Project presentation

Manufacturing as a Service to increase resilience in value networks



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MAASive

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MAASive project and team

Coordinated by Aalborg University, with partners across Europe

Academic partners

Aalborg University Politecnico di Milano

TUHH Centrale Nantes

Technology partners

SmartOpt TXT

Use-case partners

Kamstrup Arçelik

Value-chain partners

Beko ILPEA ETK EMS



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MAASive in numbers

A Horizon Europe project, Grant Agreement No. 101138040

Duration

36 months

Budget

€5.7 million



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Aim and objectives

One aim, four specific objectives

Aim

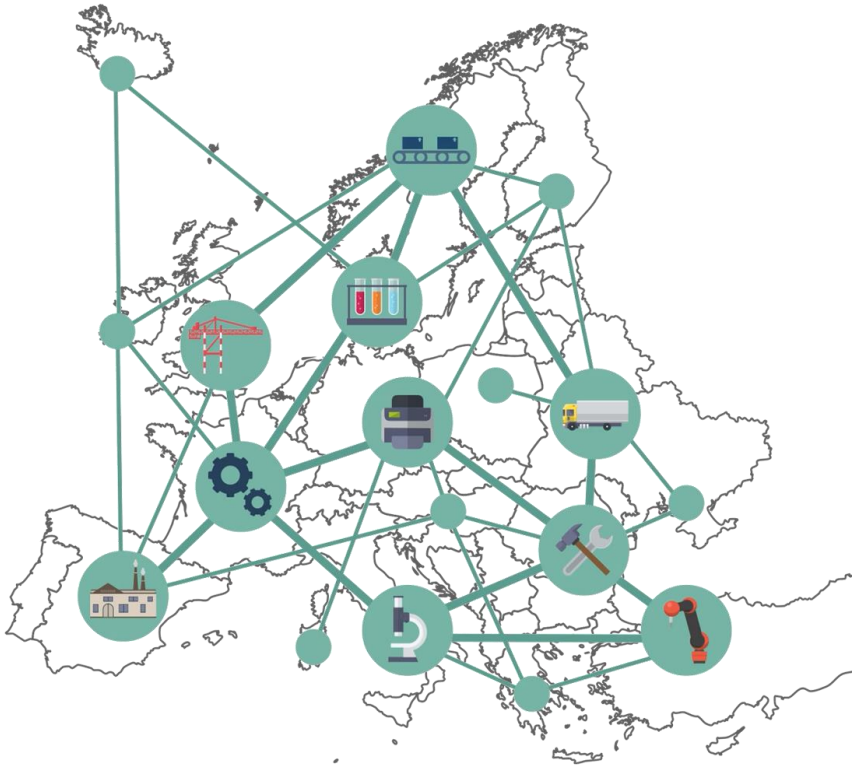
Develop models of **resilient value networks** to assess the impact of unforeseen events, and to **servitize existing manufacturing assets** in multiple organizations, so they can be orchestrated and re-orchestrated to address such events.

SO1
How to servitize manufacturing?

SO2
How to respond to disruptions using MaaS?

SO3
How to connect service providers and service consumers?

SO4
How to coordinate the re-orchestrated value network?



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Value networks: build, orchestrate, operate

Three decision levels; operation feeds back to orchestration and to building



Strategic level

Value network building

Servitize processes and connect providers.

Tactical level

Value network orchestration

Choose the best alternative when disruptions hit.

Operational level

Value network operation

Plan, run and monitor production.

Re-orchestrate

Rebuild

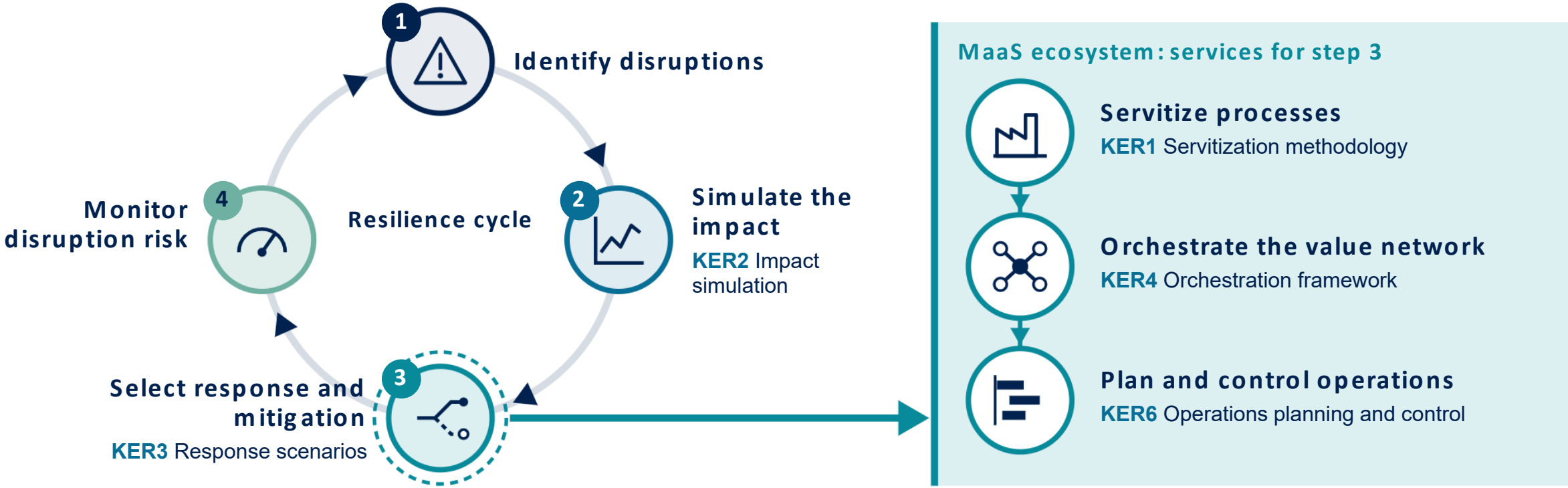
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Results: MaaS-based resilient manufacturing

A resilience cycle whose response step draws on a MaaS ecosystem of manufacturing services



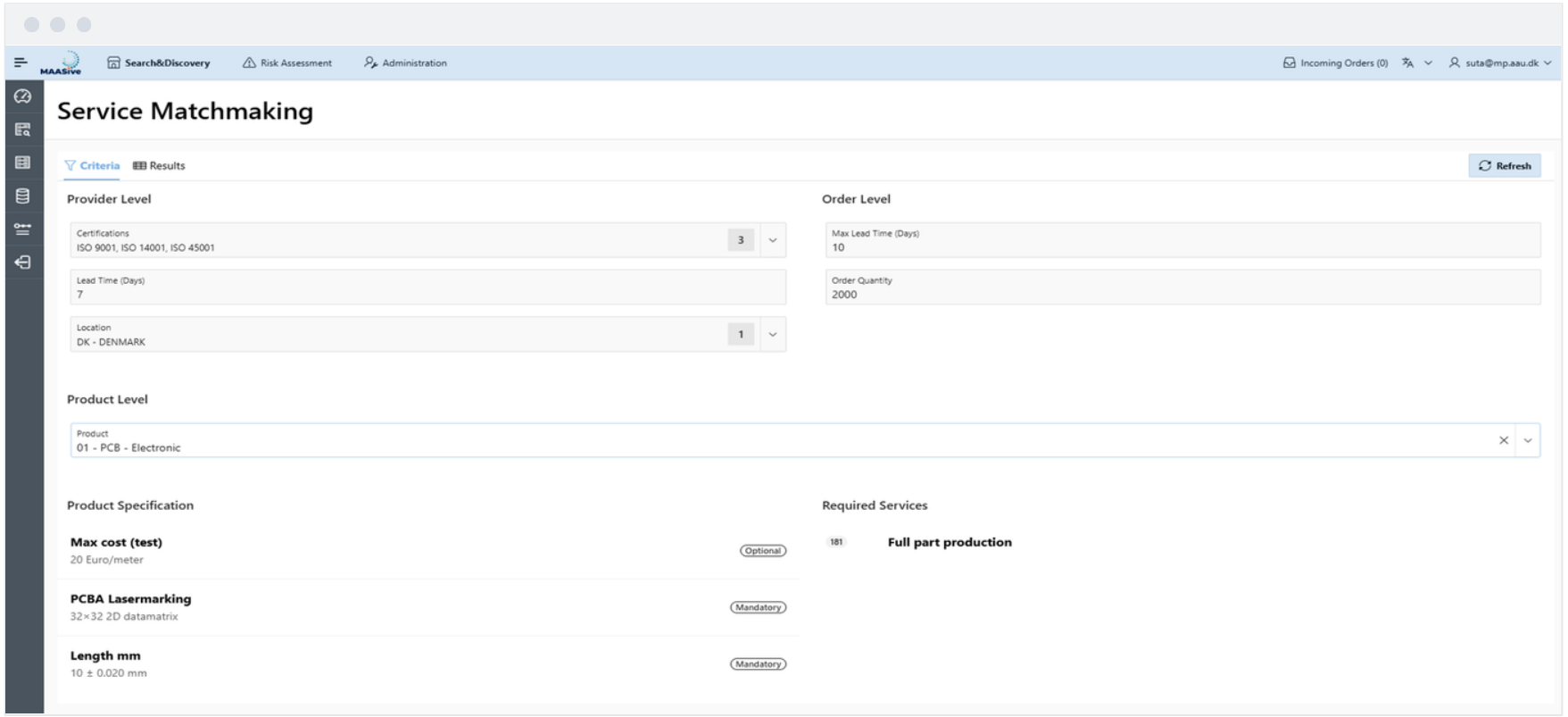
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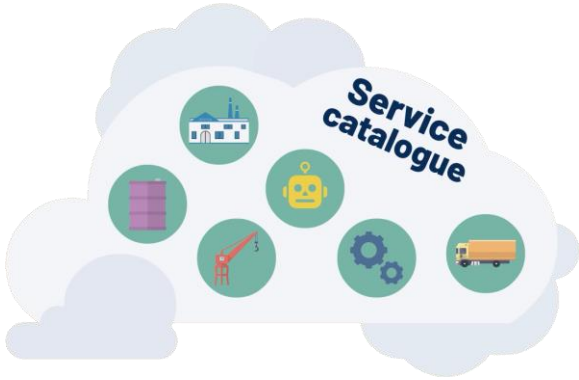
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Toolkit: service definition and matchmaking

Providers publish their processes as services; consumers find and match them



Screenshot: MAASive platform, service matchmaking



Service definition

Processes described as services in a shared catalogue

Matchmaking

Consumers matched with suitable providers

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Platform: disruption and impact simulation

Simulation shows where a disruption hits and how hard

Disruption scenarios

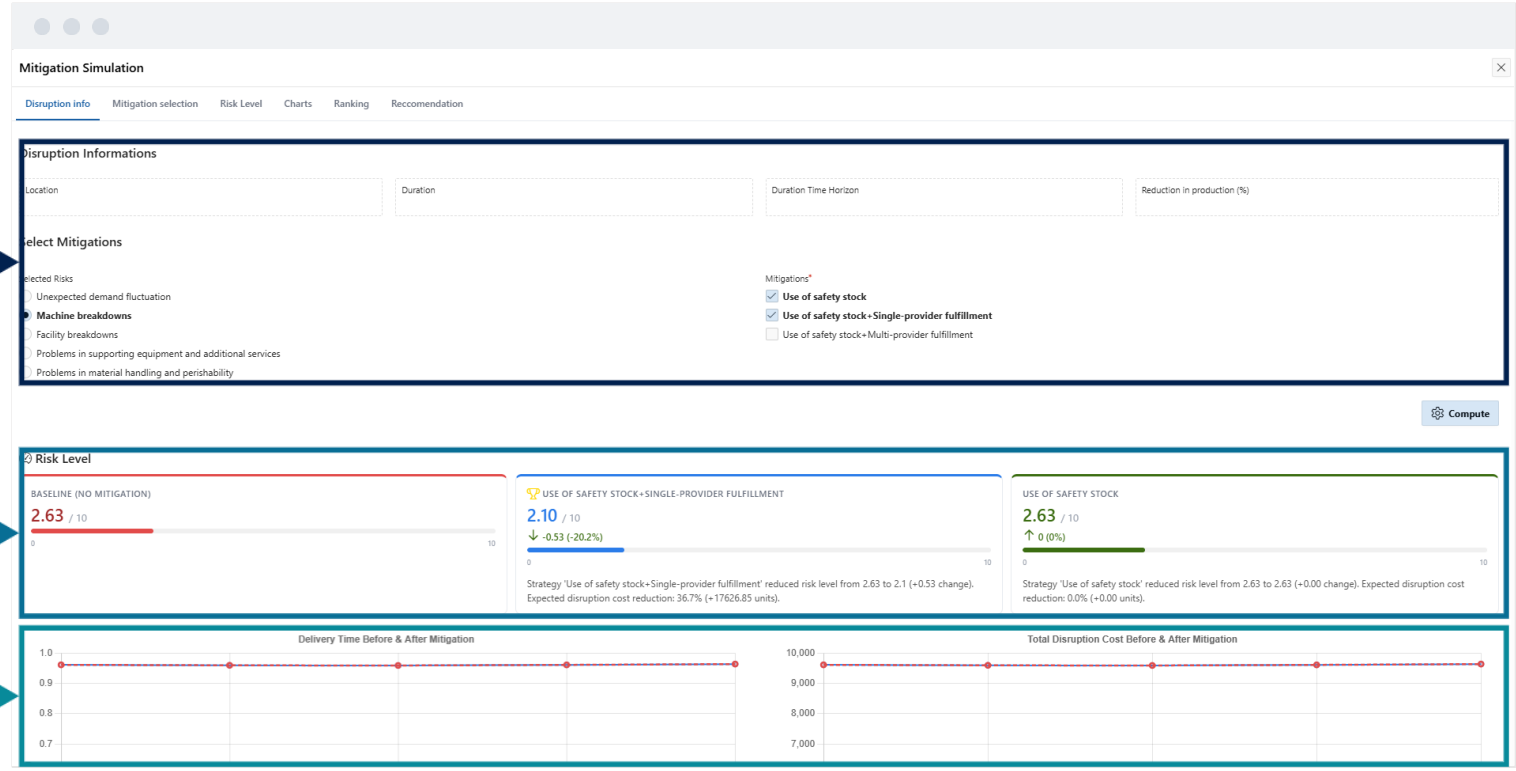
Scenarios across the supply-chain network

Risk levels

Likelihood and impact of each disruption

Response basis

Comparison of alternative response strategies



Screenshot: MAASive platform, disruption simulation

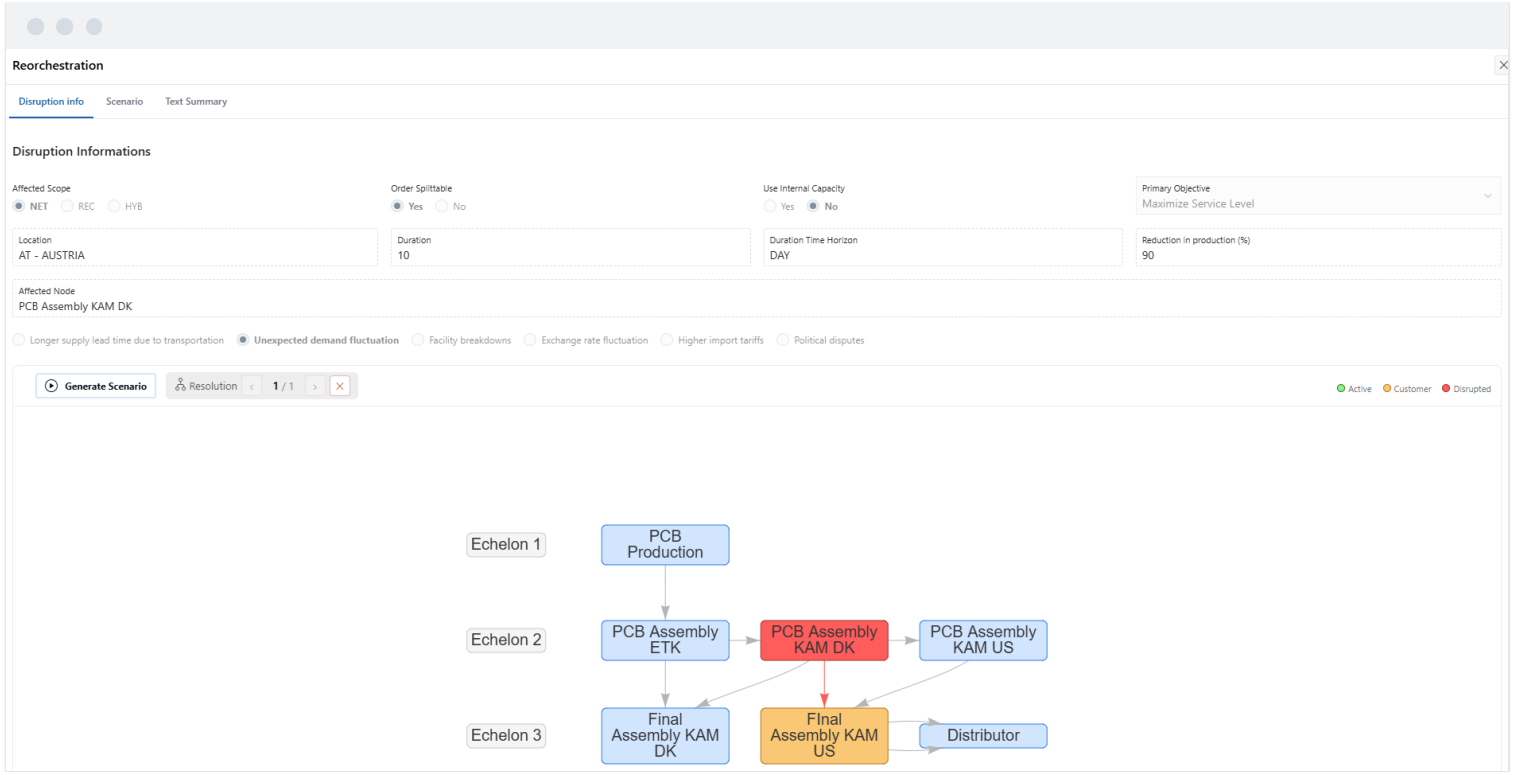
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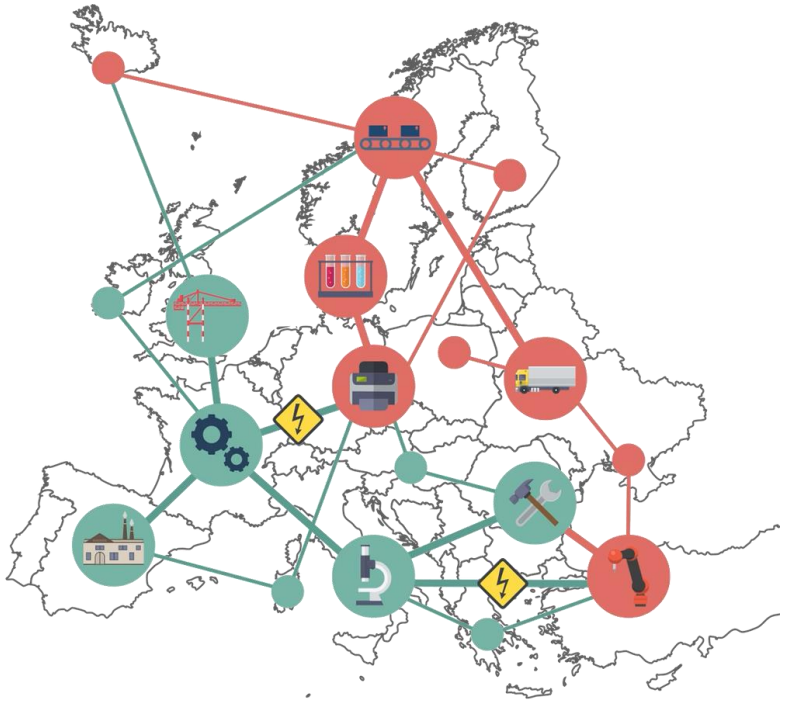
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Toolkit: alternative orchestrations

When a node fails, the platform proposes alternative routes through the value network





Screenshot: MAASive platform, alternative orchestrations

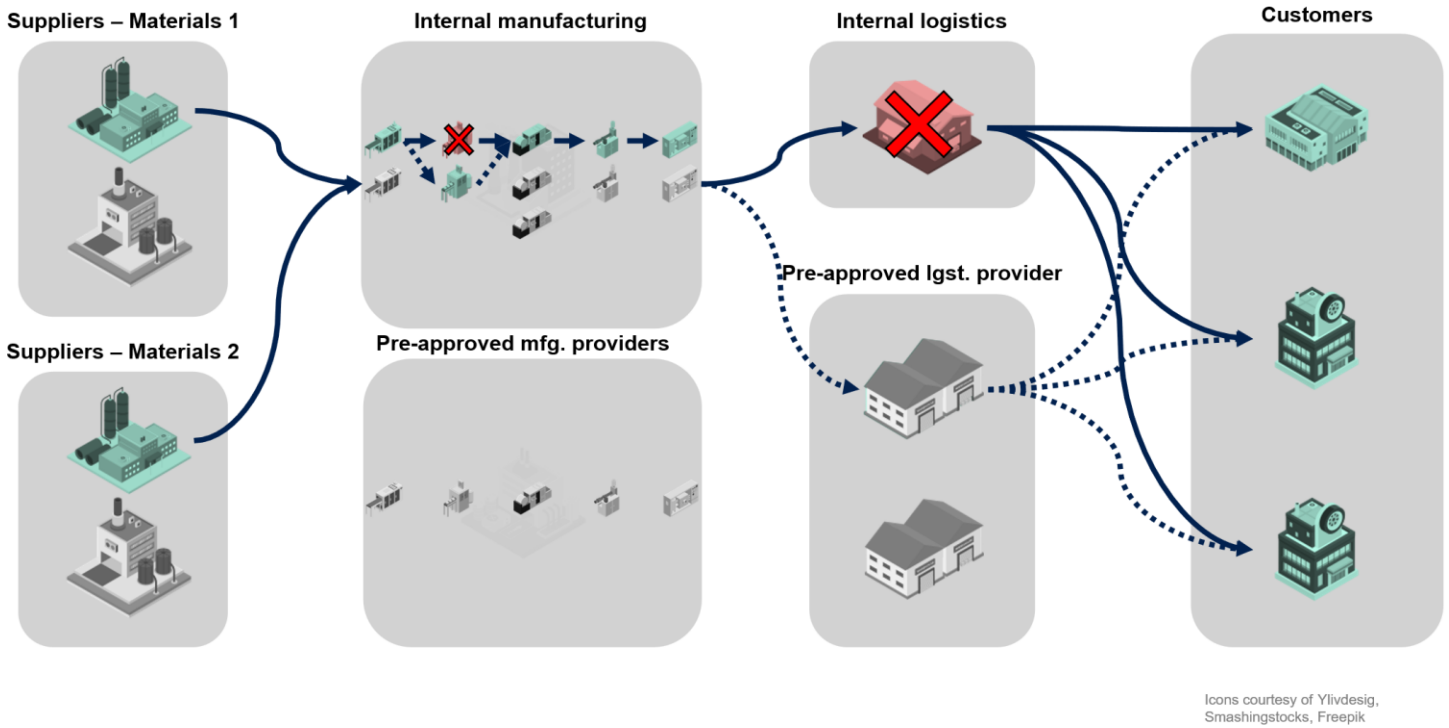
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Toolkit: orchestration and reconfiguration

Three models, from rerouting between companies to reconfiguring inside one



N **Model NET**

Re-allocates demand to pre-approved alternative providers when a node fails.

R **Model REC**

Reconfigures production inside a facility: backup machines, shifts, stock or external services.

H **Model HYB**

Combines both, routing processes across internal and external facilities.

Figure: MAASive deliverable D2.7

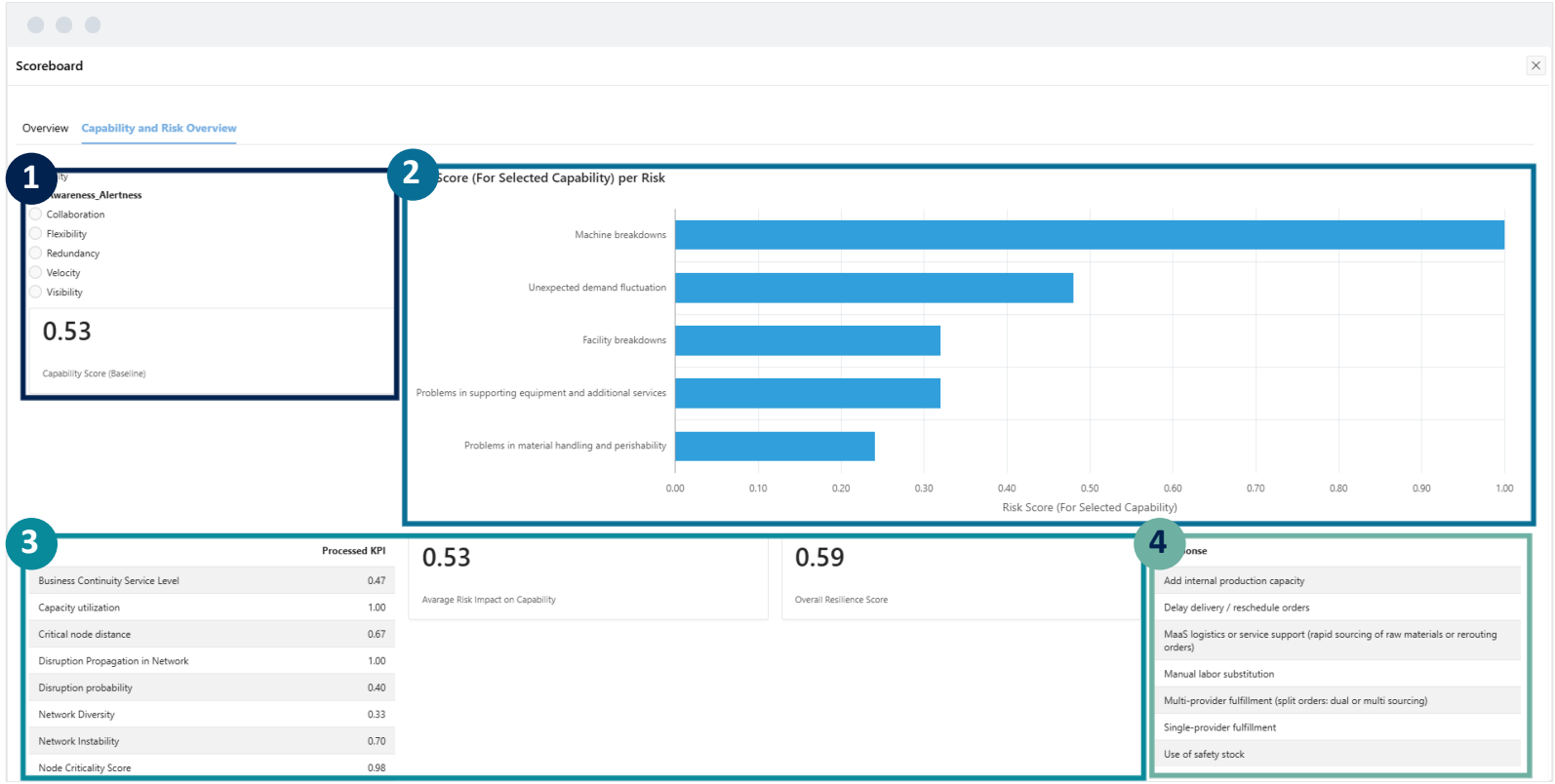
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Toolkit: resilience scoreboard

Scores each value network's resilience, from capability and risk to KPIs and responses



Screenshot: MAASive platform, resilience scoreboard

1. Capability score

Baseline score for the selected resilience capability

2. Risk per disruption

Which disruptions hit that capability hardest

3. KPIs and score

Processed KPIs roll up into one resilience score

4. Response options

Candidate responses, from safety stock to MaaS sourcing

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Arçelik/BEKO pilot: a gasket supply disruption

ILPEA (Manisa, Romania) supplies door gaskets to Arçelik Eskişehir and Beko Romania every day



Step 1
Disruption

A raw-material shortage at an ILPEA plant puts the gasket supply at risk.

Step 2
Impact

Simulation shows which customer plants are affected, and when.

Step 3
Alternatives

The platform proposes other ILPEA plants and lines for the gasket.

Step 4
Action

The order goes to the alternative plant and the trucks are followed to delivery.

Supplier selection and negotiation **stay with Arçelik's teams**; the platform gives them the data to decide.

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Arçelik/BEKO pilot: first outcomes and lessons

Indicative pilot results in the Beko–ILPEA value network (source: Arçelik)

Disruption assessment

Before Days

With MAASive **Within a day**

From days to " within a day"

to assess a disruption and identify possible responses

Scenarios evaluated

Before A handful



With MAASive **Hundreds**

From a handful to hundreds

of alternative scenarios that can be compared

Collaboration

Before Separate views



With MAASive **One shared view**

One shared view

of Beko and ILPEA plants, capacities and risks

Lessons learned

- **Data sharing**
  needs trust and clear rules
- **Set-up**
  modelling the network still takes manual effort
- **Usability**
  users need guidance on risks and results
- **Critical mass**
  value grows as more companies join

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