirektoratet



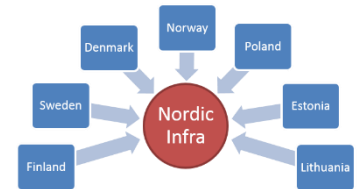
Statens vegvesen
Norwegian Public Roads
Administration



Liikennevirasto



Banedanmark



National development



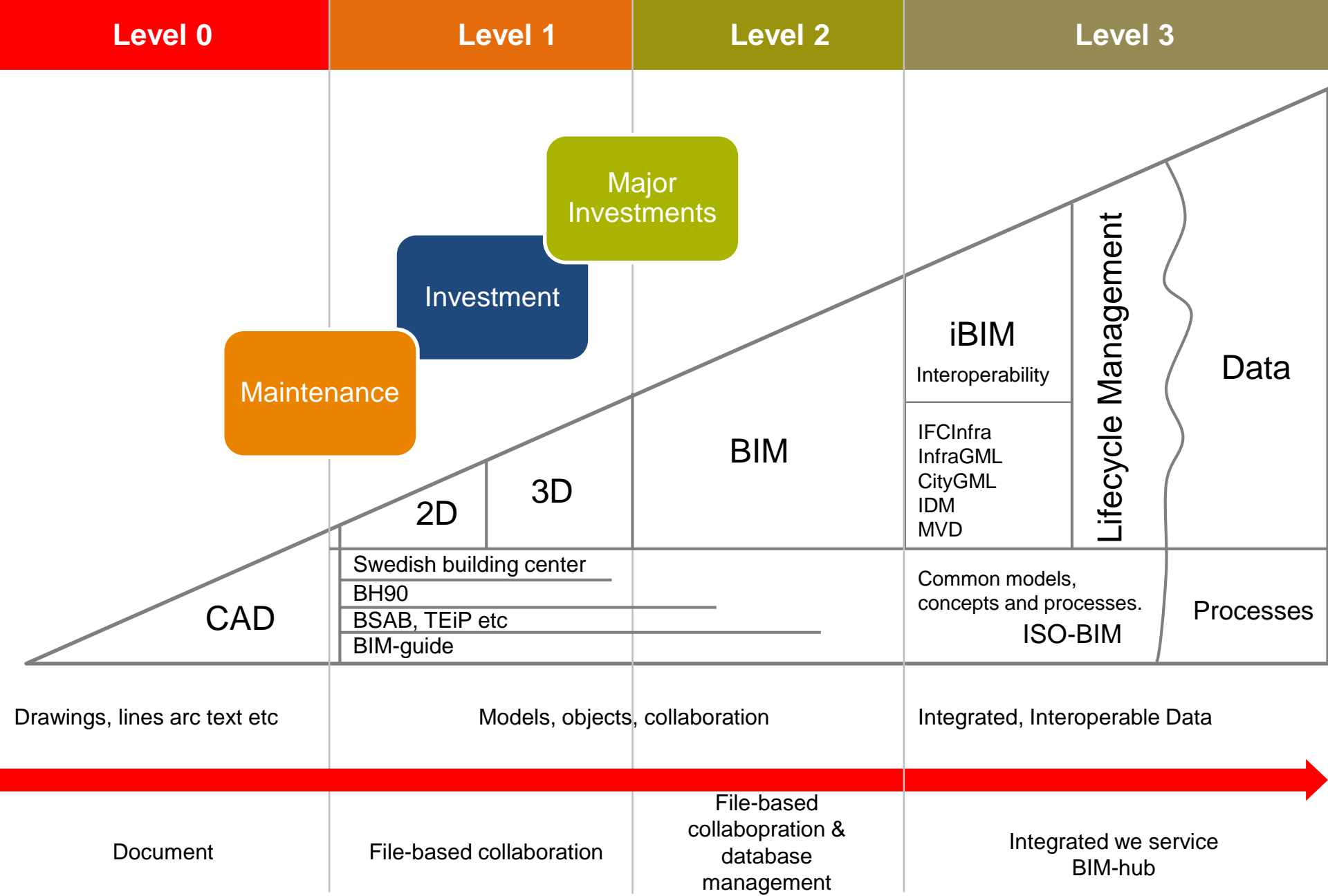
svensk byggtjänst

National Standardization



Organizational development





Roadmap for standardization activities (BIM/GIS/PLM)

Maturity level	Level 1	Level 2	Level 3 - Not defined	
Start Year	2018	2017-2020	2019-2022	2021-
		2B "Open"	3A Purpose BIM	3B-Z Workflow BIM
		3D BIM Discipline specific files		
		Start implementation of requirements based on: BSAB 2.0 InfraGML CityGML IFCinfra ...	IFC's (multiple files) mvdXML (Infra specific) BSAB/bsDD InfraGML CityGML RDF/SPARQL - Linked data	IFC's and GML's ... BCF (BIM Collaboration Format)
Information deliveries	Document based work flow	Software dependent information transfer according to ANDA specifications):	Software independent information transfer Start work with specifications: ANDA DEX (PLCS) ANDA MVD (IFC) ANDA Profile (GML)	
Technology		Layer based management	Layer and object based management	Object based management Start working with links and references to external services
To-do-list	InfraGML IFC Infra BSAB 2.0 Integration of existing standards and formats to ANDA	LoD, MVD and IDM (process flow chart) Integration of BSAB to bsDD Integration of open standards to ANDA	First version of conceptual model for IFC Infra & InfraGML Object based deliveries to ANDA RDF/OWL	Integration with Maintenance

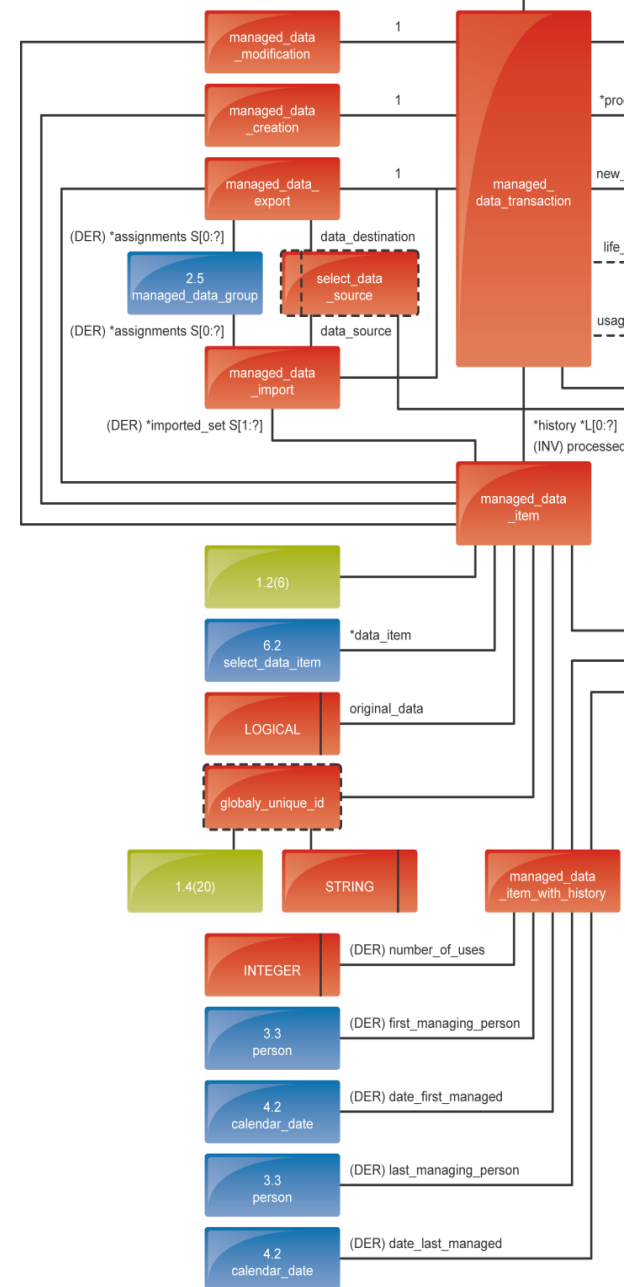
Trafikverket will have to align and influence requirements and planning with the execution plans of bSI, OGC and other stakeholders

Trafikverket supports and contribute to official bSI & OGC-standardization projects

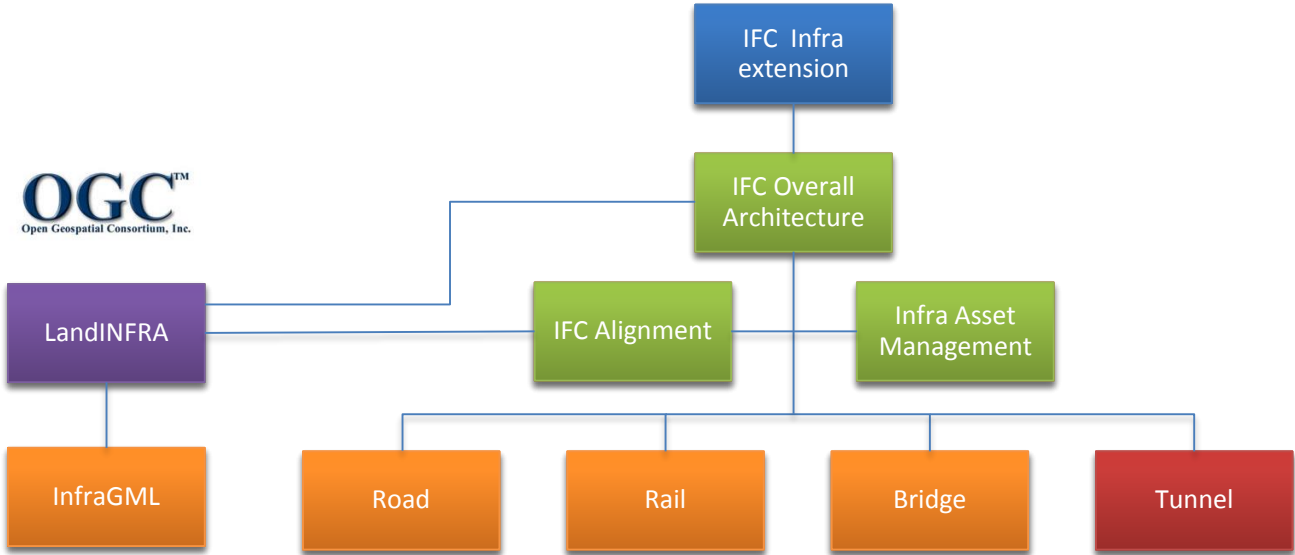
Trafikverkets requirement to make use of open standard is depending on the progress within bSI & OGC

Candidates for Trafikverkets Information Strategy

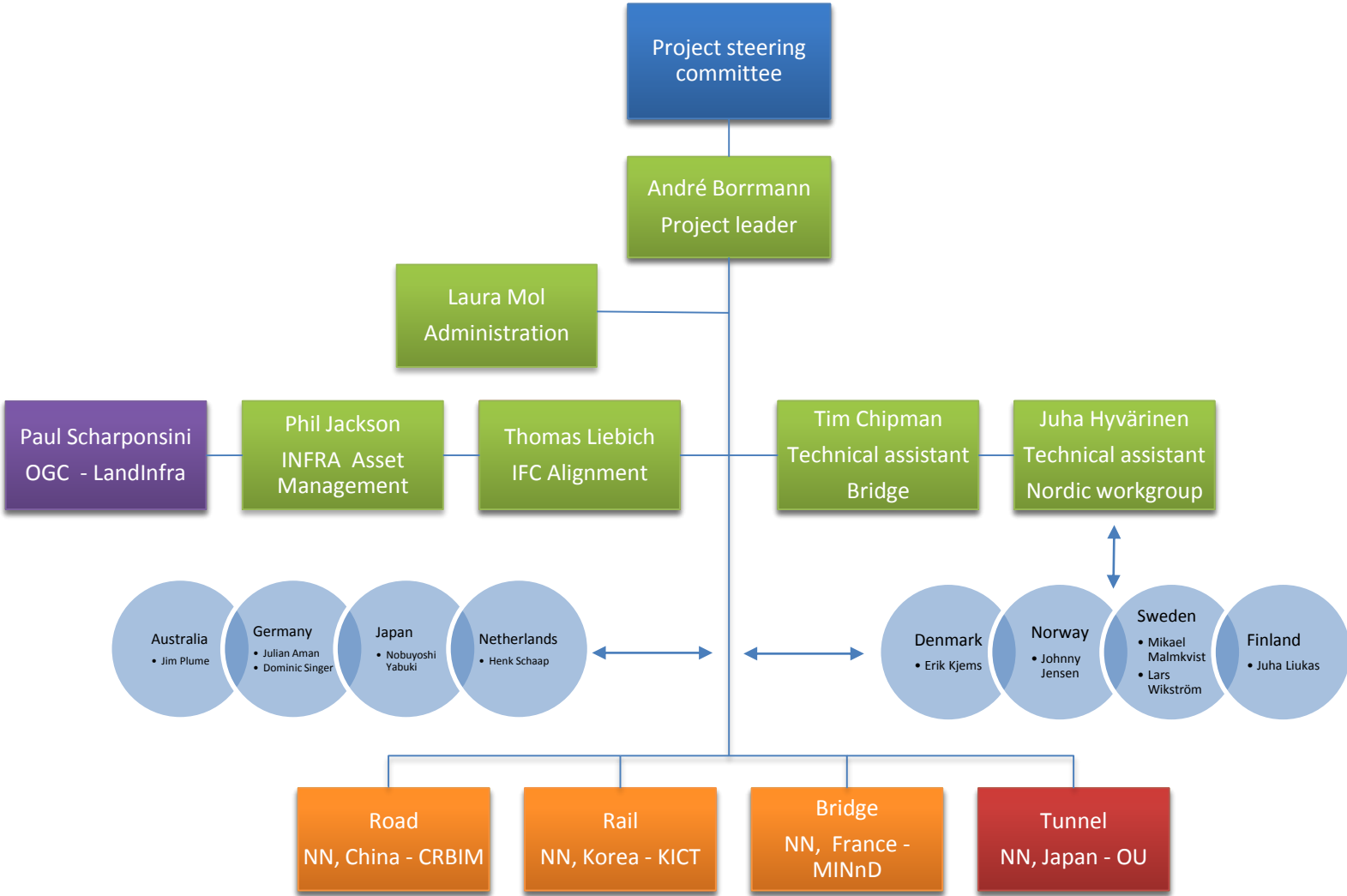
- **Framework**
 - ISO 55000 (Decided)
 - PAS 1192 (Considered)
- **Concept standards**
 - ISO 12006-2 (BSAB - Decided)
 - ISO 12006-3 (bsDD)
 - ISO/CD 81346-12 (Considered)
 - ISO 10303-239 (PLCS - Decided)
 - RDF/OWL (Learning how to make use of)
- **Exchange formats & services**
 - ISO 16739 IFC (ifcXML)
 - ISO 191xx InfraGML/CityGML
 - WMS/WFS (Inspire - Requiriments)
 - SPARQL
 - ...



Infrastructure activities - 2016

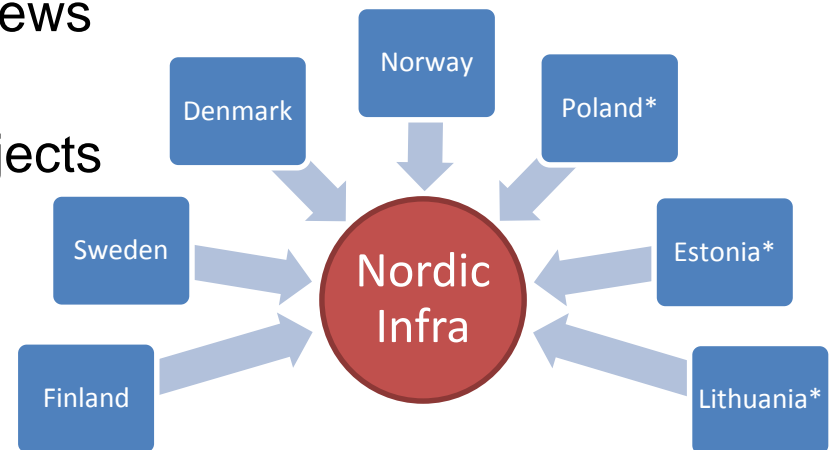


IFC Infra Overall Architecture – Project Team



Nordic-Infra group

- A way to reach people outside the Infra-Room
- A way to get national companies and organizations more active in bSI, OGC and other relevant Infra standardization activities
- A way to inform others about, the progress in a project, new standards and reviews
- Better possibility to ask for input/ participation to new- or ongoing projects
- Better coordination between ongoing bSI-projects



A pilot meeting is planned before the summer

Nordic “BIM & GIS” cooperation between authorities

A way to create a common Nordic approach

- Possibility to create a Nordic implementation strategy for BIM
- Share documents, work efforts, experience and results
- Exchange knowledge & ideas
- Inform each other about what's happens in various groups and collaborations
- Discuss common approach for ongoing activities i.e. CEN, CEDR, bSI, OGC



Vejdirektoratet

banedanmark



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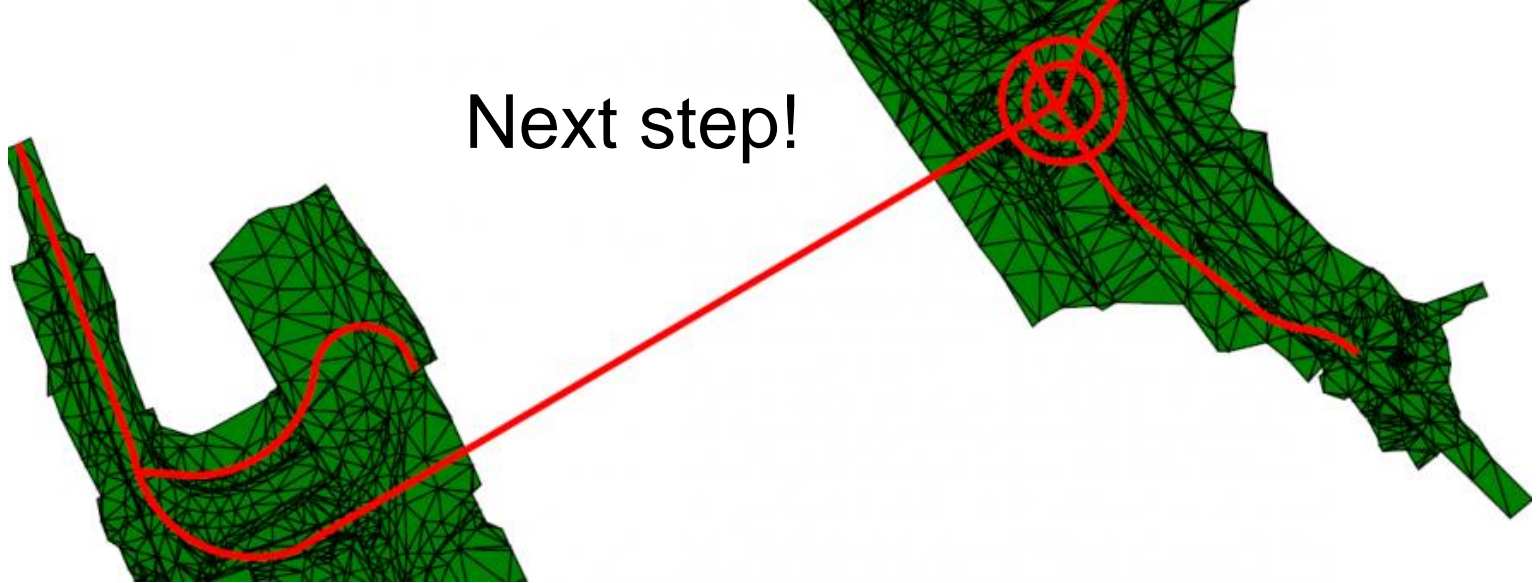


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Administration



Next step!

- Create a **letter of intent** that state that the Nordic market parties and client organizations gradually will move towards open standards such as IFC and InfraGML when exchanging or sharing data between parties
 - Including a projected schedule for this considering the parallel **schedules for ongoing or planned standardization**
 - Including agreements on how this should be achieved, e.g. various **commitments** to ongoing standardization activities
 - Clarify the **responsibilities and the common goal**
 - Achieve a concrete **stepwise movement** in the desired direction and put pressure on the involved parties
 - Do this cooperatively and use combined knowledge

Thank you!



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