



NebulOuS

A meta operating system for brokering hyper-distributed applications on Cloud computing continuums

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OUR VISION

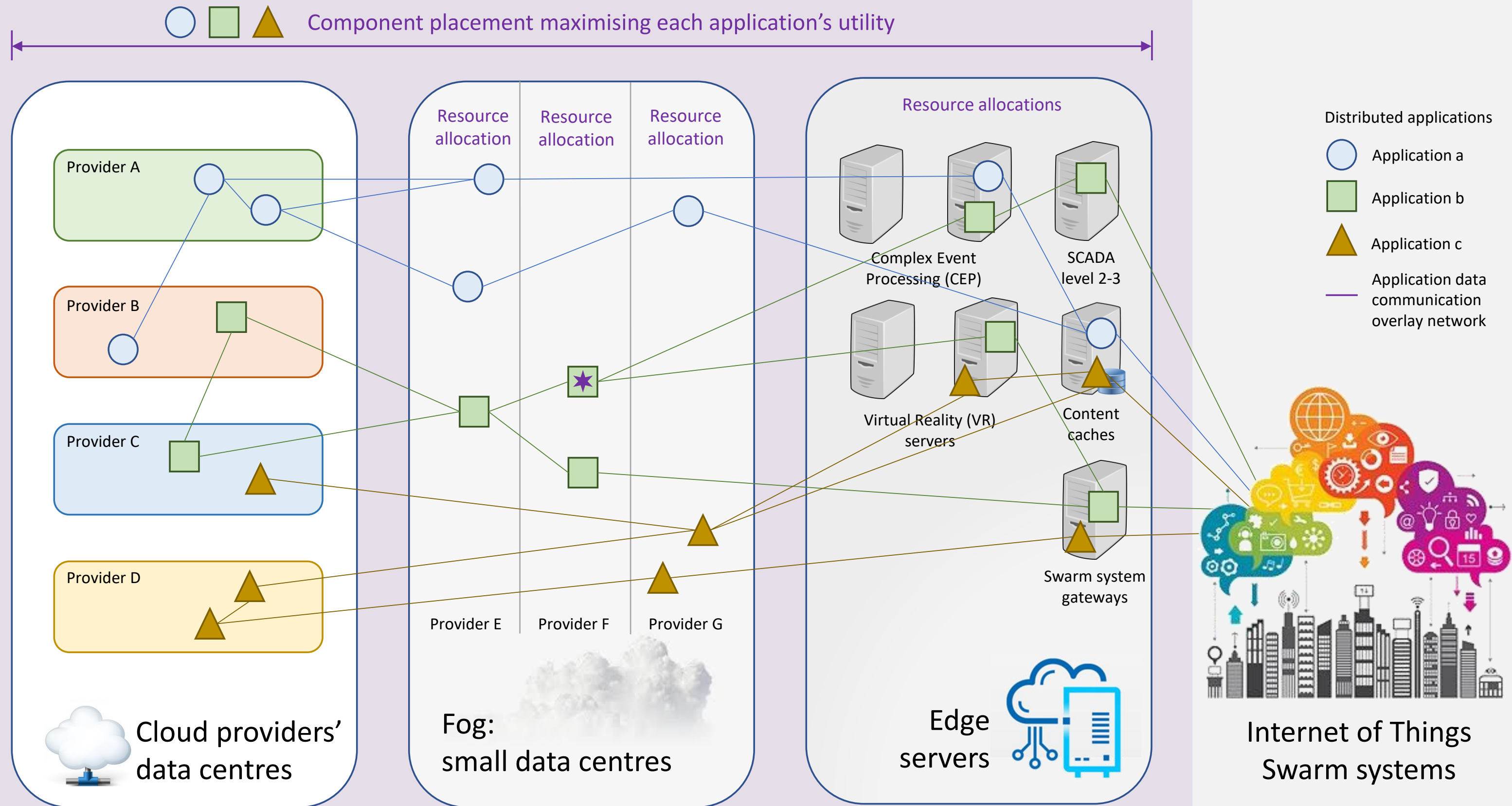
NebulOuS will develop a novel Meta Operating System and platform that seamlessly exploit edge and fog nodes, in conjunction with multi-cloud resources.



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The challenge

Rented resources available



Operating systems



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Operating system	NebulOuS
Kernel	<ul style="list-style-type: none">• MetaOS = OS per node
Hardware management	<ul style="list-style-type: none">• Advanced multi-source resource brokerage• Semantic SLA monitoring and enforcement
Input/Output	<ul style="list-style-type: none">• Distributed Event Management System• MQTT Data stream monitoring• Application level sensors
Networking	<ul style="list-style-type: none">• Secure data overlay among application nodes
Security	<ul style="list-style-type: none">• Role-based access control (RBAC)• AI based anomaly detection
User interface	<ul style="list-style-type: none">• NebulOuS Graphical User Interface



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KEY FEATURES



Tools for modelling application topologies, requirements and data streams



Multi-criteria resource brokerage



Smart-contract backed non-repudiable service level agreement monitoring



Reactive & proactive reconfiguration of applications



Unified security for cloud computing continuums



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Tools for modelling
application topologies,
requirements and data
streams

- Application modelling language based on Open Application Model to express:
 - Application topology, scalability and requirements
 - Service level objectives
 - Optimization criteria
- Specialized semantics for expressing data-stream processing-oriented applications and workflow-oriented applications.



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Multi-criteria
resource brokerage

- Tools for managing edge and fog computing nodes as well as cloud service provider accounts.
- Multi-criteria decision-making methods for computing offerings considering all dimensions of consumer requirements.



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Smart-contract
backed non-repudiable
service level
agreement monitoring

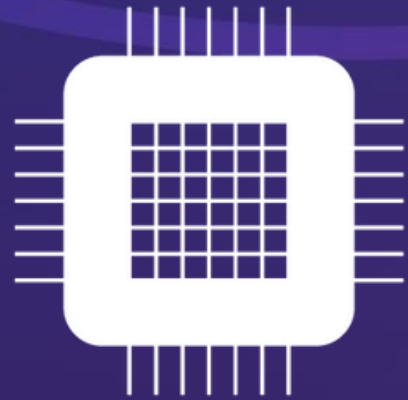
- Smart-contract backed service level agreement with computing resources providers.
- Constant monitoring of service level fulfillment.



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Reactive &
proactive
reconfiguration of
applications

- Application service level objective monitoring and forecasting to detect the need for re-configuration.
- AI driven anomaly detection.
- Optimization of application deployment topology based on expressed needs, preferences and resources availability.



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Unified security
for cloud computing
continuums

- Creation of an isolated computing clusters for each application.
- Secure virtual network to communicate cluster nodes.
- Centralized RBAC for the management of the computing cluster.



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Demonstrators



**Windmill
maintenance**

Energy and utilities



**Computer vision for
city maintenance**

Smart City



**Precision
agriculture**

Agriculture



**Fresh food
supply**

Transport and logistics



**Crisis
management**

Environment

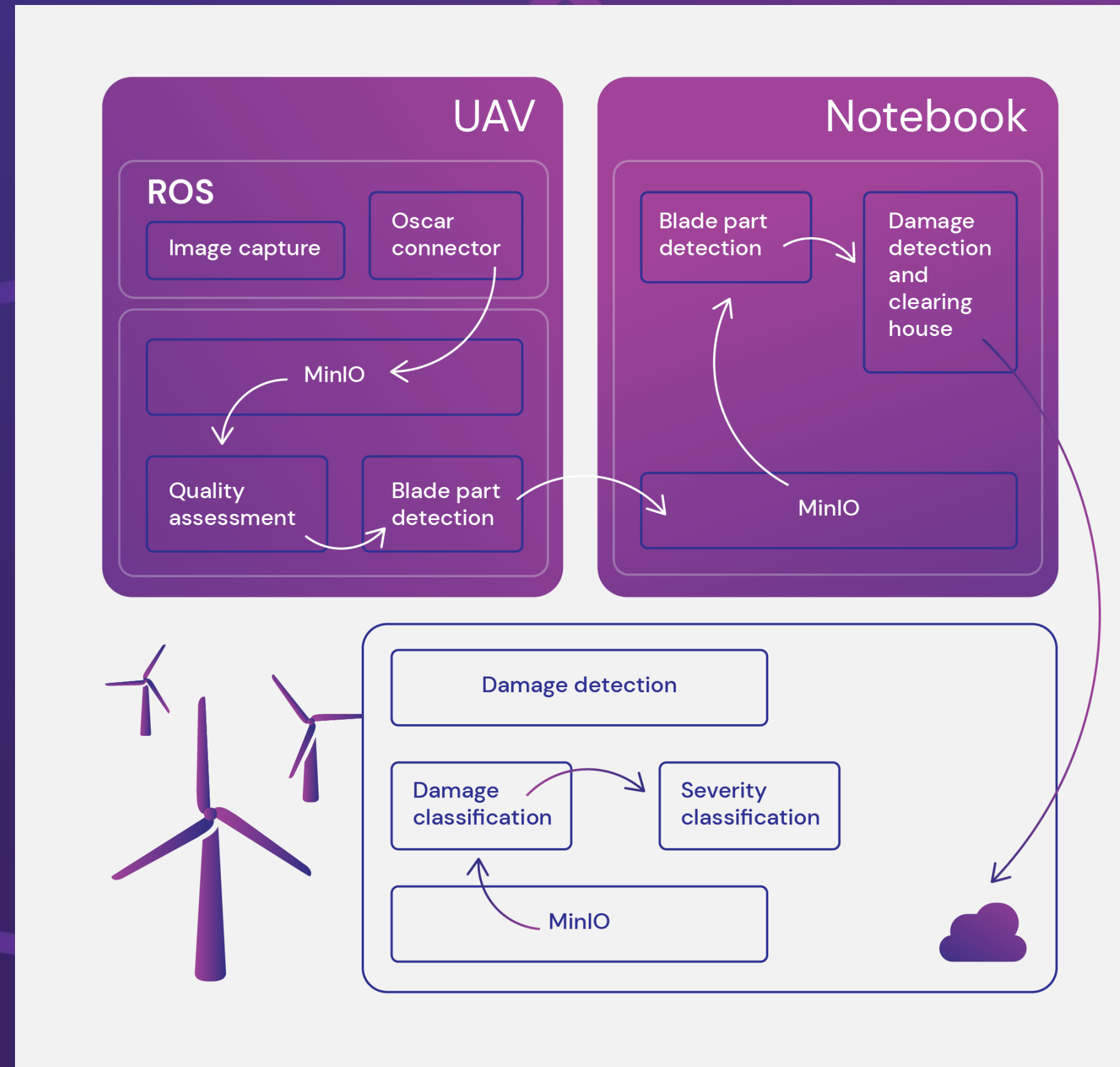


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Renewable energy



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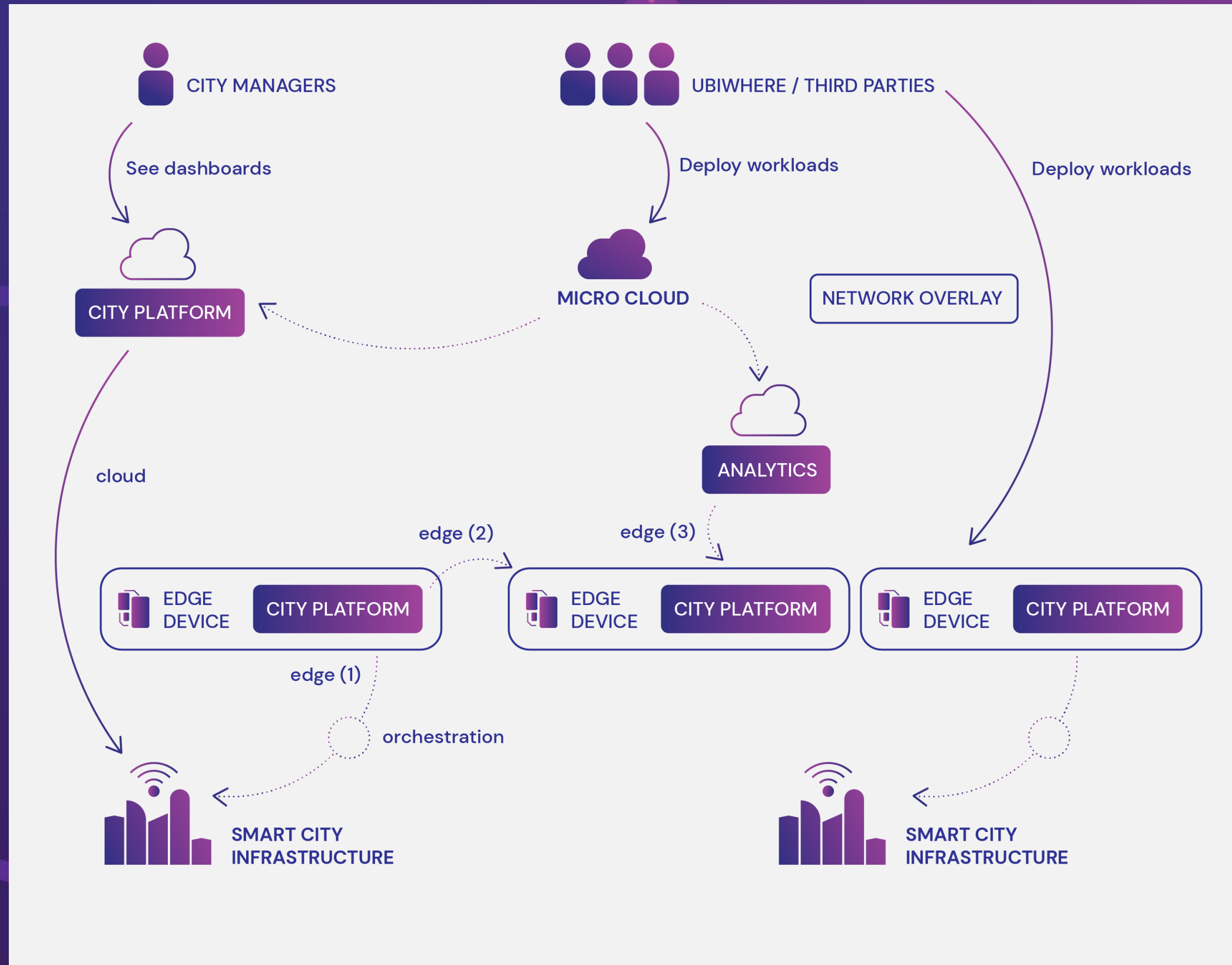


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Smart Cities



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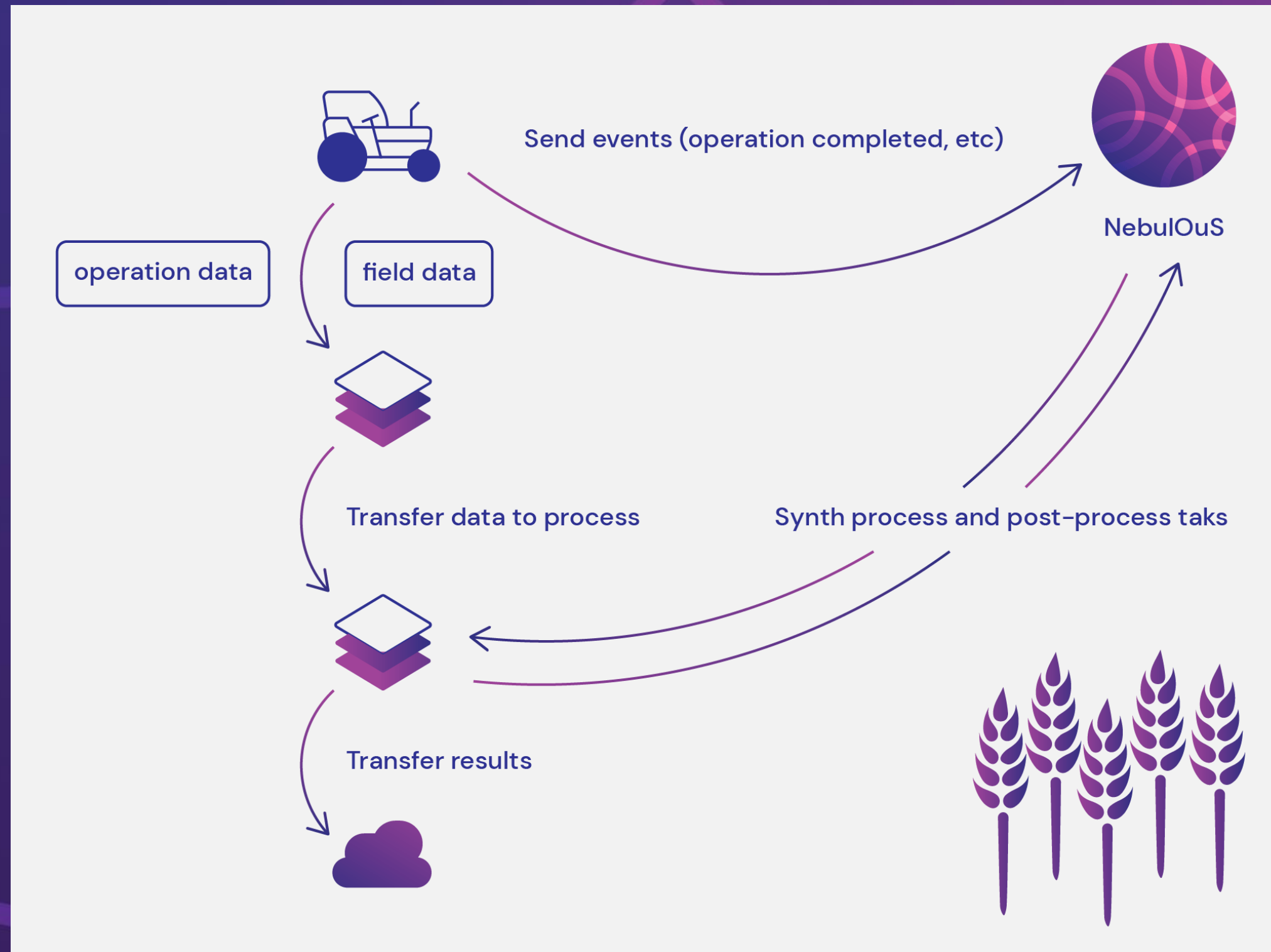


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Agriculture



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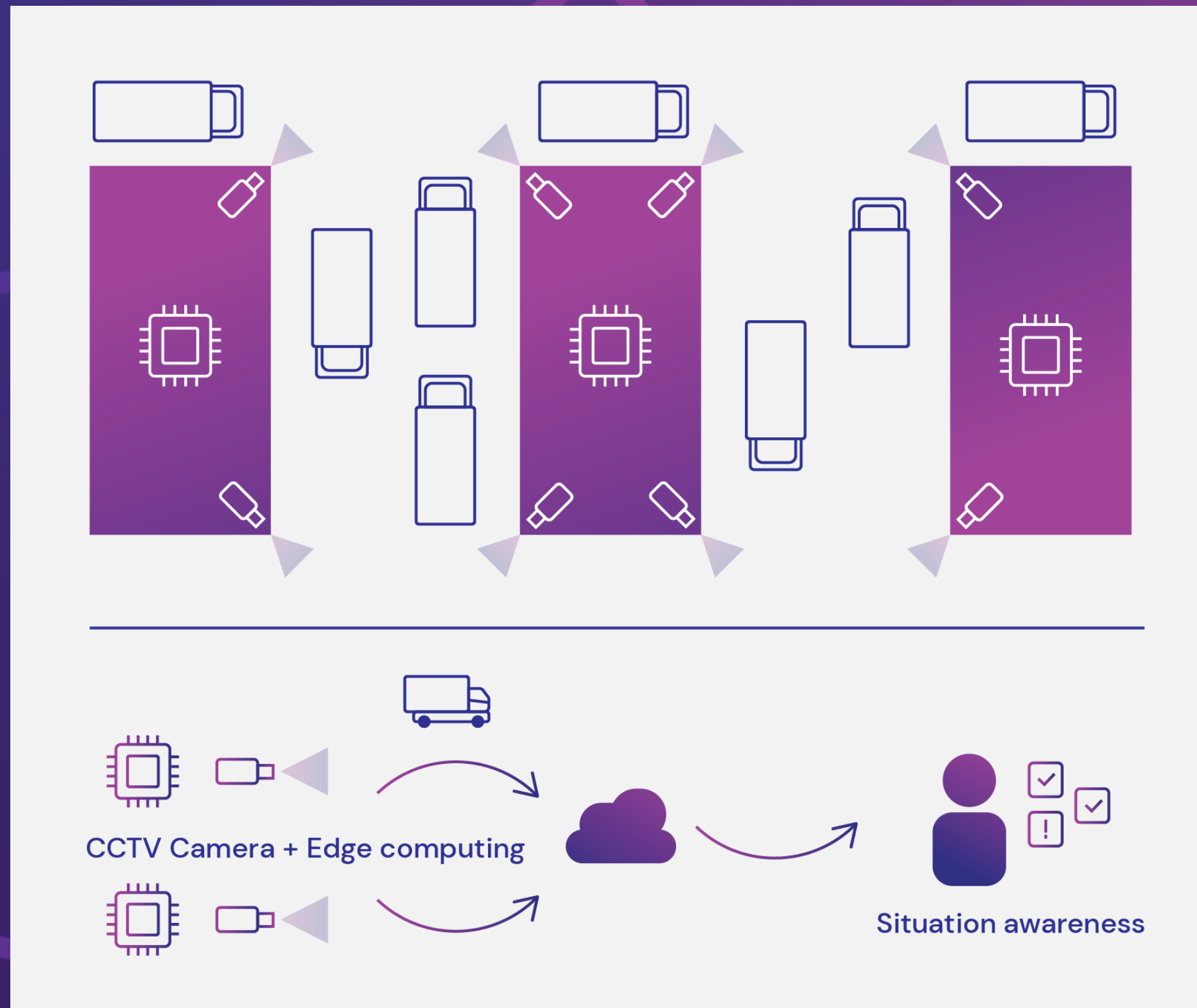


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Warehouse logistics



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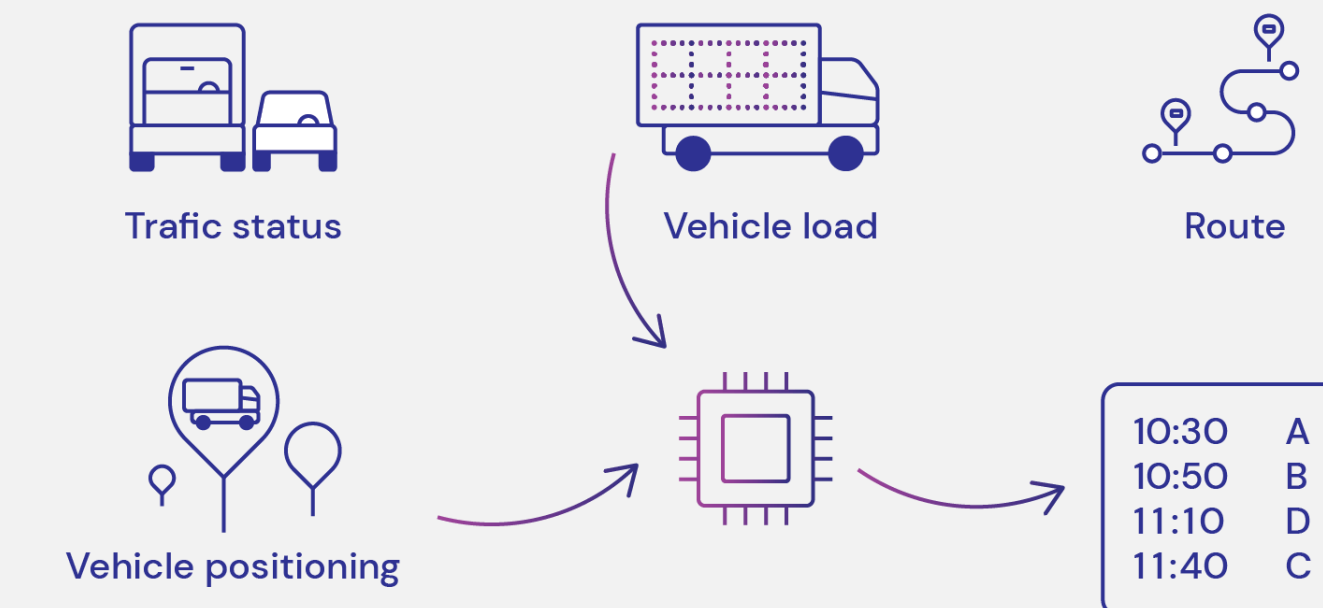
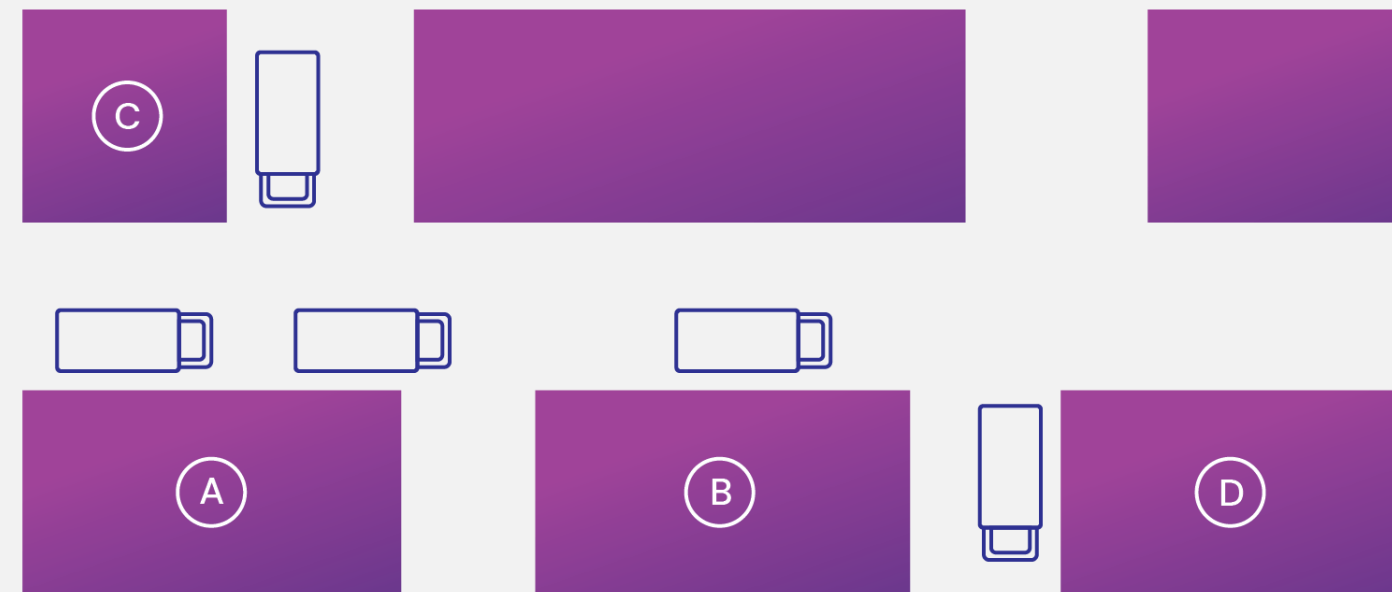


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Urban delivery



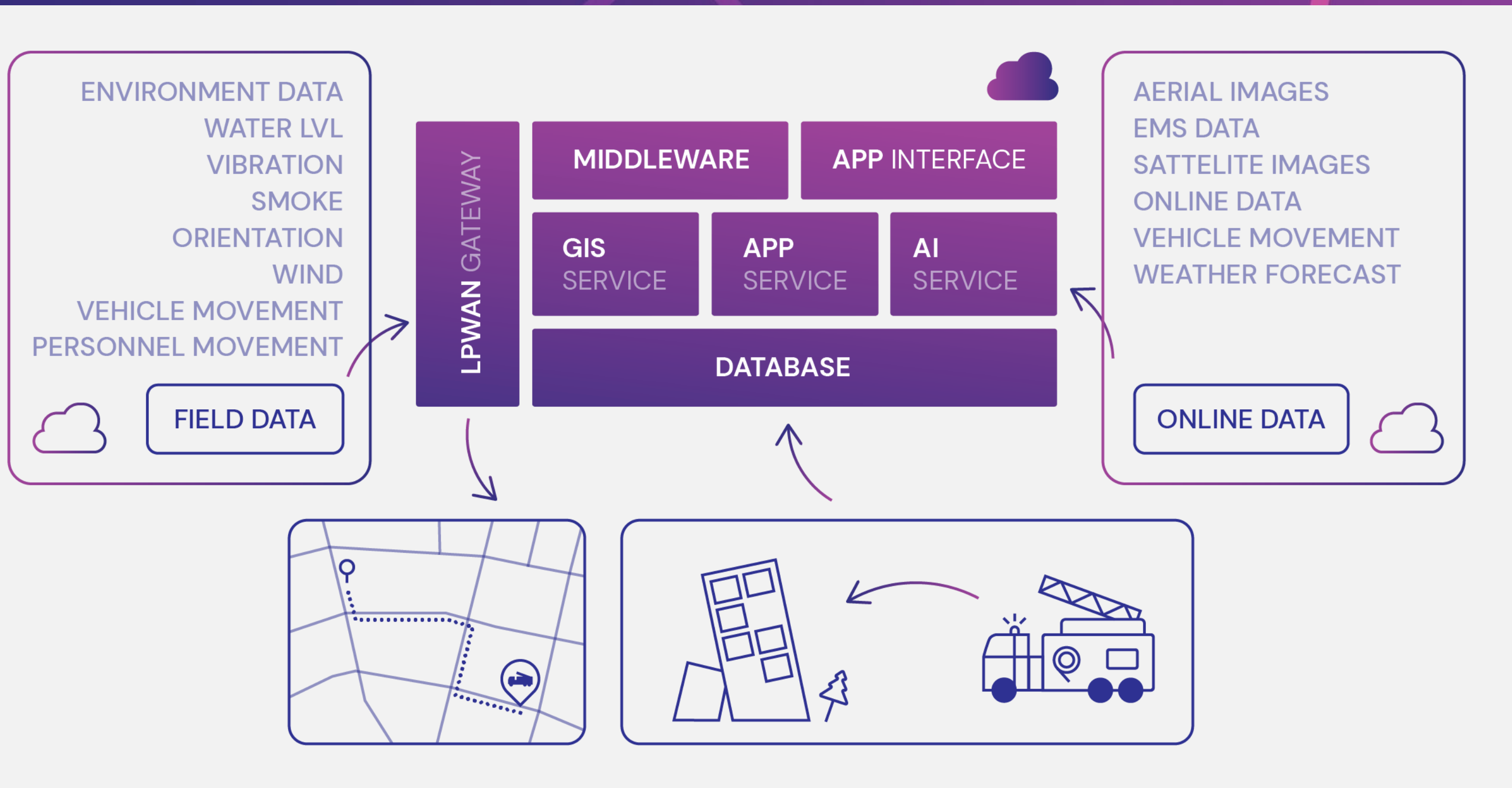
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Rescue operations



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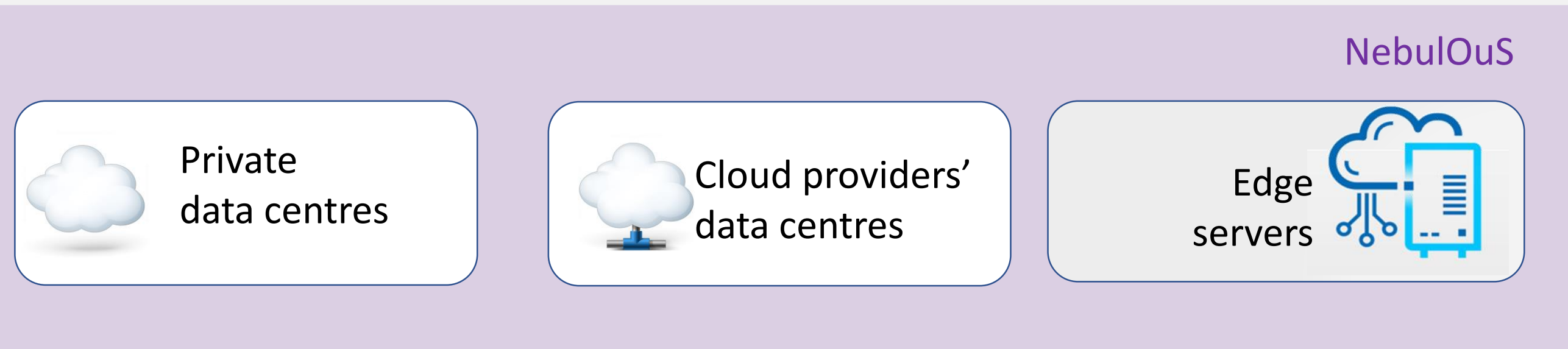
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Research challenges



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- Optimised application management
- Resource brokerage
- Data spaces
- Security



- Slicing management
- Latency
- Bandwidth

Software Defined Networking
Wireless Access Network



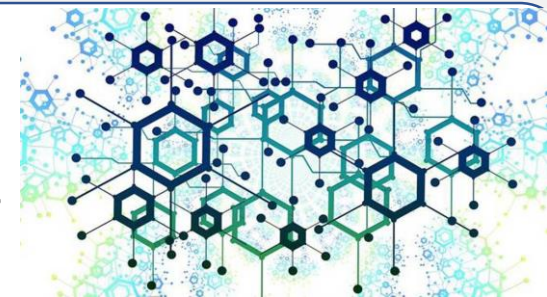
- High-speed handover
- Range
- Security

- Energy management
- Bandwidth
- Open APIs

Internet of Things



Swarm systems



- Coordination
- Emergence
- WANET – MANET

Roadmap: Holistic application context management



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- Data spaces (SIMPL)
 - Data markets
 - Federation
- Networking
 - Mobility
 - Handover management
 - SDL
- Energy management
 - End-to-end trade-offs
 - Mobile battery driven devices



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2 OPEN CALLS

1,35 MILLION EUR

Test and validate the NebulOuS Meta-OS
Platform in complementary use cases

9 PROJECTS



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OPEN CALL 1

From 14 February to 17 April 2024 17:00 CET



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MORE INFO



Call objective: validation of basic aspects of the platform by showcasing new use cases in different domains than those covered already by the project, addressing one of the challenges

- Challenge 1 – Workflow application
- Challenge 2 – IoT application with variability
- Challenge 3 – Serverless application
- Challenge 4 – Open challenge

Available funding: up to €600.000 to fund 4 projects
150K equity-free funding

Eligible applicants: Industry – SMEs, start-ups and Research organisations
Teams of 1 or 2 organisations

Applications handled via F6S platform <https://www.f6s.com/nebulous-open-call-1>



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MORE INFO



- You can find all Open Call #1 Terms and Conditions on the project website:
<https://nebulouscloud.eu/open-calls/>
- Ask questions directly in the F6S Discussion Panel:
<https://www.f6s.com/nebulous-open-call-1/discuss>
- **Ask Me Anything** online sessions every Thursday, 11 CET
For 30 minutes, the NebulOuS team is online with you
 - ◆ Having questions about **NebulOuS OC#1**?
 - ◆ Want to know more about what's in it for you?
This is your chance!

Join the live sessions here  <https://lnkd.in/dBD4aGtZ>



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