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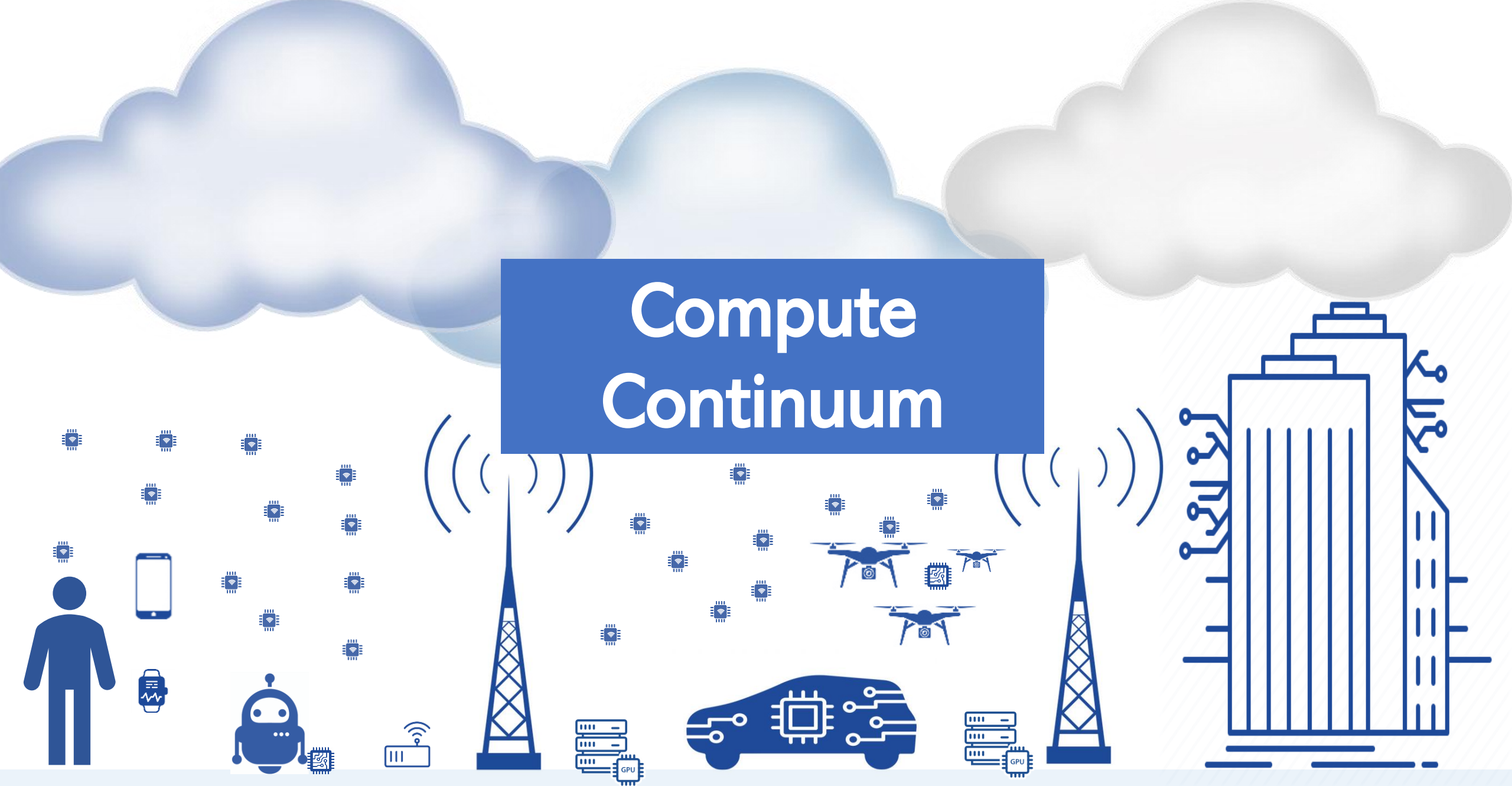


EDGE IS THE NEW CLOUD PANEL

Ana Juan Ferrer, Atos



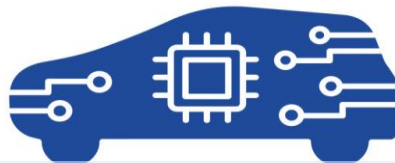
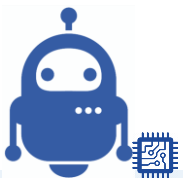
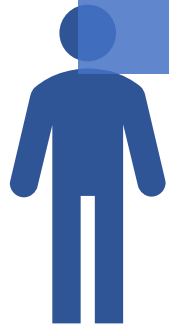
Compute Continuum





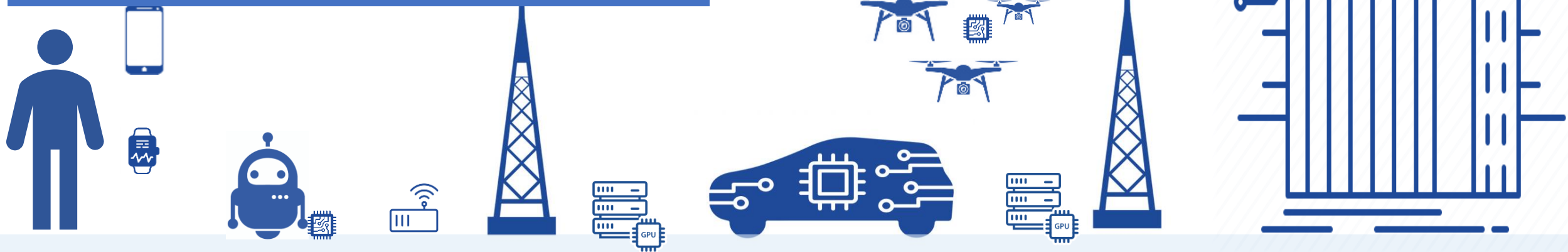
Multi-Cloud: Centralized specialized cloud and multi-cloud hybrid models

- ✓ Cloud technologies are **mainstream** now, having reached a **high degree** of **maturity** and providing **responses** to **complex scenarios**.
- ✓ **Cloud default platform** for start-ups and many enterprise organizations have already fully embraced the cloud model
- ✓ **Lack in interoperability** among solutions **still blocks full adoption of multi-cloud** options.
- ✓ Specifically in **EU**, **concerns on technological independence** is pushing towards **Cloud Federation (Gaia-X)**

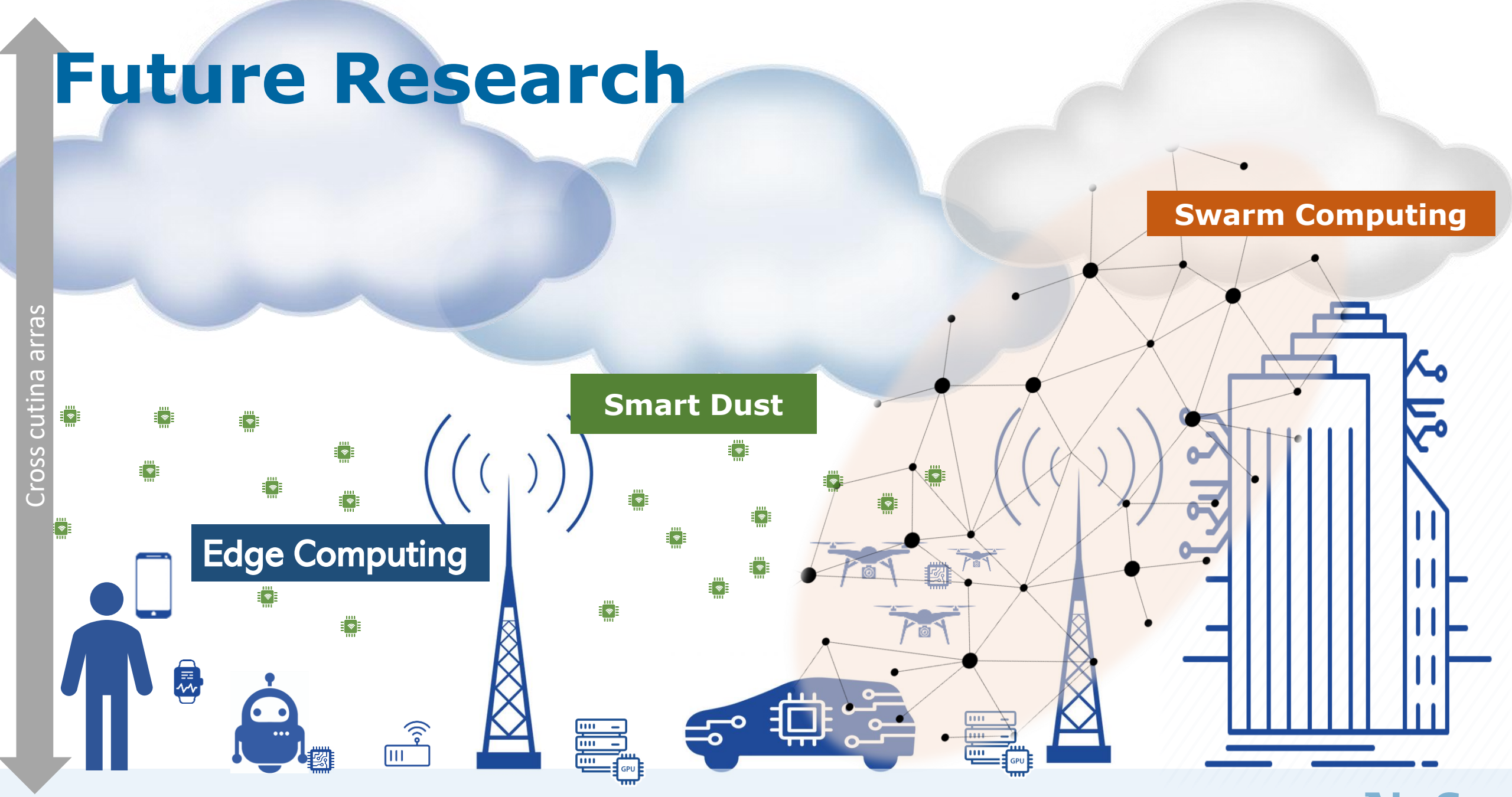


- ✓ Provision of a compute environment located in the vicinity of data generation sources able to prevent latency issues detected in accessing Cloud service.
- ✓ Initial evolution towards Decentralisation
- ✓ Current deployments only consider single device deployment
- ✓ Many research challenges still remain in relation to the optimal workload encapsulation, service placement, networking, security and privacy

Edge Computing: Mainly, experimentation stage



Future Research



Edge Computing: Research

Heterogeneity exploitation and New hardware architectures

Energy efficiency optimisation

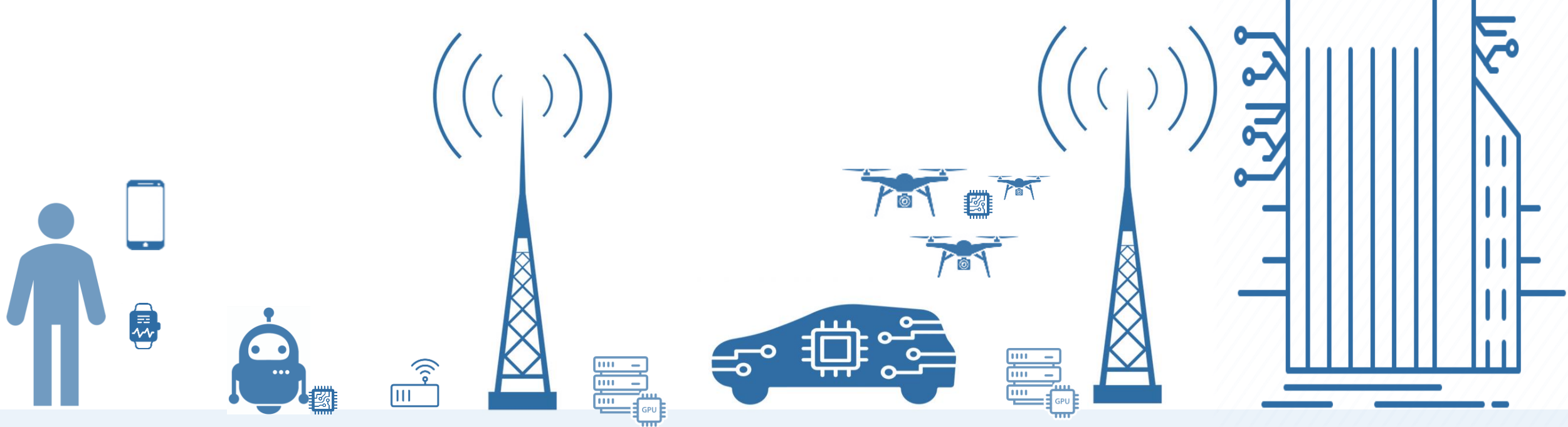
Multi-level Edge

Edge Intelligence (Federated learning)

Data Management

Edge Management

Computing continuum exploration

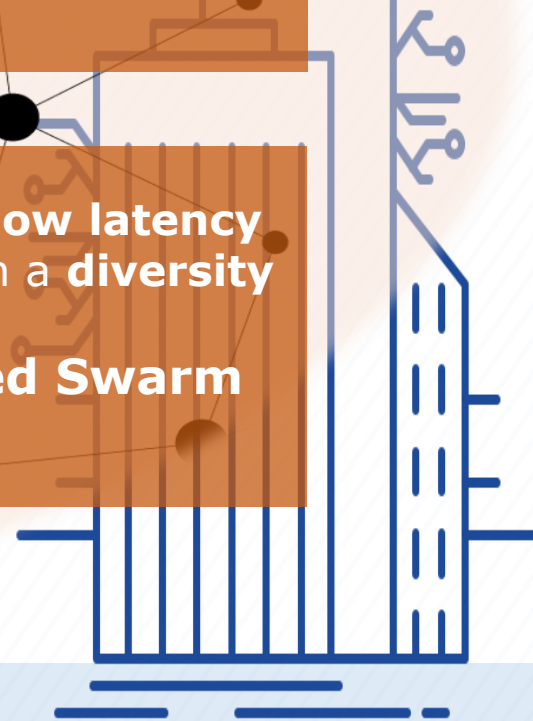
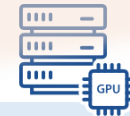
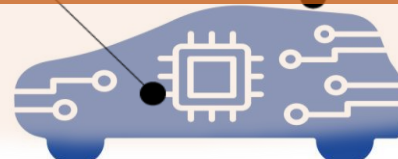
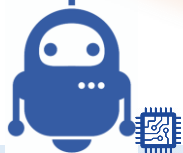
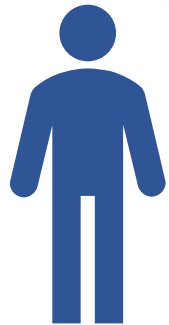


Swarm Computing

Swarm computing as a decentralised orchestration platform that combines **network and cloud principles** to create an on-demand, autonomic and decentralised computing and storage management layer that transparently interoperates among diverse and disperse Edge and cloud models and typologies.

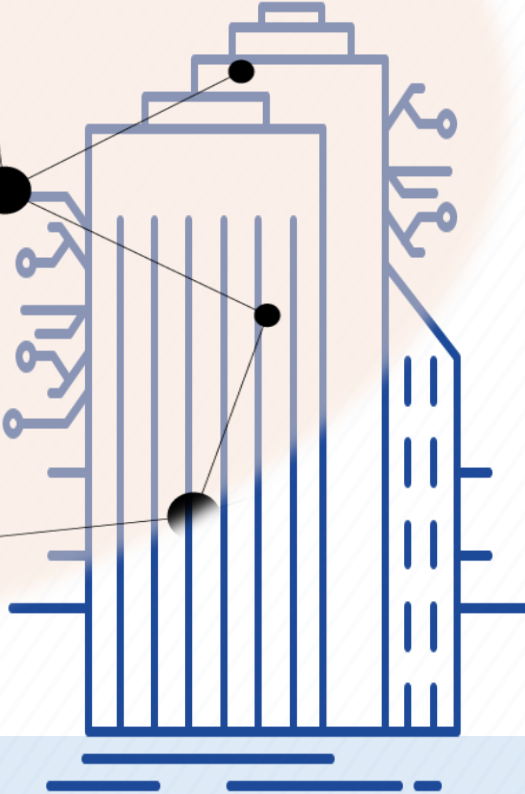
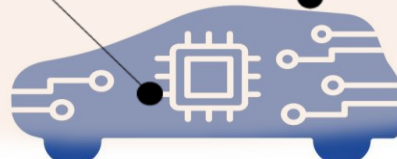
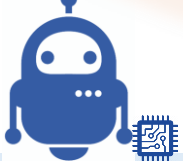
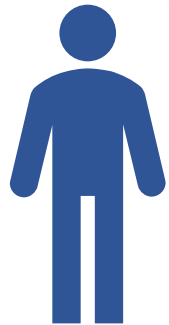
Processing required for **immediate action actuation requiring extreme low latency** will **happen** at the **Edge** of the **network**. While rest of **processes** will run in a **diversity** of cloud models.

All together in an automated, self-organized and self-managed Swarm model



Swarm Computing Research

Swarm management techniques
Resource discovery
Self-management & autonomic systems
Bio inspired optimisation techniques



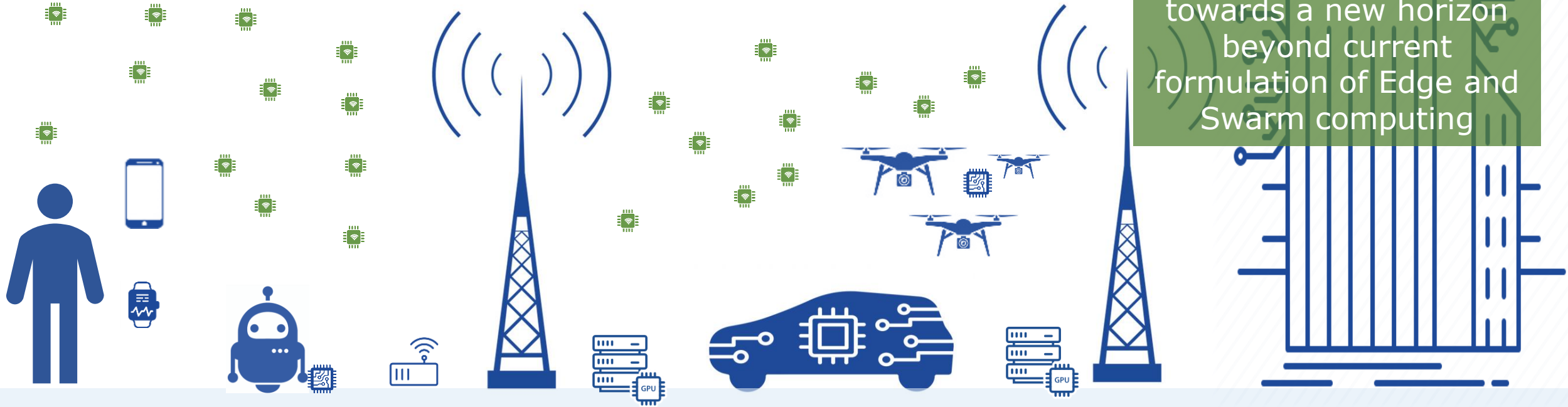
Smart Dust Research

Devices
Self-management
Communication
Environmental Impact

Smart Dust

sensors as well as “bundles of power, computing and communications electronics that are cheap and abundant enough to scatter

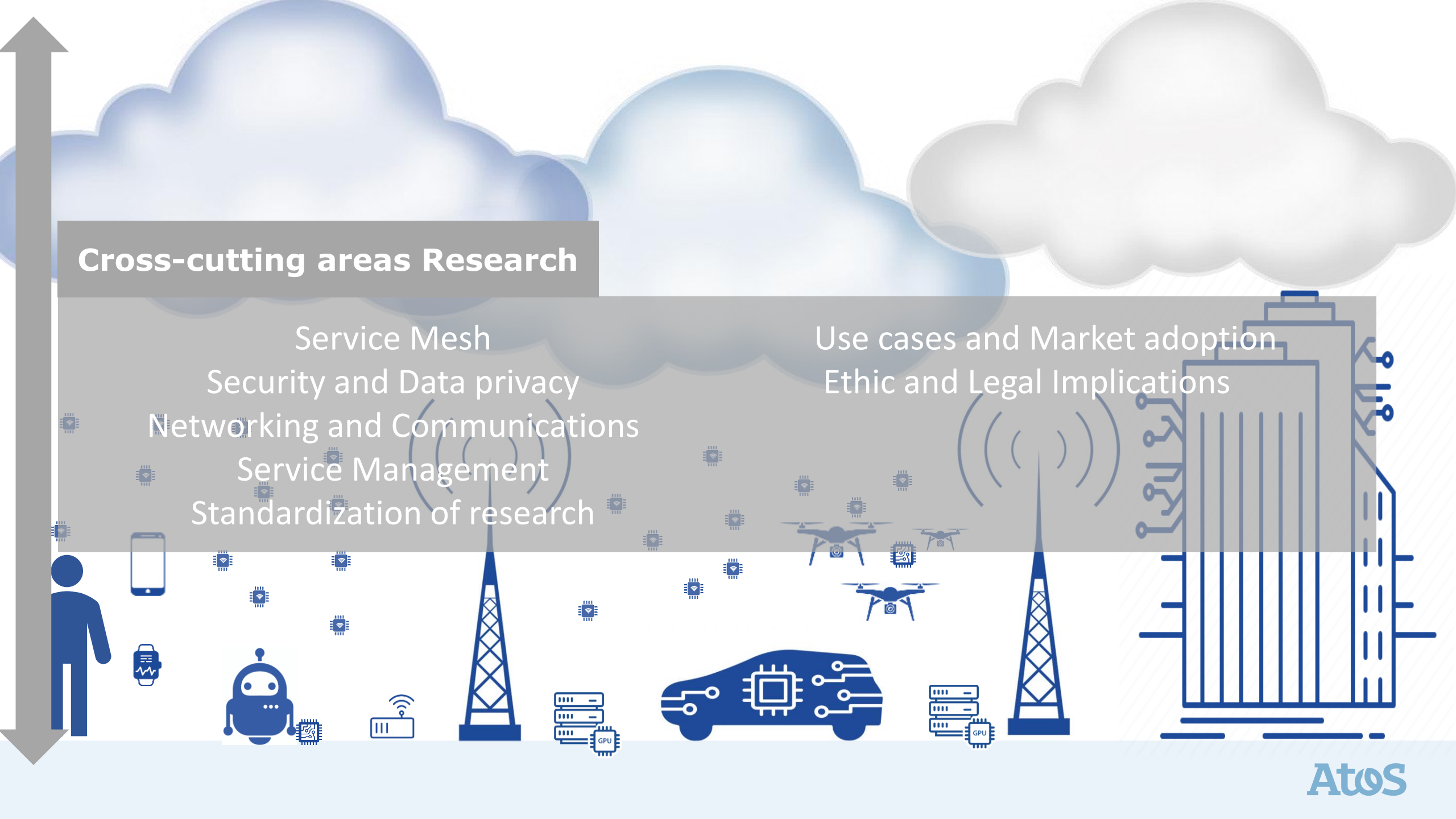
brings together edge and nanotechnology towards a new horizon beyond current formulation of Edge and Swarm computing



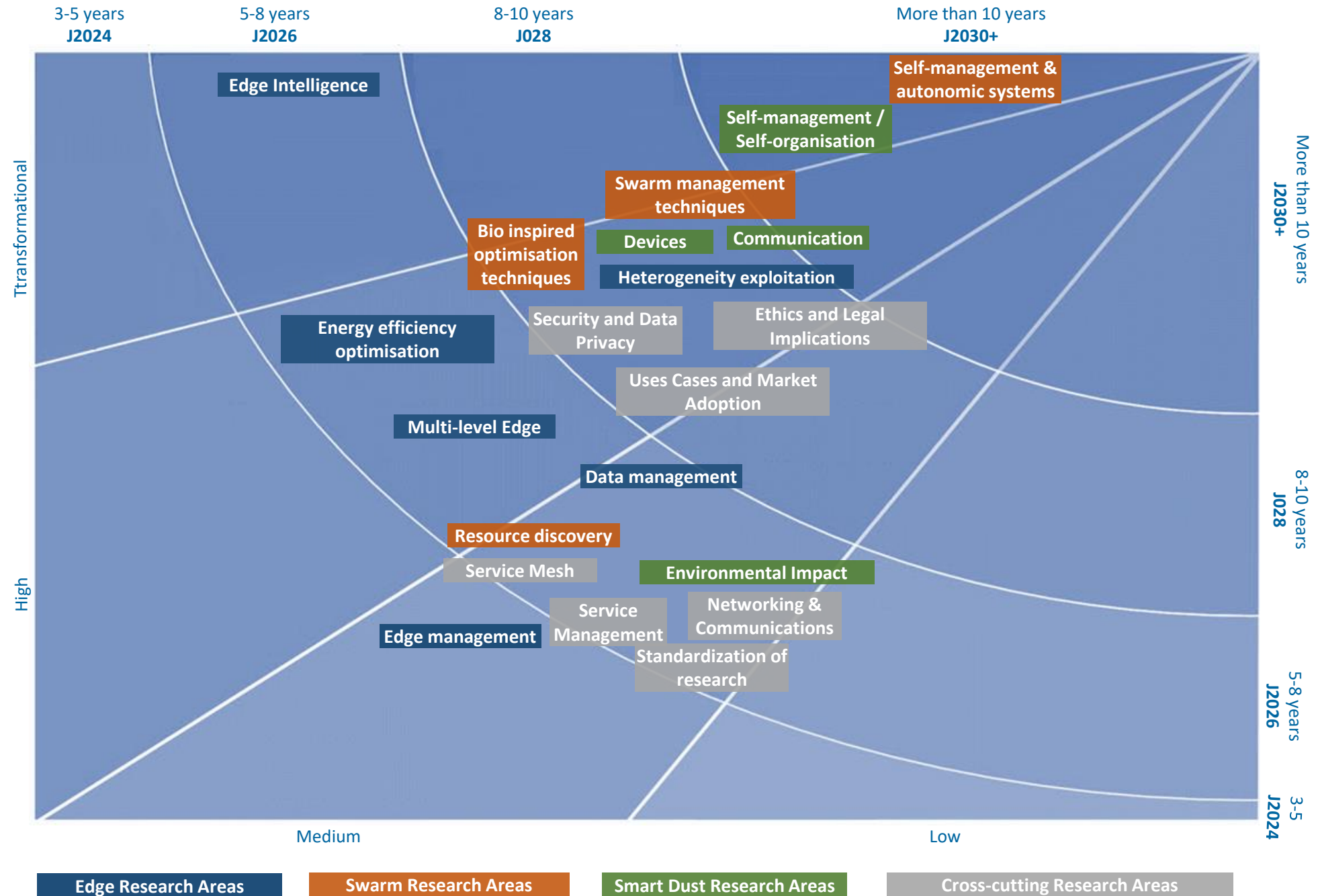
Cross-cutting areas Research

Service Mesh
Security and Data privacy
Networking and Communications
Service Management
Standardization of research

Use cases and Market adoption
Ethic and Legal Implications



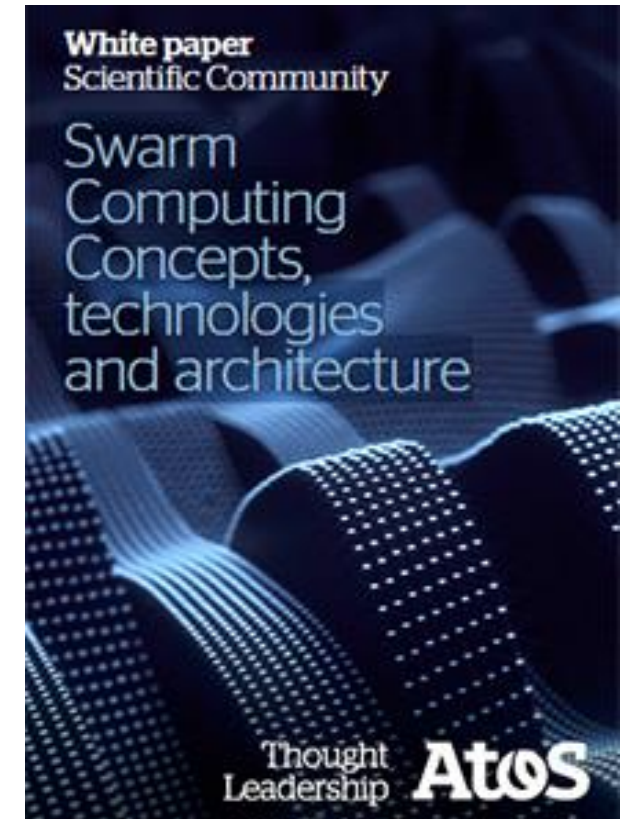
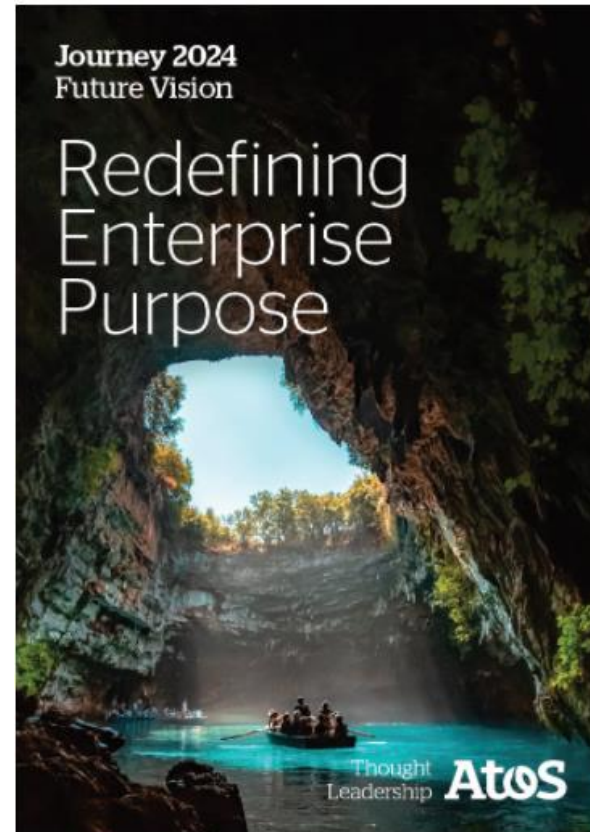
Research Roadmap



Atos Scientific Community

- Journey 2024,
<https://atos.net/en/lp/journey-2024>
- Swarm Computing
Whitepaper
- <https://atos.net/wp-content/uploads/2018/12/atos-swarm-computing-white-paper.pdf>

Atos



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