



Tech Spend in Cloud and Edge Computing

2024 and Beyond



Understanding Tech Spend on Cloud and Edge Computing

Cloud computing is a technology providing readily available, vendor-managed services like computing power, storage, advanced analytics, and database access, offering distributed computing resources. Conversely, edge computing is valuable in scenarios with latency concerns, such as remote or shielded locations. It utilizes smart devices at the network's edge for local data monitoring and analysis, sending only essential data to a central hub, thereby considerably reducing latency.

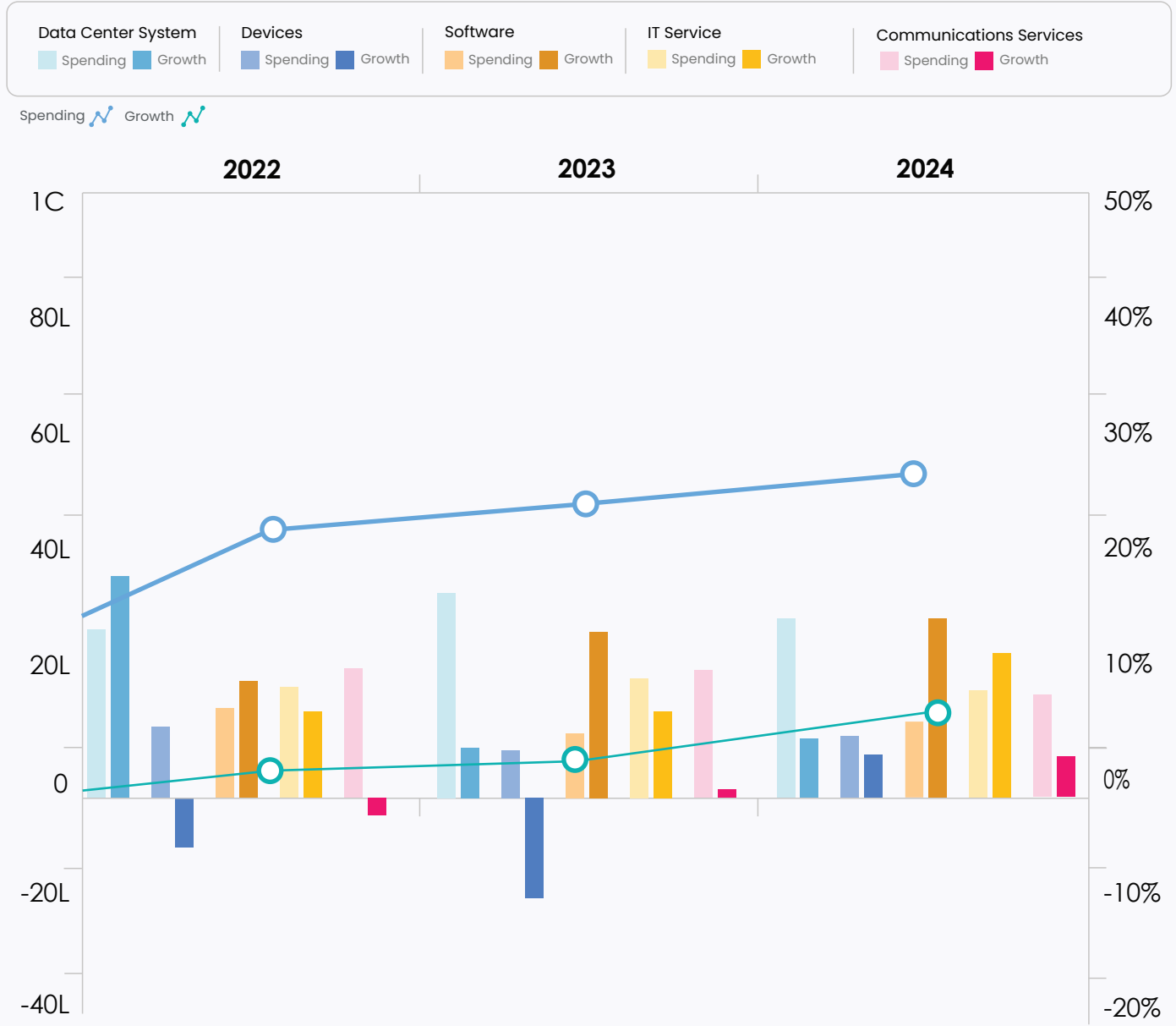
IDC reports that worldwide spending by enterprises and service providers on edge hardware, software, and services is anticipated to reach nearly \$274 billion by 2025. Additionally, the proportion of executives identifying cloud as a priority has risen from 48% last year to 65% this year.

This resource aims to offer insights into the investments organizations are making in IT, particularly in Cloud and Edge Computing, and how these investments are revolutionizing their operations, enhancing their agility, and fortifying their resilience against disruptive shifts.

Let's start by exploring the value IT companies place on cloud potential.

Both the software and IT services sectors are expected to experience double-digit growth in 2024, primarily fueled by cloud-related expenditures. Forecasts suggest a 20.4% rise in global spending on public cloud services in 2024, with the growth attributed to a mix of cloud vendor price hikes and increased utilization.

Worldwide IT Spending Forecast (Millions of U.S. Dollars)

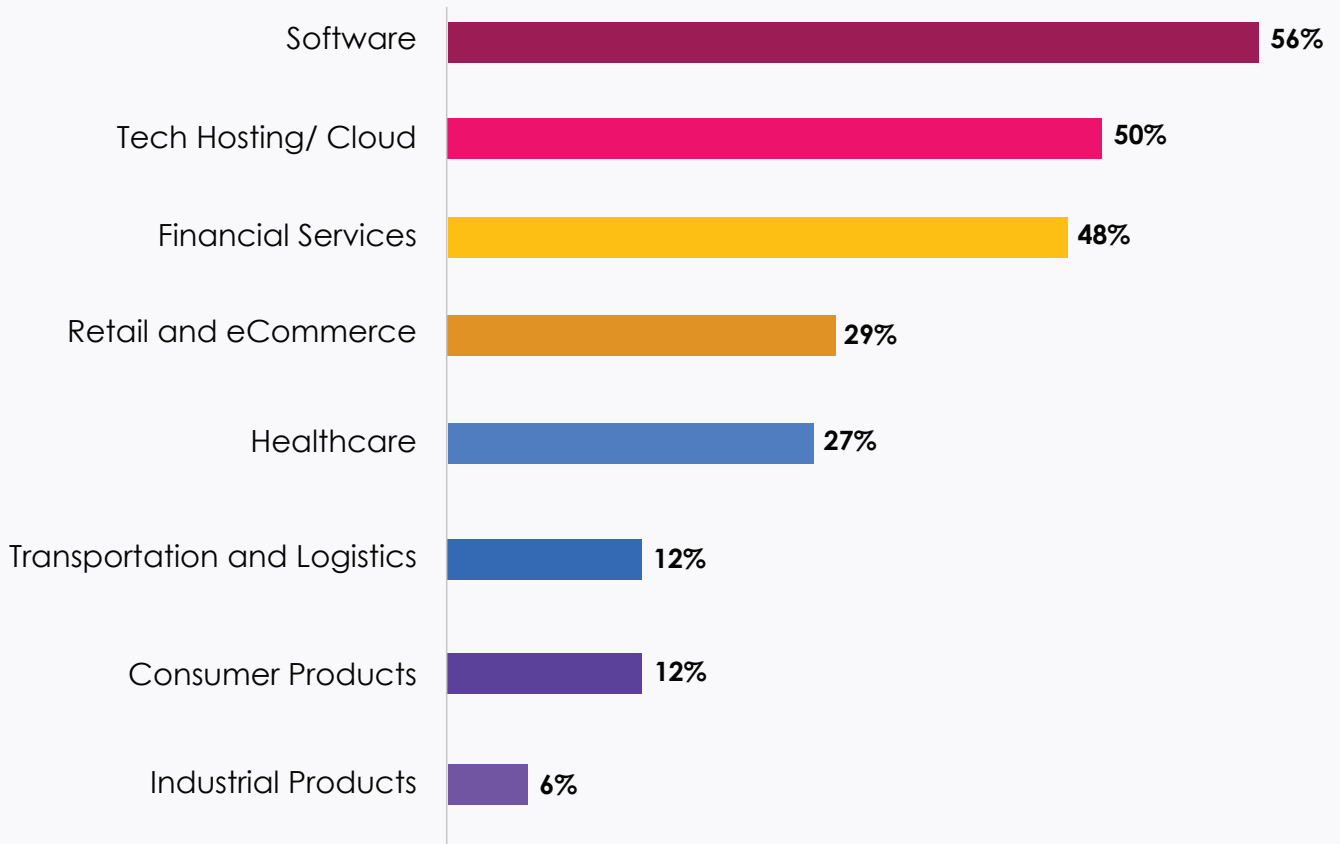


Source : **Gartner**

While software industry allocates the highest percentage of their revenue to IT (18%), the range is between 2% to 11% of revenue for companies operating in other industries.

Percentage of revenue spent on IT, by industry

Median percentage of revenue

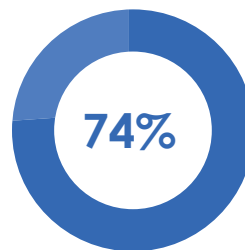


Senior IT executives have further identified their key technology initiatives for the immediate future

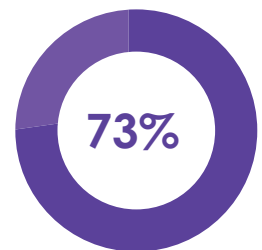
- (i) Digital Transformation (74%)
- (ii) Cybersecurity (73%)
- (iii) Cloud/Cloud Migration (65%)

The percentage of executives who reported cloud as priority has increased **60%** this year.

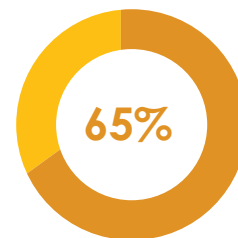
Top 3 Priorities for Technology Initiatives



Digital Transformation



Cybersecurity



Cloud/Cloud Migration

Source : Gartner

Role of Cloud in Industry 4.0

Industry 4.0, also recognized as the Fourth Industrial Revolution, encompasses the modern wave of automation and data interchange in manufacturing technologies. This includes advancements like the Internet of Things (IoT), artificial intelligence (AI), and cloud computing.

Within this framework, cloud computing emerges as a crucial element, offering the necessary infrastructure and platforms to store, process, and analyze the vast data volumes produced by IoT devices and other sensors within the manufacturing realm. Such data is instrumental in enhancing the manufacturing process's efficiency and efficacy, as well as in optimizing the functionality of each machine and device.

Additionally, cloud computing delivers the requisite computational capacity to execute AI and machine learning algorithms, which are pivotal in analyzing and making sense of the data from IoT devices and sensors. This analysis not only facilitates improved decision-making and predictive maintenance but also stimulates the creation of innovative products and services.

Tech Spend on Cloud in Industry 4.0

According to McKinsey, businesses anticipate a 47% surge in cloud investment next year. Despite this, firms are on average 23% over their cloud budget and believe that about 30% of their spending is squandered. McKinsey advises that industrial entities can yield substantial benefits from the cloud by concentrating on three primary strategies: optimizing cloud expenditure, developing cloud-native skills, and utilizing cloud ecosystems.

To encapsulate, cloud computing stands as a vital element of Industry 4.0, offering the necessary infrastructure and platform to store, process, and analyze the extensive data produced by IoT devices and other industrial systems. Companies can truly harness the power of cloud computing by focusing on efficient cloud spending, cultivating cloud-native capabilities, and tapping into cloud ecosystems.

Understanding Cloud Spend through Use Cases Across Industries

Here are some real-world examples of how cloud computing has been used across industries in 2023:

- ✔ **Healthcare:** The year 2023 marked a notable uptick in cloud integration within the healthcare sector. Notably, the UK's National Health Service (NHS) transitioned its data to the cloud, leading to reduced costs and enhanced patient services. Similarly, Cerner Corporation, a key player in healthcare technology, collaborated with Amazon Web Services (AWS) to create a cloud-based platform for medical providers.
- ✔ **Retail:** The retail sector also experienced a boom in cloud adoption in 2023. Walmart, for instance, joined forces with Microsoft Azure to develop a cloud-driven platform aimed at streamlining their supply chain operations. Additionally, Amazon capitalized on its cloud infrastructure to launch Amazon Go, a service that employs computer vision and machine learning to allow cashier-less shopping.
- ✔ **Manufacturing:** Likewise, 2023 was a year of significant cloud adoption growth in the manufacturing industry. Siemens and Microsoft Azure partnered to create a cloud-based platform designed to enhance manufacturing efficiency. Furthermore, General Electric (GE) harnessed cloud technology to introduce Predix, a service utilizing machine learning to enhance the performance of industrial machinery.

Industry 4.0 is Transforming Production and Supply Chain

A study predicts that post-2023, the internet will connect over 43 billion devices, encompassing machines, mobile devices, and vehicles. The Industrial Internet of Things (IIoT) consists of a network of machinery equipped with sensors, actuators, and communication features that gather and transmit data to the cloud for analysis.

This scenario poses a significant challenge for IT teams traditionally responsible for managing the infrastructure needed for data storage and processing. Cloud computing has empowered IT infrastructure teams to safeguard information while ensuring that organizational members make more informed decisions through data utilization.

Modern Chief Information Officers (CIOs) should continuously review their organization's product/service offerings to identify opportunities for leveraging cloud and IoT by reshaping/reconfiguring these lines.

For example, Globalmatix, a provider of telematics solutions, collaborated with Thales, a leader in global digital security, to develop a car-to-cloud solution for the Porsche Racing Team. This system collects data from the vehicle's embedded sensors, encrypts it, and transmits it via 4G cellular networks to the cloud, where Cloud Native Analytics Applications transform the data from various vehicle systems into real-time intelligence capable of predicting and reacting to potential issues like imminent engine failures.

Numerous instances exist where Industry 4.0 has led to the merging of IT and Operational Technology (OT) systems. Today's CIOs and Chief Technology Officers (CTOs) are responsible for managing cloud infrastructures that centrally process both business and operational (machine) data in the cloud.

Cloud and Edge Computing – IT and OT Convergence

Traditionally, Chief Information Officers (CIOs) and Chief Technology Officers (CTOs) handled the IT infrastructure and applications necessary for running business

operations, while Chief Operating Officers (COOs) of manufacturing companies oversaw plant operations and the plant-level Industrial Control Systems (ICS) — the essential hardware and software for operating and managing plant activities. However, analysts at McKinsey have noted a growing trend where COOs are progressively relying on IT teams to oversee plant operations, particularly in environments where machinery is outfitted with IoT devices.

Use Cases for IT-OT Convergence

- ✓ Real-time monitoring of industrial equipment and vehicles
- ✓ Remote diagnostics capabilities
- ✓ Predictive maintenance

Tech Spend in Edge Computing

Edge computing helps companies mitigate the risks and challenges faced in analyzing data from IoT-enabled machines. Along with sensors and actuators, the edge devices are equipped with processing/computing resources that can run applications to analyze data from their environment.

Industry experts believe that edge computing will get a boost from increased rollout of 5G services as companies invest in creating “Edge Clouds”, a grid of compute and storage resources embedded in machines connected locally. Edge clouds will enable IT teams to run complex applications and machine learning models to detect patterns that can enhance machine productivity and efficiency while being able to respond to anomalous events faster such as sudden change in process variables leading to a decision to shut down or temporarily suspend operations.

The “**State of the Edge**” report released by The Linux Foundation mapped the edge footprint by **2028** as follows:

- ✔ 37% for mobile and residential customer use cases
- ✔ 63% for running applications in industrial verticals

The top industrial verticals for edge adoption are manufacturing, energy, logistics, smart cities, healthcare, retail, and transportation.

Combine this with the findings of the Cybersecurity Insights Report released by AT&T: at least 1 edge use case will be implemented by a staggering **77%** of energy and utility companies worldwide.

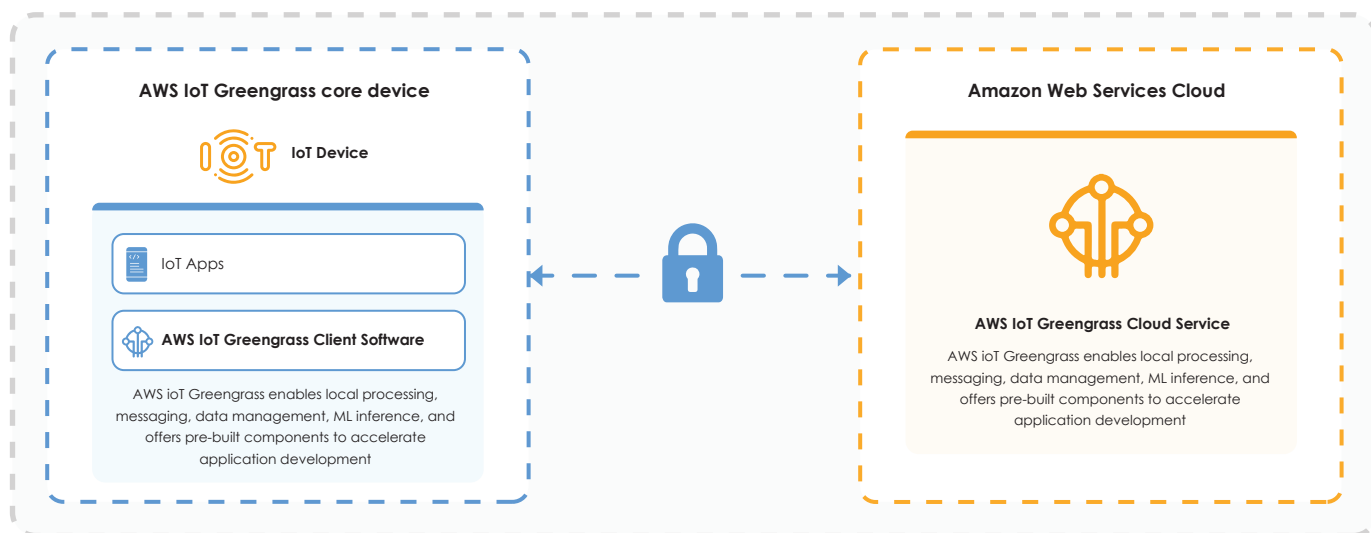
The Edge Strategy of the Hyperscalers

Edge computing will play a complementary role to cloud services as it allows companies to choose whether a particular type of data (based on sensitivity) will be processed at the cloud or at the edge. Edge computing is an extension of hybrid cloud model where public cloud and private cloud was used together depending on the type of information processed. In the future, edge computing will be seen together with cloud computing as a “fabric” of compute resources available on-demand.

Let us understand the investments the hyperscalers have made in offering edge computing services:

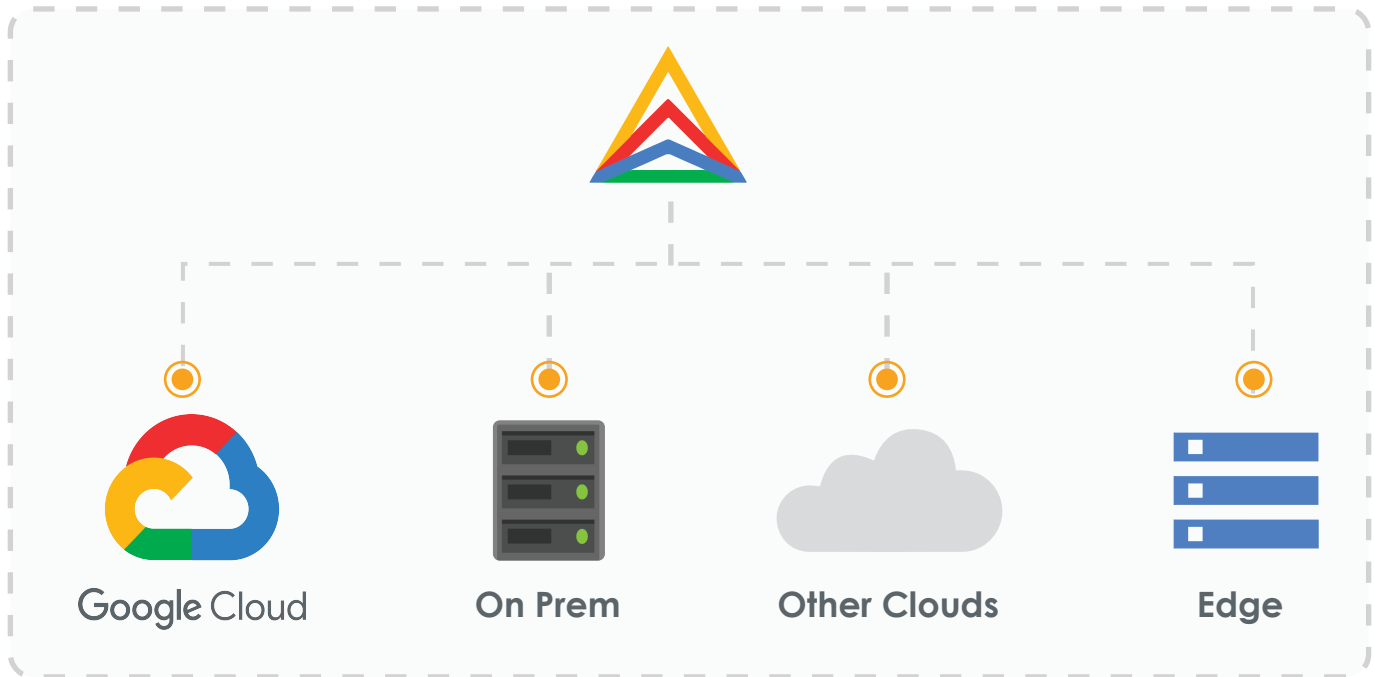
✔ Amazon Web Services

AWS customers can leverage Amazon Elastic Container Service and Amazon EKS Anywhere to deploy containers and Kubernetes clusters at the edge. AWS IoT Greengrass empowers IT teams to create ML-enabled IoT Applications for local data processing and analysis.



✔ Google Anthos

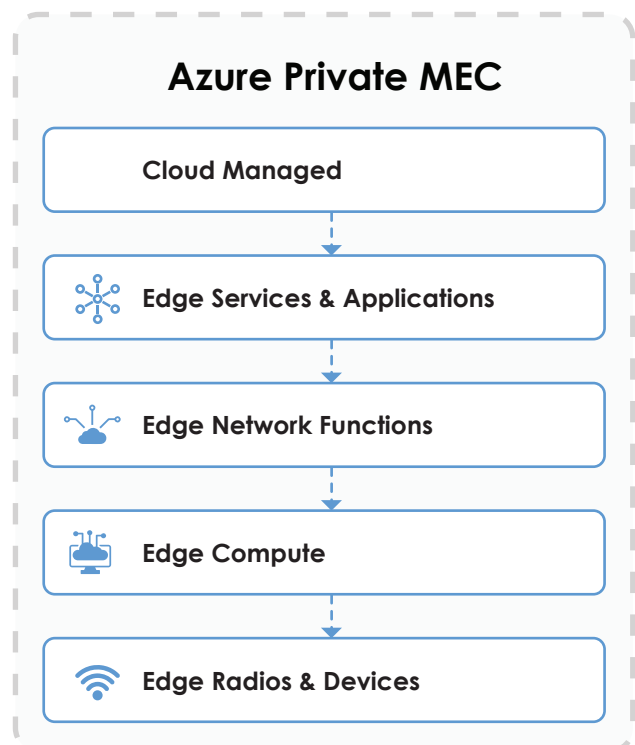
Hybrid cloud management platform, Anthos, allows IT to deploy apps on Google Kubernetes Engine (GKE) and VMs. Companies can roll-out Kubernetes clusters in the edge environment. Anthos offers 75% reduction in CPU requirements and 90% reduction in memory requirements thereby making an interesting use case for running low latency applications at the edge.



✔ Microsoft Azure

Azure Private Multi-Access Edge Compute (MEC) helps companies create a private network and create low-latency solutions (applications and services)

Furthermore, for edge use cases, companies can leverage Azure Arc, a multi-cloud platform for running cloud native applications, machine learning services and database services.



Conclusion – The Next Phase of Growth for Cloud and Edge Computing

IDC projects that the global market for edge computing will escalate to \$250 billion by 2024, with a compound annual growth rate of 12.5%.

Anticipated advancements in cloud and edge computing are likely to be propelled by evolving technologies such as 5G and cloud-native frameworks, enhancing the reliability and manageability of edge solutions. The cloud's evolution is expected to be integrated increasingly with IoT devices and edge computing, where data processing happens close to or at the source. While cloud computing continues to offer advantages in cost efficiency, agility, resilience, and as an innovation catalyst, the forthcoming "Internet of Behaviors (IoB)" is poised to spur further growth, unlocking new avenues for reimagining products, services, user experiences, and operational excellence.

After 2023, IDC predicts that over half of new enterprise IT infrastructure will be located at the edge. Additionally, Gartner forecasts that by 2025, 75% of data generated by enterprises will be created and processed outside traditional data centers or cloud environments.

The cloud's trajectory is expected to continue evolving, forming an integral part of a technology stack that includes a growing number of IoT devices and edge computing, where processing is performed near the data source.