

STATE OF THE CLOUD

2018

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Introduction

Over the past eight years here at Cloudability, we've helped our customers manage over \$5B in cloud spending. From enterprises to born-in-the-cloud SaaS companies, we've onboarded and managed the top cloud spenders on AWS, Azure and more. Our multi-cloud True Cost™ management platform provides visibility and analytics into cloud spend and usage, empowering organizations to achieve accurate cloud financials in a precise and timely manner. This, in turn, enables companies to achieve financial and operational excellence in the cloud. Over our six years of empowering our users to run their clouds strategically, we've aggregated a pretty staggering amount of spending data.

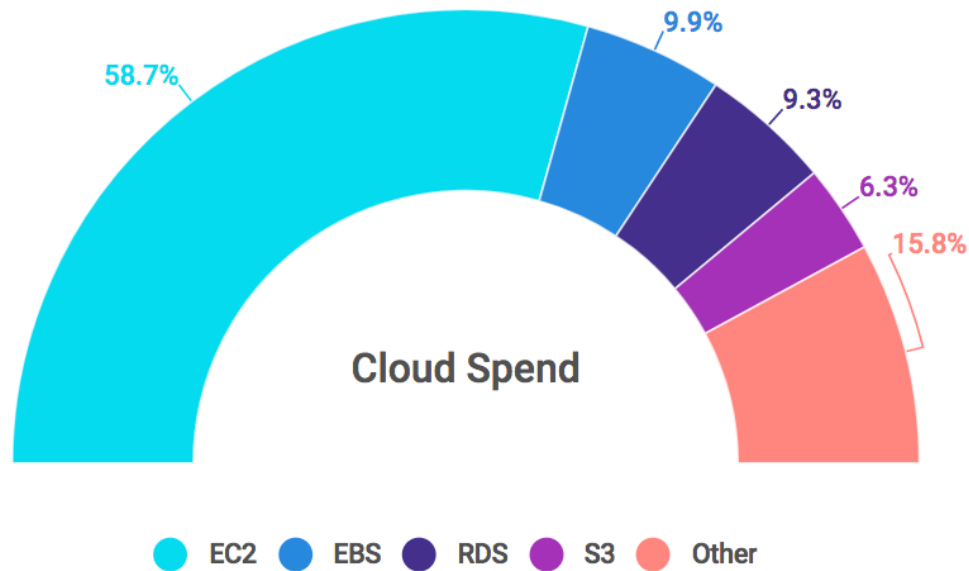
Given the scale of cloud technology adoption and the rate of new technology releases since we first launched our platform, we thought now would be a good time to leverage the data we have accumulated to look into emerging trends. We're not aware of any studies that have leveraged data across a cohort as broad as ours to provide a glimpse into cloud spending and usage patterns; so, we decided to do it ourselves.

This data is anonymized, but it's fabulously rich; Cloudability's analytics platform retains all of our customer data with full fidelity, regardless of size and duration of the source data. This helps us provide customers with unparalleled insights into both short- and long-term trends in their cloud spend – and helps us provide the industry with some pretty remarkable insights, too. Market data, as well as Cloudability's cohort data analysis, shows that AWS is the market leader in terms of market share and adoption. Due to this, much of this report's inferences, trends and findings are specific to AWS services.

The following points are a summary of Cloudability's insights and forecasts into the state of the cloud this year.

1

Out of Hundreds of Services, Only Four Account for Majority



Cloud providers offer hundreds of services, so it might seem surprising that 85% of spend is concentrated in four services: AWS EC2, EBS, RDS and S3. However, cloud adoption has only scratched the surface in the IT infrastructure market; it's estimated that only 10% of all workloads have moved to the cloud. Given the large share of compute, it's clear that "lift-and-shift" migrations continue to dominate cloud adoption.

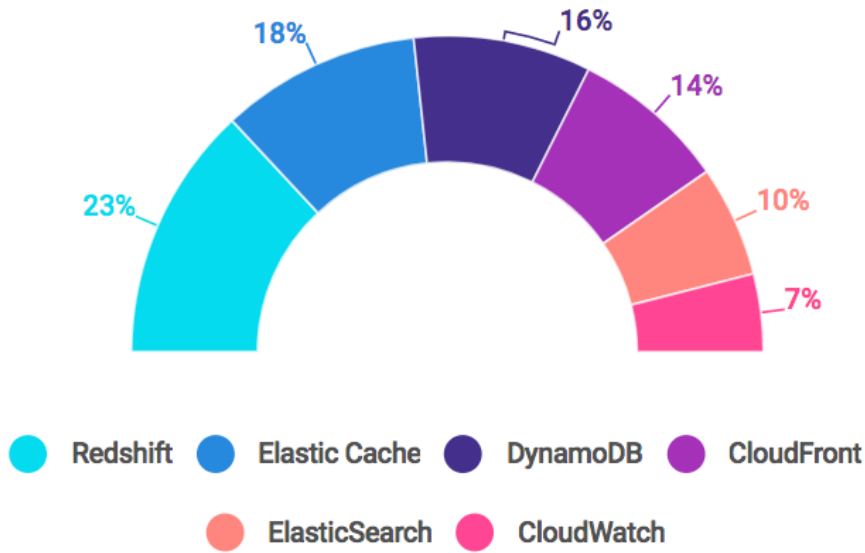
With the introduction of new bare metal capabilities last year, and with more enterprises continuing to move to the cloud, we expect this distribution to hold steady into the immediate future.

Because these are the four dominant infrastructure services, organizations looking to migrate don't have to worry about considering hundreds of services, they can start simple by taking smaller steps, instead of having to build expertise in hundreds of services offered by cloud providers.

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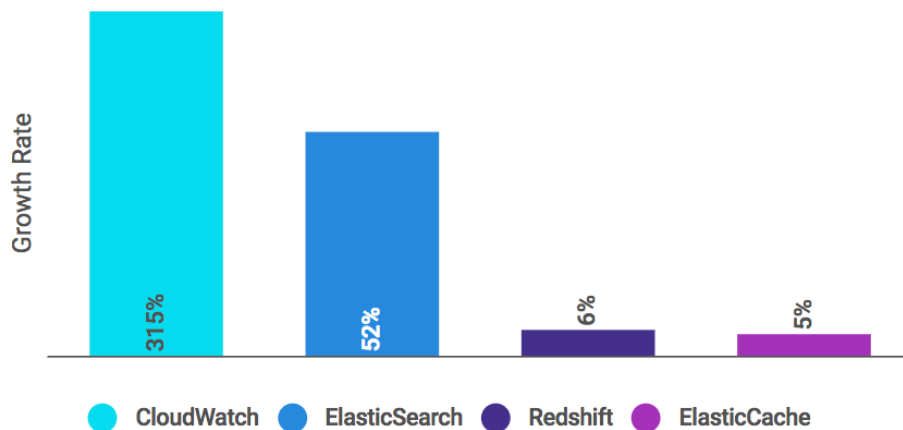
Some Surprises in the Top 10

After the top four services mentioned above, AWS Redshift, ElastiCache, CloudFront, EMR, DynamoDB, Elasticsearch and CloudWatch round out the top services leveraged by AWS users.



Among these, CloudWatch, ElasticSearch, ElastiCache and RedShift have the fastest growth rates. This shows that cloud users are getting more sophisticated with their choice of services, and perhaps beginning to build out more nuanced architectural components in addition to the ever-popular building blocks of EC2, EBS and S3.

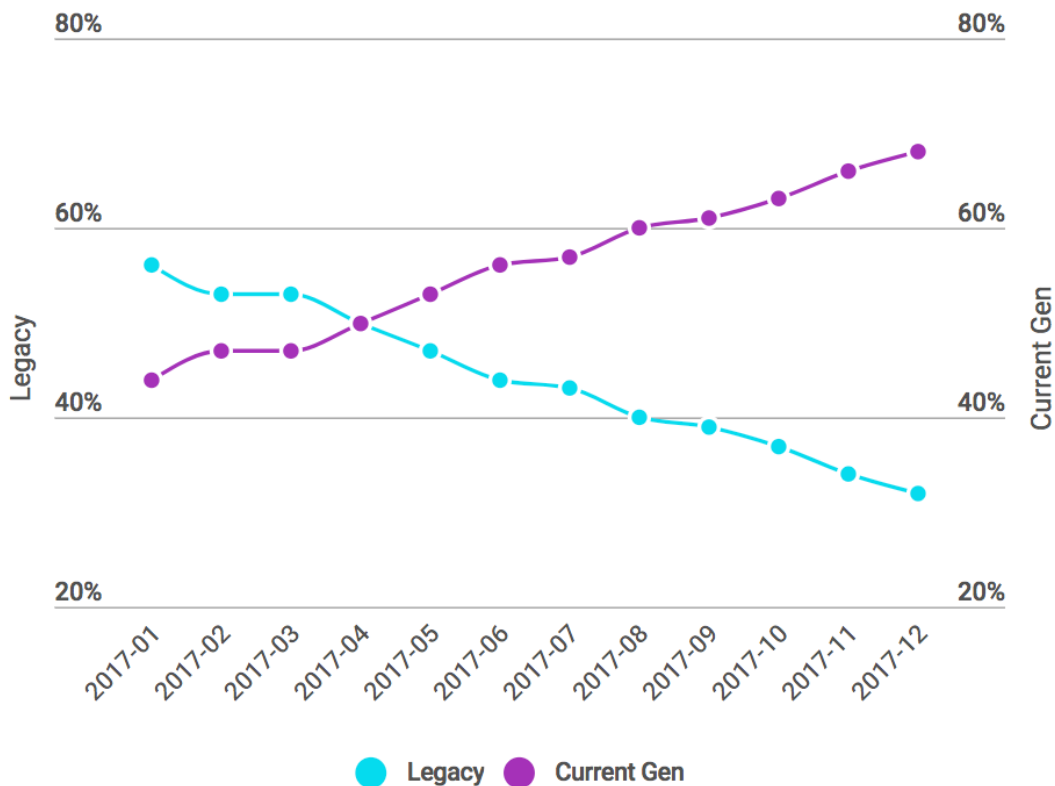
CloudWatch saw the biggest adoption growth rate, which implies organizations are looking to ensure operational visibility as they deploy workloads in the cloud.



3

Moore's Law Holds True for Cloud Compute

With [Moore's Law](#) doubling compute capacity every two years, our analysis shows that organizations are quickly and continuously adopting current-generation EC2 families. Only 30% of users remain on legacy compute instances; the other 70% of users have moved to current generation, which delivers significantly improved price/performance.

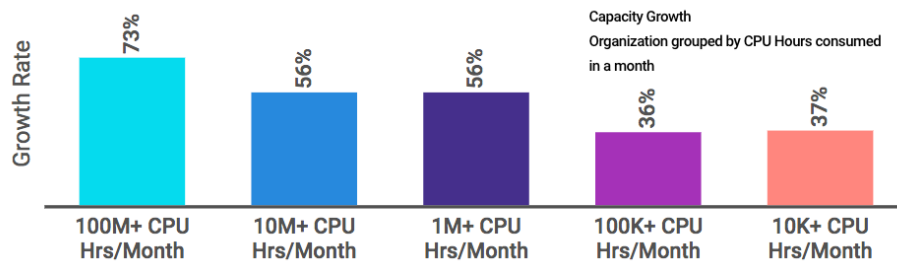


The continuous shift toward improved and next-generation compute instances shows that organizations are continuing to take advantage of the advances in improved processing, memory and storage, as well as networking options. This trend showcases a big advantage offered by the cloud, in that it allows organizations to break the traditional three-year data center hardware renewal cycle. We're now seeing a 12-month cycle with improved price/performance, with Moore's Law still holding, which can help businesses continue to build and deploy faster.

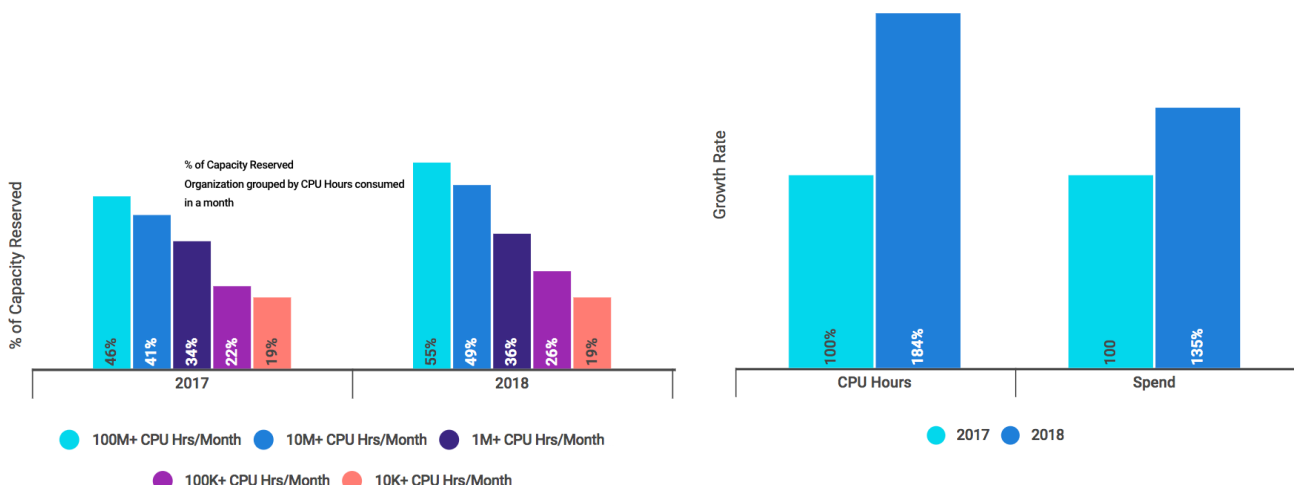
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Compute Capacity Continues to Grow at a Rapid Clip

Stiff competition among cloud providers and rapid innovation have been continuously driving down compute costs. With increased application performance requirements, the hours of vCPUs consumed grew by 85% over the last year. Given recent upticks in AI/ML-related applications, we expect this trend to continue.



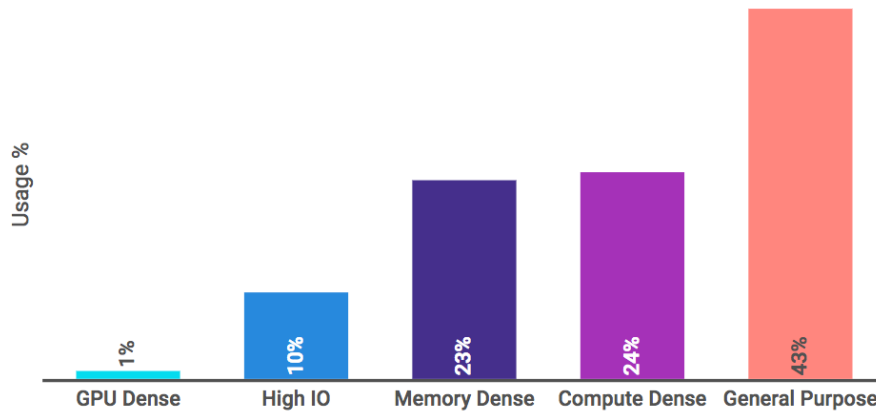
This data reveals another interesting trend. As larger organizations continue to adopt the cloud, we see that they are starting to leverage its utility model more effectively. Using Cloudability, companies have been able to better estimate their usage and purchase capacity upfront via Reserved Instances.



Due to Moore's Law and improved price/performance, we see that customers in the cloud are able to get more compute power in vCPUs for the same amount of spend. In the graph above, CPU Hours grew 84% while the spend grew only 35%. As more and more organizations increasingly continue to adopt cloud, cloud constructs such as Reserved Instances and Spot Instances are helping companies reduce spend.

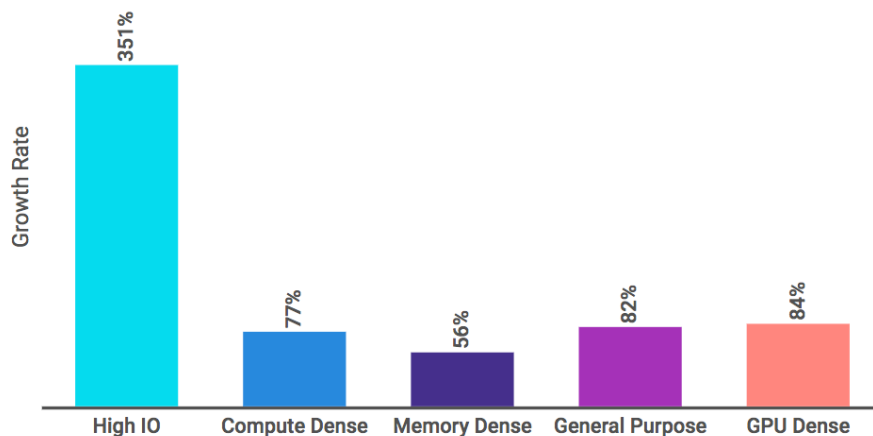
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General-Purpose Compute Families are Still King



Organizations continue to provision most of their compute workloads on General Purpose (t1, t2, m3, m4, and m5) instances, with Compute Dense (c3, c4, and c5) instances following closely behind, and Memory Dense coming in at third place. This suggests that most organizations start their cloud journey by moving development and test workloads, mostly provisioned as standard instances. Once they are able to better assess their usage, these organizations then look at determining the appropriate compute family for the application, most often compute and then memory.

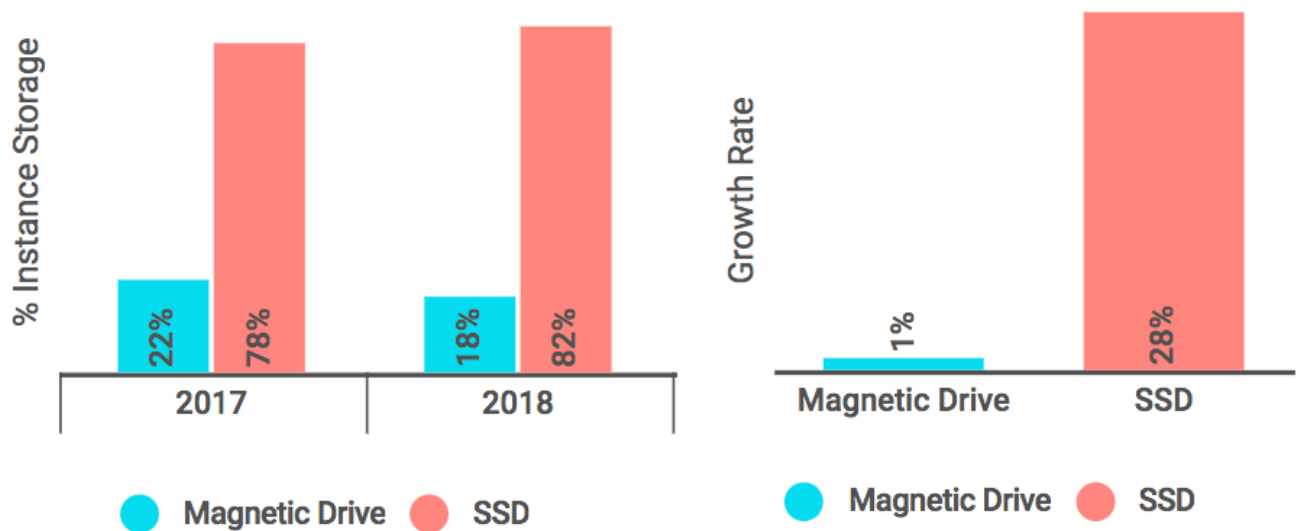
Storage, IO and GPU instances trail the other compute families quite considerably in overall spend. However, their usage has increased somewhat. Growth rates for high IO instances show that customers are increasingly deploying production-scale databases in cloud. We are also starting to see the beginnings of high-GPU instance adoption, typically leveraged for AI/ML processing. This suggests that AI will indeed be a growing trend in 2018.



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Flash is Gaining More Adoption for Block Storage

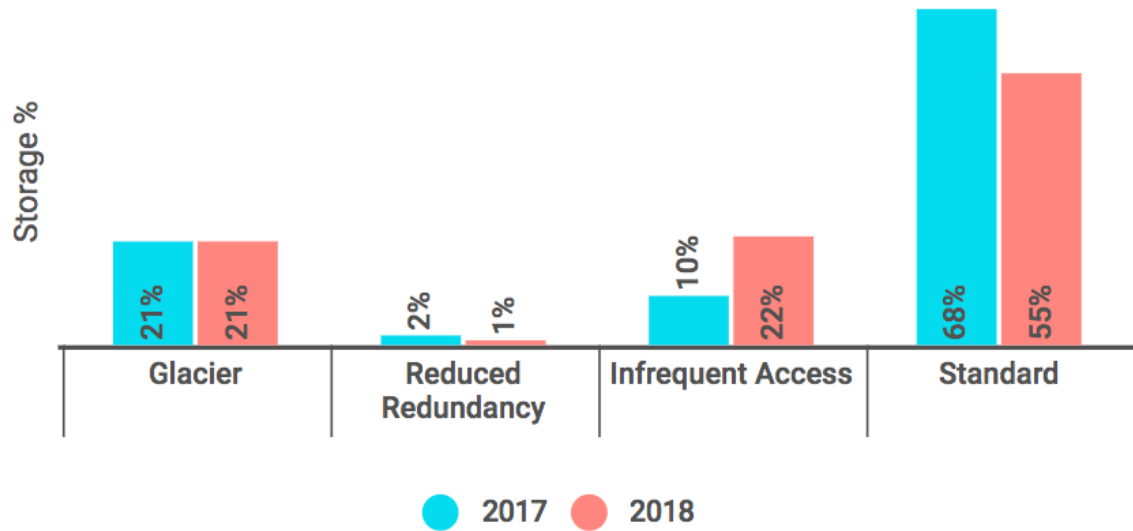
When it comes to storage, we continue to see rapid year-over-year growth of solid state drives. We expect magnetic instance storage to be limited to workloads with very dense storage requirements; object storage alternatives or EFS can now be used in lieu of magnetic storage for majority-of-use cases that need relatively slow/infrequent access to stored data.



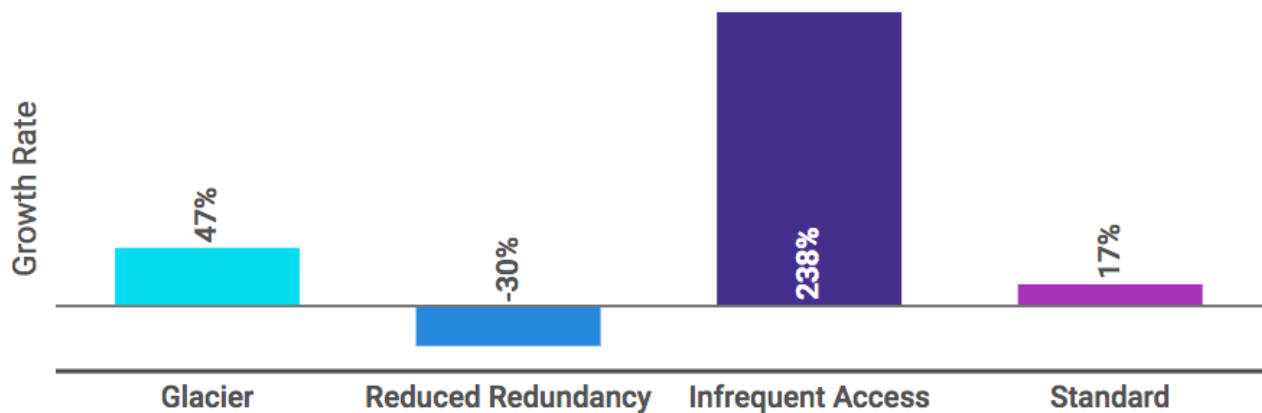
With SSDs now available in Terabytes (TBs) and high IOPSs, we see most of the storage growth in SSDs. SSDs with Provisioned IOPS also grew at a similar rate, with organizations moving more of their high-performance workloads to the cloud. Because of this, customers can be increasingly comfortable with deploying their most important, high-performance workloads in the cloud.

7

Object Storage Usage Behavior is Changing

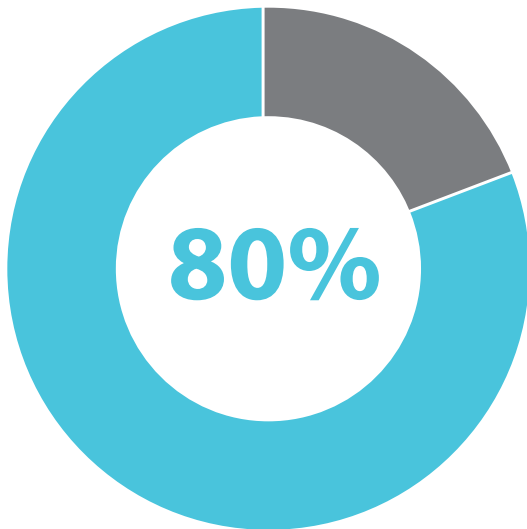


These numbers show that customers are getting smarter about how they use object storage. We've seen object storage capacity grow by over 40% in the past 12 months. Using the right combination of access and redundancy options when provisioning object storage allows a more cost-efficient way to access data.

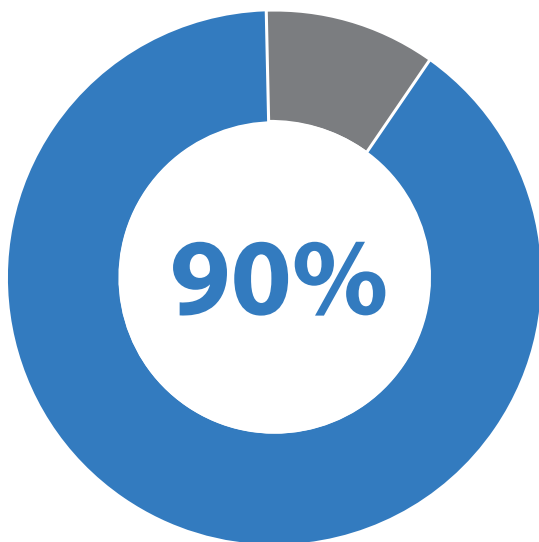


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Application Architectures Increasingly Using Cloud-native Capabilities



Of our customers, we've observed that ~80% have multiple Availability Zones (AZ) deployments; that is, the same service has resources communicating with each other across different AZs, leveraging VPC links and inter-region peering.

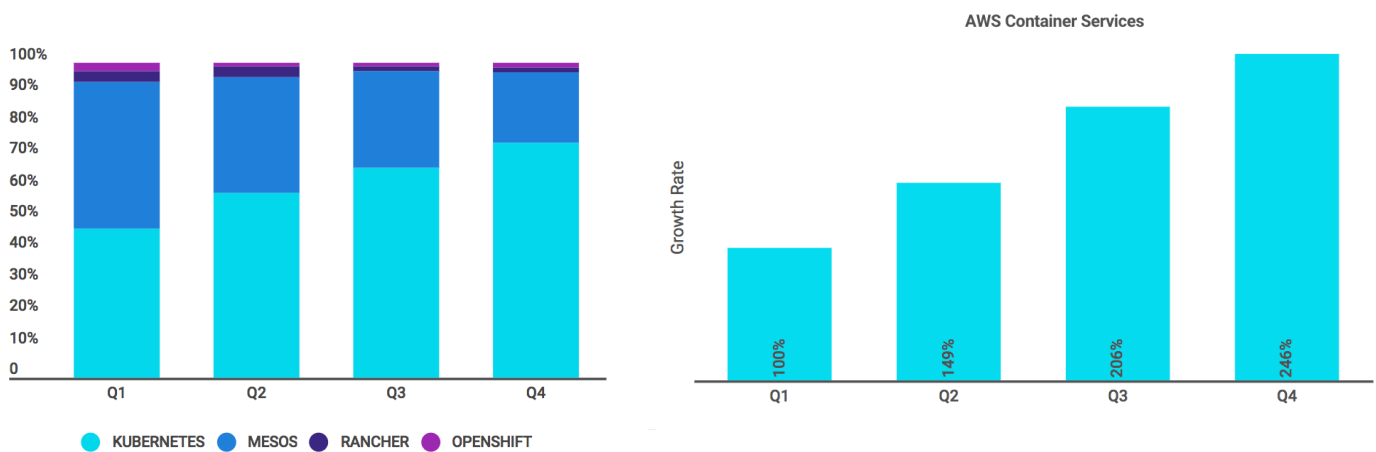


Additionally, more than 90% of Cloudability customers have infrastructure in multiple AZs, allowing for better redundancy and fault tolerance of application availability.

9

Kubernetes Takes the Container Orchestration Prize

Throughout 2017, the industry continued to converge on Kubernetes (K8s), with Mesos as the other major player. However, we did see the Mesos market share continue to fall over the course of the year. Openshift and Rancher are the other two orchestration players rounding out the major container orchestration solutions we observe.

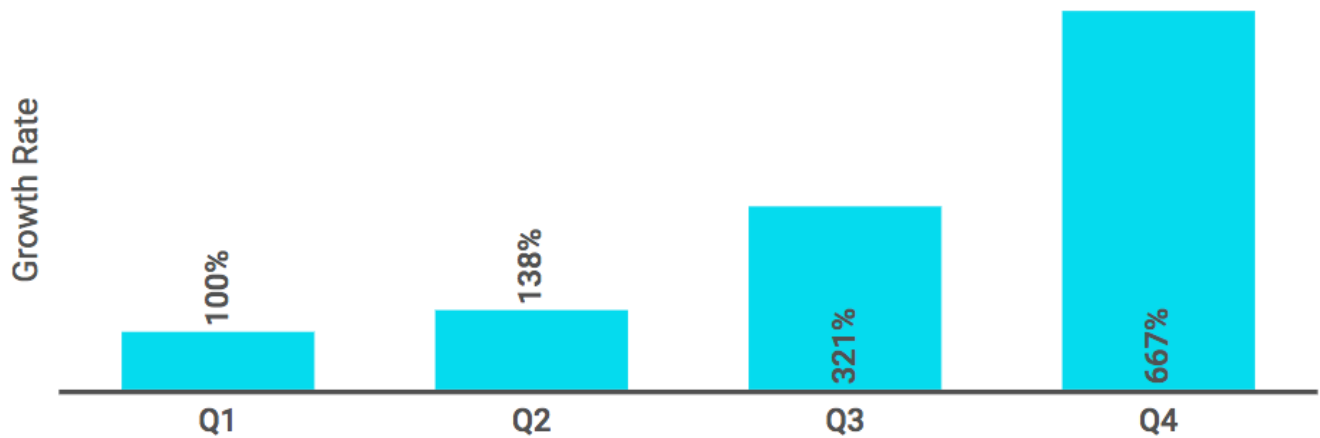


Container adoption continues to grow at a steady clip with cloud vendors offering container services. With Kubernetes (K8s) as the orchestration engine of choice, offerings such as EKS and Fargate were announced by AWS last year. With ECS, Fargate and EKS offerings starting to become available and delving further into microservices, we anticipate that container adoption will accelerate. As a result of container growth, the management complexity (including cost management) will grow significantly as well, since containers are typically seven to eight times the number of VMs and are more ephemeral in nature. A True Cost™ Cloud Management platform like Cloudability helps manage the exponentially complex cost and usage associated with new technologies, such as containers.

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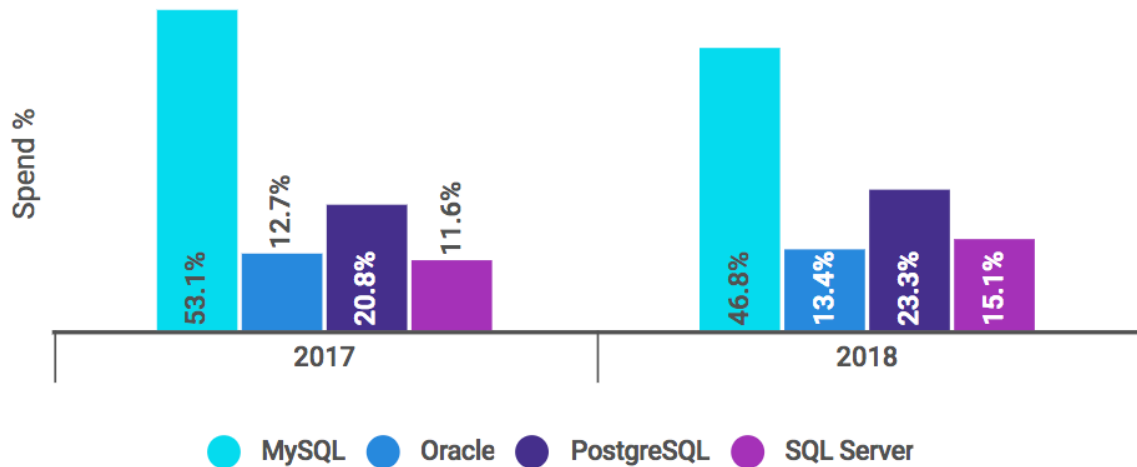
Serverless Computing Starts to Take a Bite

Serverless growth across AWS Lambda and Microsoft Azure functions continues to see a rapid quarter over quarter growth. Serverless continues to be attractive to organizations since it doesn't require management of the infrastructure. As companies migrate increasingly to the cloud and continue to build cloud-native architectures, we think the pace of serverless adoption will also continue to grow.

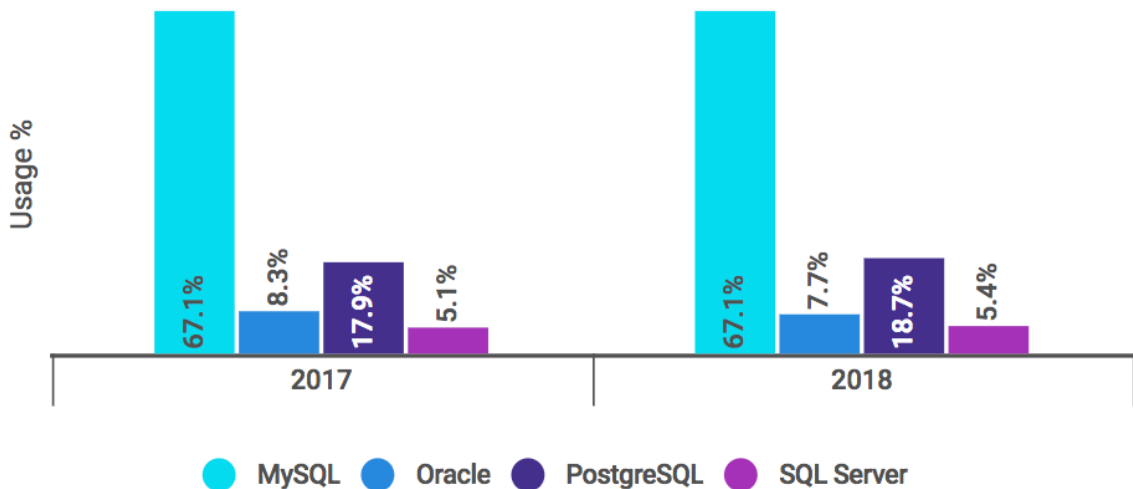


11

Relational Database Race is Tightening, with Open Source Winning



Analysis of database spend and usage reveals some interesting patterns: Organizations are still putting most of their database budgets toward MySQL. However, the race is tightening. PostgreSQL follows in second, increasing in popularity and gaining market share. SQL Server is on a slow but upward trend.



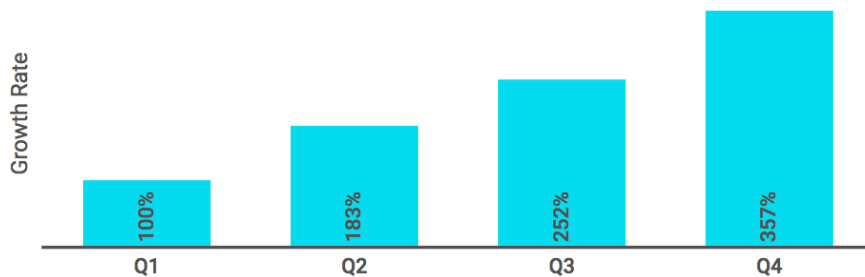
Similar to cost, usage trends for databases reveal that MySQL is the most used database. And again, PostgreSQL seems to be trending up. Open-source databases would be a good choice for companies with a database type that is dependent on the application requirements.

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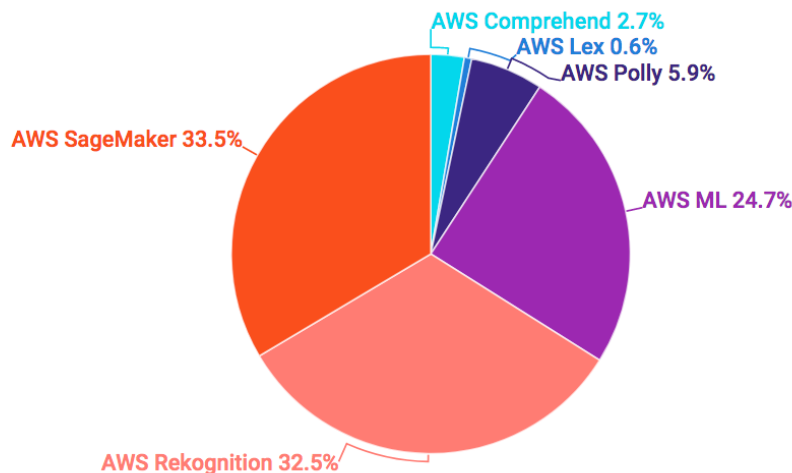
AI/ML Instances are Growing at a Rapid Clip

We continue to see high growth rates related to GPU-based instances, even though it's a smaller percentage of the overall spend on compute. As companies start to further explore and invest in machine learning capabilities, we expect to see this growth continue.

Further analysis shows some interesting insights, including that organizations heavily leverage



AWS SageMaker for ease of use and scale in developing and iterating on training models. Adoption of Rekognition shows that companies are using image and video analysis to deliver deeper insights for their users.



As cloud provider offerings make it easier for companies to leverage the extensive capabilities of AI/ML we anticipate these technologies being used for driving improved customer experience, increased efficiency and address some of the toughest business challenges



About Cloudability

Cloudability is a multi-cloud, True Cost™ management platform that delivers accurate cloud financials, empowering companies to run their cloud with financial and operational excellence. True Cost™ platform is designed to enable visibility, optimization and governance for every workload, application, department and user. Empowered with cost insights, companies can leverage the cloud as a competitive differentiator. Adopted by a number of Fortune 500 companies, Cloudability helps both enterprises and cloud-native companies leverage analytics, machine learning and automation to transform cloud infrastructure data into a new source of competitive value, providing disruptive advantage over time.

Methodology

We analyzed data from over 1,500 organizations with over \$2.5B in spend in 2017. The dataset for this analysis exceeds 75 billion data points, 3 billion CPU hours and 700M unique compute resources.

Get Your Cloud Under Control

Whether you're a cloud-native company moving quickly or an enterprise looking to migrate to the cloud, there's a complex journey ahead. Get the resources to learn more about building and managing a cost-efficient cloud.

cloudability.com/resources

