

A DATA SPACE FOR THE CONSTRUCTION ECOSYSTEM TO SUPPORT CLIMATE NEUTRAL TERRITORIES AND CITIES

Vision & Architecture

Draft for communication

DIGITAL-TER 2050

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A European consortium: DIGITAL-TER 2050

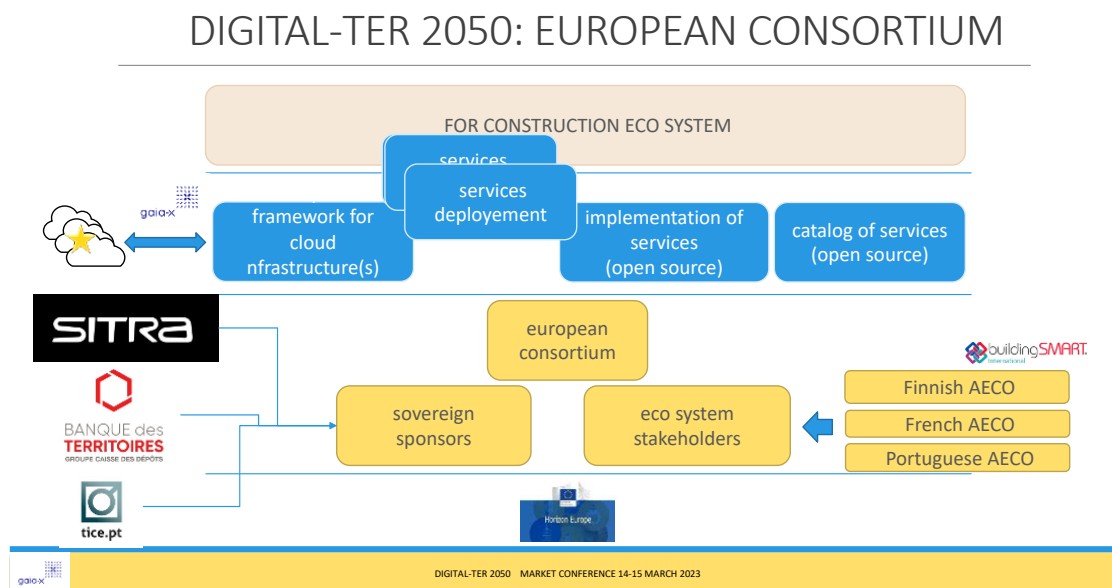
DIGITAL-TER 2050

DIGITAL-TER 2050 is based on the national ecosystems of the construction industry and aims to answer the question posed by DG Grow in the title of its SWD document published in December 2021.:

“Scenarios for a transition pathway for a resilient, greener and more digital construction ecosystem”

The European construction ecosystem has been working for a long time within international standardization organizations (CEN TC442, BuildingSmart International, OGC) to create common tools related to the information’s sharing during the life cycle of the built environment.

DIGITAL-TER 2050 means: Digital Territory in the perspective of carbon neutrality not later than 2050.



The European ecosystem:

DIGITAL-TER 2050 includes from the start, the vehicles for standardization, such as the European buildingsmart International and its national chapters in Finland, France and Portugal. For each country, representatives of public and private organizations, active in their digital ecosystem evolution have decided to join their effort in this project. As a result, DIGITAL-TER 2050 is supported by private contractors and consultants, public owners (national, and regional), public administrations, software vendors and national investment banks of investment such as “Banque des territoires” in France.

Finnish eco-system

Finnish parliament

Major changes are happening in the Finnish construction ecosystem. Parliament of Finland passed a new Building Act on 1 March 2023, and the new law will be applied from 1 January 2025.

With the new law, the fight against climate change is incorporated into building legislation in a comprehensive way. The law shall facilitate low-carbon construction, speed up the circular economy and digitisation and raise the quality of construction. This means that during construction the climate benefits that arise during the entire life cycle must be considered.

Finnish ecosystem

The Ministry of Environment is responsible for the Building Act reform and is leading cooperation for interoperability of the built environment information in the AECO industry through Project Ryhti. BuildingSMART Finland is facilitating the cooperation work for interoperability.

An important change concerns the uniformity of information: in the future, building permits and land use plans must be drawn up in machine-readable format in accordance with an interoperable information model. This is tied to the Act on the information system for the built environment, passed on 24 February 2023, which stipulates municipalities and regional associations must in the future enter required information into the new nationwide Ryhti System. Developed by Finnish Environment Institute, the Ryhti System will be taken into use on 1 January 2024. From that date, it will be possible to enter information into the system. Information on buildings must be submitted before the end of 2027 and data on land use before the end of 2028.

The public authorities have also established an interoperability platform that is already in use and being expanded. The interoperability platform maintained by the Digital and Population

Data Services Agency provides tools for defining interoperable data content. The platform consists of the glossaries, code sets and data models needed for data flows and in other areas of information management. The interoperability platform is intended for both public administration and the private sector.

Furthermore, The National Archives of Finland has given a decision, based on archiving legislation, where the archivable format of building permits handled by municipalities will be IFC. In practise, Finland is the first country, where authorities will require handing in building permit applications in IFC format. This also puts pressure on carrying out information modelling standardisation in the AECO industry.

- Sitra is an accountable and independent future-oriented fund that is influential nationally and internationally and acts as a think tank, promoter of experiments and operating models and a catalyst for co-operation. Sitra operates directly under the supervision of the Finnish Parliament.
- BuildingSMART Finland is national chapter of buildingSMART International and aims to network AECO organisations. BuildingSMART Finland is expanding knowledge on information modelling in the industry and has set up RYTV Project Programme to standardise the use of information modelling in the whole built environment.

Finnish ecosystem to manage, process and use information on the built environment

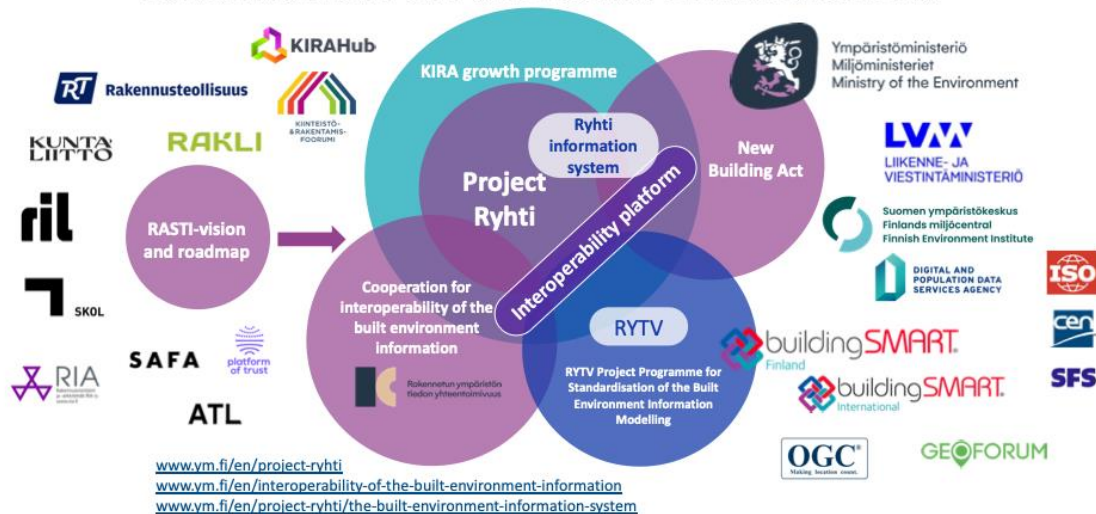


Figure 2: Finnish eco-system

French eco-system

In France a collaborative partnership has been created around a project named “Numeriter 2050”.

Numeriter 2050

Numeriter is a collaborative project to develop a commercial entity , based on public and private funding, for a construction ecosystem data space, using a European framework such as the GAIA X specifications. Numeriter 2050 means that the goal is to offer common cloud services needed to build a digital twin of the territories and manage a holistic approach to a low carbon trajectory.

Numeriter 2050 brings together:

- Egis and Setec : engineers and consultant companies
- Colas: Contractor
- Cerema and Brgm: National administration for infrastructure sector
- Sogelink: software vendor involving in bSI Implementor forum
- Regional authorities (owners) supporting the project, for example:
 - Lille Metropole
 - Metropole Rennes
 - Région Centre Val de Loire
- Software vendors supporting the project:
 - DAWEX
 - GS1
- National investors supporting:
 - Banque des Territoires





Figure 3: French Numeriter 2050

The French manifesto:

To date, there is no French regulation or national policy to impose openBim, openGIS, opensource or sovereign cloud approaches.

This is why professional organizations and standards bodies (including contractors with FNTF¹ and EGFBTP², engineers with Syntec Ingénierie³, buildingsmart France) have published a "Manifesto" that advocates a clear and strong position on these issues and calls for more proactive policies.

MINnd

MINnd is a National research Project, supported by the French Ministry of Ecology, that represents the entire public works ecosystem, with 60 organizations including engineers, contractors, public owners, public authorities and software vendors. MINnd has been very active in the development of standards for the construction (IFC4.3, ISO 19650 and ISO 23386). Most of the Numeriter stakeholders are also members of MINnd. MINnd participated in the preparation of the French Manifesto.

Buildingsmart France

Buildingsmart France is the national chapter of buildingSMART International and aims to network AECO organisations. BuildingSMART France is expanding knowledge on information

¹ FNTF : Federation National des Travaux Publics is the National Federation of Public Works for contractors

² EGFBTP : a federation of contractors working in the building sector and the public works sector.

³ Syntec Ingénierie : the French federation of consultant and engineering companies.

modelling in the industry, specially on the properties management and semantic operating on Data dictionary with the package Semantic4bim, based on the Buildingsmart Data dictionary framework.

Portuguese eco-system

Portuguese AECO Industry

The Portuguese current state of the AECO industry, reveals the need for innovation and dissemination of digital processes and standards. The urge for increasing productivity and the difficulty to answer common issues the industry is facing, leads the whole eco-system to evolve to a more digitalized environment and to seek for interoperable exchange processes.

Designers reveal flexibility and a strong sense of adaptability to BIM. The majority of the stakeholders on this area are SMEs, struggling with the lack of resources and space to innovate. Contractors are facing the urge of BIM requirements under contractual documents which tends them to change to BIM procedures. The bigger ones are already facing these needs on the international markets. Private and Public owners are starting to control the quality of the BIM deliverables, imposing a growth on the whole BIM Maturity.

Portuguese Recovery and Resilience Plan (RRP) and the AECO Industry

The Recovery and Resilience Plan (RRP) is a nationally applicable programme, with an exceptional implementation period lasting until 2026. To achieve a more Efficient Public Administration the PRR funding will create the conditions for enhancing the impact of reformulated public services and sustainable e-services, based on interoperability and re-use of public sector data for increased transparency and efficiency.

This will focus on several goals, including on promoting the creation of integrated infrastructures for specific purposes. To this end, an example will be set with an integrated information infrastructure for territorial knowledge of the country, in terms of housing, the demographic and socio-economic characterisation of families, commercial, industrial and agricultural activity, which will be required to be interoperable with other public and/or private organisation systems.

Other programs like North Regional Development and Strategic (NORTE 2030), include a strategic area of action for the local and regional administration digital transition (RSO1.2), including the adoption of new digital methodologies like “Building Information Modelling” in their transversal data governance mechanisms that, among other purposes, promotes licensed building and infrastructure data reuse, in the context of service provision, or for availability on the national open data portal.

buildingSMART Portugal

buildingSMART Portugal has a well-defined position inside the country's AECO industry, being supported by a network of BIM experts which defined the BIM presence in Portugal from day one until today. buildingSMART Portugal contributes to diffuse the openBIM among those, public or private, who search and work to spread digitalization movement towards a more advanced, innovative, and disruptive industry.

While promoting openBIM, buildingSMART Portugal position itself as the home organization regarding BIM and standards knowledge. The Portuguese chapter will support community users to manage digital data and to share knowledge, in order to surpass the current and future limitations of professionals involved in design, construction, management, maintenance, and operation. As a goal, buildingSMART Portugal wants to reinforce and contribute to the digital proficiency of the sector both national, while acting and being near all the stakeholders, and international, while supporting and helping in the developing on new and improved standards and processes.

Standardization Initiatives

As for BIM standardization in Portugal, the first steps are being taken by CT197, which is a mirror committee of CEN TC442. CT197 exists since 2016-2017 and has issued some guides such as the “BIM Tendering Guide” and the “BIM for Municipalities”. Specifications for “BIM Objects” and “BIM Execution Plan” that have been submitted to the national standardization agency (IPQ). Important international standards such as ISO19650 series in general and ISO12006 have been translated and are in process of analysis for publication soon.

Up to now, there is no national Mandate by the central government towards BIM in Portugal. Nevertheless, recently, in February 2023, just emerged a draft of a decree-law, issued from the central government, and stating the first steps of a tentative national BIM Mandate over OpenBIM. On the same level, several entities and municipalities have joined to study and propose common procedures and requirements for building licensing.

Portuguese Stakeholders (work in progress)

buildingSMART Portugal as Portuguese chapter of buildingSMART International

TICE – Portuguese hub of Gaia-X

TPF as engineering and consultant company

Mission and purpose:

Mission: Make a decisive contribution to the carbon neutrality objective of the territories and cities

Territories, including cities play a pivotal role in achieving climate neutrality.

To achieve the ambitious objective of climate neutrality, the planning, design, construction, renovation, and operation of built assets must take full advantage of digital technologies to represent, to monitor and to reduce their environmental footprint.

Digital twin technology is a powerful tool that Construction eco-system can use to improve the way they plan and manage energy, waste, safety, mobility or infrastructure using jointly GIS and BIM methodology for representing commonly the built and non-built environment in holistic way.

Life Cycle Analysis (LCA) data needs to be collected, shared and analysed during the entire life cycle of built assets⁴. BIM and GIS technologies provide the level of granularity and quality required to feed LCA information and computation engines combining data on materials, products and impact on the environment of the built assets.

The climate neutrality imperative applies to all of the assets (in construction and in operation) which must be monitored for analyzing the behavior of materials, components or products and usages. The Construction Data Space will provide a path to digitally represent the footprint and solution for neutrality.

The digital infrastructure needed to manage a long-term perspective must meet two requirements:

- Sustainability of the transaction process of sharing digital information: data and metadata must be available throughout the full information life cycle which is much longer than the lifecycle of any software vendors.
- Digital Sobriety in the process of storing information (cloud computing): reduce the duplication of information through the interoperability provided by a cloud-based platform that implements standard APIs widely adopted by the construction ecosystem.

The Gaia-X provides a key building block to help meet these two requirements. The Gaia-X Trust Framework defines the minimum baseline for being part of the Gaia-X Ecosystem⁵. It must be extended by traceability and attribution rules that guarantee the quality of the data

⁴ Towards a LCA Database for the Planning and Design of Zero-Emissions Neighbourhoods: <https://www.mdpi.com/2075-5309/12/5/512>

⁵ https://gaia-x.gitlab.io/policy-rules-committee/trust-framework/gaia-x_trust_framework/

exchanged or shared between the participants in the ecosystem. The level of quality of the data that describes the built and non-built assets is critical as it is an element of trust and confidence throughout this long-term cycle (more than 50 years) in the contractual relationships that bind ecosystem participants.

Purpose: A European framework for territories and urban data spaces

The ambition of DIGITAL-TER 2050 is to create a European framework for the data spaces of territories and cities that builds on the standards developed by the construction ecosystem. Implementing these standards is essential to managing the carbon trajectory from a long-term perspective.

Three types of actors are involved in the ecosystem:

- Local governments such as cities or counties.
- Architectural, engineering and construction (AEC) companies.
- Other companies that provide services such as transportation, energy supply, telecommunication, or waste collection services.

The ecosystem characteristics can be summarised as follows:

- A very large number of stakeholders, with 80 percent of SME, smaller than 10 employees.
- A very large number of authoring tools (several hundred)
- A very long-life cycle: some infrastructure, still in operation are older than 100 years and have to be under operation under more than 100 years.
- The biggest part of data to be managed is not related to built works, but not built environment.

The scope to be covered by the DIGITAL-TER 2050 project and approach :

- Representing and visualizing the territory including the built environment, buildings, infrastructure, and utilities, the non-built environment, and in including the information of things collected by IOT based on the construction system approach.
- For this, the objective is to develop with the construction ecosystem a framework for exchanging and sharing information (data and metadata) using the standards developed with ISO and CEN, in order to represent the territory as it's built and as it's working, as it's seen and as it's evaluated or interpreted from a climate neutrality perspective.

The data that describes the infrastructure of a territory is the basis on which the digital twins of this territory are created. By and large these digital twins create models of their territory infrastructure that focuses mostly on the needs of their specific digital twins. This has the following disadvantages:

- Little or no reuse of the territory's infrastructure data, which is a source of duplication of effort.
- Too narrow a scope that often does not include the data needed for carbon footprinting or life cycle analysis.
- Doesn't include the construction industry's processes for creating, managing and maintaining the information.
- Questionable data integrity due to lack of traceability or attribution of the territory's infrastructure data.

The DIGITAL-TER 2050 architecture vision presented in Figure 4 is a solid foundation on which the territories digital twins (DT) will be created. The DIGITAL-TER 2050 platform will facilitate and accelerate the development of DT-enabled value-added services.

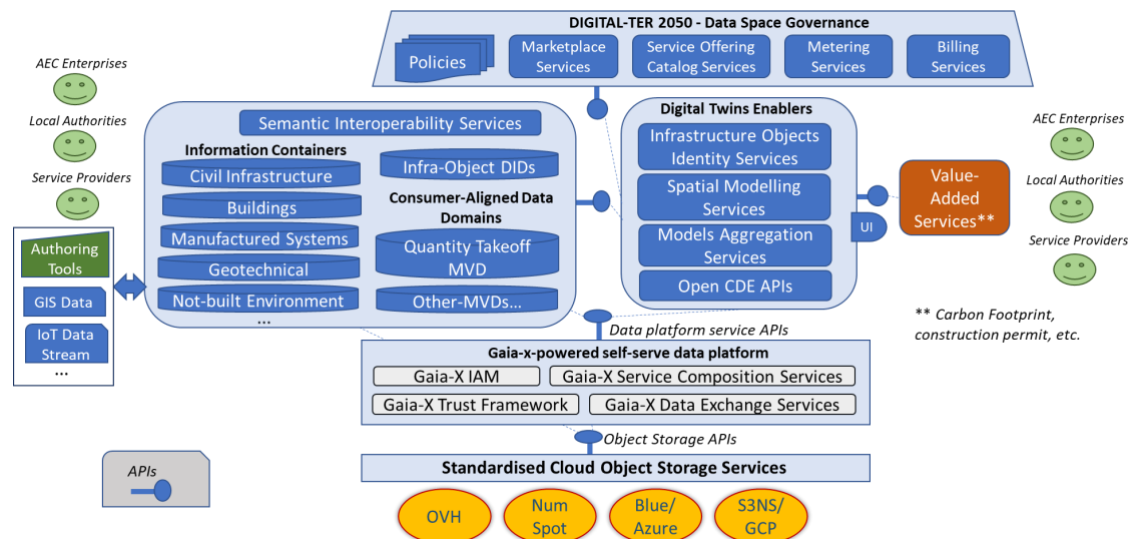


Figure 4: Operating model of the DIGITAL-TER 2050 platform

Architecture vision

This section begins with the key requirements that drive the architecture model in Figure 5. It then briefly describes each of its features.

Key requirements

The very first requirement is based on the contractual obligation “to keep the evidence of the proof” in order to develop the confidence on any data sharing processes to be embedded by the contract (including smart contracts).

This very first requirement has to be considered as the foundation of any digital twin to be used for the long-term monitoring of the territory.

DIGITAL-TER 2050 ensures accessibility to trusted data. It facilitates collaboration by making data exchange more fluid (interoperability issue). Shared data is trusted because the platform implements mechanisms that preserve data integrity throughout its lifecycle, from collecting to archiving in the perspective of the next fifty years.

Data integrity

NIST defines [data integrity](#) as the property that data has not been altered in an unauthorized manner. Data integrity covers data stored, processed, and in transit. Data processed by the DIGITAL-TER 2050 platform has the following characteristics:

- **Attributable** to a specific source that supplied data in the context of a well identified data exchange transaction.
- **Traceable** by historizing all the changes that have mutated the state of the data.
- **Accurate** by checking the data for errors.
- **Original** by preventing unnecessary copies of data.
- **Legible** by verifying its completeness and consistency with other data.

Fluidity

Mechanisms that ensure trust should not be implemented at the cost of slowing or blocking the flow of data between platform stakeholders. To achieve this the platform has the following characteristics:

- It is **Highly usable**, especially its APIs which developers should love to use.
- Eliminate tedious work (toil) by **automating** data integrity mechanisms where possible and economical.

DATA exchange

Due to the large number of stakeholders and source of information the data exchange processes need to be transparent by using, as much as possible, interoperability with existing international standards.

Data exchanged consists of data set needed for construction and maintenance that is provided by a large number of authoring tools including geographical and environmental data such as the one provided through INSPIRE policy (by BRGM and IGN in France) and other data such as (but not limited to) IoT data.

Semantic interoperability services

Since DIGITAL-TER 2050 federates data from a variety of sources, semantic operability is an indispensable feature. It helps translate data structures from one modeling language to another. This ensures that the various domain models are not polluted with foreign concepts following the [anti-corruption layer](#) pattern.

DIGITAL-TER 2050 uses established standards such as the BIM dictionary defined by ISO 23386 to model the properties and semantic to be attached to object and components or meta data to be attached to the processes specified but ISO 19650.

Gaia-x data exchange services

Data exchange processes follows the [Gaia-X data exchange services](#) specification which defines the vocabulary for data exchange, sets the definition of data exchange services as well as conceptual & operational models, data exchange policies and ontologies for data exchange to deliver trust, interoperability, discoverability, and traceability necessary for the data economy. It creates a common understanding of how the infrastructure ecosystem and the data ecosystem connect to each other based on the Gaia-X trust framework.

Authoring tools and standards

Data exchange between authoring tools and the DIGITAL-TER 2050 platform takes place according to IDM (Information delivery manual – ISO 29481-1) and MVD (Model view definition⁶), or equivalent⁷.

⁶ MVD : “computer-interpretable definition of an exchange requirement, specifically bound to one or more particular standard information schemas”- ISO 29481- Note 1 to entry: A model view definition (MVD) is also referred to as a view definition, a subset (of a schema) and a conformance class (CC) especially in [ISO 10303](#).

⁷ IDS is a candidate standard by BuildingSmart International, in progress, in bSI and in ISO/CEN for replacing IDM AND MVD

The AEC industry uses a variety of proprietary authoring tools (more than 80 different authoring tools for a single project) . DIGITAL-TER 2050 does not intent to replace them but envisions to integrate the models they produce to enable the rapid development of Digital Twins (DT) that model a territory.

DIGITAL-TER 2050 IDS definitions are mostly based on standardized approach such as specified by bSI ([IFC](#)) and OGC ([GML](#)), completed by domain classifications such as Uniclass, etc., materials and properties organized in data dictionaries for mapping . International standard such IFC or GML are now currently used as a contract to deliver the correct information ("Model as a mandatory document").

Data Mesh MODEL

The DIGITAL-TER 2050 platform is based on specifications developed by openBIM and Open GIS. It also follows a [Data Mesh](#) model which is a decentralized sociotechnical approach to share, access, and manage analytical data in complex and large-scale environments-within or across organizations. OpenBIM and the Data Mesh approach share common principles in their approach to data federation.

Data domains interoperability relies on a set of international standards that cover data governance, data formats and related meta data. In case of transformation of the data by a domain, the owner can recover it for her own needs

A Data Mesh aims to achieve these results:

- Respond gracefully to change: Complexity, volatility, and uncertainty in an organization.
- Maintain agility in the face of growth.
- Increase the ratio of data value to investment.

It promotes a domain-oriented decomposition of analytic data into three archetypes of domain data:

- **Source-aligned** domain⁸ data which reflect the business facts generated by the authoring systems, here *data generated by authoring tools*.
- **Aggregate** domain data which aggregate multiple upstream domains into one consolidate domain, here data that is transformed according to the IDS standard and is identified uniquely across source-aligned domains.
- **Consumer-aligned** domain data which are structured into Model View Definitions (MVD) which are specific implementation level of aggregate data to facilitate a specific usage. Source-aligned domains

The DIGITAL-TER 2050 platform structure source-aligned data into the domains below (not exhaustive):

⁸ In this context, the term domain refers to domains as defined in the Domain Driven Design modelling approach

- Civil infrastructure data,
- Utilities and facilities
- Buildings data,
- Manufactured data,
- Geotechnical data,
- Not-build environment data.

As it is often not suitable to keep all project information within a single model, The [information container](#)⁹ concept provides the logic to combine different source-aligned models based on their metadata retaining their original (standard or proprietary) data formats. Interdependencies between models are represented by relationships that link related objects using references to their unique IDs.

Infrastructure object Identity

Infrastructure objects are uniquely identified in a territory. Gaia-x recommends adopting the [Self-Sovereign Identity](#) (SSI) paradigm which is a good fit to the distributed nature of the DIGITAL-TER 2050 platform. That's why the architecture model is adopting Distributed Identifiers or DIDs.

The integration of SSI into the DIGITAL-TER 2050 platform model provides the benefits below:

- Robust and interoperable identity and authentication.
- Data provenance and integrity.
- Privacy and information confidentiality.

Infrastructure Objects Identity Services

Infrastructure Objects Identity Services assigns a unique DID to imported objects. It uses correlation algorithms to discover when a new object instance represents an entity that has already been identified in the system. In this case no new DID needs to be created into the DID registry, and the existing DID is added as a property of the imported object. This mechanism ensures that an object in the physical world is uniquely identified in DIGITAL-TER even though it may be instantiated in more than one domain model. Infrastructure Objects' identity services form the basis of the model federation capability of DIGITAL-TER.

⁹ ISO 19650 : information container

named persistent set of [information](#) (3.3.1) retrievable from within a file, system or application storage hierarchy

Consumer-aligned data domains

Approach of use cases to be explained

Consumer-aligned data domains use the [Model View Definition](#) (MVD) mechanism to narrow the scope of an aggregated model to meet the specific needs of a use case or value-added service. When appropriate DIGITAL-TER will use existing MVD specifications, complete them or specify new ones as necessary.

[Quantity Takeoff](#) is an MVD example which purpose is to estimate and track construction materials and costs. This approach can be extended to communicate all the information related a carbon footprint with the Green Deal data space for sharing and comparing.

2050 : Carbon neutrality

Additional MVDs can be specified and implemented to meet the needs to specific use cases or value-added services.

Gaia-x-powered self-serve data platform

A Data Mesh leverages the power of a self-serve data platform.

Since Gaia-X Federation Services and the Trust Framework provide capabilities similar to the self-service data platform of a data mesh (source: [Gaia-X Conceptual Model](#)), the DIGITAL-TER platform will reuse the Gaia-X reference implementations below to create its self-serve data platform:

- Gaia-X IAM
- Gaia-X Trust Framework
- Gaia-X Service Composition Services
- Gaia-X Data Exchange Services.

Standardised Cloud Object Storage Services

The DIGITAL-TER platform persists its data into third-party storages such as MySQL, PostgreSQL, or MongoDB. These storages can be hosted into a cloud infrastructure. The *Cloud Object Storage Services* provides an abstraction layer which enables the portability of DIGITAL-TER on any cloud infrastructure.

DIGITAL-TER will first target cloud infrastructures that are SecNumCloud compliant and preferably have no direct links to non-European cloud providers.

Digital Twins Enablers

The infrastructure object identity, multi-model federation mechanisms and model view definitions presented in the previous sections form the basis on which digital twins can be created.

The DIGITAL-TER Platform APIs implement when appropriate the API specifications provided by [Open CDE](#) which is a portfolio of API standard. Digital Twins consume these APIs.

DIGITAL-TER 2050 Data Space Governance

The governance of the DIGITAL-TER 2050 Data Space is materialized by a set of policies that can be expressed in a machine-consumable language that enables compliance automation.

It also provides the set of services necessary to define the catalog of value-added services the platform offers, the marketplace to distribute it and the metering and billing services necessary to collect revenue.

GENERIC USAGES

The usages to be developed on the DIGITAL-TER architecture are based on a crucial element :

- Offering a central point for all of the parties in delivering services for the management of the transaction and data sharing.

The various managements of usages are listed below.

Generic usages

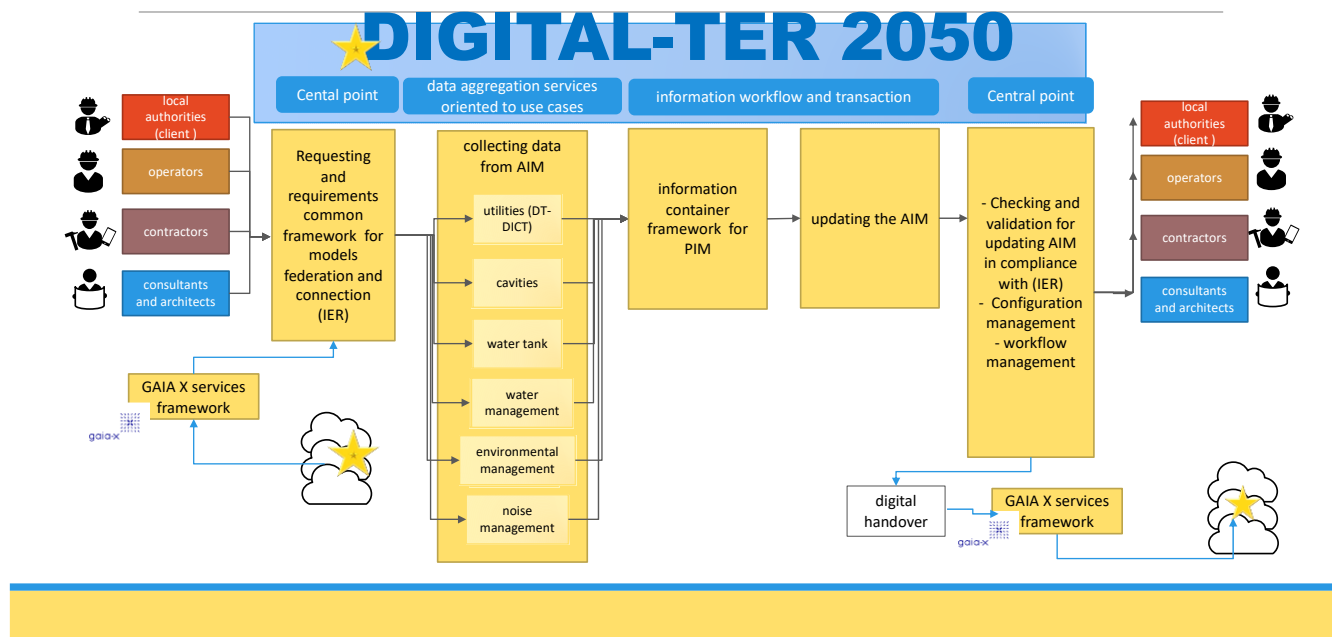


Figure 5: generic usages

Typical DIGITAL- TER 2050 Use cases

Management of the data transaction

- GAIA X services according to construction ecosystem industry
- Information container specifications

Management of the Information Exchange requirement (IER)

- INSPIRE services (under BRGM and IGN governance in France)
 - o Certified open data on the territory
- IER regarding utilities with operators for power, gaz supply or transportation.
- IER regarding IOT (sensors) based on standardization approach.

Management of semantic

- Governance on data dictionaries for semantic
- Common mvd including IFC, GML, PLCS (GAIA X data mesh policy) for developing:

Management of business cases:

Based on the existing experience of combining BIM and GIS Tools for

- o Quantities Take Off (classification systems management)
- o Planning application (building permit)

The holistic approach of DIGITAL-TER 2050 provides the opportunities to develop a large panel of new services using a unified and central point of information.

The carbon footprint using services already existing for QTO could be the first example of this.

ENVIRONMENTAL MONITORING

- Public lighting monitoring for energy sobriety
- Monitoring of public water services for maintenance improvement to reduce massively leaks.
- Monitoring contamination and de-contamination
- Programming and coordinating works under traffic.
- Monitoring building performance (energy, water)
- Monitoring biodiversity performance
- Monitoring the cavities in urban area (subsoil and construction, under the climate impact)
- Monitoring the land and ground management

TERRITORY MANAGEMENT

- supervision the network development for vehicles power supply
- monitoring the interoperability of transportation system (Mobilities analysis for transportation management)
- Monitoring the public asset value (carbon footprint included) for contracting (procurement process)
- Programming and coordinating works under traffic.
- Publishing dashboard on the monitoring of the public asset management
- Website (central point) for information delivery of all of stakeholders
- Website (central point of information) for emergency services
- Website (central point of information) for works in progress on the territory

Problems solved and benefits

The solution:

DIGITAL-TER 2050 is supporting the full construction ecosystem for improving the digitalization policy by innovation, fair governance, and European sovereignty with the perspective to guarantee for 2050, a neutral impact of the built environment.

The solution is to develop an European framework for building confidence in the digital process to share the information between stakeholders in building confidence with the digital process to share the information:

- Securing the transaction process for sharing the information with identification of partners and stakeholders, with identification of the required information
- Unifying the dematerialization process for sharing information in using an unified process for sharing (based on standardized approach with ISO 19650) through a full confidence in the transaction and a full confidence on the information

Benefits for all

The benefits for the all ecosystem are classified in 4 domains:

- The Cloud infra framework for the transaction management between stakeholders
- The Data mesh specifications for the Information exchange requirements management
- The data aggregation for dedicated use cases
- The data sharing framework for managing a dynamical digital twin.

The benefits are not only oriented for improving the performance of the digitalisation process, but also improving the capacity for managing sobriety in the digitalisation process and for managing the construction and operation performance in carbon neutrality.

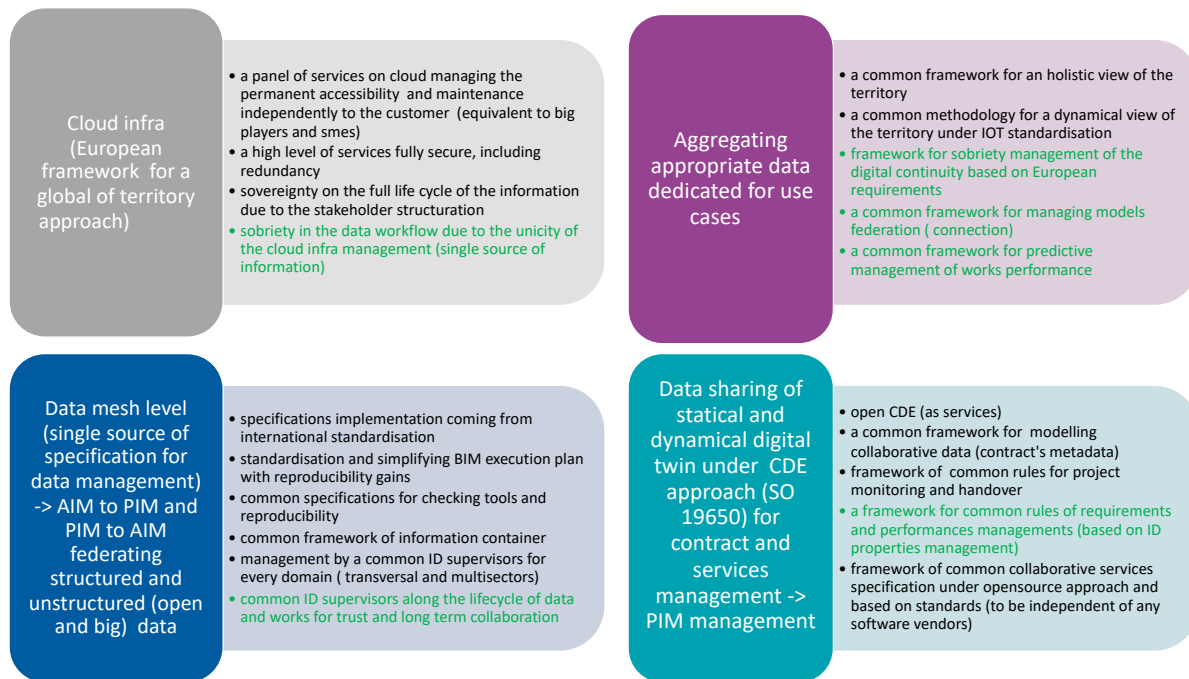


Figure 6: gains for all

Next steps

Developing the GAIA X lighthouse project

This position paper is the first step for the development of a GAIA X light house project. The next step will have to explain deeper the impact on the impact on the European economy and society, the business model and scale potential.

GAIA X lighthouse requirements			
			quite described
			to be improved
Alignment with the vision and the goals of Gaia-X			
1.1	How is Data Sovereignty considered in your dataspace?		
1.2	How do you increase the level of transparency, i.e., for services in your dataspace?		
1.3	How do you address compliance with European data protection legislation?		
Openness: creating open, non-proprietary ecosystems for data exchange			
2.1	How are proprietary solutions encapsulated to avoid lock-in effects?		
2.2	Which open-source standards (if any) are applied?		
2.3	How do you ensure to reduce dependencies in your dataspace?		
Adoption of the Gaia-X policies, rules, architecture and trust framework			
3.1	How do you ensure compliance with the Gaia-X policies, rules and architectural guidelines (documents listed above)?		
3.2	How do you comply with the self-description requirements for your services?		
Impact on EU economy and/or society			
4.1	How do you characterise and estimate the potential economical and/or social impact of your use case?		
4.2	Which challenges of the EU economy are addressed?		
Pan-European scale			
5.1	Your initiative has participants from how many different European countries?		
5.2	How can your use case or solution possibly be adopted in other markets?		
5.3	How does your initiative contribute to the development and application of European rules and standards?		
Large potential user-base			
6.1	What is the structure and size of your potential user base?		
6.2	How do you foster adoption and growth of the user base?		
6.3	How does your solution support SMEs in particular?		
Target scale and scale potential			
7.1	How generic is the solution you tackle (Sector, Region, Use cases).		
7.1	What's the scaling potential of your solution?		
Clear use cases, value or business cases and deliverables			
8.1	Which use cases/business cases are addressed by your initiative? What's the business model?		
8.2	Which key deliverables exist/are in development / are planned in the future?		
Critical mass of committed stakeholders			
9.1	Who are the contributing stakeholders in your initiative?		
9.2	In what form and capacity do partners contribute to your project?		
9.3	In which Gaia-X Working Groups are you actively involved?		
Funded and resourced (in flight)			
10.1	How is your project funded?		
10.2	What are critical resources and how are they managed?		
Time-to-market and time to initial target-scale			
11.1	What is the overall timeline to initial go-live of services (and what are key milestones)?		
11.2	What is the size of your initially targeted user group/market?		
Complementary to, and linked to, other data spaces			
12.1	What adjacent or similar initiatives exist? How do you differentiate, is an integration planned?		
12.2	How is your use case or solution positioned in the value chain?		
12.3	What is the potential to transfer into other industries/domains?		

Figure 7: GAIA X requirements

Encouraging new countries to participate to DIGITAL-TER 2050

DIGITAL-TER 2050 is an initiative coming from three European countries: Finland, France, and Portugal. The goal is not to limit the project to these one. The position paper has to be considered as a call for participating for continuing the work already done by the construction ecosystem in the standardisation approach in CEN TC 442, and around the Horizon 2020 plan, with DIGIPLACE for functional specifications of a European cloud framework for the construction industry.

Encouraging synergies

The construction industry ecosystem is embedded in some other industrial sectors. The standards and data mesh described in the project can have some impacts on and with:

The railway industry

Due to the usage of common standards for the information exchange developed commonly , and the collaborative approach in contracting.

The nuclear industry

Due to the usage of common standards for the information exchange adopted by the nuclear sectors for the construction phase, and the collaborative approach in contracting. (GIFEN, in France, is adopting IFC (ISO 16739) and ISO 19650 as standards of the nuclear domain.

The mobility sector

Due to the needs of structured, georeferenced and standardised information to describe the infrastructure including the behaviour and the performance.

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