Satellite and the Cloud: Innovative Cloud Strategies Infusing Next-Gen Technology

Future satellite networks: virtualisation, standards-based orchestration & AI adoption

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Research Overview

Network Virtualisation

Standards-based network orchestration

AI Adoption

Recommendations

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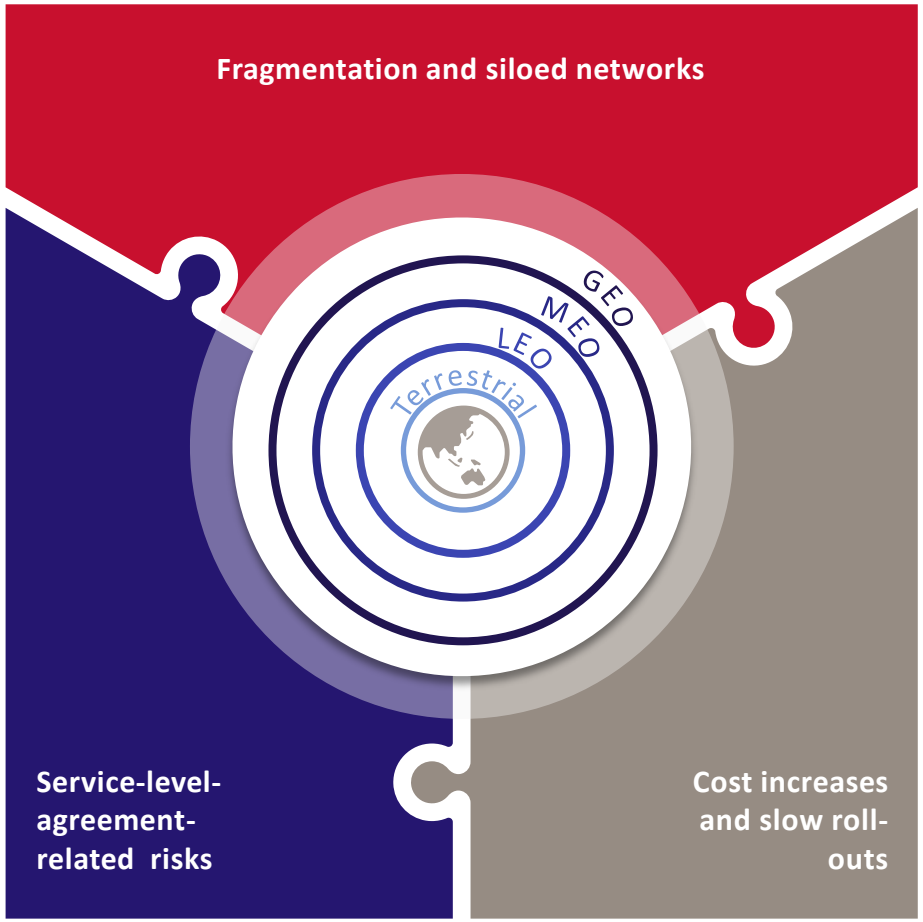
Challenge: multi-orbit systems and telecom integration are making satellite networks far more complex to operate

Today's networks are hardware-bound and siloed are characterised by slow rollout and limited routing flexibility and thus impede scalability.

Peak-capacity designs waste money due to underutilisation

Fragmented architectures prevent operators from meeting SLAs efficiently and or deploying new services

Satellite operators must prioritise virtualisation, orchestration and ecosystem alignment to enable AI-driven, agile and competitive multi-orbit networks or risk falling behind agile rivals.



Source: Analysys Mason

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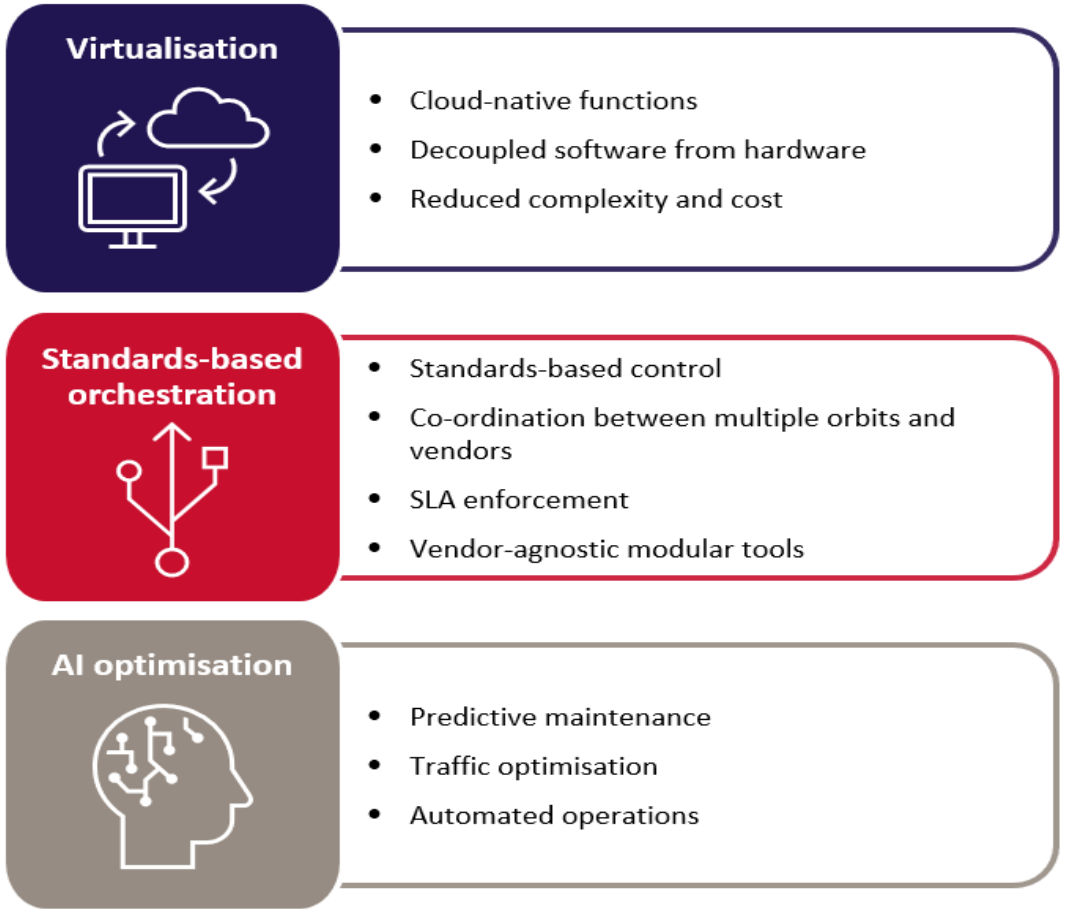
Solution: satellite network operators must commit to cloud-native, software-defined architectures to ensure eventual phased AI

Virtualisation moves network functions into cloud-native software that is decoupled from hardware. This cuts complexity and cost while making upgrades easier and more flexible.

Standards-based orchestration provides a common control layer that coordinates multiple vendors and satellite orbits, enforces SLAs and uses modular tools that avoid vendor lock-in.

AI optimisation adds intelligence on top, using predictive maintenance, traffic optimisation and automated operations to keep the network running efficiently with minimal manual intervention.



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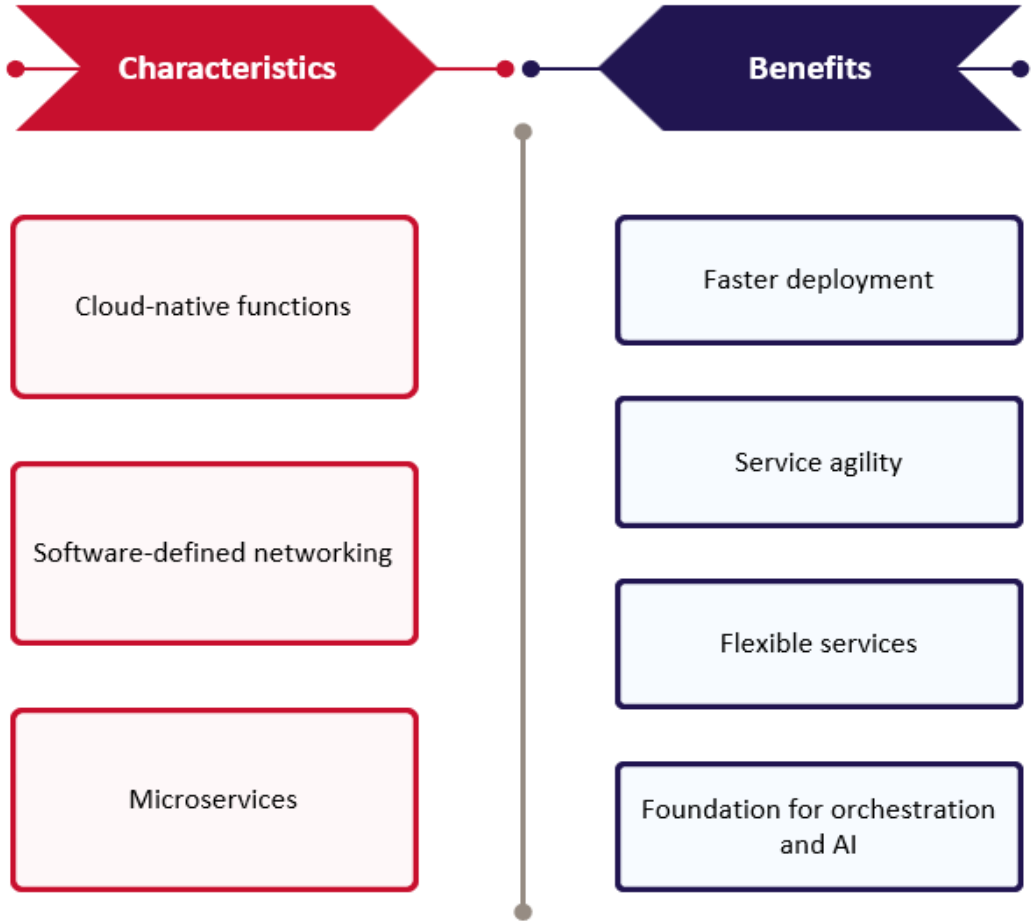

Characteristic	Benefit	Explanation
Cloud native functions	Scalability, Cost savings	Cloud-native CNFs enable dynamic resource scaling (e.g., Kubernetes orchestration for traffic spikes) and cut costs via efficient, serverless deployment without over-provisioning hardware.
Software defined satellites	Flexibility	SDS allows software reconfiguration of payloads/beams across orbits, adapting missions dynamically without hardware changes.
Microservices	Flexibility, Scalability	Microservices decompose VNFs into reusable, independently scalable components, boosting agility and fault isolation in satcom ground segments.

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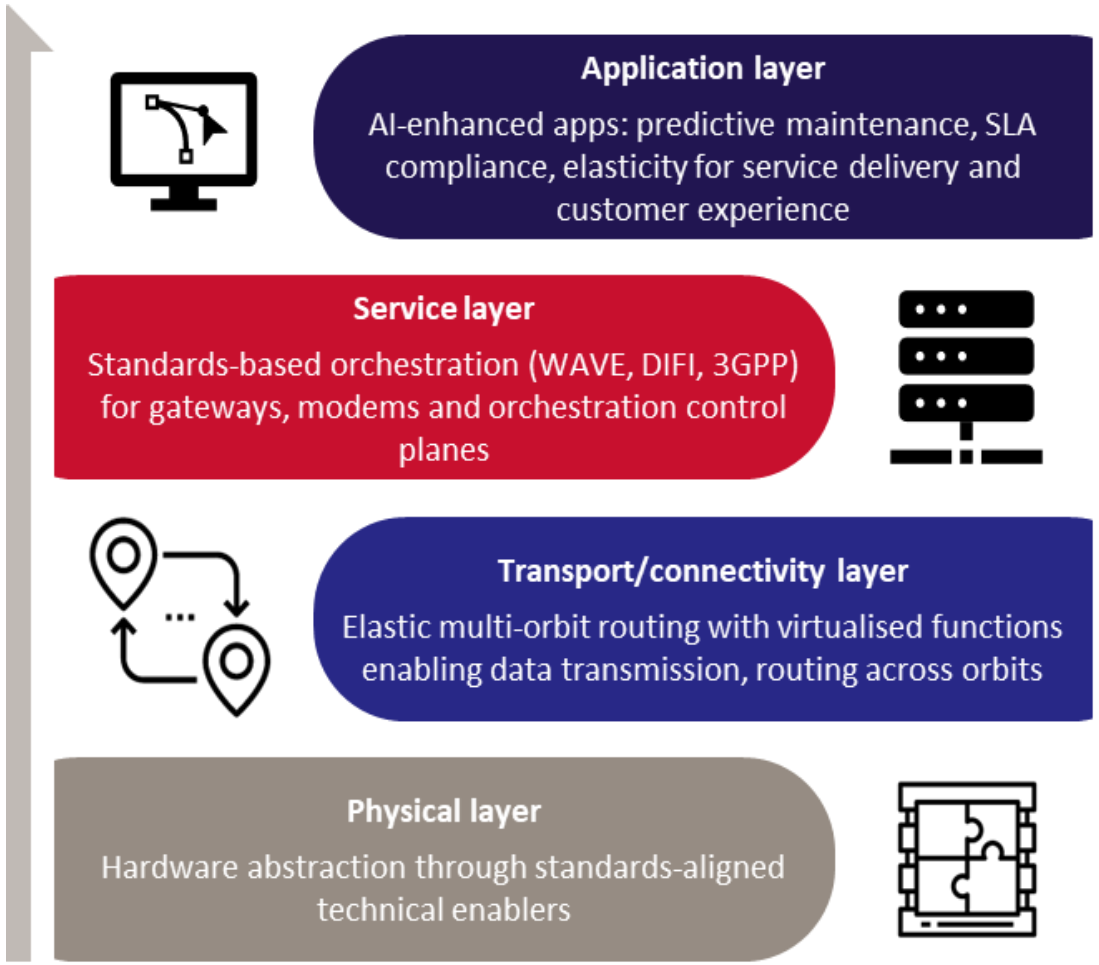

Automated coordination of network resources using open, industry-agreed protocols to ensure different vendors' equipment works together seamlessly.

Player	Role
Operators	Deploy and manage the standards-based orchestration layer
Vendors	Embed APIs and open interfaces
Software developers	Deliver AI-capable orchestration modules
Manufacturers	Design dynamically taskable payloads
Standards and industry bodies	Define interoperability frameworks to ease integration tensions

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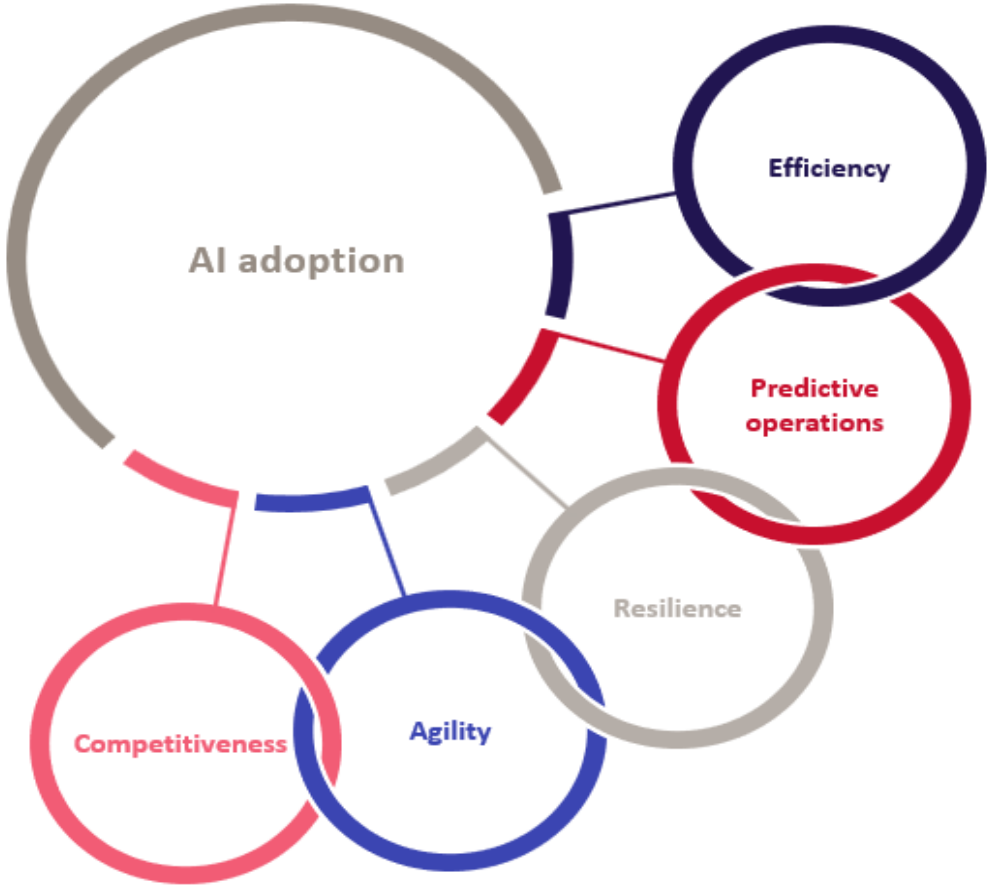
AI adoption within satellite networks



Capability	Applications	Players	Impact
Automation	Traffic routing, anomaly detection and SLA monitoring	Operators and vendors	Reduced opex, faster troubleshooting and SLA compliance
Prediction	Demand forecast and spectrum allocation	Operators, vendors and telecoms partners	Anticipates network issues and resource allocation
Optimisation	Self-balancing networks and application support	Operators, vendors, manufacturers and telecoms partners	Maximises efficiency, ensures resilience and opens new revenue streams

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Recommendations

1

Network vendors must deliver modular, cloud-native, standards-compliant connectivity platforms that decouple software from hardware and enable multi-orbit networks.

2

Satellite operators should begin implementing standards-based orchestration frameworks immediately. They should follow a phased approach to unify multi-orbit networks and build the foundation for AI-ready automation.

3

Satellite operators must embed AI into virtualised network environments to enable predictive, self-optimising operations across multi-orbit satellite networks.

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