Understanding the multimodal transport ecosystem
Initial results and next steps in ReMuNet project

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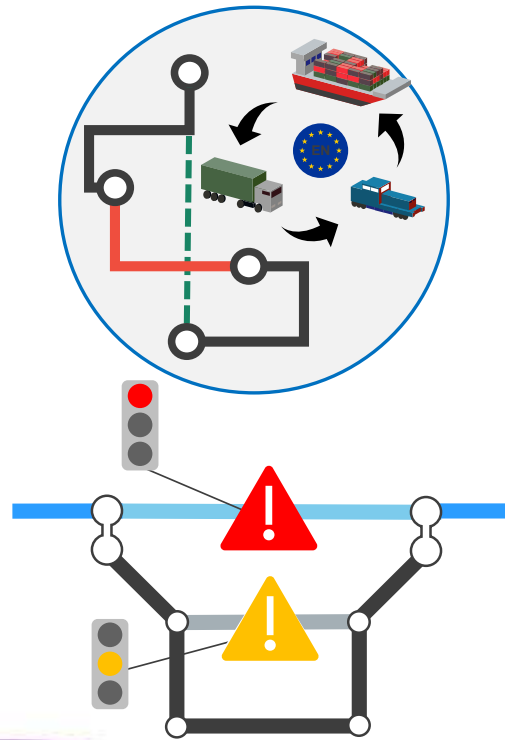**ReMuNet**
Pioneering resilient and adaptive
multimodal transport networks

ReMuNet aims to increase resilience of European multimodal freight transport networks

European transport networks

Understanding
of multimodal transport networks and description of the effects of disruptive events

WP 1
▶ ReMuNet ontology
▶ Typology of disruptive events

Reference model

Calculation
of multimodal transport route options against the background of disruptive events

WP 2
▶ Replication of the infrastructure and its utilisation
▶ Route planning algorithm

Industrial application

Empowerment
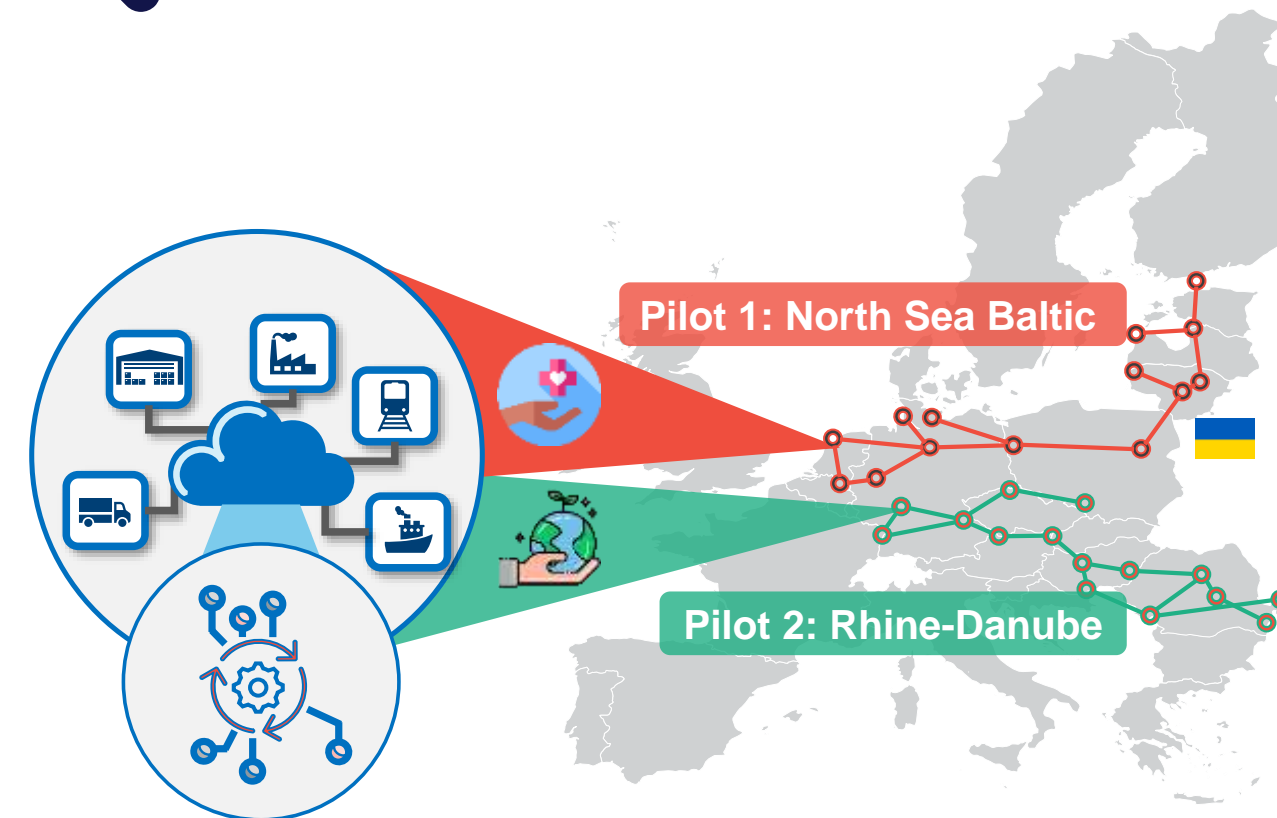for collaborative synchromodal freight transport

WP 3
WP 4
▶ Collaborative platform
▶ Self-learning algorithm

Piloting and improvement
system-optimising transport and route allocation

WP 5
WP 6
▶ P1: Social use case
▶ P2: Ecological use case

Pilot 1: North Sea Baltic

Pilot 2: Rhine-Danube

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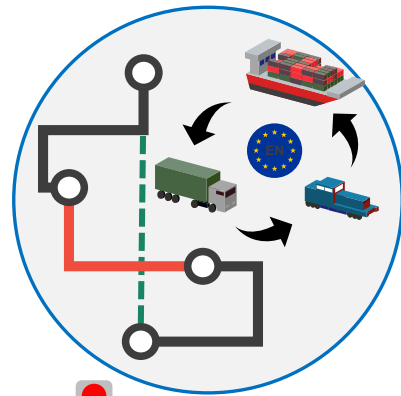
WP1: Developing European multimodal transport ontology and classifying disruptive events and their impact on transport networks

European transport networks

Understanding of multimodal transport networks and description of the effects of disruptive events

WP 1
▶ ReMuNet ontology
▶ Typology of disruptive events
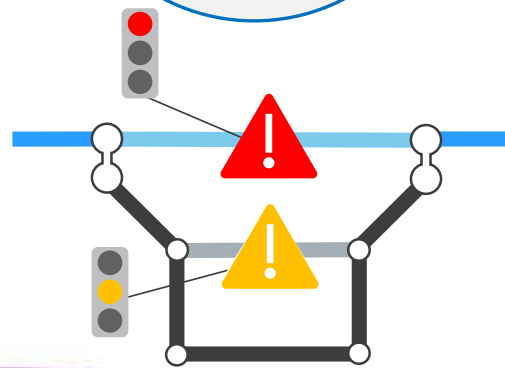
WP Objectives

To understand the impact of disruptive events on transport chains and analyze mitigation alternatives

To lay the foundation for common standards to describe sustainable European multimodal transport networks
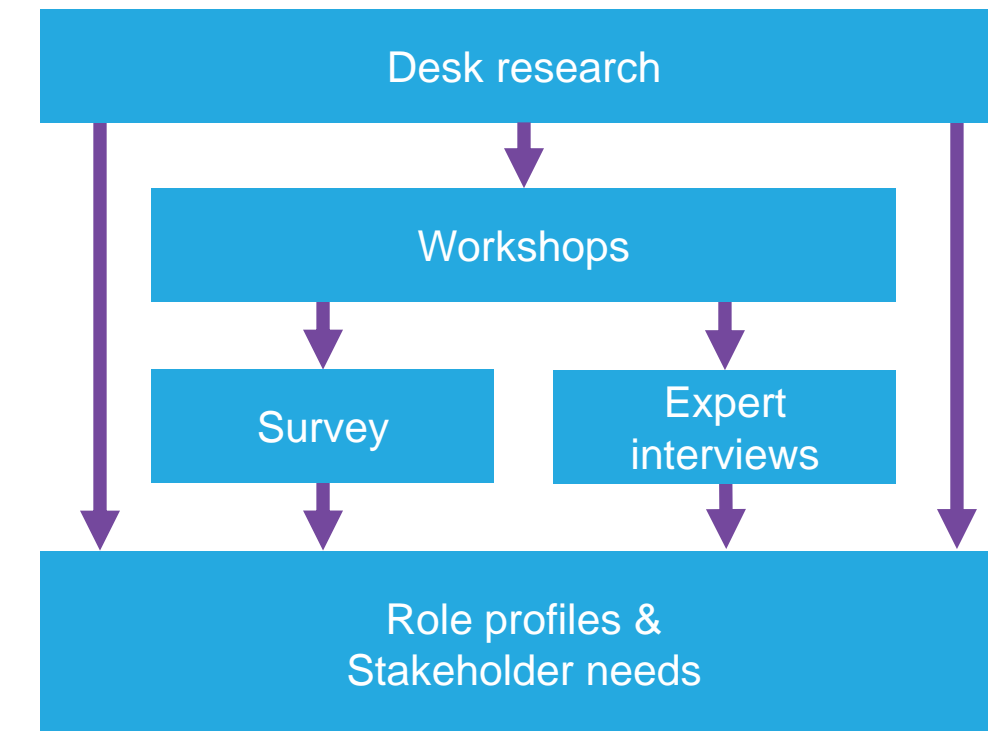
Deliverable 1.1 Objective

Identify relevant stakeholders for multimodal transport and analyse their needs

Survey and in-depth interviews were essential for stakeholder analysis.
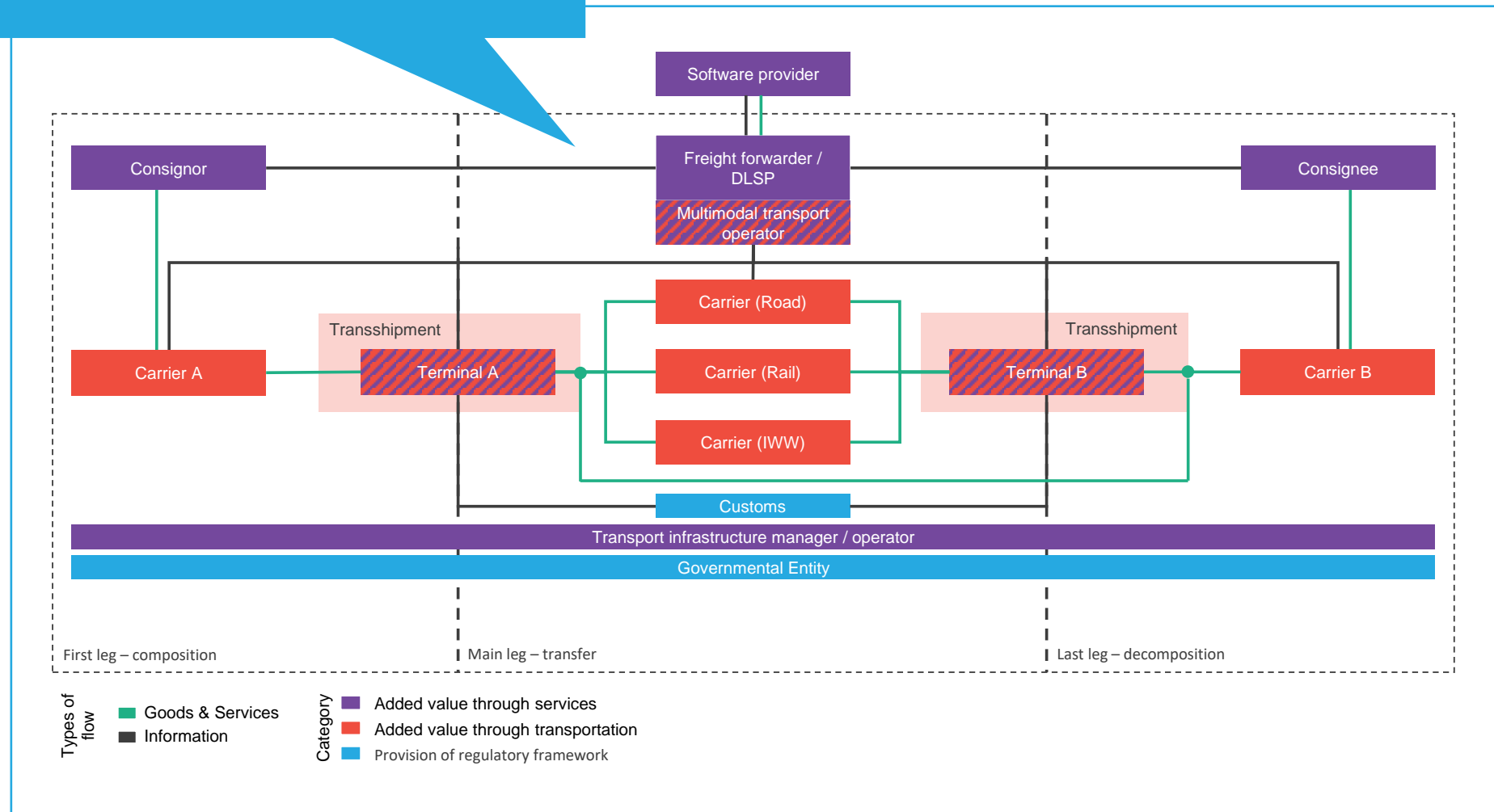
Thank you for participating!

Research design for the stakeholder needs analysis

| Understand multimodal freight transport ecosystem and create role profiles of key stakeholders | Analyse disruption types impacting different stakeholders | Identify stakeholder-specific challenges in the face of these disruptive events | Derive stakeholder needs to address these challenges and summarise implications for ReMuNet |

Desk research

Workshops

Survey | **Expert interviews**

Role profiles & Stakeholder needs

- Online Survey with SARIL promoted at ALICE webinar and social media channels provided insights for interviews

- Semi-structured interviews with 24 freight transport representatives from ten different European countries

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Multimodal freight transport process and stakeholder role profiles

Multimodal freight transport process

Information flows between roles and role profiles
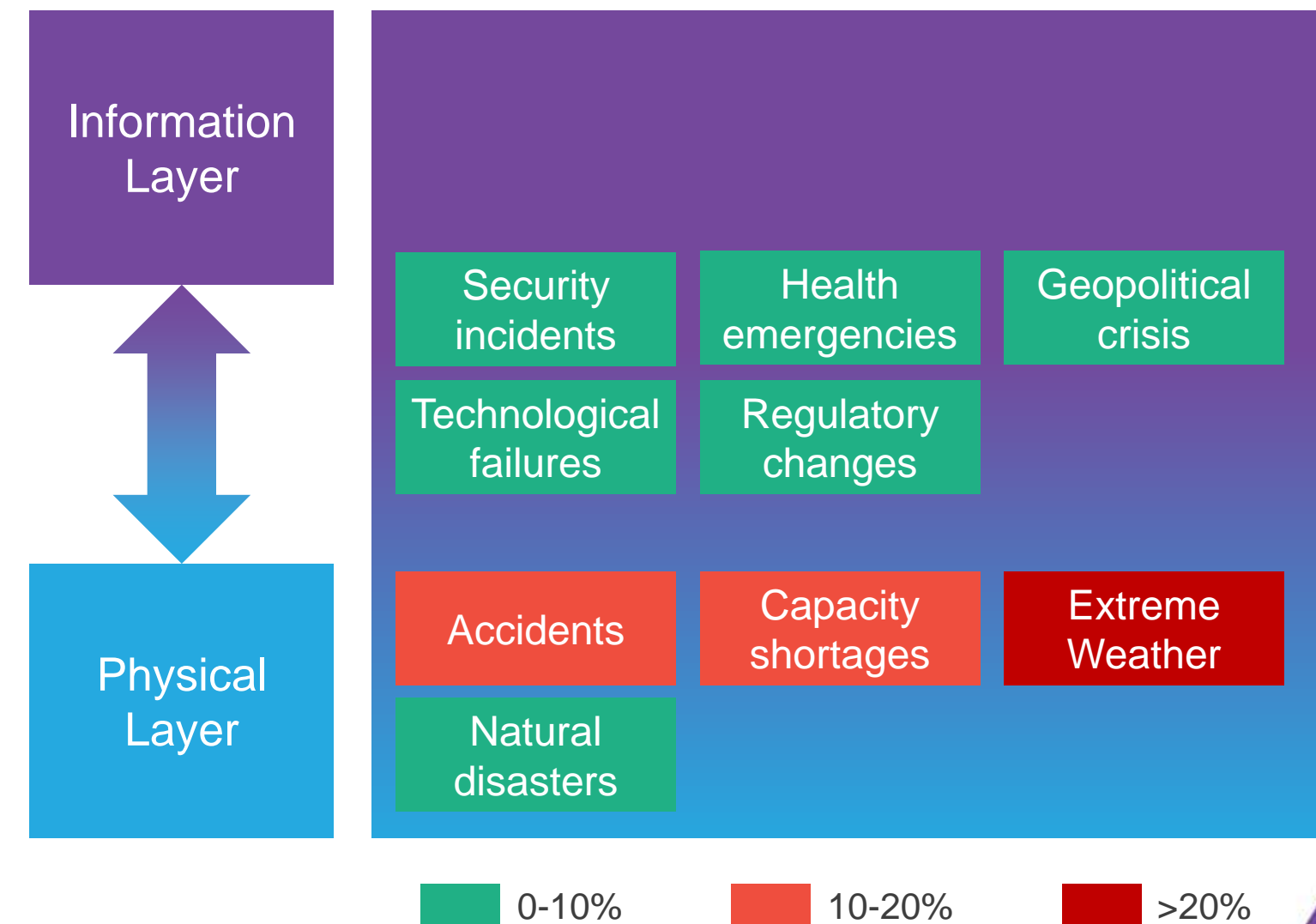
Extreme weather events have highest disruptive impact on freight transportation

Carriers are most affected by disruptions

Pie chart segments:
- Carrier 50%
- DLSP and Software Provider 26%
- Infrastructure Manager/Operator 9%

Expanded bar (from Carrier):
- Rail 24%
- Road 13%
- IWW 13%

Legend:
- Consignor/Consignee
- Freight Forwarder/Multimodal Operator
- Infrastructure Manager/Operator
- Terminal
- DSLP and Software Provider
- NGO
- Carrier
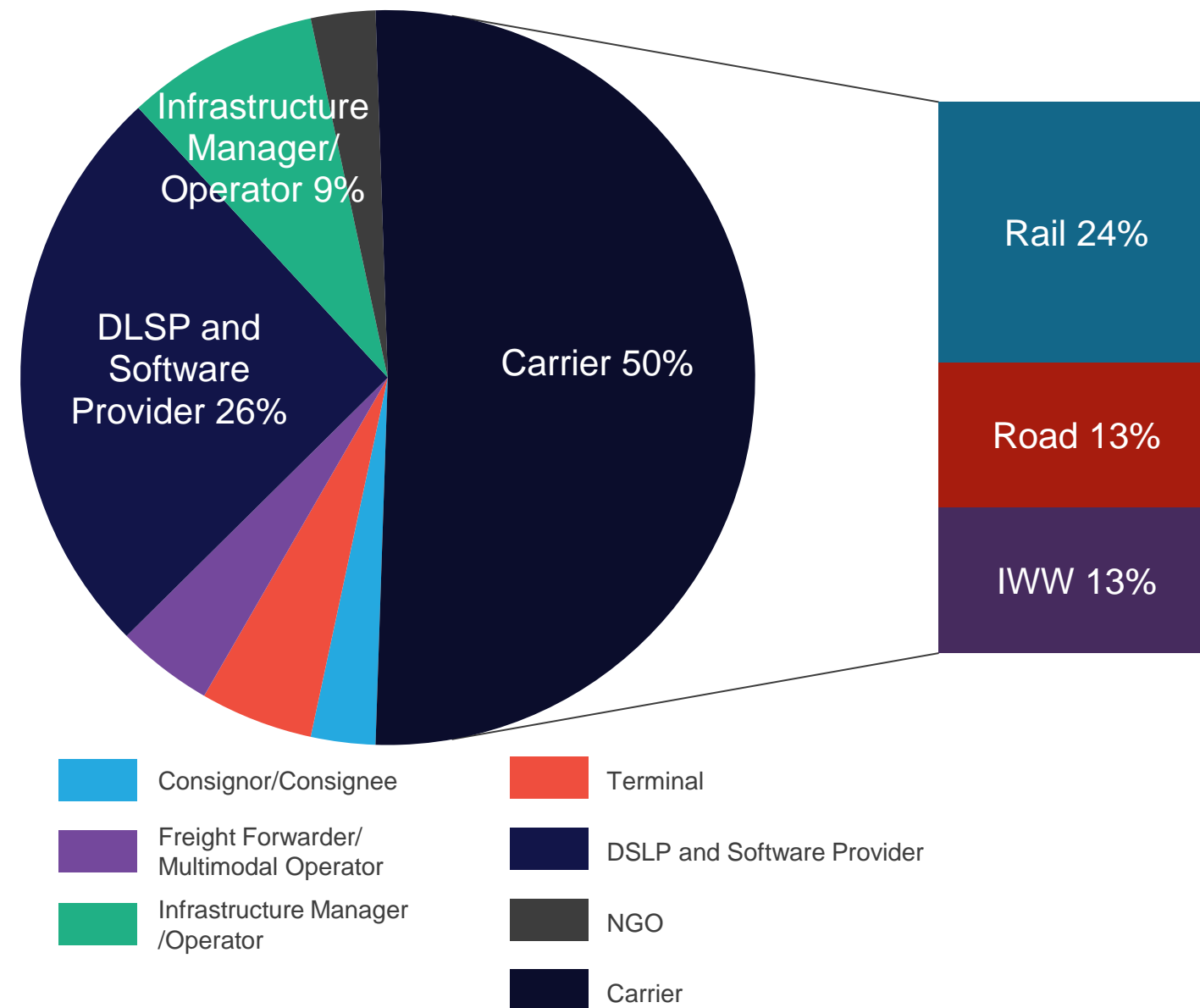
Most disruptions affect the physical layer; extreme weather events take the top spot

Information Layer

Physical Layer

- Security incidents
- Health emergencies
- Geopolitical crisis
- Technological failures
- Regulatory changes
- Accidents
- Capacity shortages
- Extreme Weather
- Natural disasters

Legend:
- 0-10%
- 10-20%
- >20%

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Most industry-wide challenges occur in the information layer and in the context of regulatory issues

Regulatory factors cause most challenges

Bar chart categories (top to bottom):
- Regulatory factors
- Data management and quality
- Information exchange
- System interoperability and adotion
- Capacity management
- Vulnerability of rail network
- Infrastructure limitations
- Human resources
- Cost and economic factors

Axis: 0,00% 25,00% 50,00%

Legend:
- Infrastructure related factors
- Regulatory factors
- Socio-economic factors
- Technology factors

Most challenges occur in information layer

Information Layer

- Data Mgmt. and Quality
- Information Exchange
- System interoperability and adoption
- Capacity Management
- Regulatory Factors
- Human Resources
- Cost and economic factors

Physical Layer

- Infrastructure Limitations
- Vulnerability of Rail Network

Legend:
- 0-10%
- 10-20%
- >20%

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ReMuNet needs to address the top stakeholder needs in the information layer

Top challenges information layer

1. Data management and quality
2. System interoperability and adaption
3. Information exchange
4. Regulatory factors
5. Capacity management

Top stakeholder needs

1. Data standardisation and automation
2. Integrated digital solutions
3. Facilitated data exchange and collaboration
4. Streamlined transport regulations
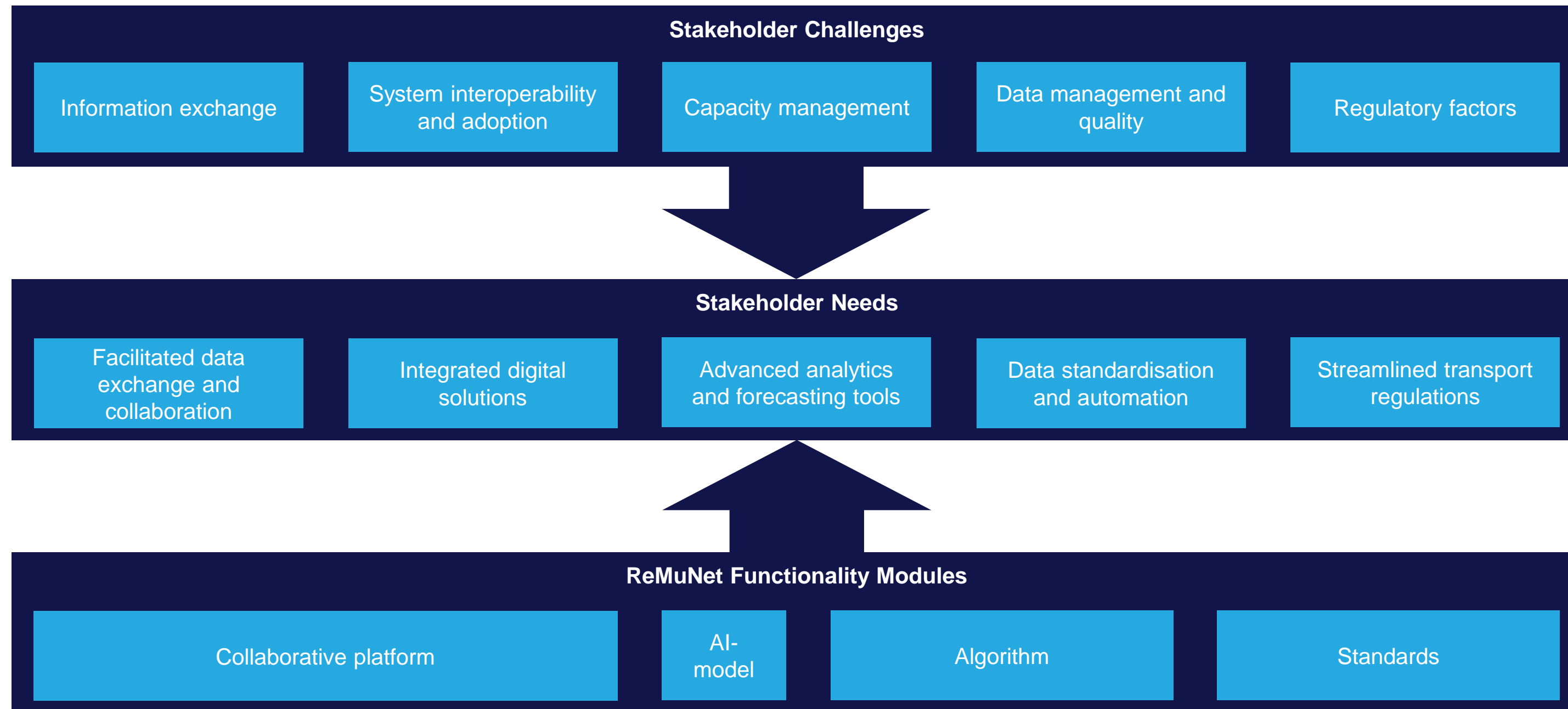5. Advanced analytics and forecasting tools

ReMuNet functionalities must be designed to adress stakeholder needs

Stakeholder Challenges

| Information exchange | System interoperability and adoption | Capacity management | Data management and quality | Regulatory factors |

Stakeholder Needs

| Facilitated data exchange and collaboration | Integrated digital solutions | Advanced analytics and forecasting tools | Data standardisation and automation | Streamlined transport regulations |

ReMuNet Functionality Modules

| Collaborative platform | AI-model | Algorithm | Standards |

You can download the complete Deliverable for free on our ReMuNet website

https://remunet-project.eu/deliverables/
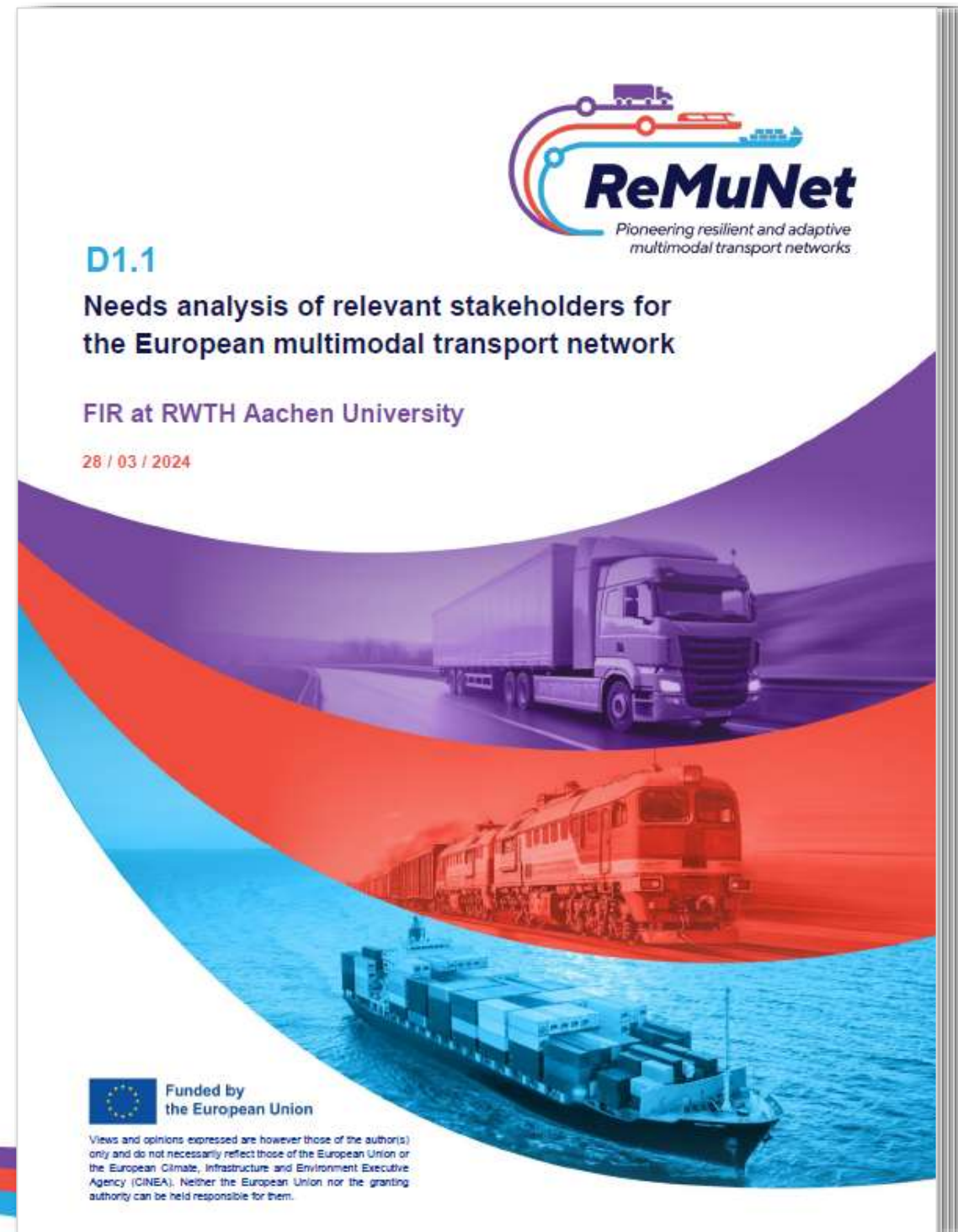
To provide superior customer value we need to understand the CT **ecosystem** dynamics

Stakeholder Challenges

Information exchange	System interoperability and adoption	Capacity management	Data management and quality	Regulatory factors

Stakeholder Needs

Facilitated data exchange and collaboration	Integrated digital solutions	Advanced analytics and forecasting tools	Data standardisation and automation	Streamlined transport regulations

ReMuNet Functionality Modules

Collaborative platform	AI-model	Algorithm	Standards

ReMuNet T3.2 aims to map the current and develop a future CT ecosystem

Purpose

PRESENT

Map **current multimodal transport ecosystems** for focus **corridors**

Identify and visualize **deficiencies** and **pain points**

Define the **value proposition** of ReMuNet

FUTURE

Visualize the **new value creation system**

Develop ReMuNet **platform** and its core **service portfolio**

Derive **service offerings** based on requirements

Survey

Participants: **European stakeholders** in **multimodal transportation**

Focus on

- **roles** in multimodal transportation,
- **actors** in **TEN-T focus corridors**,
- relevant **transport modes**,
- role-specific **business models** and **IT systems**,
- **exchange relationships**

anonymous

Expected outcome

Comprehensive understanding of **current multimodal transport ecosystems** in the North Sea-Baltic and Rhine-Danube corridors

Detailed **list** of ReMuNet **core services** derived from the catalog of requirements, enabling a **function-based selection of partners**

A new and visualized **ecosystem blueprint** based on redesigned value streams

Enhanced **collaboration with industry partners** through workshops, leading to an **accepted and effective ReMuNet platform**

While our initial data collection focused on the individual, we are now focusing on the interaction between roles

	Task 1.1: Stakeholder-level	Task 3.2: Ecosystem-level
Content	Individual **role**	Individual **role** (**elaborated**)
	Individual **challenges**	Activities and **actors in TEN-T** corridors
	Impact of **disruptive events**	**Business** and **operating models**
		Exchange relationships
		Requirements for a digital platform
Methodology	Expert's **interviews**	Online **survey**
	Online **survey**	Validation **interviews**
		Co-creation **workshops**
Value for practitioners	Awareness of the needs and challenges of individual stakeholders	Understanding of the mechanisms of value creation and requirements for a digital platform of the individual actors

Within ReMuNet T3.2 the survey is the central mode of data collection

Join our survey and shape the future of European multimodal transport!

Your voice matters!
Help us enhance resilience and efficiency in freight transport and logistics across Europe

Why participate?
- ✓ Influence future transport policies and systems
- ✓ Ensure your needs and perspectives are heard
- ✓ Be part of innovative solutions for current transport challenges
- ✓ Your input will directly impact the ReMuNet project
- ✓ If interested, you will receive the deliverable in which your survey results have been directly incorporated

Act now!
- ✓ Complete the survey
- ✓ Visit https://forms.office.com/e/3sDkBHnu9J
- ✓ or scan the QR code to participate

Need help?
Contact us at lars.klapper@fir.rwth-aachen.de for any questions

Thank you for your valuable contributions!

https://forms.office.com/e/3sDkBHnu9J

www.remunet-project.eu

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