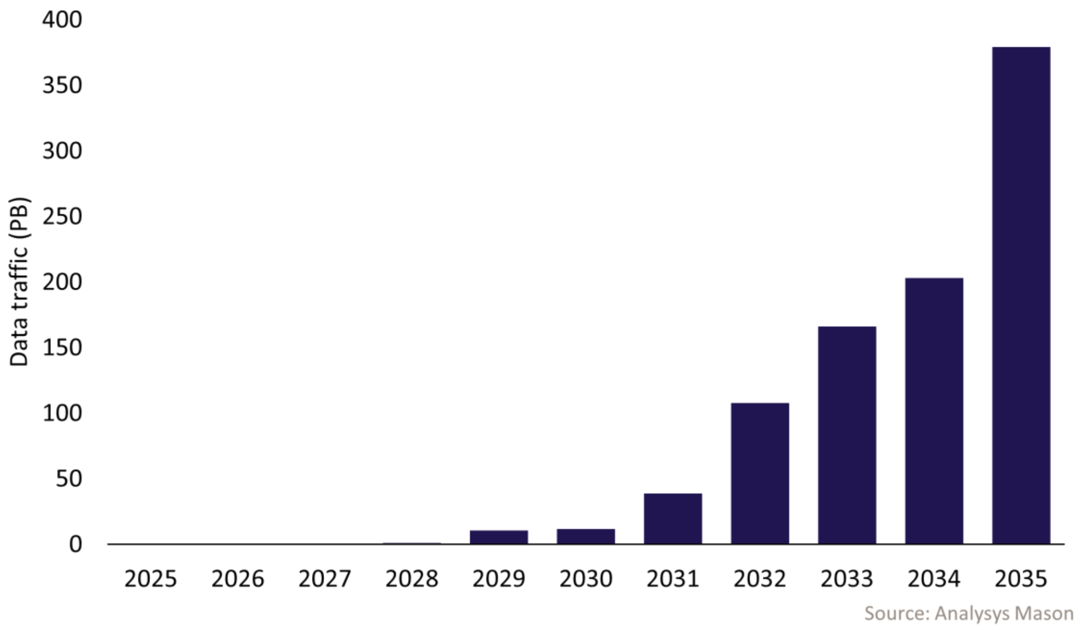
Orbital data centres are the new space cloud layer, but scaling depends on launch and deployment capacity

August 2026

Marcus Taylor

Orbital data centres (ODCs) have moved rapidly from concept to constellation announcements, reflecting growing demand for AI-driven data processing and distributed compute architectures. Analysys Mason's *Space cloud computing and AI: trends and forecasts 2025–2035* estimates that ODC-related data traffic will reach significant volumes over the next decade, scaling to 379PB by 2035 (Figure 1). To capture this opportunity, ODC operators will need to combine launch access, constellation deployment and in-orbit computing capabilities within a single, scalable architecture.

Figure 1: Orbital data centres cloud data traffic, forecast



The pace of constellation announcements – made by companies such as SpaceX, Starcloud and Blue Origin – suggests strong strategic direction from both space and cloud players: they plan to use ODCs to reduce data downlink requirements, enable in-orbit processing and support secure storage.

In addition to strategic positioning, the pace and scale of announced initiatives reflect near-term commercial demand. These initiatives point to a shared view among space and cloud players that processing data closer to its source (that is, the satellite) will become increasingly valuable as data volumes grow and AI workloads expand. However, a significant gap still exists between strategic intent and deployable capacity due to the technical complexity and infrastructure dependencies involved.

ODCs create a new cloud services revenue layer, with value concentrated in specific use cases

ODCs introduce a new layer of cloud services revenue by enabling the delivery of storage and compute directly in orbit, rather than solely through terrestrial infrastructure. The value associated with this is driven by the scaling of deployed storage and processing capacity across constellations, the utilisation of that capacity and the pricing associated with storing and processing data in orbit. As a result, revenue generation is linked more closely to utilised compute and storage than to headline deployment volumes of announced constellations.

In practice, this shifts where value is captured across the data processing chain. ODCs reduce the need to downlink large volumes of raw data by enabling processing closer to the source, which allows operators to extract more value per unit of data before transmission. The commercial opportunity lies in enabling workflows that minimise data movement and support more distributed architectures, rather than in replicating terrestrial data centres.

However, this opportunity is not uniform across applications. Value will be concentrated in space operations and data-intensive satellite applications for cases in which operating in orbit provides a clear advantage. Examples include reducing data downlink requirements, performing processing prior to transmission and supporting secure and sovereign data storage. Early demand is therefore expected to remain focused on high-value, specialised workloads rather than broad enterprise adoption.

Some of SpaceX's recent activity reinforces the framing of this opportunity at the highest level. For example, in its IPO filing,[1] SpaceX is heavily leaning towards becoming an AI-driven infrastructure company, with its space segment supporting a broader compute and connectivity strategy rather than acting as the end market. The company estimates a total addressable market of USD 28.5 trillion, of which approximately USD 2.4 trillion is attributed to AI, indicating clear prioritisation of compute-intensive applications. SpaceX is not pursuing investments in in-orbit infrastructure (including ODC-like capabilities) in isolation but as part of a wider shift towards integrating space-based assets into global AI and cloud computing ecosystems.

[1] For more information, see Analysys Mason's *SpaceX IPO: analysis of SpaceX's AI segment based on the S-1 filing*.

Deployment constraints and infrastructure dependencies will limit the pace at which operators realise the ODC opportunity

ODC deployment depends on multiple infrastructure layers maturing simultaneously: launch capacity, satellite manufacturing and in-orbit compute platforms. While each of these areas is advancing independently, the commercialisation of ODCs requires them to scale in parallel, which can lead to a structural bottleneck. This challenge is compounded by the dual nature of ODC deployments, combining a constellation roll-out with the integration of highly complex payloads. ODC platforms must also address thermal management, power generation and radiation resilience, all of which constrain achievable compute density and increase system complexity.[2]

These technical requirements place additional pressure on launch supply, which is already constrained.[3] ODC constellations will compete for limited launch capacity with larger, near-term revenue-generating systems, moving them down in the queue. As a result, many announced deployments should be viewed as long-term strategic positioning rather than imminent capacity roll-outs. The need for frequent replenishment cycles, driven by shorter operational lifetimes for compute payloads, will further increase reliance on launch availability. Computing hardware evolves much faster than conventional satellite systems, with processors and AI accelerators requiring regular refreshes to remain competitive and support new workloads. This creates an ongoing need to renew and upgrade orbital infrastructure rather than simply maintaining it.

Commercial constraints reinforce this dynamic. Limited initial supply and high deployment costs will result in premium pricing for in-orbit storage and compute, restricting demand to government, defence and other high-value niche applications. Early market activity is therefore likely to reflect technology validation and efforts to establish an early foothold in the market rather than broad-based adoption.

ODCs harbour an opportunity for operators, but realising this opportunity will be a gradual process, and market development will depend on improvements in launch capacity, reductions in deployment costs and the integration of ODCs into broader cloud architectures. ODCs therefore serve as an extension of the cloud, rather than a replacement for terrestrial infrastructure.

To learn more about orbital data centres, space cloud computing and the infrastructure required to support their deployment, see Analysys Mason's Space Data and AI and Satellite Manufacturing and Launch research programmes.

[2] For more information, see Analysys Mason's *Orbital data centres: trends and analysis*.

[3] For more information, see Analysys Mason's *The satellite launch bottleneck may soon leave operators stranded*.