Presentation of the DigiPLACE Reference Architecture Framework

DigiPLACE event - EU Industry Week 2021

16 March, 2021

This project has received funding from the European Union's H2020 programme under Grant Agreement N. 856943

Outline

- The Reference Architecture Framework : scope, purpose and articulation with other DigiPLACE outputs
- Overview of the Reference Architecture Framework
- Selection of guidelines and open options

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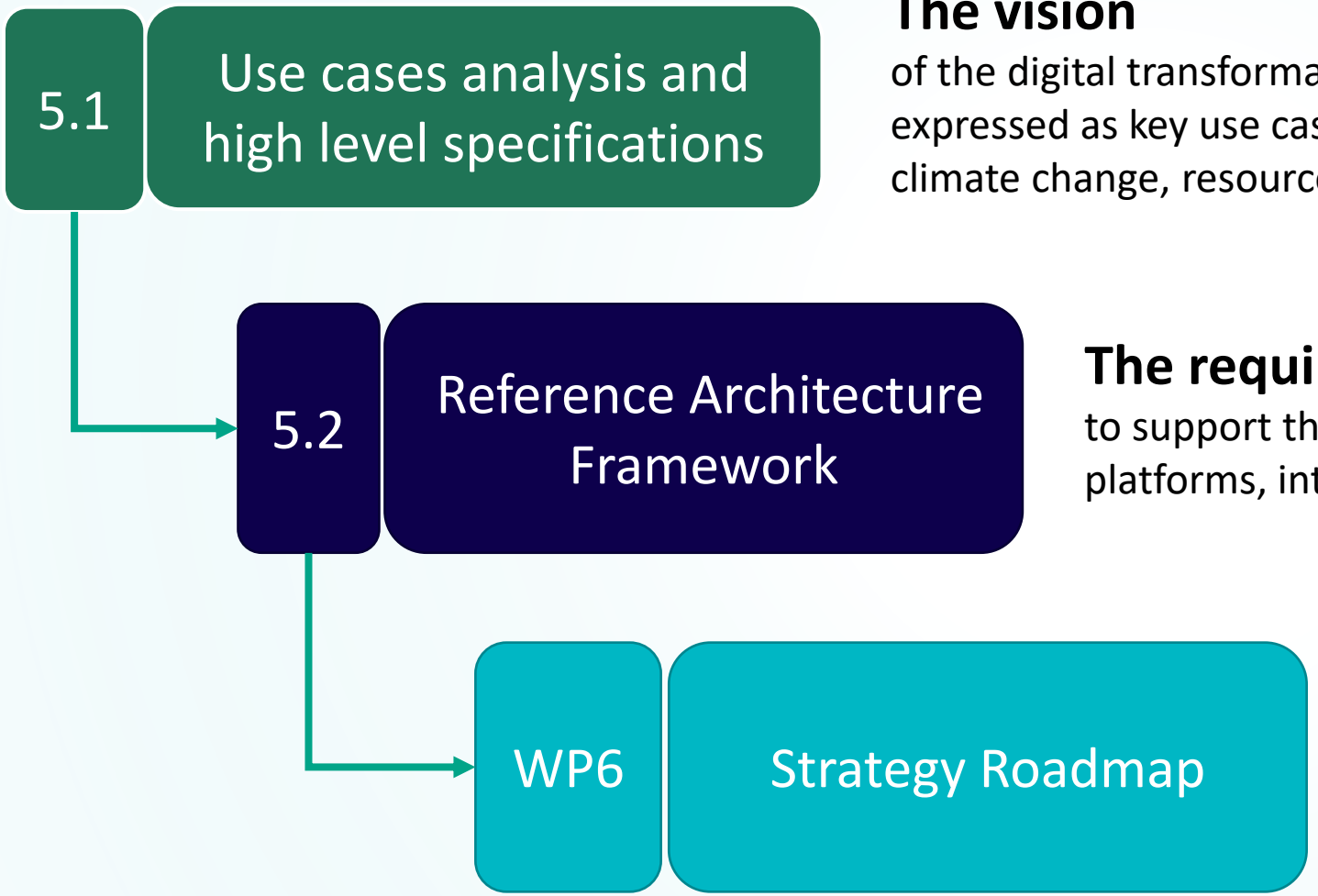
DigiPLACE key outputs



The vision

of the digital transformation of the european construction industry, expressed as key use cases, to help achieve core objectives (eg climate change, resource use, health, productivity, competitiveness…)

The required architecture

to support this vision, in terms of digital tools, services and platforms, interoperability, data and knowledge sharing…

How to get there

Promotion, Research effort, pilot projects, regulations, deployment of new services…

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D5.2 – Architecture guidelines

- Delivered Jan. 2021
- Reference Architecture Framework

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Scope of the Reference Architecture Framework

DigiPLACE Reference Architecture Framework

A comprehensive set of common guidelines for building and deploying interoperable digital platforms for the construction sector across europe (public or private, local or european…)

Different types of guidelines

- General guidelines for implementing digital platforms (interoperability, open standards, data security & privacy…)
- Tools and services to be developped/generalized to support key use cases
- Special focus on required public services and regulations, both at EU and MS levels

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Purpose

Construction digitalisation is complex: regulations, standardisation works, public and private platforms and initiatives, business model disruptions…

- Put the existing references into **a comprehensive and structured vision**, and highlight their interconnections
- Improve the **common understanding of the ongoing evolutions, educate ourselves on the disrupting potential of digital platforms** for the sector
- Identify the gaps in this current landscape, and the **actions to be carried out to fill them**, in order to facilitate **the development of platforms** based on a common vision
- Create a **level playing field** for both construction stakeholders and digital services providers
- Support identified underlying objectives: **sustainability, competitiveness, single market…**

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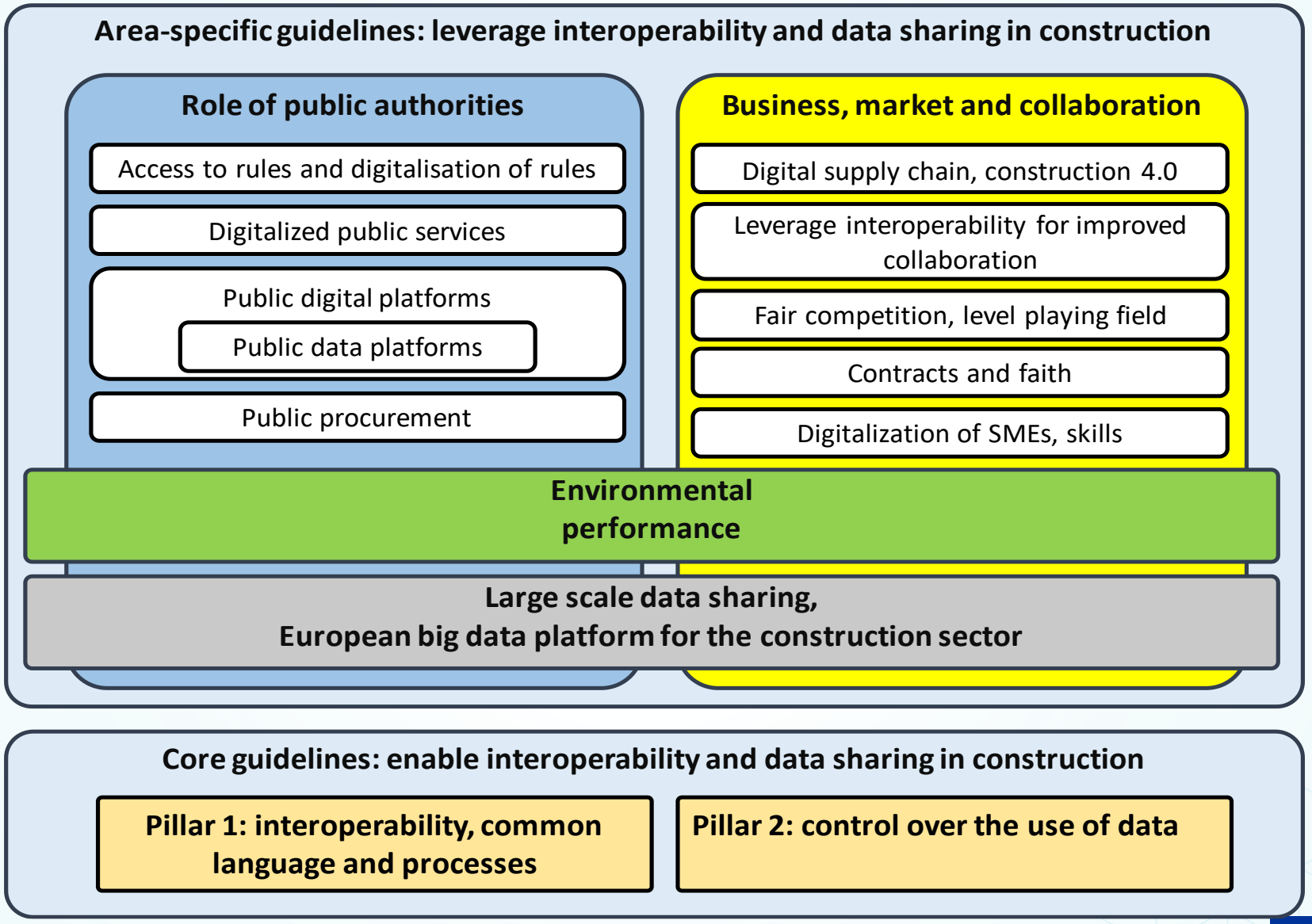
Reference Architecture Framework for construction digital platforms



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Core guidelines: enable interoperability and data sharing in construction

Pillar 1: interoperability, common language and processes

Data formats, models and semantics

Semantics	Data models and formats
Semantic interoperability, Data dictionaries	Open Standards
Application: focus on product data	Standards for data exchange & access
	Integration of BIM and GIS data

Information management and processes

- Collaboration, Common Data Environments
- Data management along the lifecycle, digital twin

Governance and access to standards and frameworks

- Open and easy access
- Engage with the community

Pillar 2: control over the use of data

Data storage, security and sovereignty

- Data security
- Data sovereignty
- GAIA-X, European Common Data Spaces

Data ownership

- GDPR compliance
- Data ownership in business relations
- Transparency on the use of data

Data qualification and trust

- Data certification, blockchain
- Data with contractual or regulatory value

Data availability, access and sustainability

- FAIR data principles
- Open APIs
- Data sustainability

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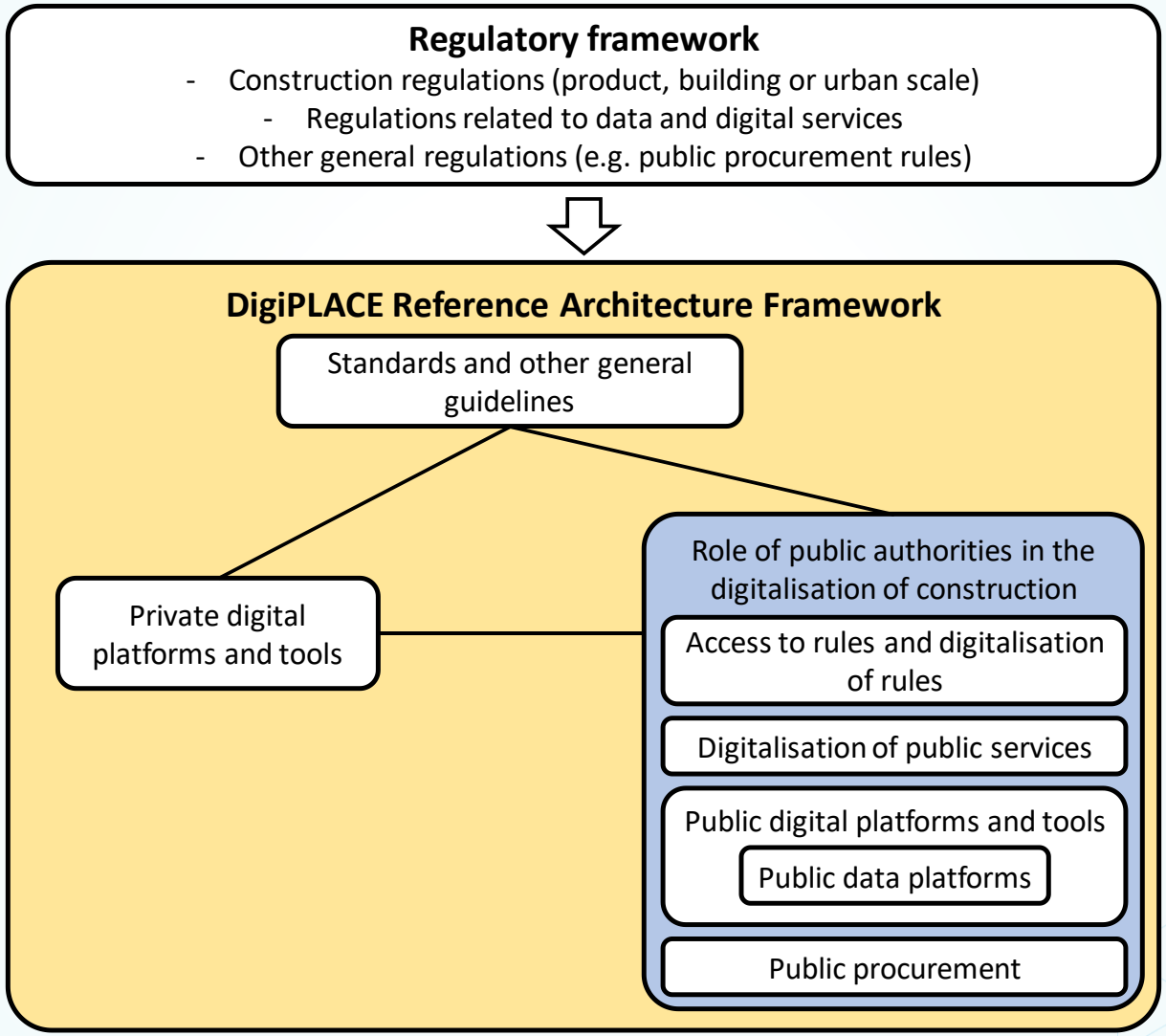
The Reference Architecture Framework and the regulatory framework



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Selection of guidelines and open options

Pillar 1 : interoperability, common language and processes

Open standards are key to enable:

- Digital continuity over the full life cycle of construction works
- Cross-domains and multi-scale digital twins
- More generally, interoperability between proprietary software and platforms
- BIM-based public procurement and regulatory procedures (e.g. permitting)
- Sustainable long-term preservation of information
- Contribution of the publicly funded academia to the progress of BIM technology in a vendor neutral way

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Selection of guidelines and open options

Pillar 1 : interoperability, common language and processes

- Integration of BIM and GIS data, enable territorial digital twin
- Importance of **semantic interoperability**
  - Guidelines for **interoperable product data**
  - Towards a **European data dictionary** (network of dictionaries with common framework and governance)
- Implementation of ISO 19650
- Define/harmonize **building digital twin methodologies** (incl. handling of IoT data) ?
- Semantic Modeling and Linking Standard: need to define/adopt reference ontologies ?

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Pillar 2 : control over the use of data

- **GDPR compliance**
- Data ownership in business relations, **transparency on the use of data**
- **Data sovereignty**
  - Sovereignty of cloud services
  - Link with European common data spaces and the GAIA-X initiative
- Data security, cybersecurity

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Selection of guidelines and open options

Environmental performance

- Support the widespread use of LEVEL(s) framework:
  - Need to provide digital tools enabling to inform as well as to use Level(s)

- Life Cycle Assessment for the construction sector:
  - Smooth the access to buildings products description and building characteristics data through the availability of adequate standards
  - Standardize the products' impact data, access through APIs
  - Availability, transparency and flexibility of LCA applications' methodologies
  - Provide guidance for users
  - Make BIM-based LCA a reality: **ISO/DIS 22057 EPD for BIM**

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Selection of guidelines and open options

Environmental performance

- Circular economy
  - Conditions for buildings as digital material banks
  - Standard templates for the inventory of existing components
  - Digital deconstruction process

- Other guidelines
  - Enable generic dashboards of geoclustered buildings performance in EU
  - Harmonize scan-to-BIM for renovation or deconstruction
  - Sharing of best practices

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Selection of guidelines and open options

Large scale data sharing, European Big data platform for the construction sector

- Discuss the place of the construction sector in existing initiatives: European common data spaces, GAIA-X
- Examples from other sectors: agriculture, healthcare, aeronautics…
- Improve EU wide access to public data
- Leverage existing or developing frameworks (e.g. LEVEL(s), building logbook)
- Explore the potential of large scale sharing of private data

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Selection of guidelines and open options

Business, market and collaboration

- Implementation issues for digital collaborative processes:
  - **Streamline and simplify the setup of BIM collaboration**: BIM Execution Plans, Exchange Requirements, Model View Definitions…
  - Re-use Information Delivery Manueals (IDMs), repositories of IDMs
  - **Common syntax and classification for use cases**
- **Digital supply chain**
- **Link with ERP and CRM tools**

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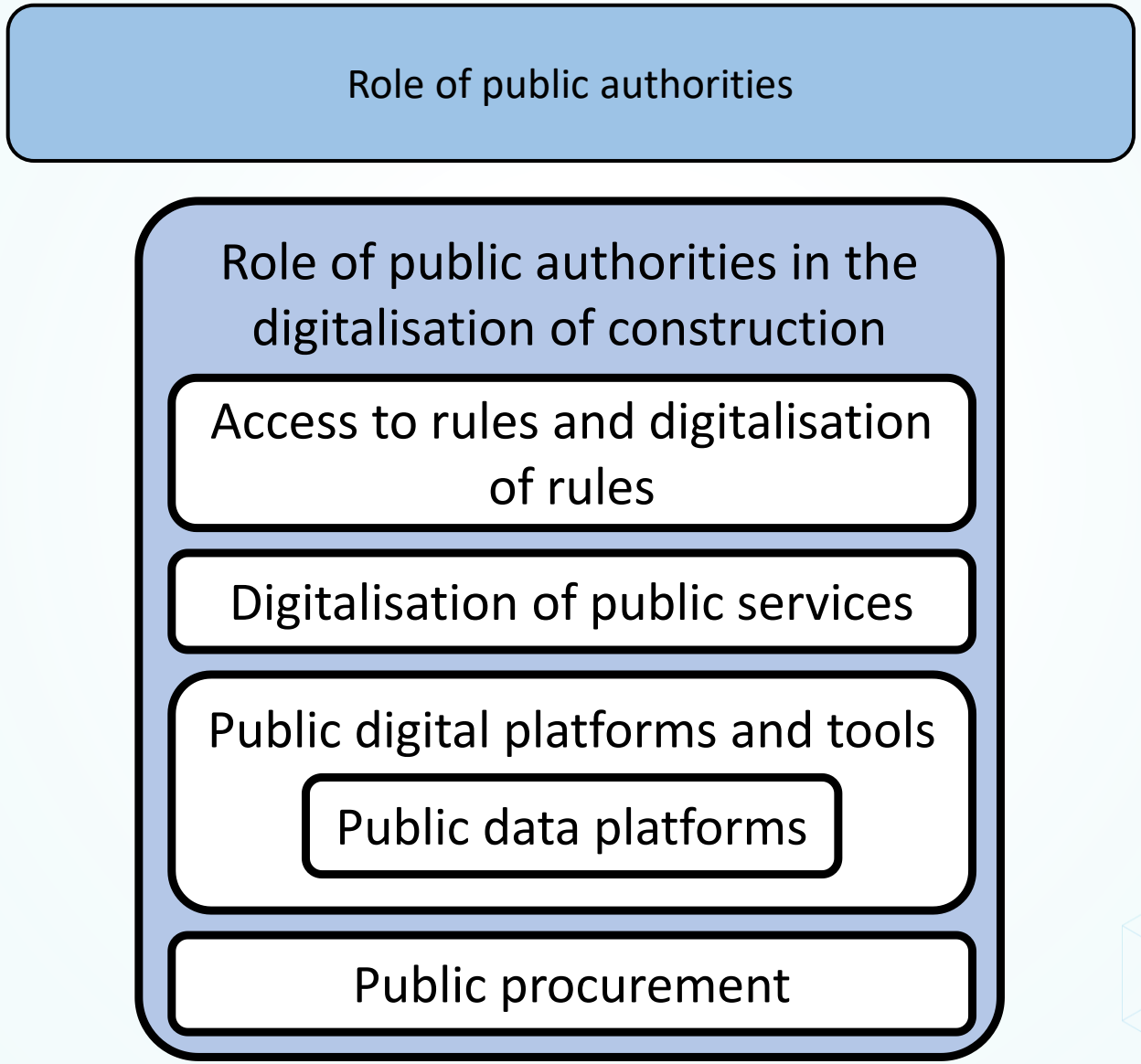

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Selection of guidelines and open options

Possible perimeter of public platforms

Services	National platforms	European platform
Publicly driven open platform for BIM and other digital services	X	X
Access to digitalized public services (e.g. building permit)	X	
Access to construction rules	X	X
Access to digitalisation standards		X
Access to public data, territorial digital twin	X	X
Big data platform, large scale data sharing		X
Educational content and tools	X	X
Sharing of best practices and innovation (esp. related to environmental performance and digitalisation)	X	X
Connection with Public procurement platforms	X	X
Connection with other existing public platforms (e.g. LEVELs)	X	X

Selection of guidelines and open options

DigiPLACE
TOWARDS A EUROPEAN DIGITAL PLATFORM FOR CONSTRUCTION

Publicly-driven open platforms for BIM and other digital services: principles

- Provide an open architecture to integrate services in meaningful workflows for AEC use cases
- Orchestration system that coordinates different public and private services
- Standard ways to integrate data between services
- Ensure a fair distribution of value
- Facilitate collaboration through the use of templates, assessment of interoperability features, interoperability checking tools…

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TOWARDS A EUROPEAN DIGITAL PLATFORM FOR CONSTRUCTION

Publicly-driven open platforms for BIM and other digital services: rationale

- Provide a BIM and collaboration toolkit readily accessible by all stakeholders, including SMEs, and that can be used to answer the requirements related to the use of BIM in public procurement
- Give an impetus to the digitalization of the construction sector, in a transitory phase
- Create a **level playing field** through a platform that is opened equally to all providers, and designed to:
  - Promote innovation and new entrants (esp. small players)
  - Guarantee market access to all stakeholders independently from proprietary platforms
  - Foster competition, avoid market capture by some players, ensure a fair distribution of value across the value chain
  - Promote European vendors and increase the technical value of smaller players' services by integrating them, thus reinforcing the **ecosystem of European digital AEC services**

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TOWARDS A EUROPEAN DIGITAL PLATFORM FOR CONSTRUCTION

Publicly-driven open platforms for BIM and other digital services: rationale

- Ensure the respect of European principles in terms of data security, data sovereignty or data ownership
- Focus on unmet needs: multi-scale, cross-lifecycle data integration

Points of caution

- **Vendor neutrality** must be ensured, through adapted processes to enrol and assess the services

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