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Cloud Usage Report 2024

NUTANIX



Introduction

This is the 5th edition of the annual Cloud Usage report where Nutanix analyzes evolving trends in Public and Hybrid Cloud usage each year. Unlike opinion surveys, this report examines real consumption data and trends to inform readers about the real cloud adoption landscape. 2023 marked a year of significant transformation and adaptation, shaping the growth of cloud services. The post-pandemic period has brought new challenges like economic uncertainty, labor shortages, high inflation, supply chain disruptions, and changing consumer behaviors, but also presented the world with various opportunities for businesses and individuals to leverage cloud technology.

This report delves into the patterns and trends of cloud spending across various segments and industries, highlighting the resilience and innovation within the cloud domain amidst fluctuating economic conditions and evolving global priorities. It also examines effective strategies for managing public cloud expenditures and provides insights into the leading cloud services across various categories, including Compute, Storage, Analytics, Databases, and more. As you explore the data and insights presented in this report, we aim to equip you with a comprehensive understanding of the current state of cloud service trends. Whether you're strategizing for your enterprise or navigating your individual cloud journey, this report offers valuable guidance and foresight to help you make informed decisions in today's rapidly evolving technological landscape.

About This Report

The Nutanix Cloud Usage report analyzes public cloud spending data from Nutanix customers throughout 2023. All cloud usage data is anonymized to protect customer identity. The data presented in this report is only representative of a subset of Nutanix customers that used the Nutanix Cloud Manager (NCM) Cost Governance (formerly Beam) solution to manage and optimize their cloud infrastructure. It may not be representative of the cloud usage of non-NCM Cost Governance customers.

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Key Cloud Trends

Public Cloud Spend Projected to Surge

Based on a recent [report](#) by Gartner, public cloud spend is expected to grow 20.4% to reach \$675.4 billion in 2024. This significant increase is primarily driven by generative AI adoption, application modernization, and accelerated digital transformation initiatives. The growth trend underscores the cloud's central role in driving business agility, scalability, and innovation across industries, as organizations increasingly shift from capital expenditure to operational expenditure models in IT spending.

Economic Recovery and Emerging Technologies Fuel Cloud Adoption

Despite initial challenges such as inflation, labor shortages, and other economic uncertainties, which reduced spending in the first two quarters of the year, cloud spending rebounded significantly in the latter half of the year. This resurgence was mostly driven by better economic conditions, infrastructure modernization and the emergence of advanced technologies like generative AI.

FinOps and Cost Governance: Critical for Sustainable Cloud Growth

The demand for robust governance systems is reshaping global IT spending. Challenges like capital restrictions and margin concerns can be addressed through FinOps practices, which offer visibility, control, automation, and cost improvements across diverse cloud environments. According to the latest Nutanix Enterprise Cloud Index, 85% of respondents indicated that their current IT infrastructure makes cloud cost control a challenge, highlighting the growing importance of FinOps in cloud management.

The Start of the AI Sprint

2023 brought Artificial Intelligence (AI) into the mainstream for enterprises, but we're still in the very early days of AI solution adoption. Most organizations are still evaluating which IT environments are optimal for running various AI processes and workloads, and determining which types of AI applications are most relevant and beneficial to their specific industry or business.



User Classification

Cloud Maturity Classification



Beginner

Number of cloud services used is less than 16. These users primarily consume IaaS services and some managed database services.



Proficient

Number of cloud services used is between 16 to 30. These users leverage advanced cloud services and makes heavy use of IaaS with a mix of PaaS services.



Expert

Number of cloud services used is greater than 30. Extremely advanced skills to leverage broad set of services like serverless computing, realtime and batch analytics, IoT, and AI/ML offerings.

Segment Definition



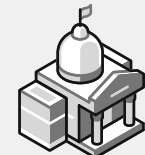
SMB

Revenue **Less than \$50M/year**



Commercial

Revenue **\$50M to \$1B/year**



Enterprise

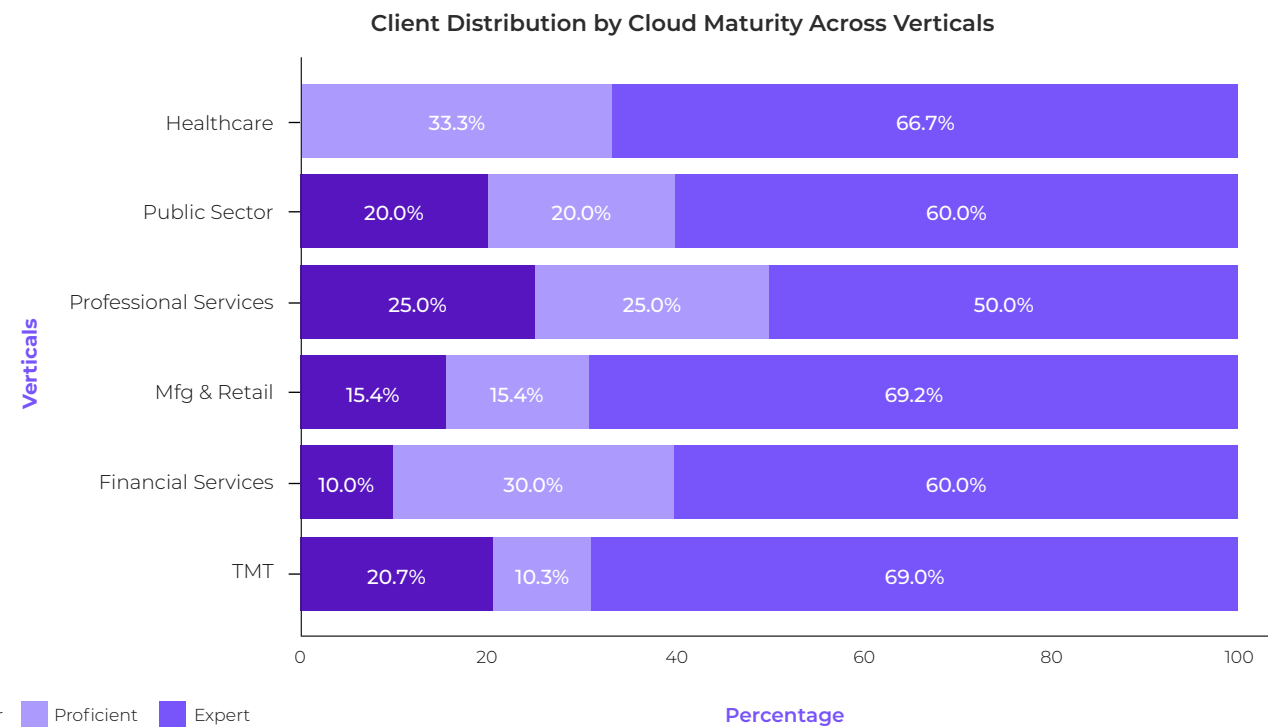
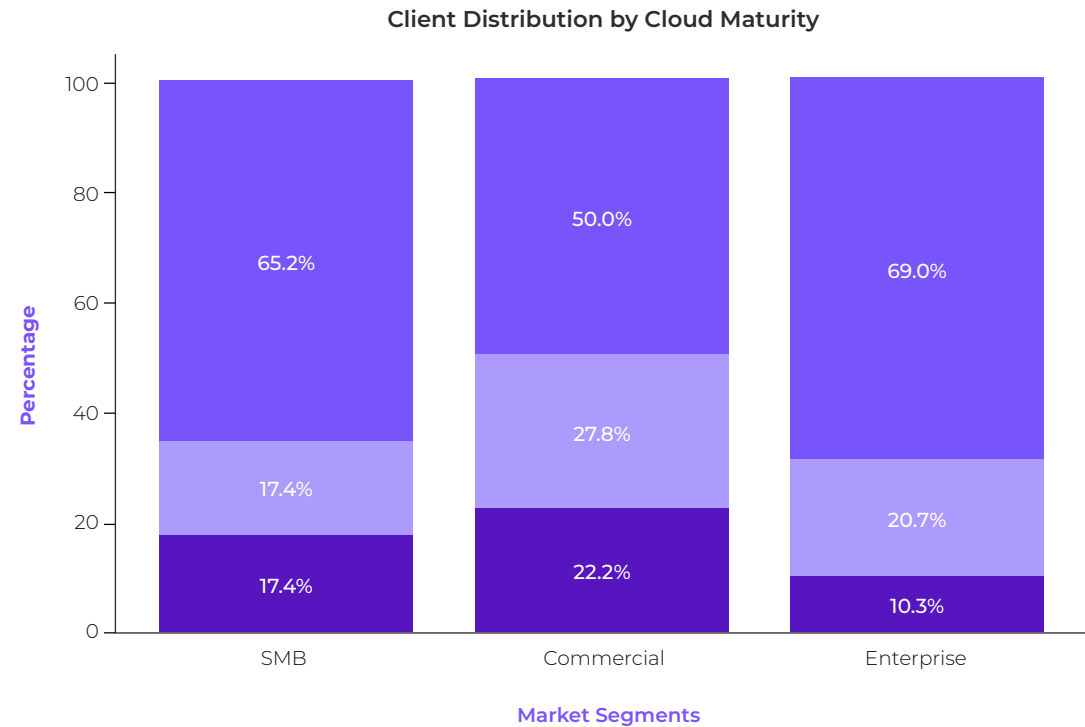
Revenue **More than \$1B/year**



Cloud Maturity Index

65% of SMBs Now Cloud Experts

- The majority of SMBs and Enterprises are in the Expert category, indicating high proficiency in cloud services.
- In the Commercial segment, there is a more even distribution of beginners, intermediates, and experts across all three maturity categories, indicating a diverse range of cloud adoption and usage within this segment.
- Verticals like Healthcare, Manufacturing and Retail, and Technology, Media, and Telecommunications (TMT) demonstrate advanced cloud proficiency, suggesting high demand for advanced cloud services.
- Meanwhile, the Public Sector and Professional Services have a similar distribution of cloud maturity levels, with a higher proportion of experts, indicating that they have similar needs for cloud services.



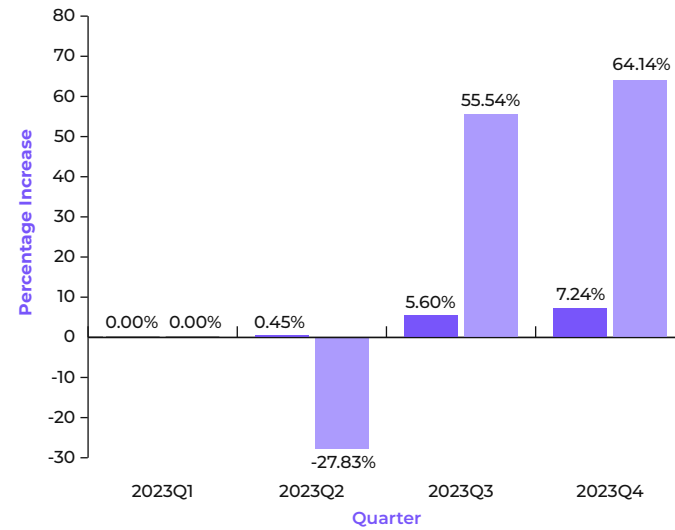
Cloud Spend Growth

AWS and Azure Surge Forward

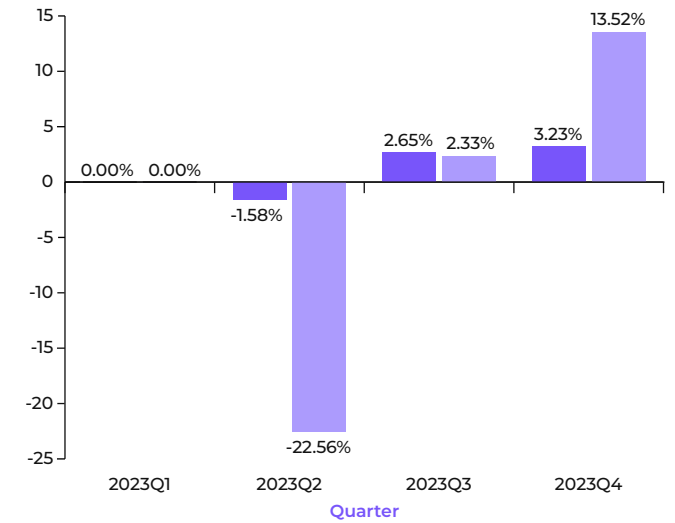
Based on data gathered by NCM Cost Governance, the two leading public cloud providers both showed growth in 2023.

- Amazon Web Services (AWS) showed consistent, modest growth across all market segments, indicating strong customer retention and steady service adoption.
- Microsoft Azure initially experienced declines, particularly in the Enterprise segment, but demonstrated significant recovery and substantial growth in the latter quarters across all segments.

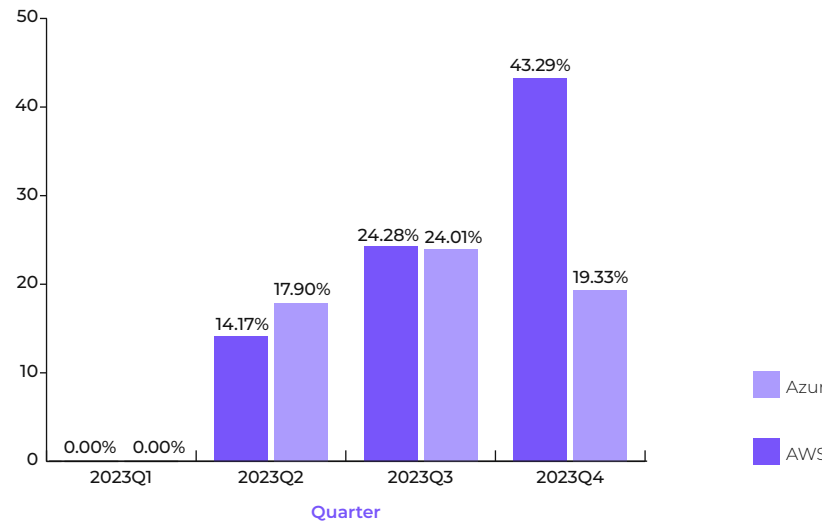
Percentage Increase in Spend Compared to the First Quarter for Each Cloud Provider Across **All Segments**



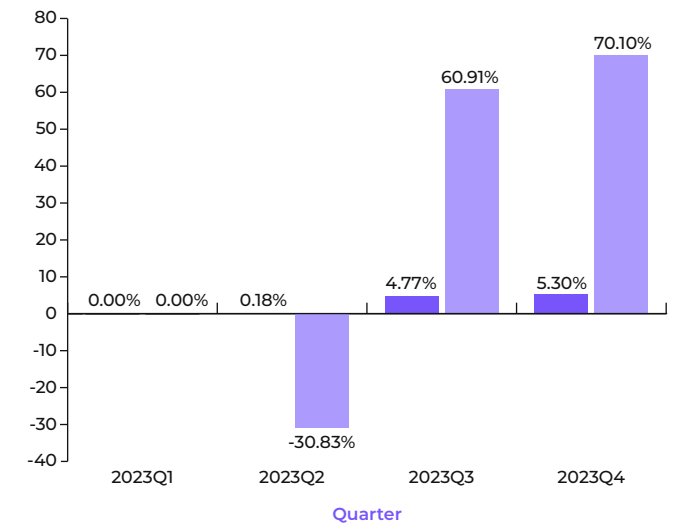
Percentage Increase in Spend For **SMBs** Compared to the First Quarter for Each Cloud Provider



Percentage Increase in Spend For **Commercials** Compared to the First Quarter for Each Cloud Provider



Percentage Increase in Spend For **Enterprises** Compared to the First Quarter for Each Cloud Provider



Note: the growth % in Q2, Q3, Q4 have been calculated by taking Q1 spend in 2023 as the baseline



Cloud Spend Growth by Vertical

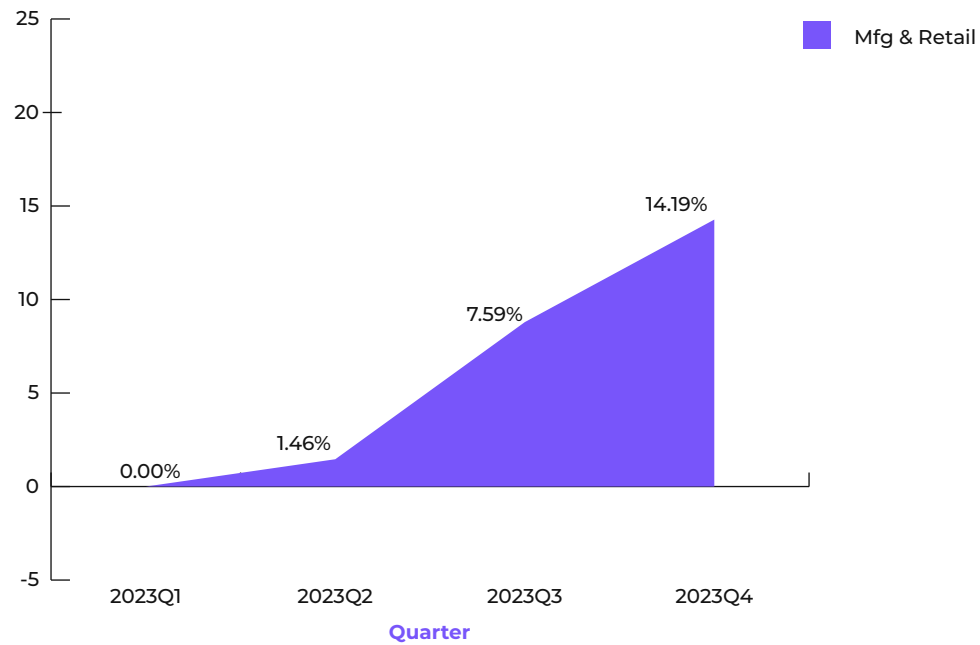
Manufacturing and Retail

- The manufacturing and retail industries showed consistent growth in cloud spend throughout 2023, with each quarter outperforming the previous one. This trend indicates a steady and increasing adoption of cloud services within these industries.
- Despite challenges like economic uncertainty, labor shortages, and supply chain disruptions, the manufacturing sector prioritized digital transformation, including smart factories, industrial metaverse, and generative AI ([Deloitte](#)). These efforts significantly contributed to the growth in cloud spend.
- The retail sector faced mixed performance in 2023, influenced by economic stratification, sustainability initiatives, and changing shopping behaviors driven by e-commerce and remote work. Retailers responded to these dynamics with digital transformation efforts to enhance supply chain visibility, sustainability, and customer engagement ([NIQ](#) and [KPMG](#)), fueling increased cloud spend in the latter half of the year.

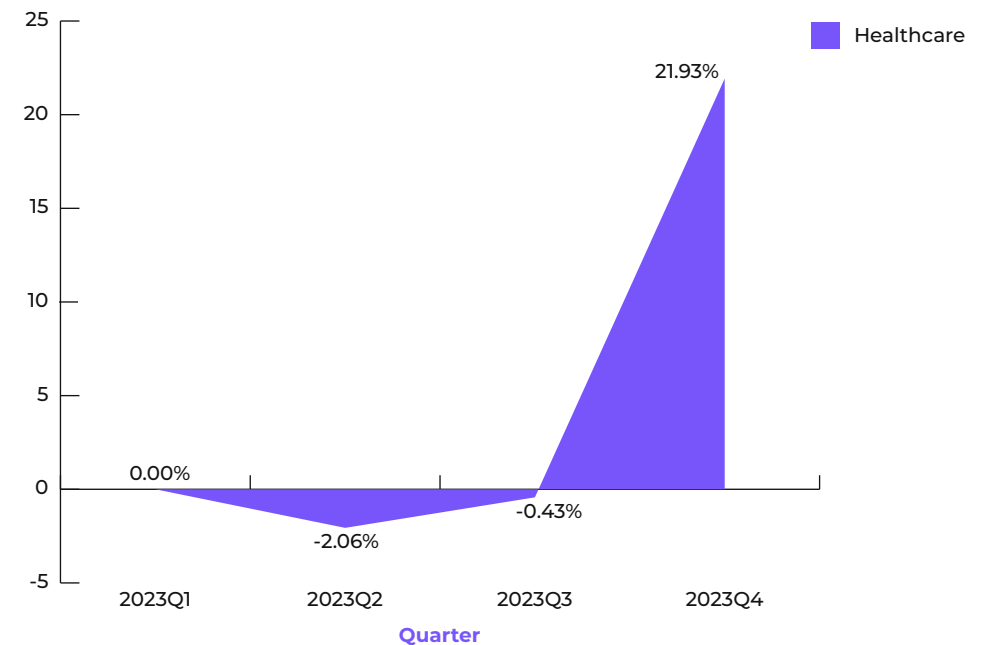
Healthcare

- The healthcare industry experienced a slight decrease in Q2 and Q3, largely attributed to significant challenges including high inflation, labor shortages, and rising operational costs, compounded by the lingering effects of the COVID-19 pandemic ([McKinsey & Company](#)).
- However, there was a substantial increase in Q4 spending. This was likely driven by better economic conditions, efforts to modernize IT infrastructure, and investments in advanced technologies such as AI, telehealth, and other digital tools aimed at optimizing administrative functions and care processes ([THL](#) and [Deloitte](#)).

Percentage Increase in Spend Compared to the First Quarter For Mfg



Percentage Increase in Spend Compared to the First Quarter For Healthcare

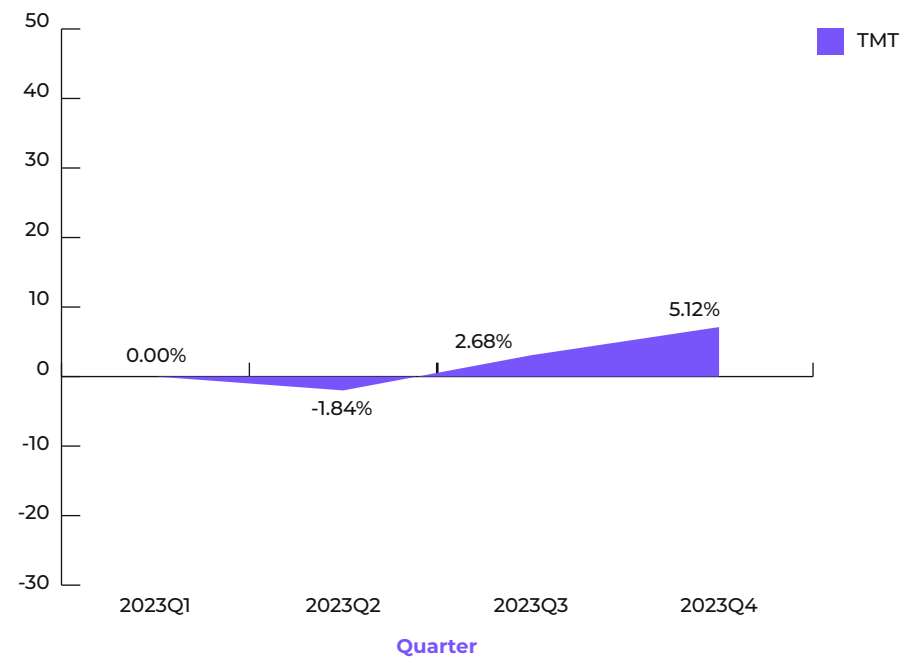


Cloud Spend Growth by Vertical

Technology, Media, and Telecommunications

- The TMT industry saw a decline in cloud spend in Q2, followed by a recovery in Q3 and continued growth in Q4.
- The Q2 decrease could be linked to factors like economic slowdowns, softening consumer spending, and lower product demand. Strategic mergers and acquisitions, right-sizing workforces, and optimizing existing resources ([Deloitte](#)) could have also played a role in reducing cloud spend.
- Adoption of 5G, AI, and other emerging technologies ([Deloitte](#) and [PwC](#)) as well as increased investment in cybersecurity drove the recovery and growth in cloud spend in the latter quarters as companies invested in modernizing their infrastructure, enhancing digital capabilities, and strengthening their cybersecurity measures.

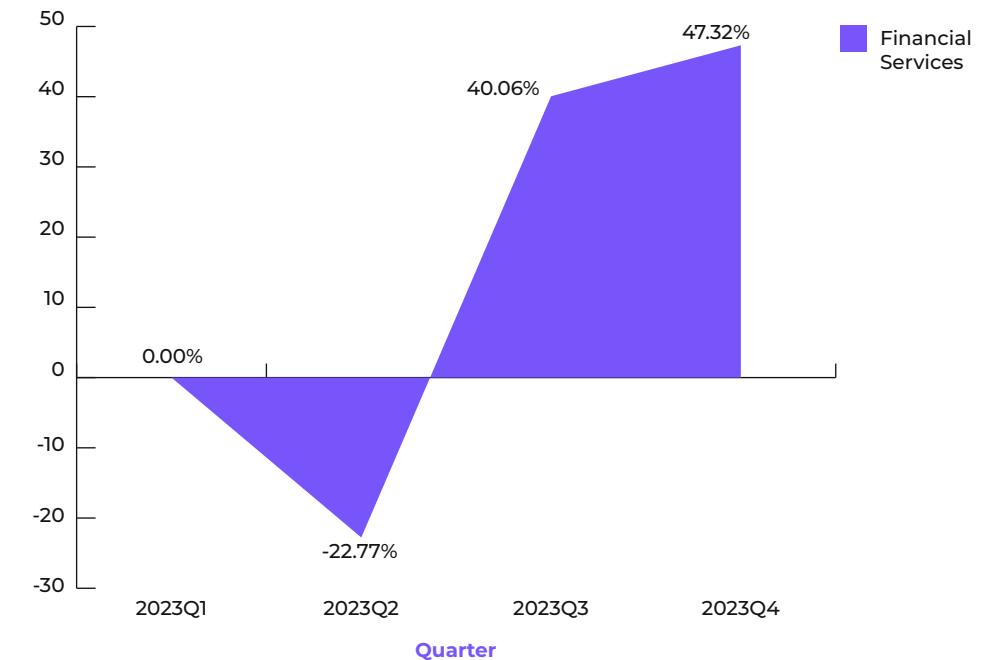
Percentage Increase in Spend Compared to the First Quarter For TMT



Financial Services

- In early 2023, economic uncertainties, inflation, and geopolitical tensions ([McKinsey & Company](#) and [IBM](#)) prompted cost-cutting measures in the financial industry, resulting in low cloud spend in Q1 and Q2.
- However, financial institutions accelerated hybrid cloud adoption to redefine technology investments ([IBM](#)), leading to strong rebound in Q3 cloud spend.
- With increased economic clarity and regulatory frameworks, alongside investments in technological advancements like generative AI, cloud investment continued to steadily grow in Q4.

Percentage Increase in Spend Compared to the First Quarter For Financial Services

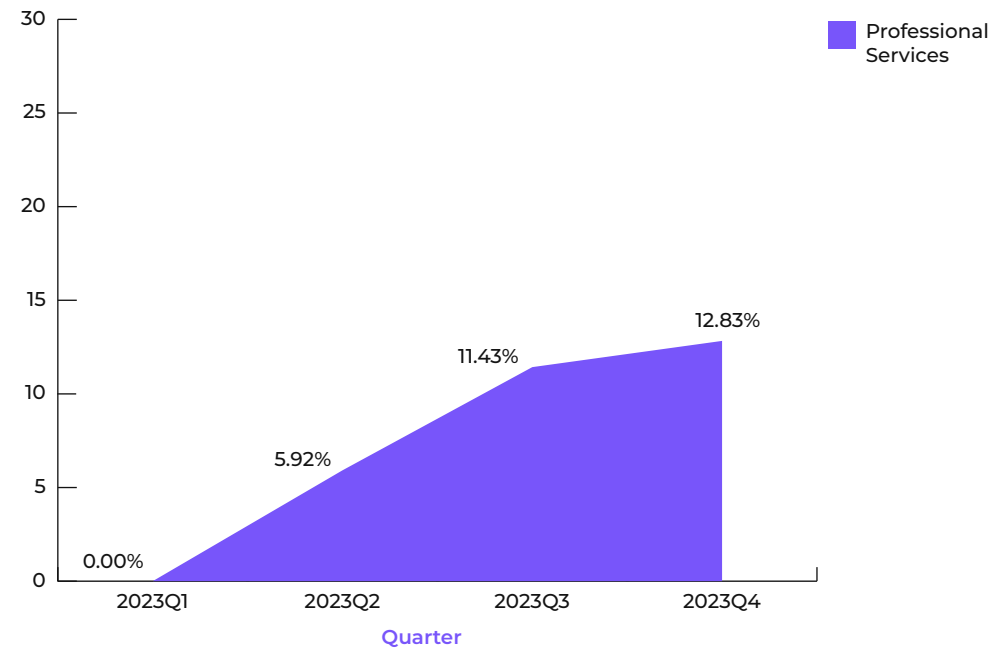


Cloud Spend Growth by Vertical

Professional Services

- Modest Q2 growth stemmed from cautious yet strategic tech and AI investments aimed to boost productivity and efficiency amid economic uncertainties and downward pricing pressure from clients ([RSM](#) and [Korn Ferry](#)).
- The uptick in Q3 growth reflects confidence in digital transformation, with firms benefiting from earlier tech investments and further adopting cloud solutions to enhance client engagement and service efficiency ([Unit4](#)).
- Sustained Q4 growth indicates continued digital transformation momentum, with the industry increasing their spend on AI, Compute, and Analytics related cloud services.

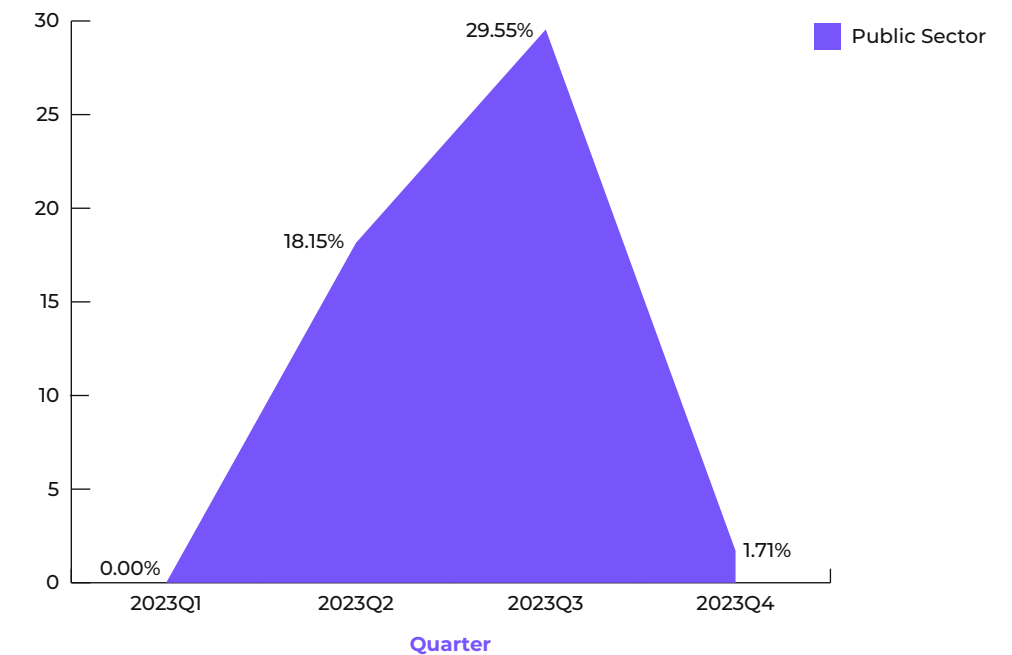
Percentage Increase in Spend Compared to the First Quarter For Professional Services



Public Sector

- Substantial growth in Q2 and Q3 was fueled by digital transformation, modernization of legacy systems, and increased investment in AI.
- Modest growth in Q4 likely reflects budget pressures, a focus on maintaining and optimizing earlier investments, and prioritization of immediate operational needs over new tech investments.

Percentage Increase in Spend Compared to the First Quarter For Public Sector



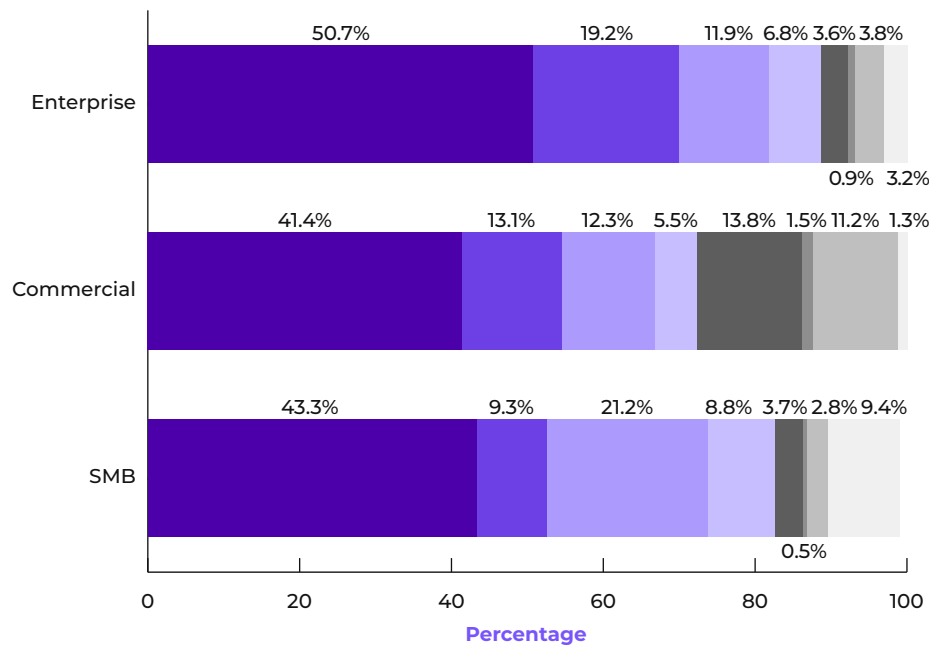
Spend Analysis for All Cloud Services

Compute Dominates All Segments, Azure Leads in Storage and Analytics Spend Proportion

- Compute dominates spend across all segments, and forms a larger proportion of total cloud spend in AWS as compared to Azure.
- Database spend proportion is significantly higher in SMBs compared to Commercials and Enterprises.

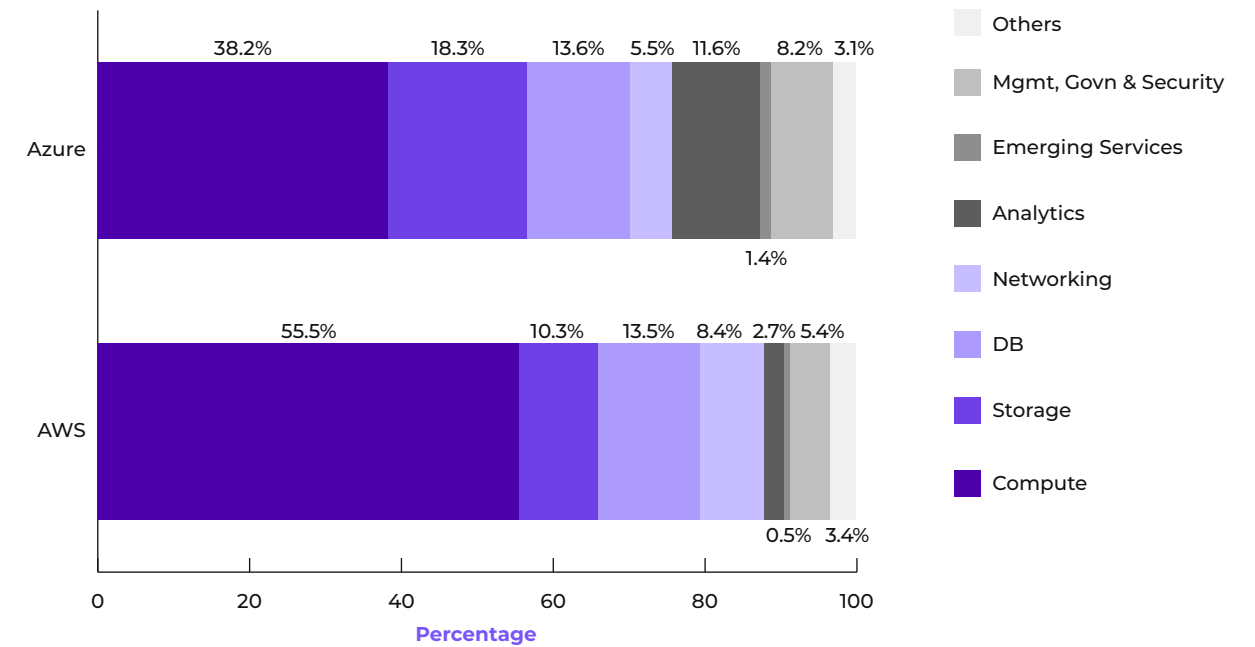
- Commercials allocate significantly more of their budget to Analytics, and Management, Governance and Security services than SMBs and Enterprises.
- Azure leads in Storage and Analytics and Emerging Services (AI, IoT, etc.) spend proportions compared to other clouds.

Spend by Service Category Across Market Segments



<Analytics for Enterprise is 3.6%, Emerging Services for Enterprises is 0.9%, Mgmt Govn & Security for Enterprise is 3.8%>
 <Analytics for SMB is 3.7%, Emerging Services for SMB is 0.5%, Mgmt Govn & Security for SMB is 3.8%>

Spend by Service Category Across Cloud Service Providers



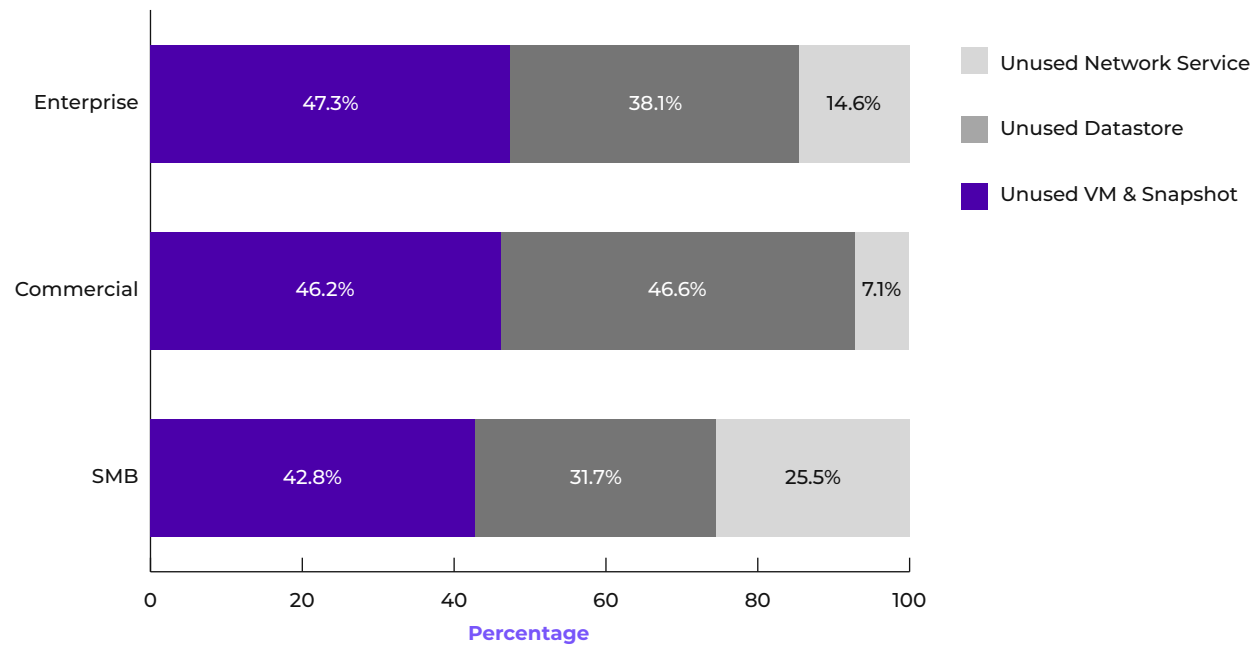
Cost Saving Actions

Eliminating or Rightsizing VMs and Datastores Leading Strategy to Save Costs

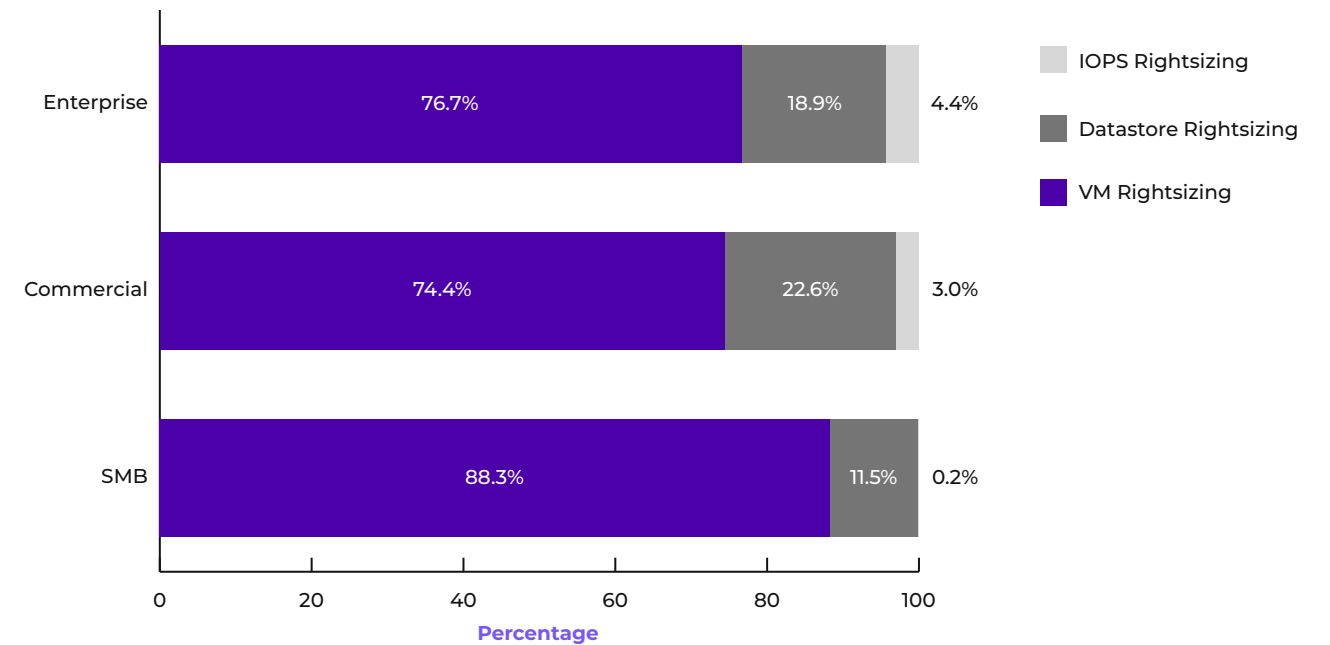
- When it comes to eliminating unused resources, businesses primarily benefit from eliminating unused VMs and datastores
- For rightsizing, VM rightsizing is the predominant contributor to cost savings across all segments.

- On average, businesses annually save **\$43,800** when eliminating unused resources and **\$150,000** when rightsizing underutilized resources.¹

Share of Cost Savings by Eliminating Unused Resources



Share of Cost Savings by Rightsizing Underutilized Resources



¹These values are calculated based on the mean of the data.

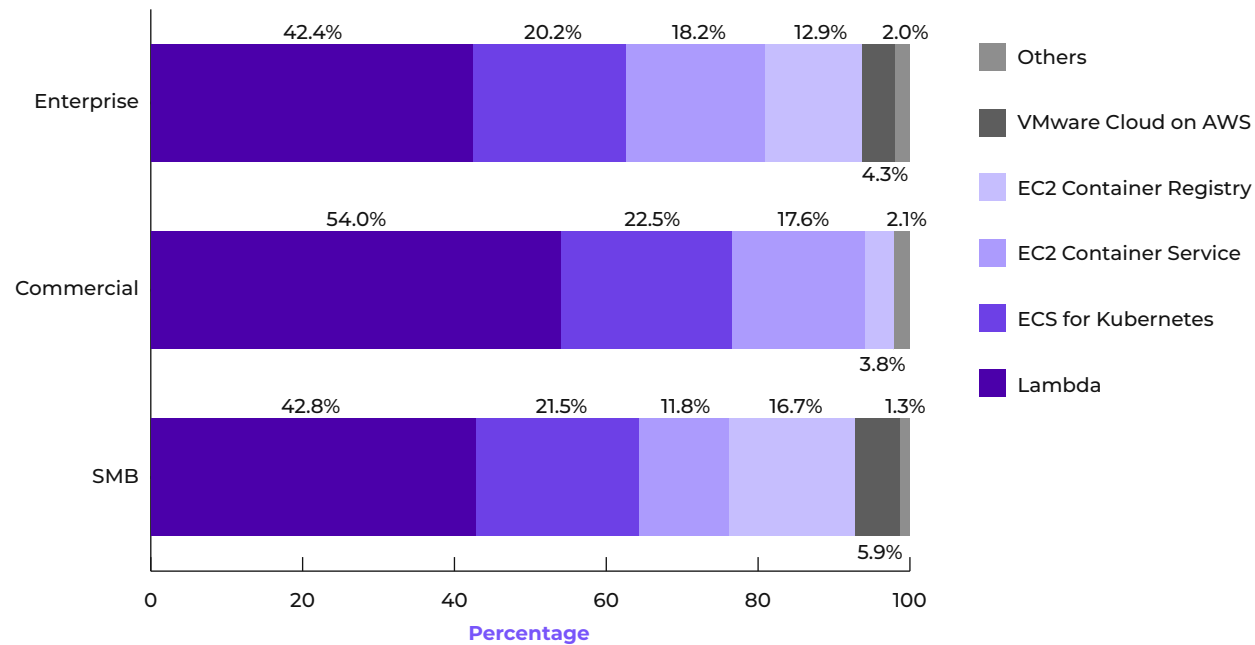


Compute Services Spend Analysis

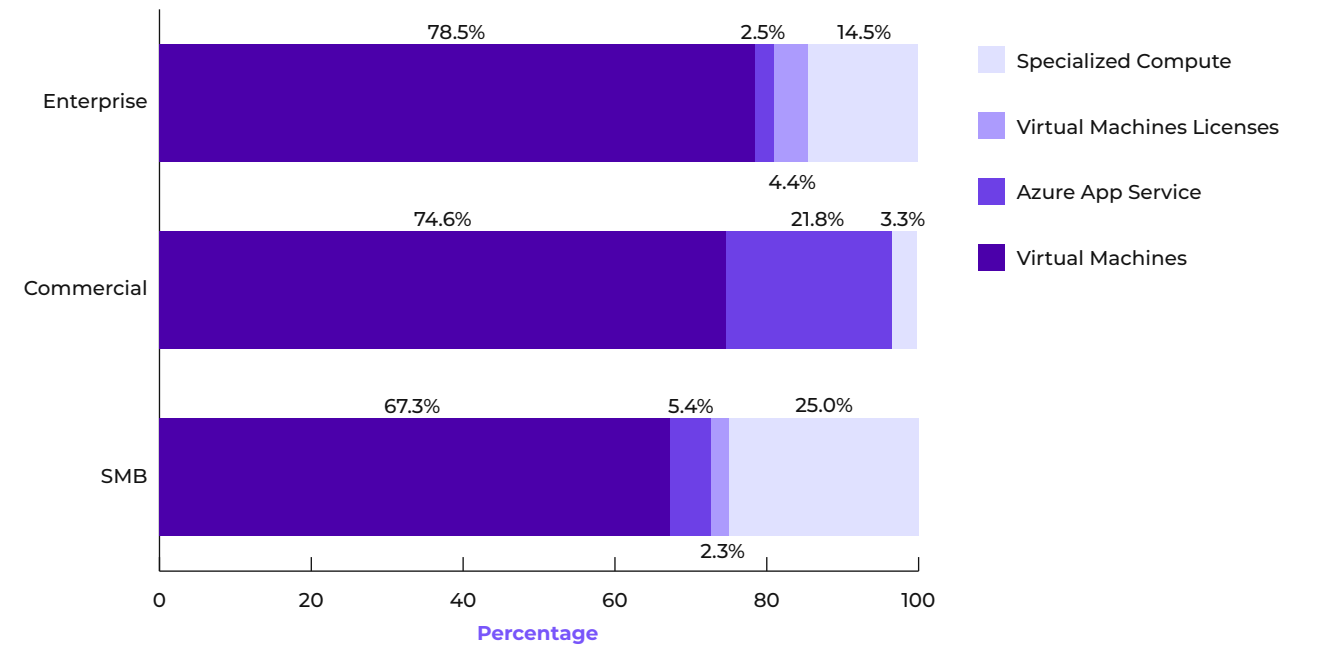
VMs Dominate Compute But Containers and Serverless Also Growing

- Amazon Elastic Compute Cloud (EC2) service constitutes **95%** of AWS compute spend and Azure VMs makeup **74%** of Azure's compute spend.
- Excluding EC2, AWS compute spend is primarily on Lambda, ECS for Kubernetes® and ECS.
- Specialized Compute (Nutanix Cloud Clusters (NC2) platform) forms a significant proportion of Azure compute spend for SMBs and Enterprises but not for Commercial businesses.

AWS Compute Spend Analysis (Excluding EC2)



Azure Compute Spend Analysis



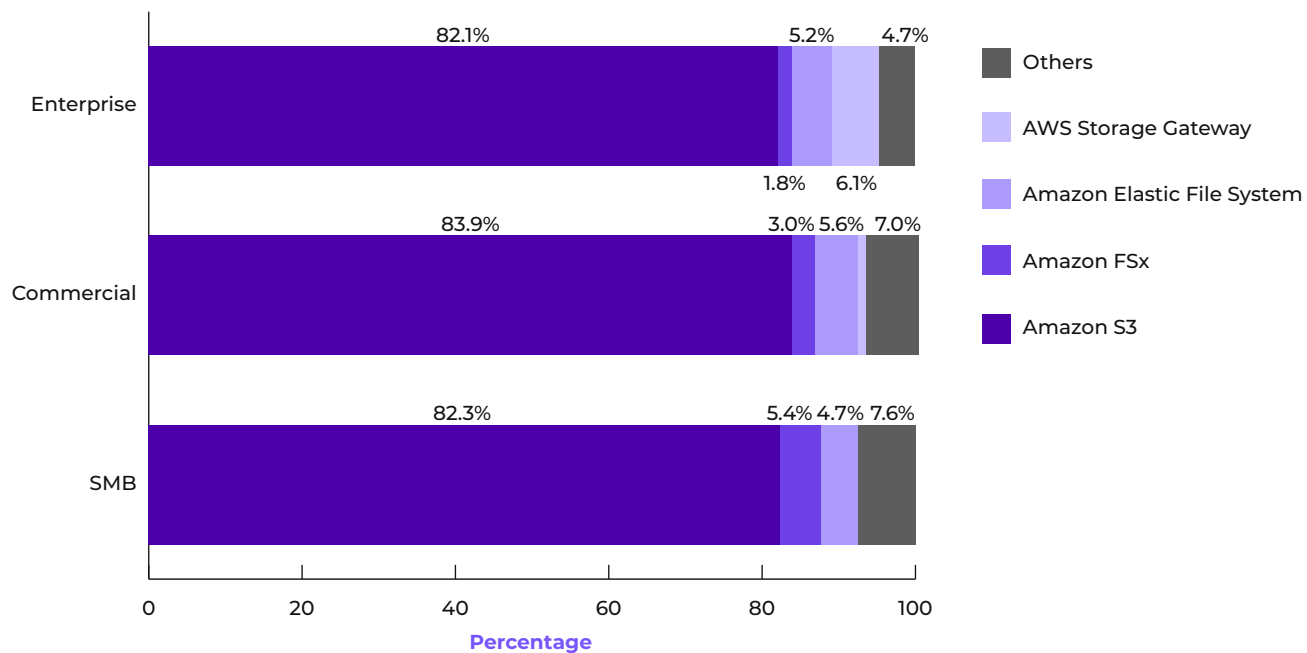
Storage Services Spend Analysis

Object Storage Rules Storage Spend Across All Clouds

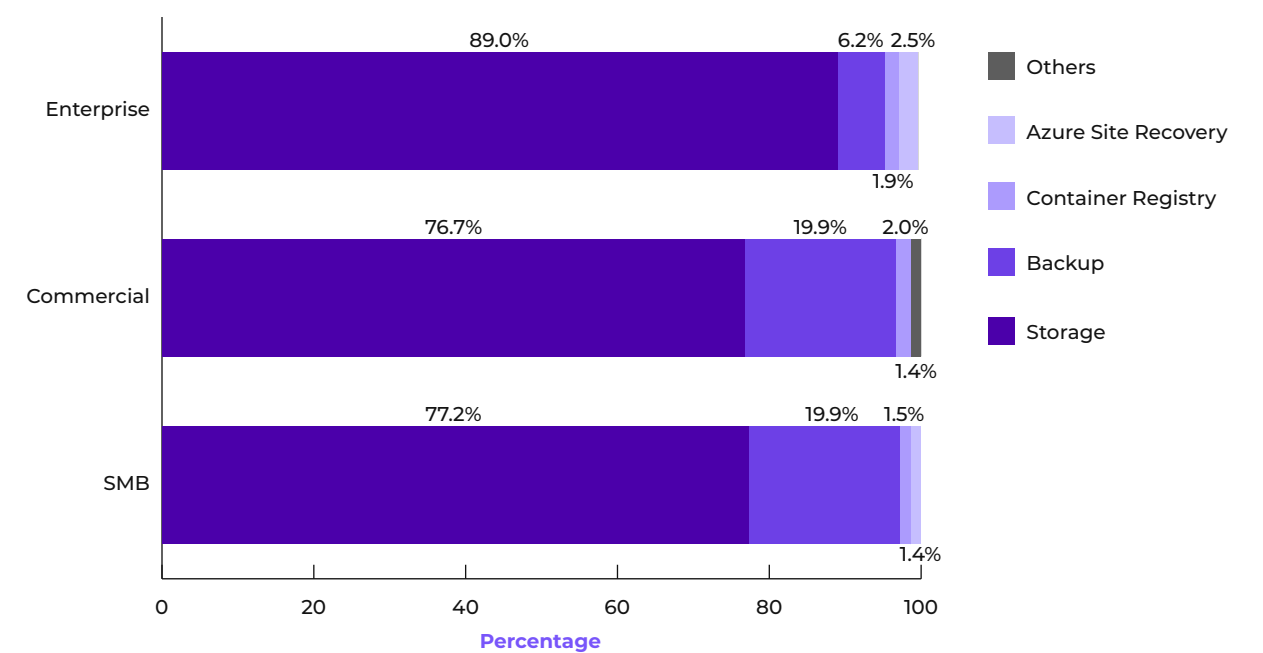
- Amazon Simple Storage Service (S3) and Azure Blob Storage services see significant spend across all segments, suggesting that they're the preferred choice in their respective clouds. This reflects the industry trend of object storage as the de facto standard due to scalability and flexibility ([Cloudian](#)).
- Varying spends on Amazon FSx file services and Amazon Elastic File System (EFS) file services indicate adoption driven by specific use cases or workloads.

- Azure Backup shows significant spend in Commercial and SMB segments, highlighting a priority on backup solutions amidst trends in enhanced cybersecurity and data protection strategies ([Gartner](#)).
- Relatively low spend on AWS Storage Gateway and Azure Site Recovery for Commercials and SMBs suggest a preference for cloud-native storage solutions over hybrid or on-premises integration.

AWS Storage Spend Analysis



Azure Storage Spend Analysis



< Others for Enterprise is negligible, Container registry for Commercial is 2%, Azure Site Recovery for Commercial is 0%, Others for Commercial is 1.4%, Container Registry for SMB is 1.5%, Azure Site Recovery for SMB is 1.4%, Other for SMB is negligible >



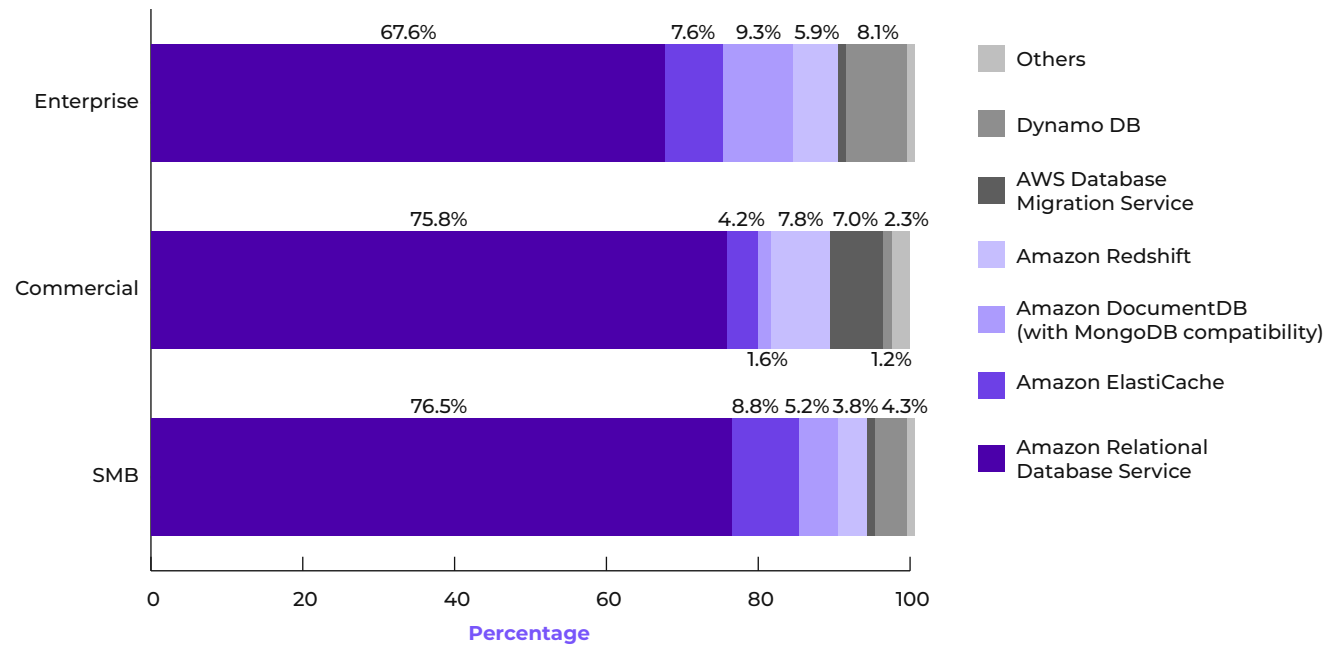
Database Services Spend Analysis

Relational DBs Lead, NoSQL Rising

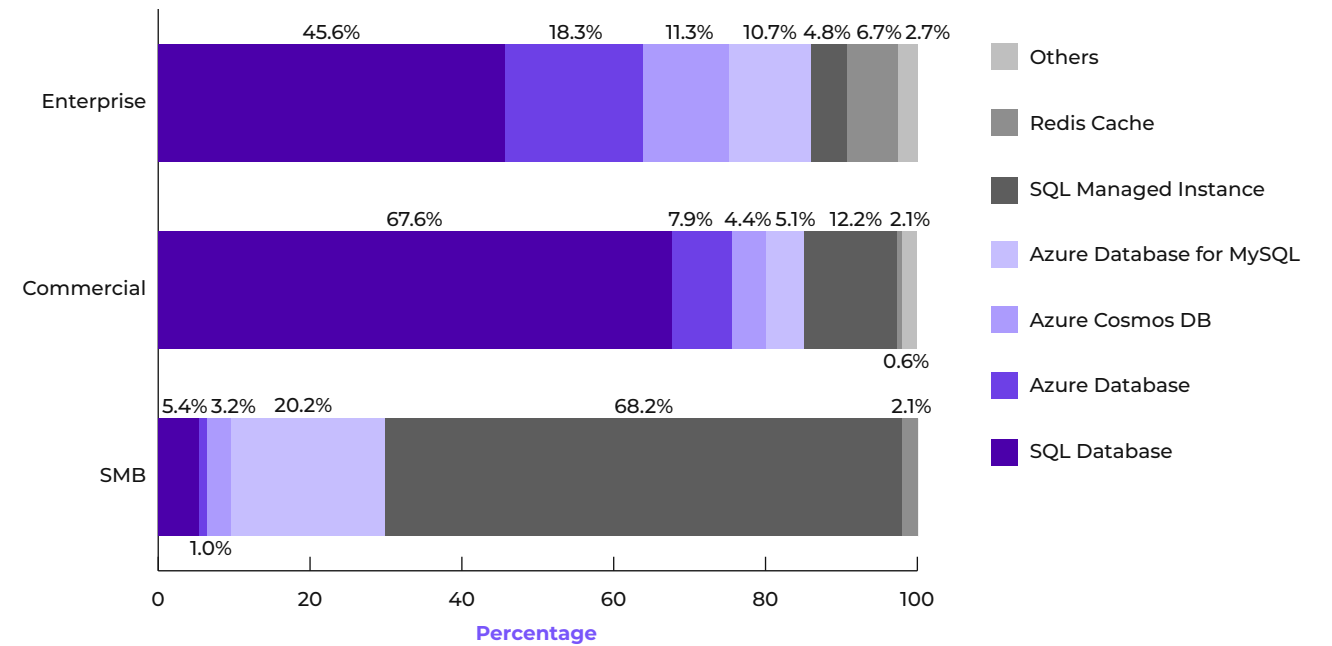
- Relational Database Management Systems (RDBMS) dominate database spend across all segments.
- NoSQL and in-memory database services like AWS DynamoDB, Azure Cosmos DB, and Redis are seeing significant adoption.
- Azure SMBs show a preference for SQL Managed Instance, indicating high popularity among smaller businesses.

- Enterprises using Azure have a notable spend on Database for PostgreSQL and Cosmos DB, showing a preference for these database types in large-scale applications.
- Enterprises show a higher relative spend on in-memory data storage solutions when compared to other segments using similar Azure storage services.

AWS DB Spend Analysis



Azure DB Spend Analysis



< Dynamo DB for Commercial is 1.2%, Others for Commercial is 2.3%, bars not marked are negligible >

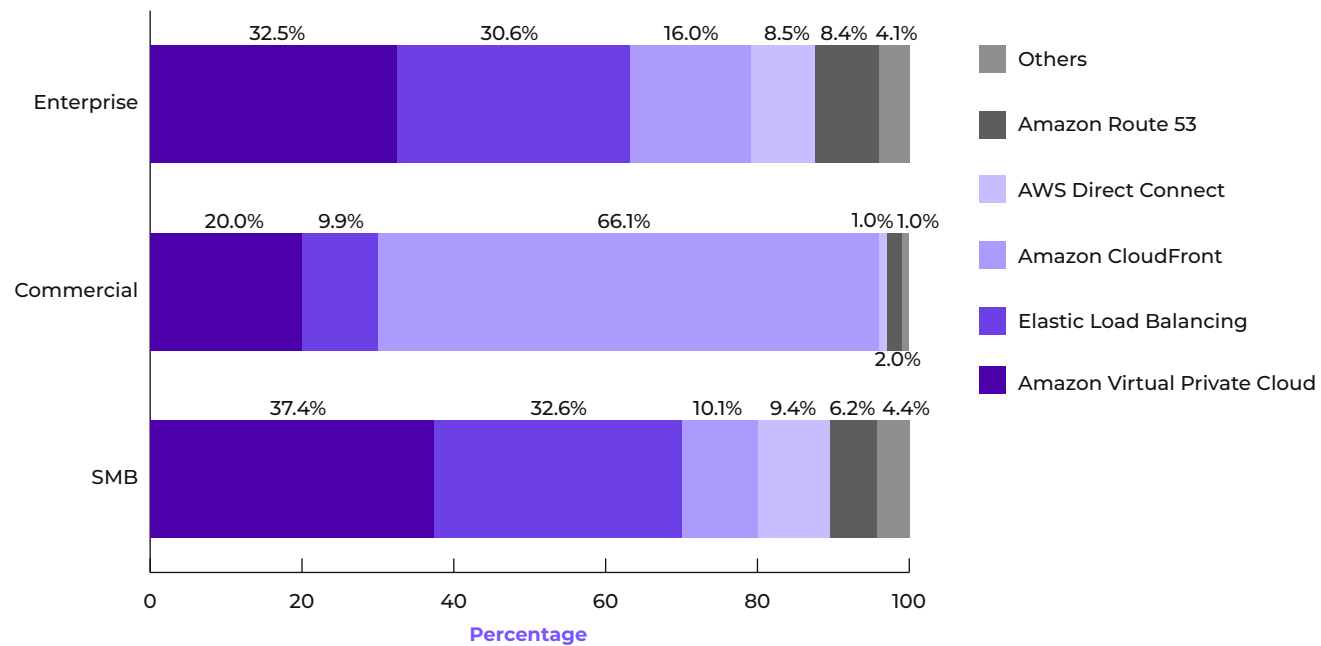


Network Services Spend Analysis

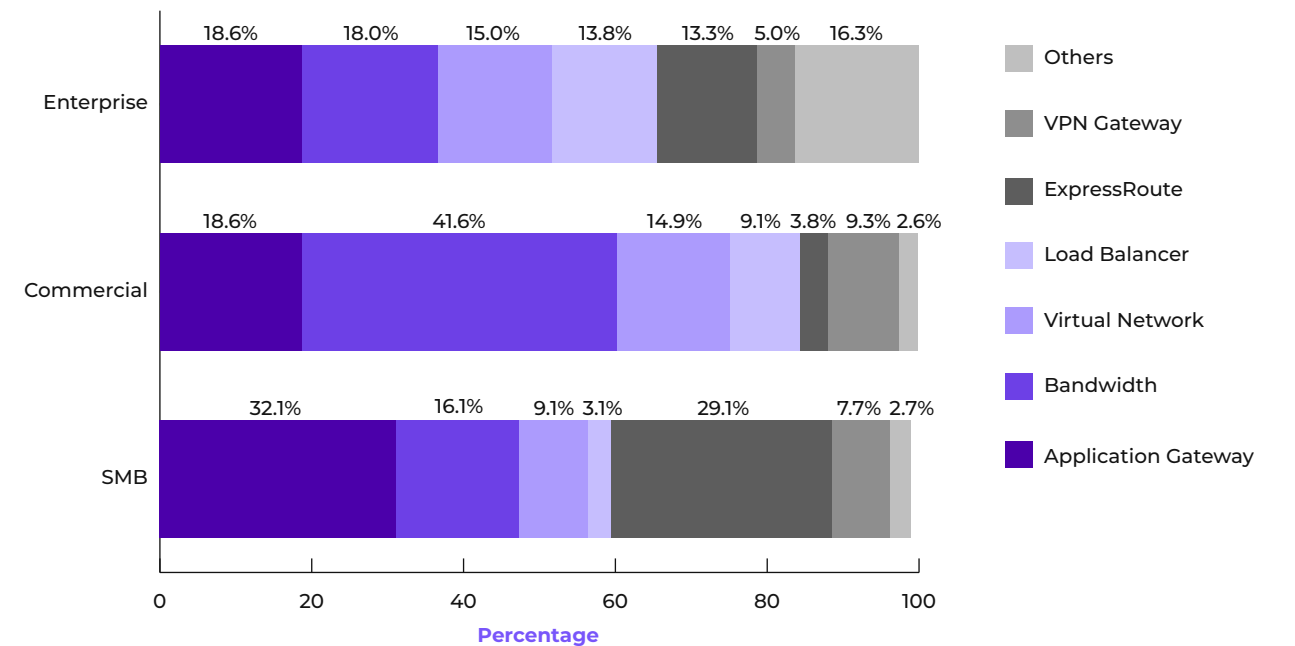
Private Networking and Load Distribution Dominate AWS Spend, Azure Prioritizes Application Delivery

- Enterprise and SMBs using AWS focus on private networking and load distribution services like Amazon VPC and Elastic Load Balancing, while the Commercial segment invests heavily in content delivery networks like the Amazon CloudFront service.
- Enterprises using Azure balance spending with a focus on Application Gateway and Bandwidth, whereas the SMB segment prefers Application Gateway and ExpressRoute, highlighting priorities in application delivery and data transfer.
- The use of diverse services like VPC, CloudFront, and Load Balancers across segments, suggests a hybrid and multicloud approach.

AWS Network Spend Analysis



Azure DB Spend Analysis



< AWS Direct Connect for Commercial is 1.0%, Amazon Route 53 for Commercial is 2.0%, Others for Commercial is 1.0% >



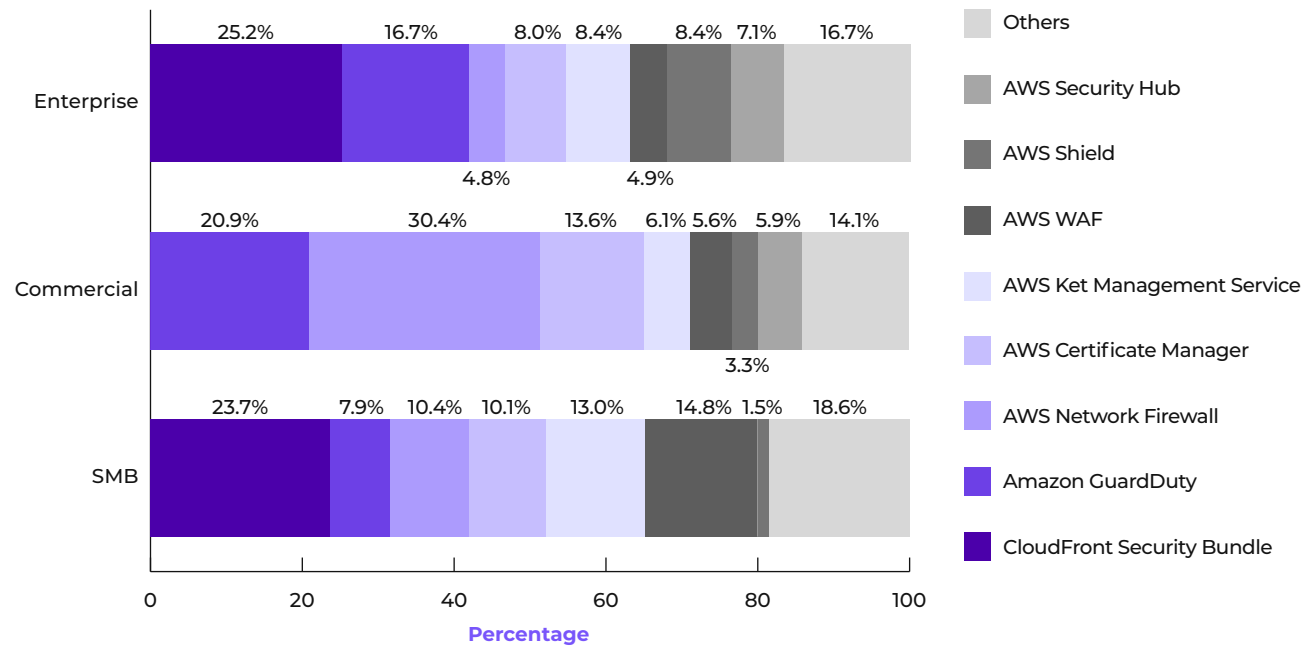
Security Services Spend Analysis

Azure Shows Diverse Security Focus Across Segments

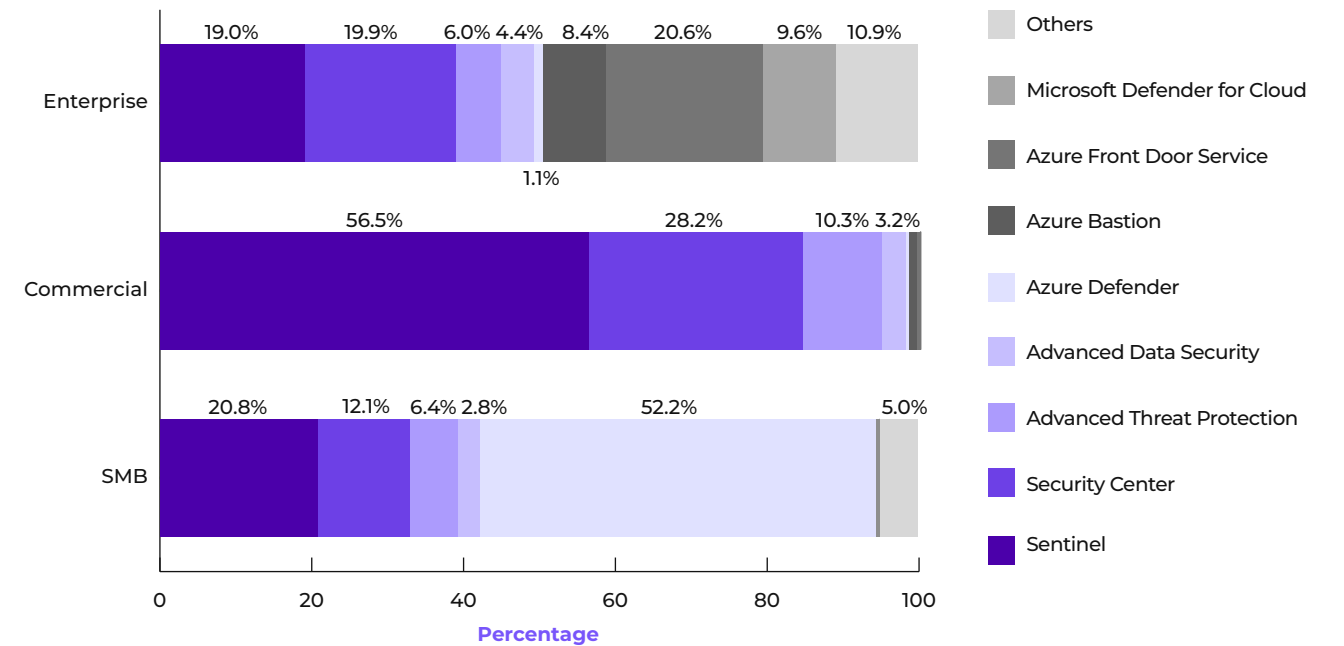
- AWS security spending varies by segment, reflecting diverse security needs: CloudFront dominates amongst SMBs and Enterprises, while AWS Network Firewall dominates in the Commercial segment.
- Enterprises using AWS prioritize comprehensive security services like CloudFront Security Bundle, GuardDuty, and Shield, while Commercial segments focus on network security and certificate management services like AWS Network Firewall and AWS Certificate Manager.

- SMBs emphasize AWS Key Management Service and AWS WAF firewall, highlighting diverse security strategies with a focus on web application security.
- On Azure, Microsoft Sentinel leads in the Commercial segment, Microsoft Defender in SMBs, and Enterprises show a balanced spend across services. This indicates comprehensive security approaches in Enterprises versus focused strategies in Commercial and SMB segments.

AWS Security Spend Analysis



Azure Security Spend Analysis



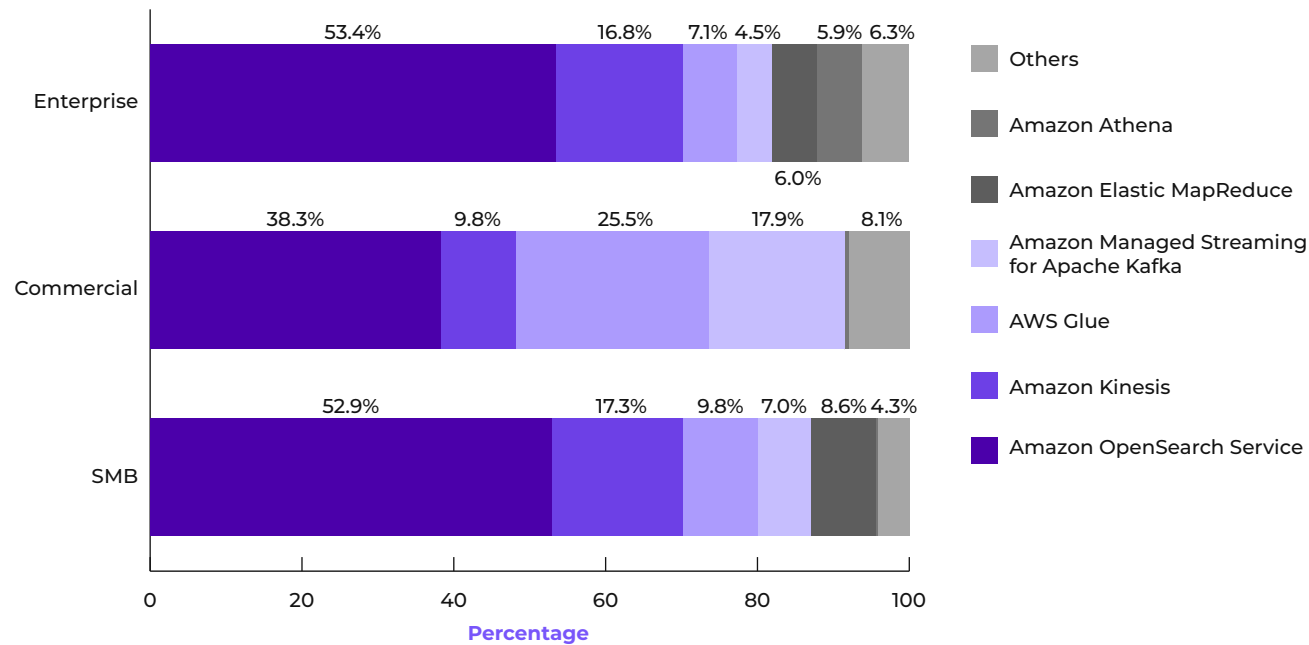
Analytics Services Spend Analysis

Cloud Giants Compete For Data-Driven Dollars

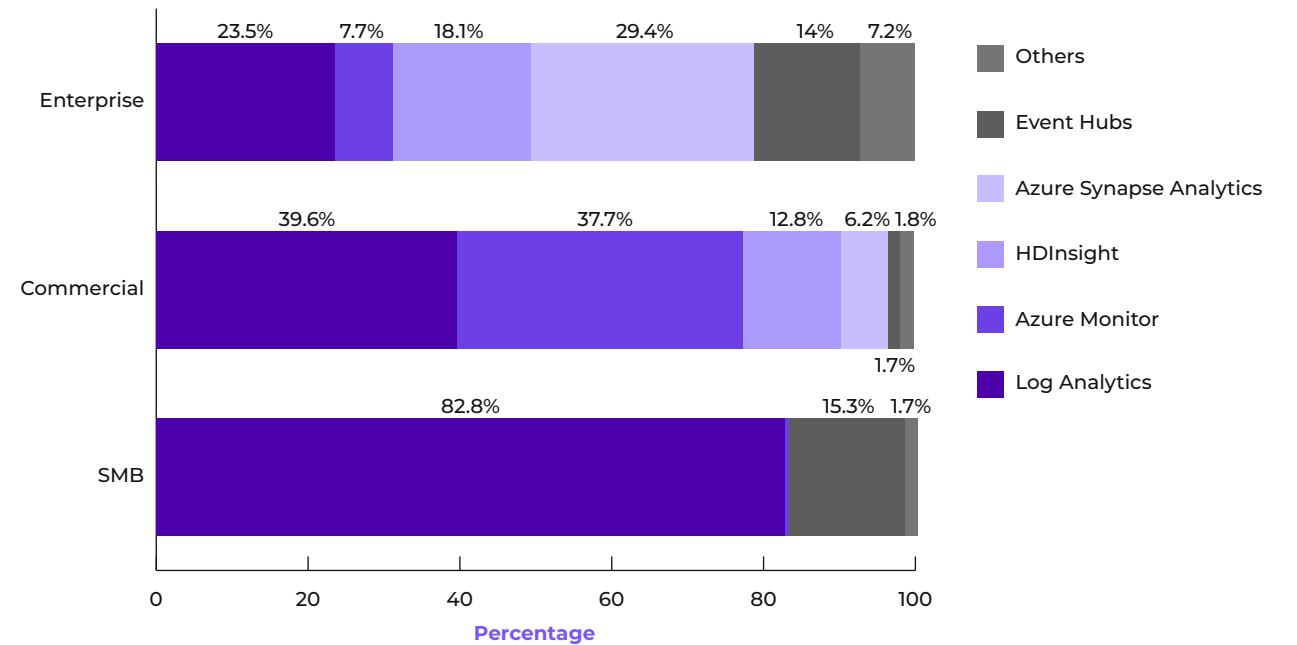
- AWS Enterprise and SMB segments prioritize Amazon OpenSearch Service for search and analytics, with smaller investments also in Amazon Kinesis and Amazon Elastic MapReduce services.
- In the AWS Commercial segment, spending is diversified with a strong emphasis on data integration and real-time processing. This is highlighted by the AWS Glue service and Amazon Managed Streaming for Apache Kafka.

- Azure's Enterprise segment distributes spend across Azure Synapse Analytics, Log Analytics, and Event Hubs, indicating diverse use of analytics, real-time data processing, and logging services.
- Azure Commercial segment focuses on Log Analytics and Azure Monitor for monitoring and logging, while SMBs heavily rely on Log Analytics and Event Hubs services.

AWS Analytics Spend Analysis



Azure Analytics Spend Analysis

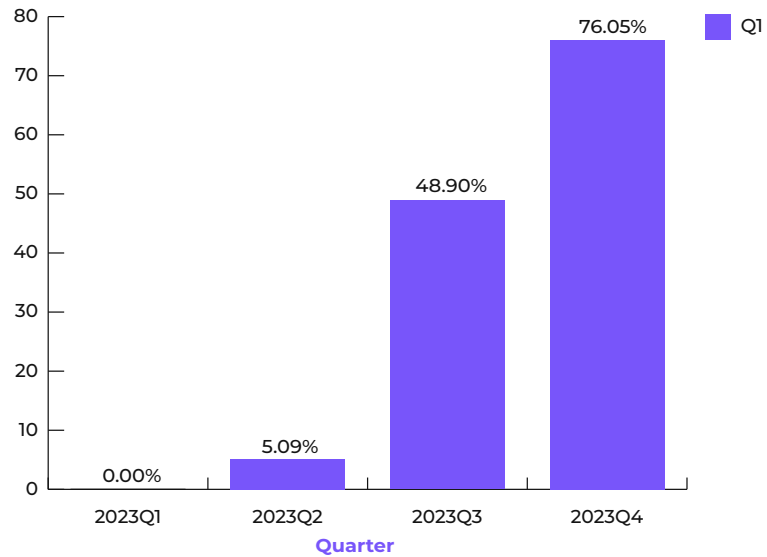


Emerging Services Spend Analysis

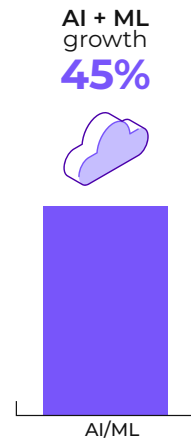
AI/ML Shows Remarkable Growth Through 2023

- Emerging Services seeing most cloud spend include IoT and AI/ML services
- AI/ML services saw a 45% YoY increase in spend.
- IoT spend was low in the first half of the year but rebounded in the latter half.
- The enterprise segment is the largest consumer of AI services followed closely by the commercial segment, likely due to their larger budgets and extensive data needs.
- There is a substantial increase in AI spending throughout the year, especially in the second half, showing a growing adoption and investment in AI technologies. The
- Azure Cognitive Search and Amazon SageMaker services are the top AI/ML services.

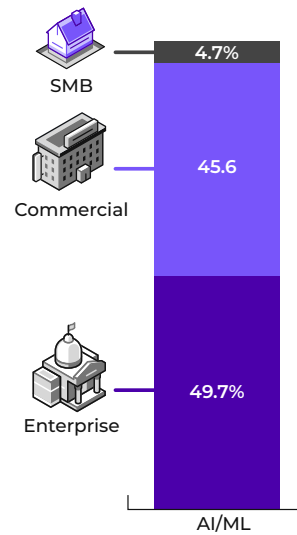
Percentage Increase in Spend Compared to the First Quarter



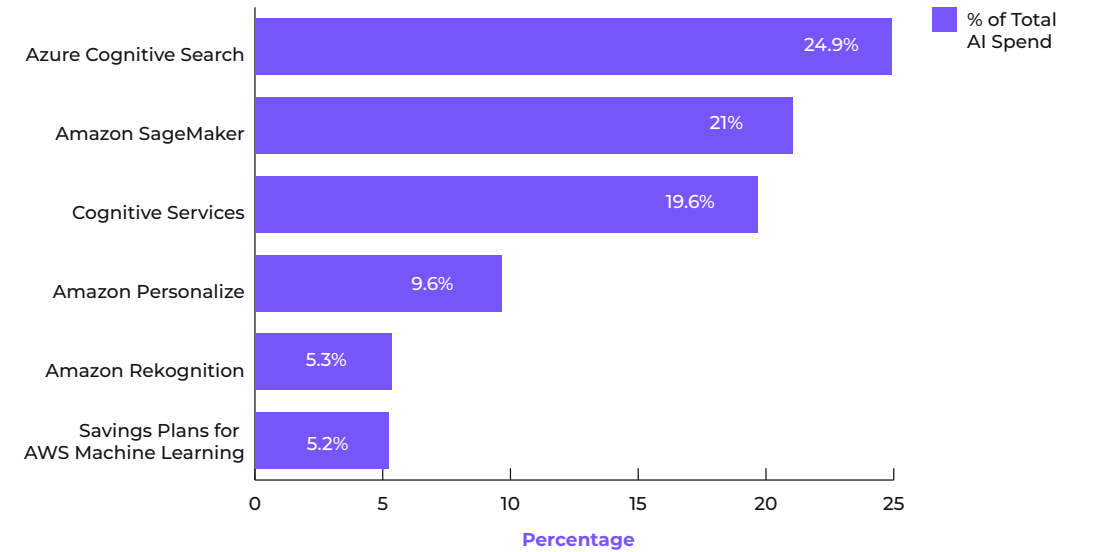
Cloud Spend



Spend by Segment



Top AI/ML Services Spend as % of Total AI Spend



The Hybrid Multicloud Vision

Embracing Hybrid Multicloud Essential For Modern Enterprises, But Achieving Interoperability Remains Key Challenge to Unlock Full Potential

The 6th edition of the [Enterprise Cloud Index \(ECI\)](#), a global research study commissioned by Nutanix to assess global enterprise cloud deployments, was conducted by U.K. researcher Vanson Bourne in December 2023. The survey included 1,500 IT and DevOps/Platform Engineering decision-makers worldwide. It revealed that nearly half (**46%**) of the organizations have already implemented a hybrid cloud or hybrid multicloud IT infrastructure model.

Furthermore, over **80%** of organizations believe that hybrid IT environments are most advantageous for managing applications and data. This shift is now a top executive priority, with almost half of the respondents indicating that hybrid IT implementation is a primary focus for their CIOs.

The increasing adoption of hybrid multicloud environments can be attributed to their numerous benefits. These environments provide modern digital enterprises with cost, billing, and deployment options for their data and applications. This flexibility allows organizations to optimize spending, enhance application performance, and accelerate the time to market for complex IT infrastructure solutions.

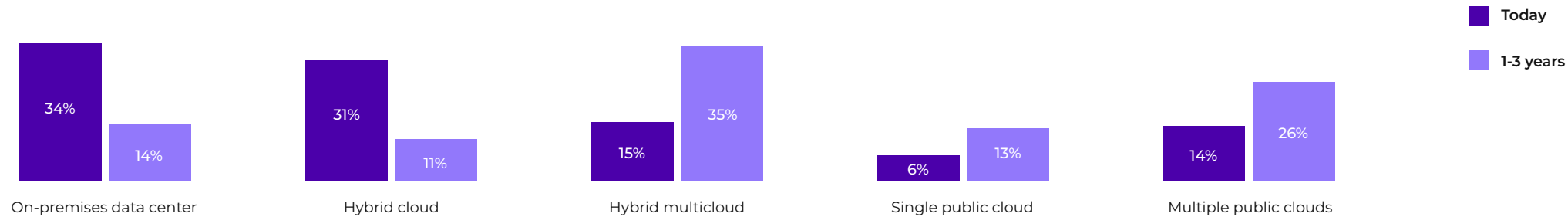
As a result, the ability to run solutions flexibly across clouds and on-premises (i.e., hybrid) is ranked as the **#1** driver of infrastructure choice for IT decision-makers, surpassing performance and security.

However, the adoption of hybrid multicloud environments comes with its own set of challenges. Managing multiple deployment environments necessitates the use of universal data management, protection, security, and monitoring tools to ensure interoperability across heterogeneous platforms.

Additionally, cost management becomes increasingly complex in multicloud setups, as organizations struggle to maintain visibility and control over spending across diverse cloud providers. Therefore, a unified hybrid multicloud approach, with a consistent cloud operating model across environments, is crucial for success.

Despite this, more than half (**51%**) of ECI respondents reported that their hybrid multicloud environments are not fully interoperable. This challenge is even more pronounced among large enterprises (organizations with 5,000+ employees), where the proportion rises to **76%**. Thus, achieving and maintaining higher levels of interoperability should remain a top priority for any organization committed to a long-term hybrid multicloud strategy.

IT Deployment Models in Use and Planned



AI and Its Impact on IT Modernization

AI Driving IT Modernization, Making Edge Infrastructure and Data Management Critical Priorities For Success

The [Nutanix State of Enterprise AI report](#), (SEAI) alongside the Enterprise Cloud Index (ECI), offers a comprehensive view of global enterprise AI deployments. Conducted by U.K. researcher Vanson Bourne from July to September 2023, this study surveyed 650 IT, DevOps, and Platform Engineering decision-makers worldwide.

The findings reveal that while AI gained significant traction in enterprises in 2023, the adoption of AI solutions is still in its early stages. Many organizations are still assessing which IT environments are optimal for different AI processes and workloads, and identifying the most applicable AI applications for their industry or business. In fact, **37%** of ECI respondents cited running AI applications on their current IT infrastructure as a “significant” challenge and **91%** of the State of Enterprise AI report respondents agreed that their IT infrastructure needs improvement to support AI. This underscores AI’s role in driving a new wave of IT infrastructure modernization. Consequently, AI strategy support and IT modernization have become top priorities for ECI respondents.

The top two IT priorities expected to be impacted by AI are:

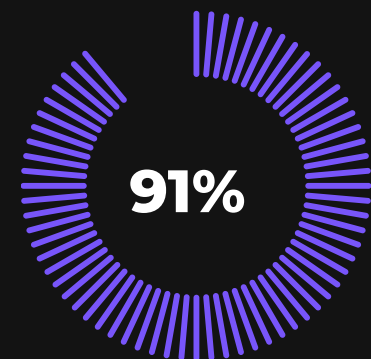
Edge Infrastructure Development

- The rapid adoption of AI solutions is accelerating the urgency of edge infrastructure deployment, particularly as a component of hybrid multicloud infrastructure. This development is crucial for faster data processing and real-time access.
- A notable **90%** of ECI organizations believe that strengthening their edge strategy will be a key priority in 2024, and **83%** of Nutanix State of AI organizations plan to increase investment in their edge strategy to support AI initiatives.

Data Management

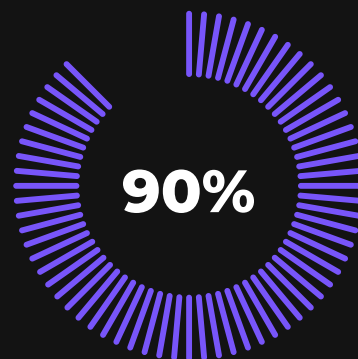
- The deployment of complex AI and analytics solutions amplifies existing data visibility and management challenges. An overwhelming **93%** of ECI respondents agreed on the importance of improving visibility over data locations, while **49%** identified linking data across multiple environments as a major challenge.
- Additionally, **47%** cited a lack of visibility over data locations as a significant data management issue. Addressing these challenges should be a continuous focus for enterprises on their AI adoption journey.

Modernizing IT Outlook



91%

of SEAI respondents agree that IT infrastructure needs improvement to support



90%

of ECI organizations believe that strengthening their edge strategy will be a key priority in 2024

Customer Perspectives



“We configured NCM Cost Governance to look at our public cloud deployments,” explained Wiley. “It has already found several snapshots that were left out there from testing, and I was able to quickly delete them and get some money back. NCM Cost Governance also gave us the visibility we needed to tighten up our security.

Craig Wiley
Senior Infrastructure Systems Architect,
Penn National Insurance



“It has saved us a couple times. One instance was when our backups in Google Cloud weren’t being aged out appropriately, increasing our bills exponentially. We were able to quickly get it back in line with Nutanix technology.

Matt Carmichael
CIO, University of Canberra

UC San Diego

“Cost Governance has paid for itself by providing the insight we need to control costs. In one instance, we uncovered an API on a development environment that did not need to be running, and shut it off, saving thousands of dollars per month.

Declan Fleming
Enterprise Architect for Cloud, UCSD



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