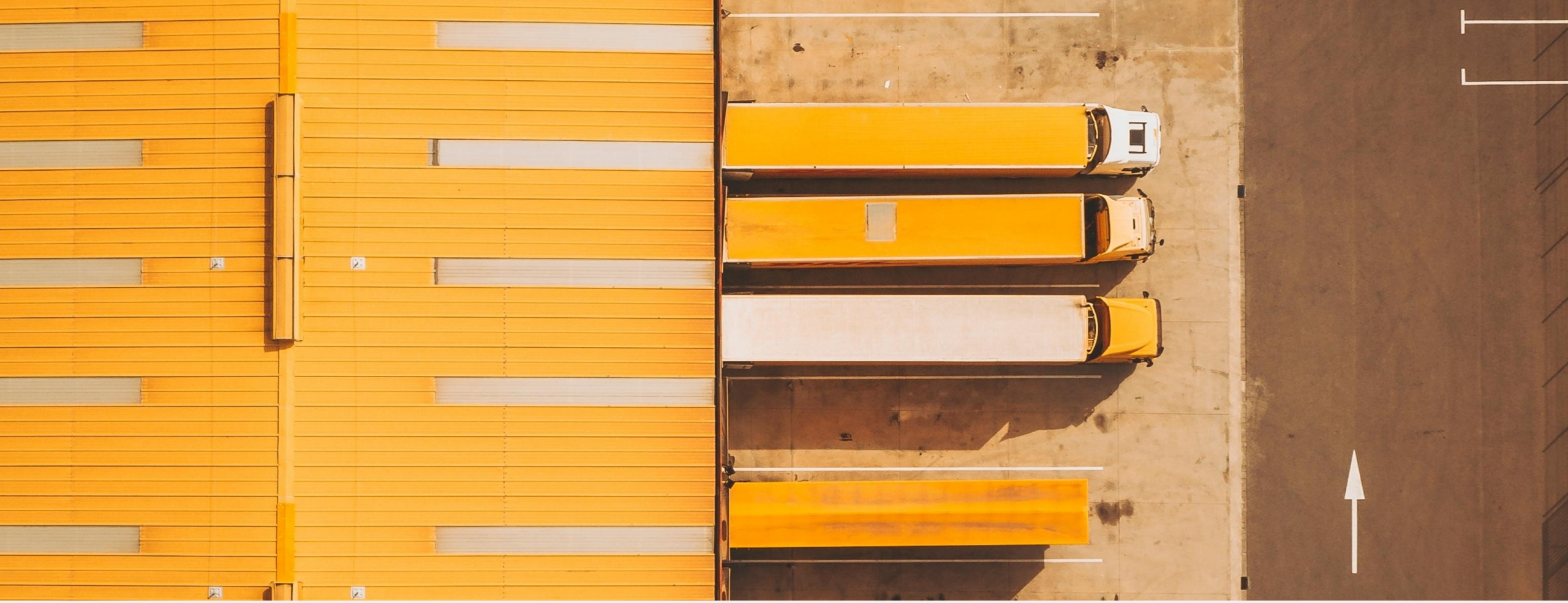

Conditional access of heavy vehicles as part of smart logistics

Thomas Asp, Trafikverket and CEDR
Vardhman Lunkar, TRT – Trasporti e Territorio

CEDR
Conférence Européenne des Directeurs des Routes
Conference of European Directors of Roads

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AGENDA

- The context
- What is Intelligent Access (IA)
- Background research call IA
- ISAC Project
  - ➢ Methodology
  - ➢ Target vehicles
  - ➢ ISAC IA functional architecture
  - ➢ Country readiness
  - ➢ Conclusions and Recommendations
- Key reflections

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The context

The growing complexity of freight transport operations and its digitalization present both challenges and opportunities for public authorities and transport operators

Challenges:

Diverse vehicle configurations and rising traffic volumes have placed unprecedented pressure on infrastructure aging and replacement, and on regulatory systems.

Opportunities:

Growing digitalization and using possibilities with connected vehicles in freight transport operations offers a significant potential to collaboratively enhance road network efficiency, safety and environmental performance.

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What is Intelligent Access?

Intelligent Access Policy (IAP) can be a cornerstone for modernizing road freight governance by creating a technical and functional framework that leverages vehicle generated data to manage heavy-duty vehicle access to the road network, ensuring compliance with weight and dimension rules while promoting efficiency and safety. The principle underpinning IAP is simple yet transformative:

“the right vehicle on the right road with the right weight at the right time.”

IA has potential for:

- Better use of existing infrastructure with traffic management based on time and place
- Less degradation of road infrastructure through improved management of weight, speed and routing of heavy vehicles
- Increasing road safety through, for example, less overloading or improved insight into where safety incidents arise on the road network
- Creation of a level playing field between different haulers/carriers, improving compliance by haulers/carriers with regulations as set out by NRAs
- Faster and more unified and controlled processing of transport documents in cross- border transport through digitalization.

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Functions of Intelligent Access

- **Facilitating:** Assisting transport operators and relevant authorities in accessing road infrastructure, particularly through support with permitting and planning process.
- **Managing:** Enabling authorities and transport operators to align vehicle characteristics with infrastructure capabilities, thereby supporting asset and traffic management e.g., transit over bridges or through tunnels.
- **Monitoring:** Helping authorities track and analyse the actual usage of road infrastructure by heavy-duty vehicles.
- **Controlling:** Supporting transport operators and enforcement bodies in ensuring operational compliance, including adherence to regulations concerning vehicle dimensions, weight, and spatial or temporal constraints.

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Background research call IA

- CEDR-Report and webinars there we could see the potential in IA
- Overall aim for the call:
  - To investigate how IA could help NRAs to optimize use of infrastructure capacities and contribute to more environmentally sustainable road transport of freight.
- Principal output:
  - Opportunities and challenges, primarily for road authorities but also other stakeholders, should be explored.
  - Building blocks for IA-framework
  - Provide guidelines for the implementation of IA at national level.
  - Identify scenarios where IA could be applied to the management of cross-border road transport of goods.
- Requirement:
  - To collaborate with and actively involve relevant stakeholders (such as: members of CEDR (road authorities), industry partners, OEMs, service providers).

ISAC Methodology

Desk research
Review of literature, policies, and existing IA initiatives

Stakeholder engagement
20+ bilateral interviews with national experts and authorities

Development of the Building blocks
Functional architecture of the ISAC scheme

Framework validation
Iterative refinement with stakeholders and advisory board

Comparative country analysis
Assessment of 5 countries IE, NL, SE, FI, NO. Evaluation across five ISAC BB

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Target Vehicles

The **target vehicles** of ISAC scheme are:

- Abnormal Indivisible Loads AIL
- European Modular Systems EMS
- Battery Electric BEV trucks.

Though minor share of all road freight vehicles, their disproportionate and potentially serious implications on road safety, infrastructure wear and operational complexity

The most fitting target vehicles for early IA implementation but there are also many other

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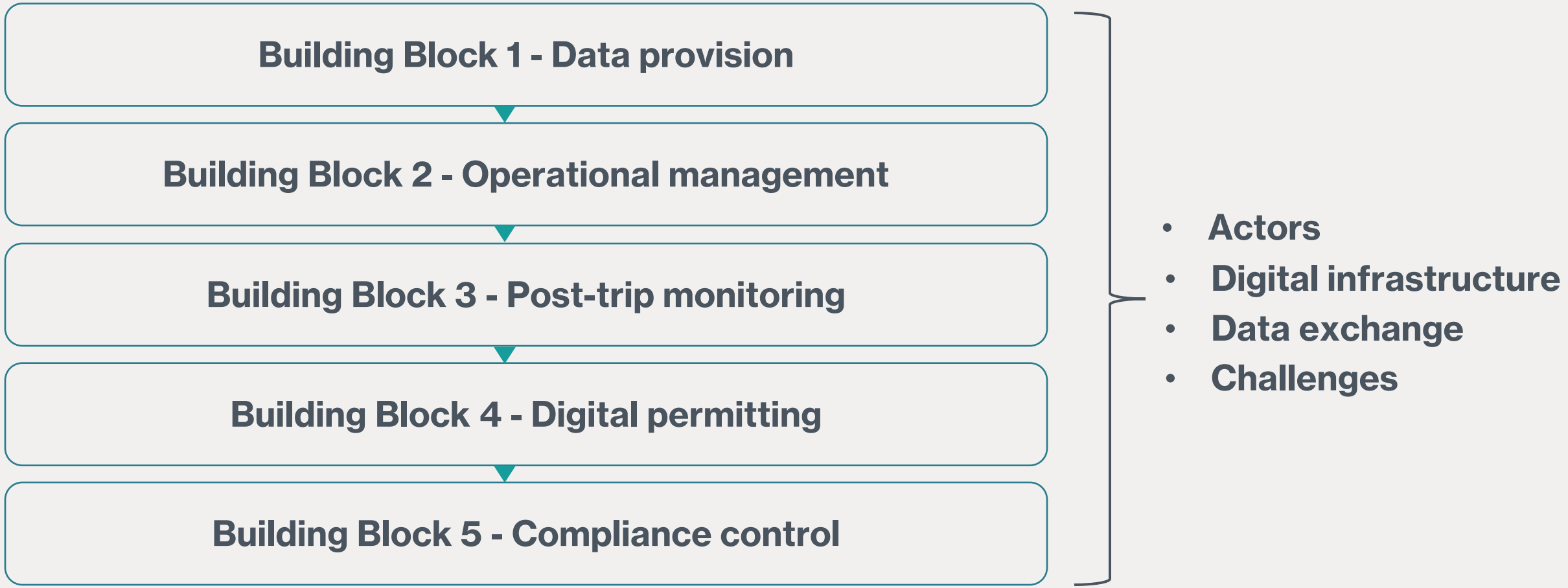
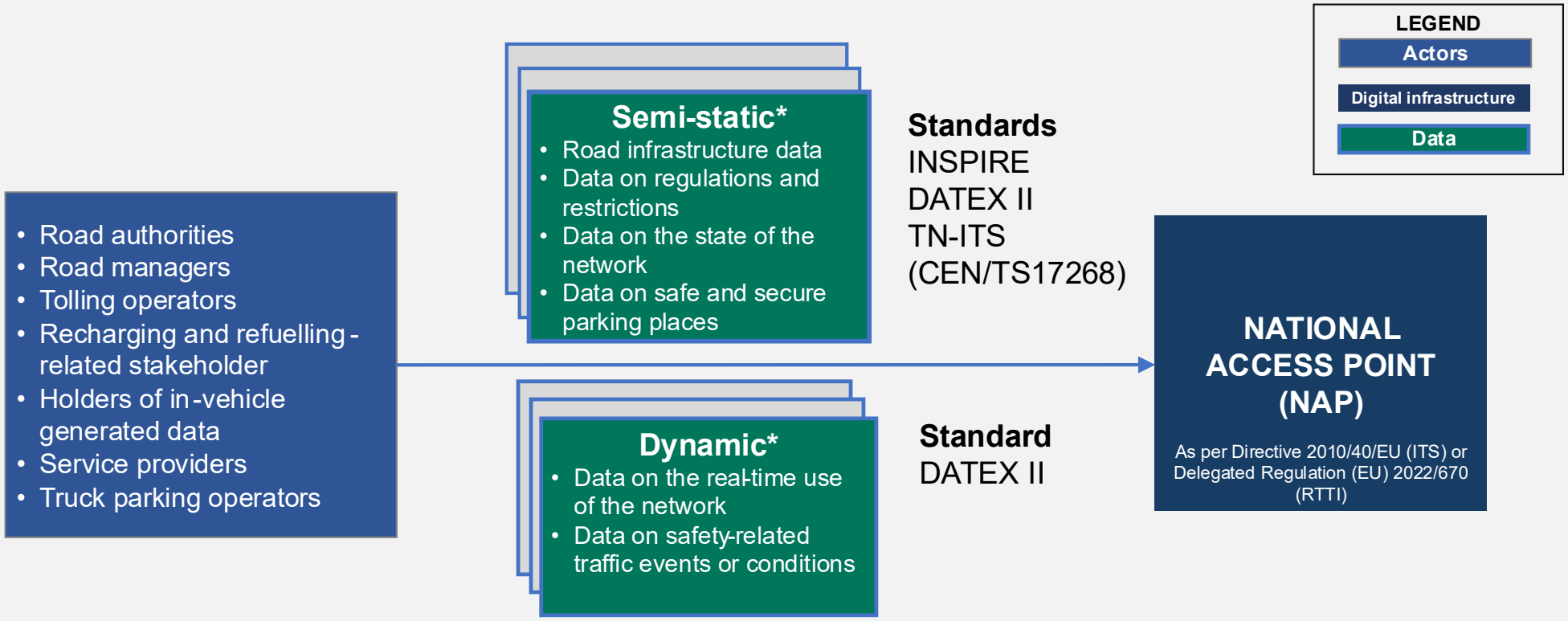
System Architecture



System Architecture

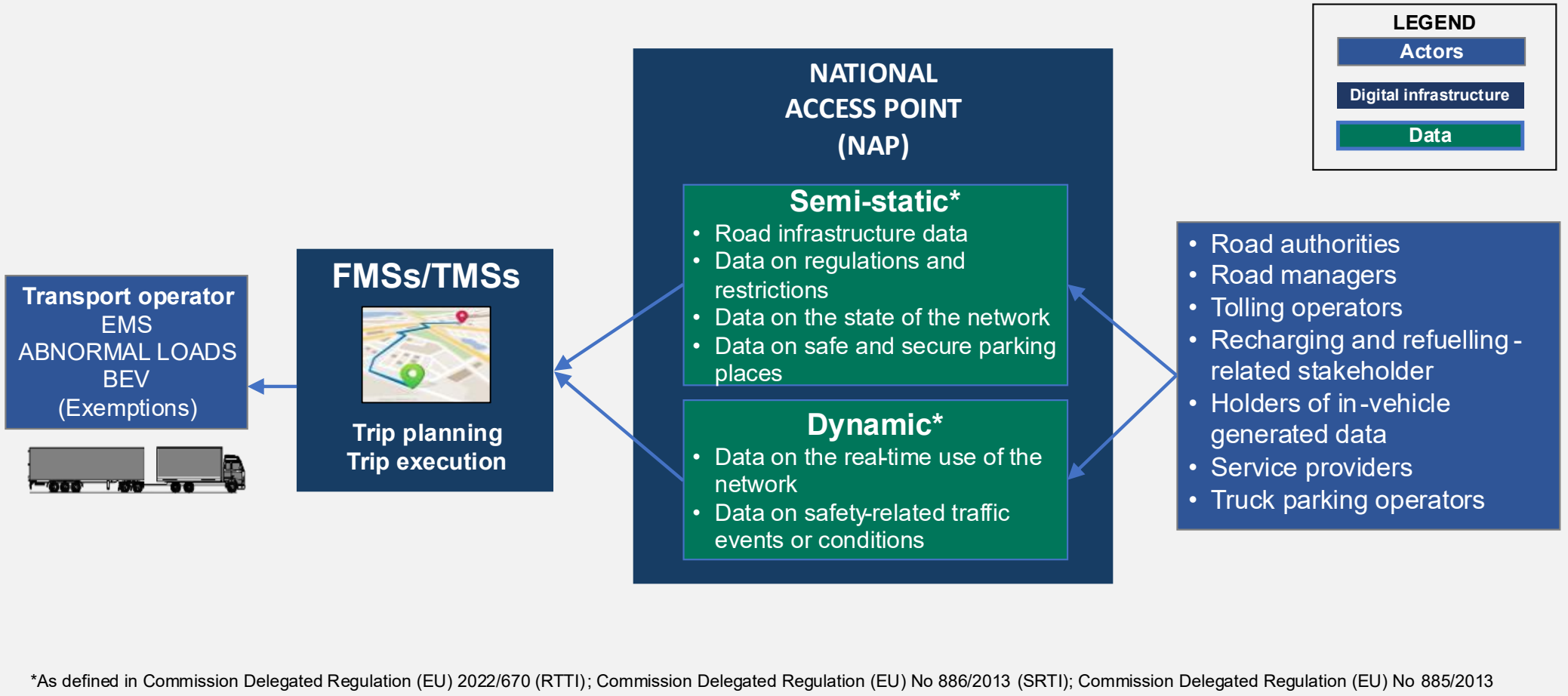
Building Block – 1 Data provision



*As defined in Commission Delegated Regulation (EU) 2022/670 (RTTI); Commission Delegated Regulation (EU) No 886/2013 (SRTI); Commission Delegated Regulation (EU) No 885/2013

System Architecture

Building Block – 2 Operational management



*As defined in Commission Delegated Regulation (EU) 2022/670 (RTTI); Commission Delegated Regulation (EU) No 886/2013 (SRTI); Commission Delegated Regulation (EU) No 885/2013

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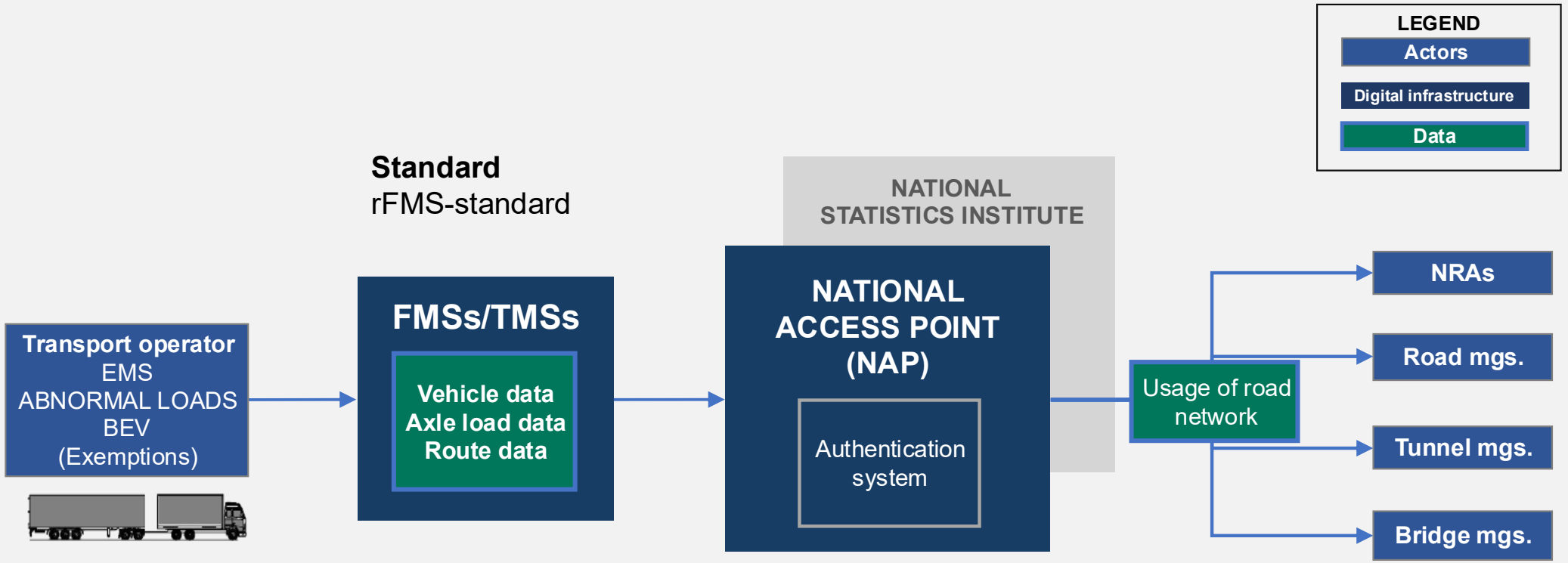
System Architecture

Building Block – 3 Post trip monitoring



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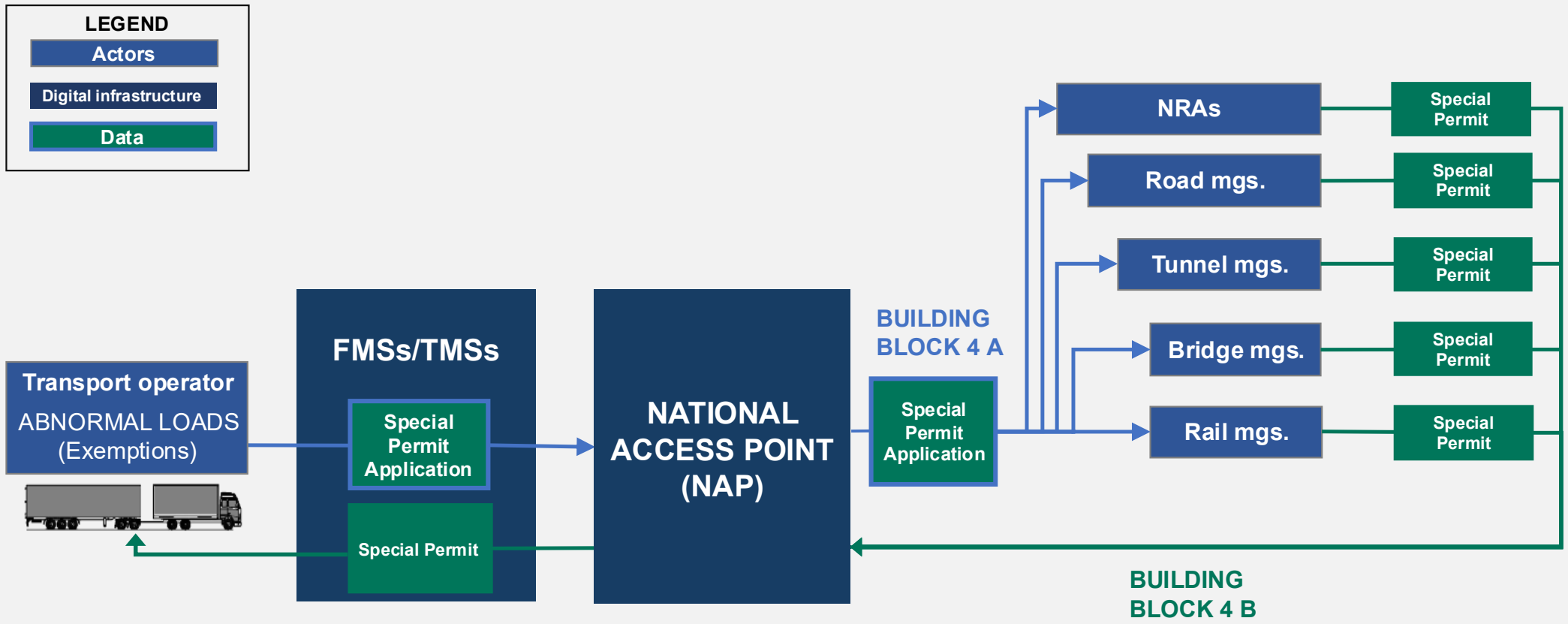
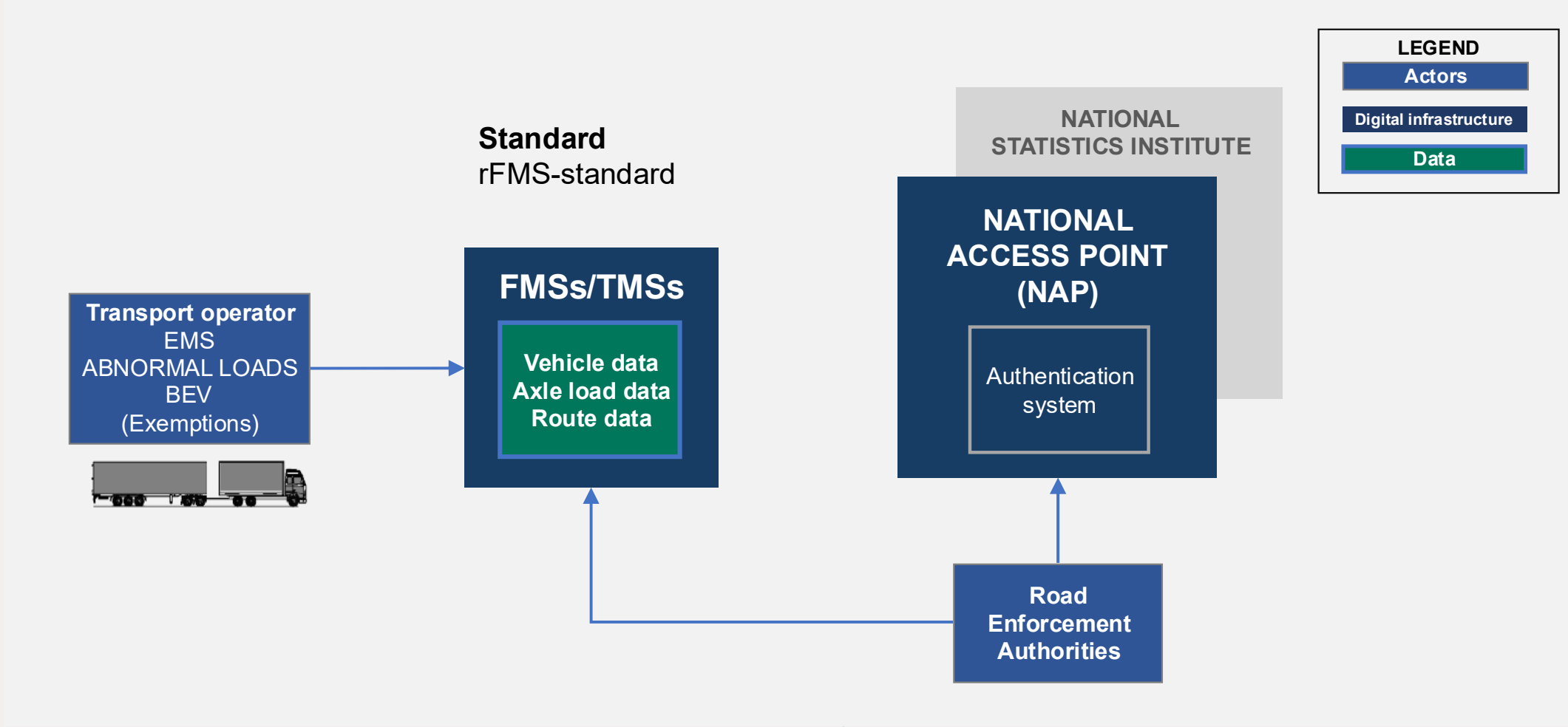
System Architecture

Building Block – 4 Digital permitting



System Architecture

Building Block – 5 Compliance control



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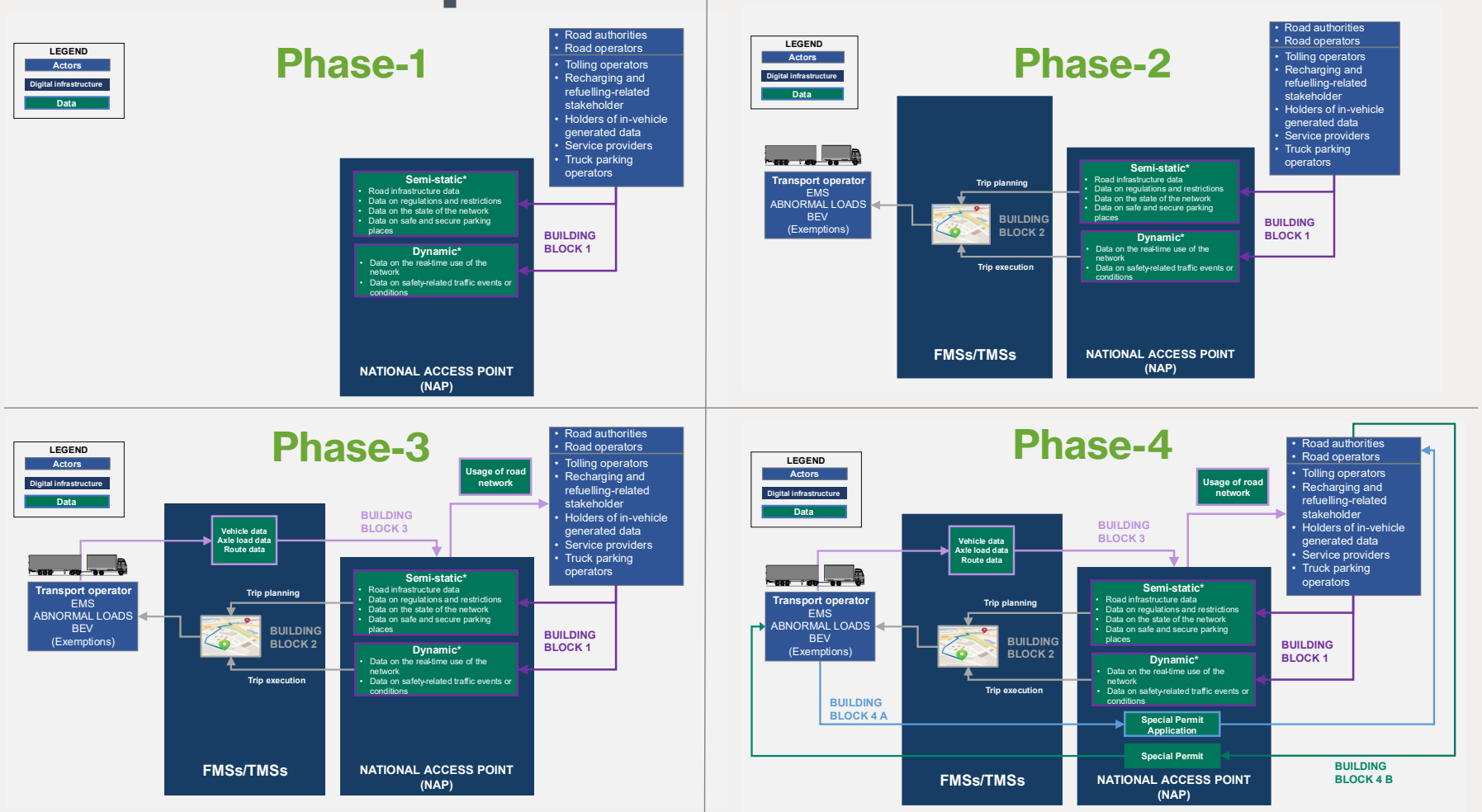
Phased implementation



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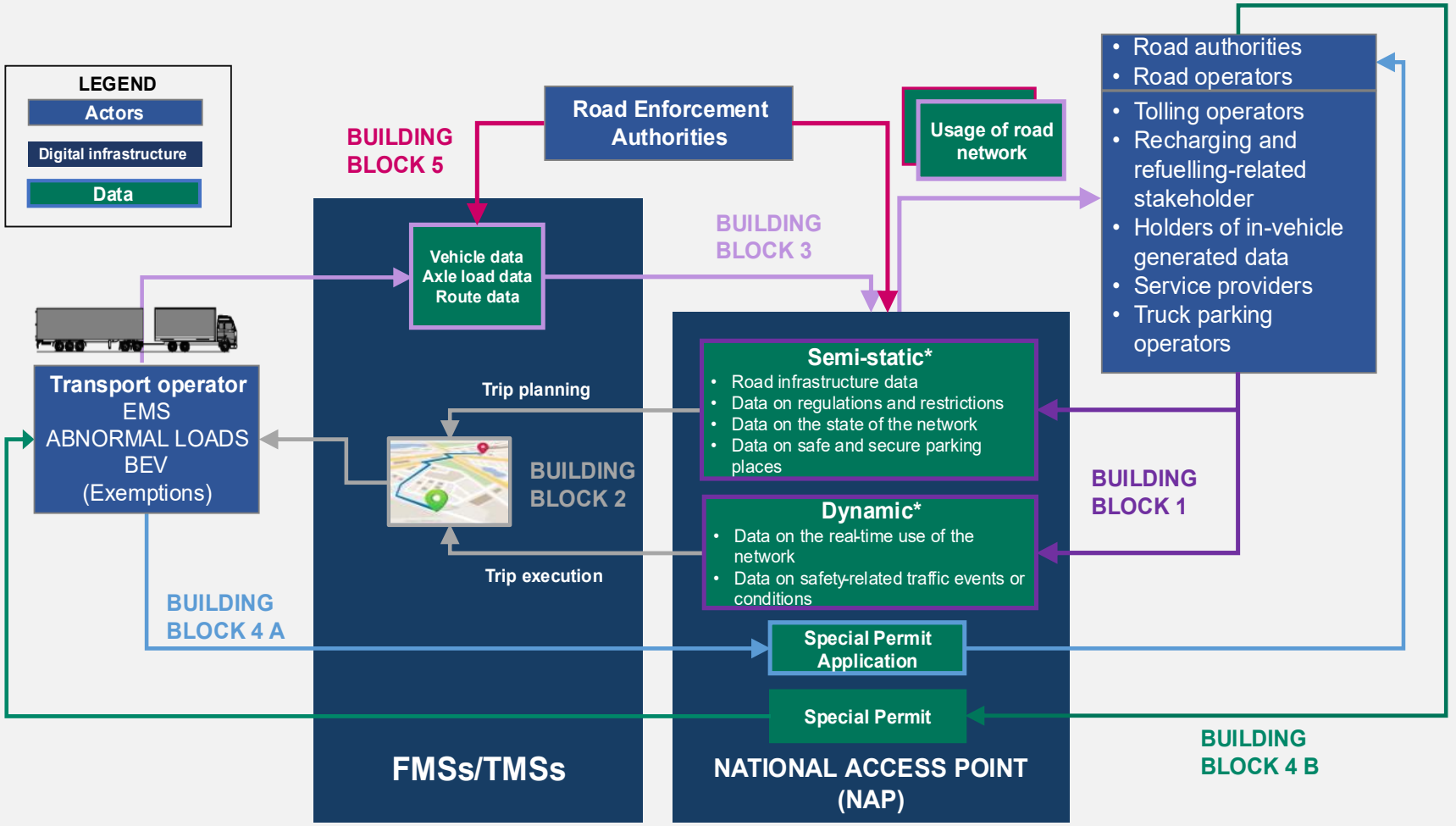
Functional Architecture



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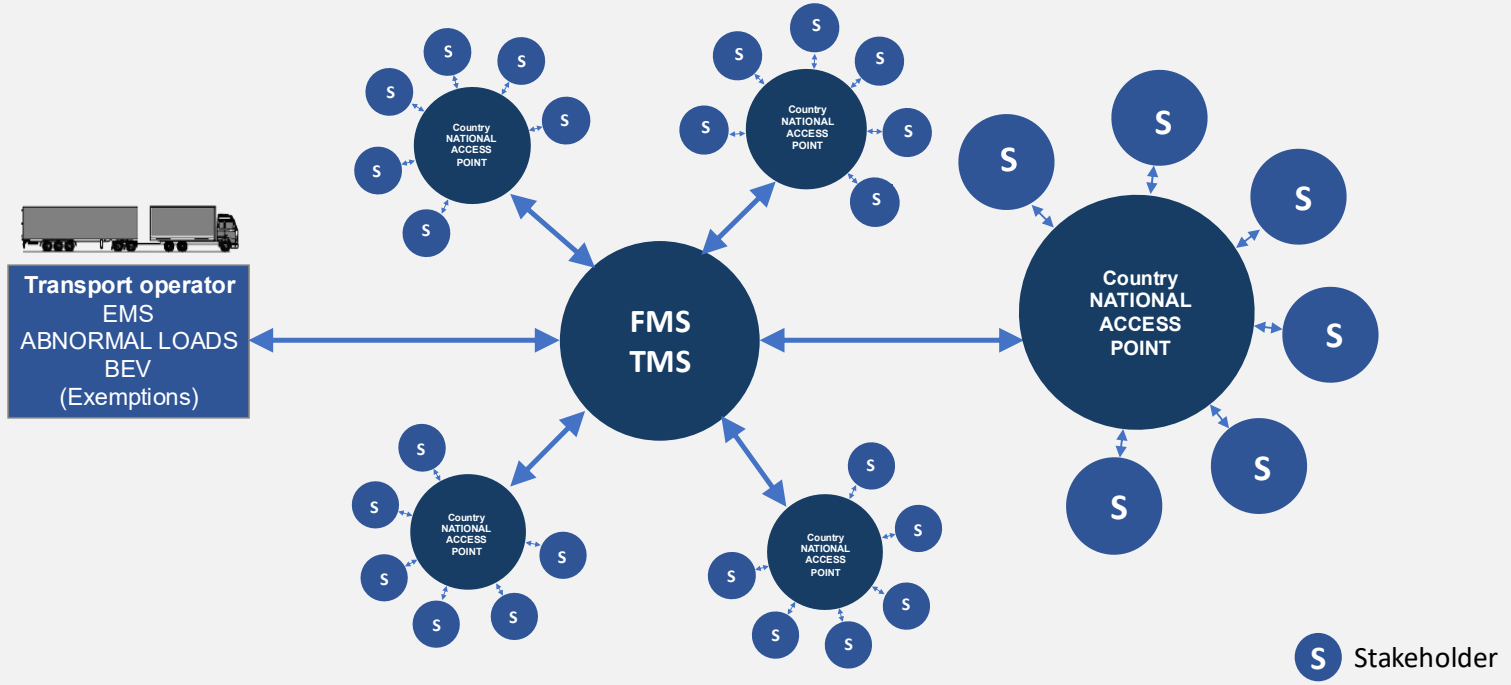
Cross-border architecture

- The proposed approach involves a wide array of stakeholders (data holders and users) connected to the NAP in each country.
- Data exchange between transport operators and relevant national stakeholders occurs through the NAP via FMS/TMS systems
- From a cross-border perspective, this entails for each FMS/TMS to establish connections with all NAPs of European countries



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Challenges across the Building Blocks

Legal and regulatory constraints
Certified planning tools, Data sharing, Cross-border permits

Uneven digital maturity across countries
NAP, standards, coverage, permits

Data availability and quality
Data gaps, Reliability, Up-to-date minimum viable datasets

Governance and Trust
Roles and responsibilities, GDPR, Institutional capacity

Technical and integration
Data exchange architecture, One stop shop functions, Axle weight calculation methods

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Country readiness

ISAC made a detailed assessment implementation potential of the five building blocks in selected countries. Each country's readiness is evaluated based on:

- existing digital infrastructure
- regulatory frameworks
- data availability
- stakeholder engagement
- Ongoing and planned initiatives

Country	BB1	BB2	BB3	BB4	BB5
Ireland	Low 2028-2029	Low 2029	Low 2031+	Low-Medium 2029-2030	Low 2030+
Netherlands	High 2027-2028	Medium 2028-2029	Medium-High 2028-2030	Medium-High 2028-2029	Low-Medium 2030-2031
Sweden	Medium 2027-2028	Medium 2029-2031	Low-Medium 2031+	Medium-High 2028-2029	Low 2030+
Finland	High 2026–2027	Medium-High 2027–2028	Low-Medium 2029–2030	Low-Medium 2030+	Low 2030+
Norway	Medium 2028	Low-Medium 2029-2030	Low 2030+	Medium 2028-2029	Low 2030+

*"Implementation needs to be **phased and adaptable**, building on existing strengths while addressing gaps over time"*

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Conclusions & Recommendations

To foster the effective implementation of IA schemes across Europe, the following next steps are suggested:

- **Establishing legal and regulatory foundations:**
  EU-wide regulation for harmonized IA deployment ; Establish data sharing mechanisms, certified planning tools, and minimum data standards
- **Accelerating digital infrastructure development:**
  Improve National Access Points NAPs ; Harmonise data formats and APIs for cross-border interoperability
- **Enabling secure and trustworthy data exchange:**
  Clarify GDPR roles and responsibilities ; Define frameworks for private data access and use
- **Piloting and scaling IA schemes strategically:**
  Launch targeted pilots EMS, abnormal loads ; Use results to refine architecture and rollout
- **Promote stakeholder engagement and capacity building:**
  Create national IA working groups ; Support training and stakeholder engagement

"With the right legal, technical, and institutional frameworks, IA schemes can become a foundational element of Europe's future transport system"

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Some important reflections

- The transition to Intelligent Access is not merely a technical upgrade; it represents a paradigm shift in how road freight is governed.
- It requires a cultural change in the relationship between public authorities, transport operators, and technology providers, fostering collaboration and trust in data-driven decision-making creating a win-win scenario.
- The transition will require coordinated action at both national and EU levels, but the benefits - in terms of efficiency, safety, and sustainability - make it a worthwhile investment.

Thank you for your attention...

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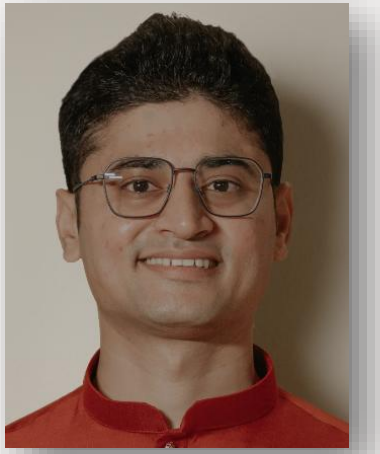

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