

RightScale 2018 State of the Cloud Report™

DATA TO NAVIGATE YOUR MULTI-CLOUD STRATEGY

RIGHT SCALE®

RightScale 2018 State of the Cloud Report

As Public and Private Cloud Grow, Organizations Focus on Governing Costs

Executive Summary

In January 2018, RightScale surveyed 997 technical professionals across a broad cross-section of organizations about their adoption of cloud computing.

The 2018 State of the Cloud Survey identified several key findings:

81 percent of respondents have a multi-cloud strategy.

- 81 percent of enterprises have a multi-cloud strategy.
- Enterprises with a hybrid strategy (combining public and private clouds) fell from 58 percent in 2017 to 51 percent in 2018, while organizations with a strategy of multiple public clouds or multiple private clouds grew slightly.

96 percent of respondents now use cloud.

- Public cloud adoption increased to 92 percent from 89 percent in 2017.
- Private cloud adoption increased to 75 percent from 72 percent in 2017.

More enterprises are prioritizing public cloud in 2018.

- Many more enterprises see public cloud as their **top** priority, up from 29 percent in 2017 to 38 percent in 2018.
- Hybrid cloud has decreased as a **top** priority for enterprises, declining from 50 percent in 2017 to 45 percent in 2018.

Organizations leverage almost 5 clouds on average.

- Respondents are already running applications in 3.1 clouds and experimenting with 1.7 more for a total of 4.8 clouds.
- Among those using any public cloud, the average is 2.7 public clouds used.
- Among those using any private cloud, the average is 3.0 private clouds used.

Enterprise cloud spend is significant and growing quickly.

- 26 percent of enterprises spend more than \$6 million a year on public cloud, while 52 percent spend more than \$1.2 million annually.
- 20 percent of enterprises plan to more than double public cloud spend in 2018, and 71 percent will grow public cloud spend more than 20 percent.
- In contrast, only 23 percent of enterprises will grow private cloud use by more than 50 percent in 2018.
- SMBs have smaller cloud bills (half spend under \$10K per month) but 17 percent still plan to double that spend in 2018 and 62 percent will grow at least 20 percent.
- Only 17 percent of SMBs will grow private cloud use by more than 50 percent.

Companies run a majority of workloads in cloud.

- Respondents run 40 percent of workloads in public cloud and 39 percent in private cloud.
- Among enterprises, respondents run 32 percent of workloads in public cloud and 45 percent in private cloud.

Most enterprises have a central cloud team.

- 57 percent of enterprises already have a central cloud team or Center of Excellence with another 24 percent planning one.
- Among SMBs, only 31 percent have a central cloud team.

Enterprise central IT teams shift role to governance and brokering cloud.

- In 2018, enterprise central IT is taking a stronger cloud governance role in advising on which apps move to cloud (69 percent vs. 63 percent in 2017), managing costs (64 percent vs. 55 percent), setting policies (60 percent vs. 58 percent), and brokering cloud services (60 percent vs. 54 percent).
- In contrast, this year enterprise central IT is taking a significantly smaller role in choosing public and private clouds and in building private clouds.
- In comparison, respondents in business units are less likely overall to delegate authority to central IT, but are in close agreement that central IT should manage and optimize cloud costs.

Top cloud challenges in 2018 are security and spend.

- Security is a challenge for 77 percent of respondents, while 29 percent see it as a significant challenge.
- Managing cloud spend is a challenge for 76 percent of respondents, while a smaller 21 percent see it as a significant challenge.
- Security is the largest issue among cloud beginners, while cost becomes a bigger challenge for intermediate and advanced users.
- Enterprises cite more challenges across the board than SMBs.

Significant wasted cloud spend drives users to focus on costs.

- Cloud users underestimate the amount of wasted cloud spend. Respondents estimate 30 percent waste, while RightScale has measured actual waste at 35 percent.
- Optimizing cloud costs is the top initiative again in 2018 across all cloud users, increasing to 58 percent from 53 percent in 2017.
- The number focusing on optimizing spend is even higher among intermediate and advanced cloud users, at 65 percent and 69 percent, respectively.
- Other top initiatives include moving more workloads to cloud (51 percent), better financial reporting (44 percent), and automated policies for governance (42 percent).
- Despite an increased focus on cloud cost management, only a minority of companies have implemented automated policies to optimize cloud costs, such as shutting down unused workloads or selecting lower-cost clouds or regions.
- More companies have defined at least manual policies to control cloud spend.

Container use is up: Docker is used most broadly while Kubernetes grows quickly.

- Overall Docker adoption increases to 49 percent from 35 percent in 2017 (a growth rate of 40 percent).
- The AWS container service (ECS/EKS) follows close behind at 44 percent adoption.
- Kubernetes sees the fastest growth, almost doubling to reach 27 percent adoption.
- Azure Container Service and Google Container Engine also grew strongly to reach adoption of 20 percent and 14 percent, respectively.
- A higher percentage of enterprises adopt all container tools as compared to SMBs, with Docker reaching 54 percent adoption among larger companies.

Use of configuration tools grows, with Ansible showing strongest growth.

- Among all respondents, Ansible and Chef are tied with 36 percent adoption each, followed by Puppet at 34 percent adoption.
- Among enterprises though, Chef (48 percent) and Puppet (47 percent) hold the top two positions, while Ansible follows with 42 percent adoption.
- Ansible leads handily among SMBs with 29 percent adoption, followed by Chef and Puppet.
- Ansible showed the strongest growth since last year, up 71 percent in adoption.

Azure continues to grow quickly and reduce the AWS lead, especially among enterprises.

- Overall Azure adoption grew from 34 to 45 percent of respondents, while AWS grew from 57 to 64 percent of respondents.
- Google also grew from 15 to 18 percent to maintain third position.
- VMware Cloud on AWS was used by 8 percent of respondents, a strong showing in the first year of availability.
- Oracle Cloud also showed strong growth overall, albeit on much lower penetration, doubling adoption from 3 to 6 percent.
- Among enterprises, Azure did even better. Azure increased adoption significantly from 43 percent to 58 percent while AWS adoption in this group increased from 59 percent to 68 percent.
- Among other cloud providers that were included in the survey in 2017, all saw increased adoption among enterprises in 2018 with Oracle growing fastest from 5 to 10 percent, IBM Cloud from 10 to 15 percent, and Google from 15 to 19 percent.
- Among enterprise cloud beginners, Azure led slightly with 49 percent adoption vs. 47 percent for AWS.
- Serverless is the fastest growing extended cloud service, with a 75 percent growth rate year over year.

Private cloud adoption grows across the board.

- Overall, VMware vSphere continues to lead with 50 percent adoption, up significantly from last year (42 percent).
- OpenStack (24 percent), VMware vCloud Director (24 percent), Microsoft System Center (23 percent), and bare metal (22 percent) were all neck and neck.
- Azure Stack was in the sixth slot, but showed the highest percentage of respondents that were experimenting or planning to use the technology.
- Among enterprises, vSphere led adoption at 66 percent followed by VMware vCloud Director (38 percent) and OpenStack (33 percent).
- CloudStack showed the highest growth rate in the enterprise by doubling over last year, albeit on lower adoption, from 9 to 18 percent.

vSphere has most users with 1,000+ VMs, but AWS leads in 50+ VMs; Azure grows footprint faster.

- Across the top public and private clouds, 15 percent of respondents have more than 1,000+ VMs in vSphere as compared to 10 percent in AWS.
- However, AWS leads in respondents with more than 50 VMs, 47 percent vs. 37 percent for VMware.
- In third position, Azure shows stronger growth, increasing respondents of more than 50 VMs from 21 to 29 percent.
- Among enterprises, Azure stays in third but tightens the gap. 44 percent of respondents have 50+ VMs as compared to 59 percent for AWS and 52 percent for vSphere.

Methodology

In January 2018, RightScale conducted its annual State of the Cloud Survey. The survey questioned technical professionals across a broad cross-section of organizations about their adoption of cloud infrastructure. The 997 respondents range from technical executives to managers and practitioners and represent organizations of varying sizes across many industries. Respondents represent companies across the cloud spectrum, including both users (19 percent) and non-users (81 percent) of RightScale solutions. Their answers provide a comprehensive perspective on the state of the cloud today.

Key Survey Stats:

All respondents = 997

- Enterprise respondents (1,000+ employees) = 525
- SMB respondents (<1,000 employees) = 472

Margin of error = 3.08 percent

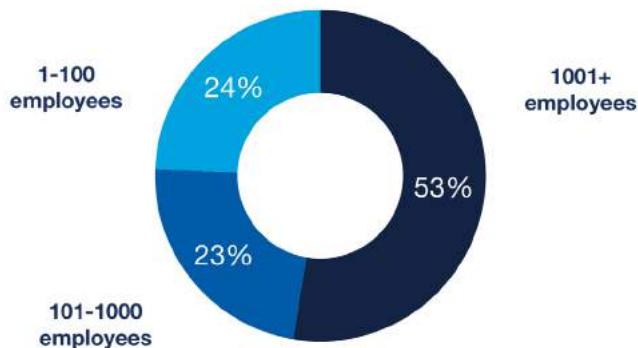
Use of Charts and Data In This Report

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Respondent Demographics

Respondents by Company Size

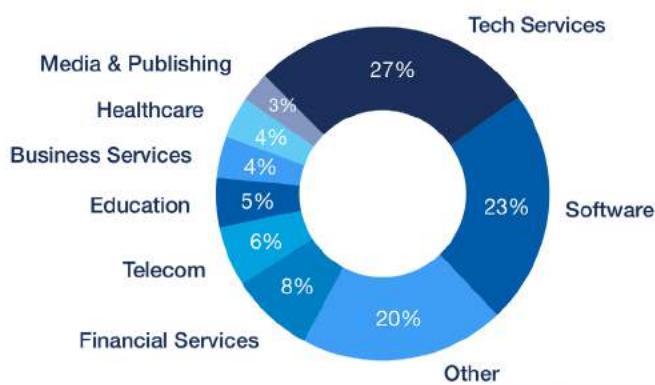
997 respondents



Source: RightScale 2018 State of the Cloud Report

Respondents by Industry

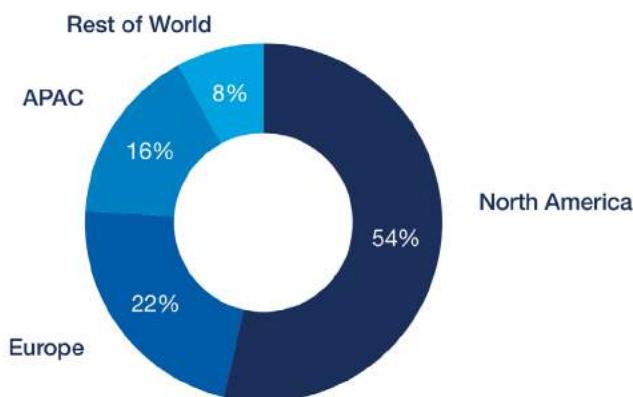
997 respondents



Source: RightScale 2018 State of the Cloud Report

Respondents by Region

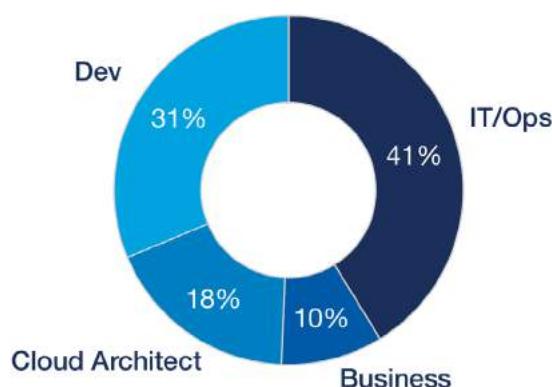
997 respondents



Source: RightScale 2018 State of the Cloud Report

Role of Respondents

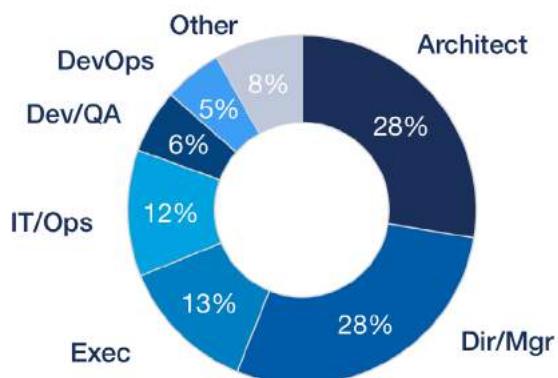
997 respondents



Source: RightScale 2018 State of the Cloud Report

Level of Respondents

997 respondents



Source: RightScale 2018 State of the Cloud Report

The Cloud Maturity Model

In this report, RightScale uses its Cloud Maturity Model to segment and analyze organizations based on their levels of cloud adoption. The Cloud Maturity Model identifies four distinct stages of cloud maturity. Denoting cloud adoption by organizations from least to greatest experience, the four stages are:

Watchers are organizations that are developing cloud strategies and plans but have not yet deployed applications into the cloud. They want to evaluate available cloud options and determine which applications to implement in the cloud.

Beginners are new to cloud computing and are working on proof-of-concepts or initial cloud projects. Beginners want to gain experience with cloud in order to determine future projects.

Intermediate users have multiple projects or applications already deployed in the cloud. They are focused on improving and expanding their use of cloud resources.

Advanced businesses are heavily using cloud infrastructure and are looking to optimize cloud operations as well as cloud costs.

The survey on which the RightScale 2018 State of the Cloud Report is based includes organizations across all the stages of cloud maturity.

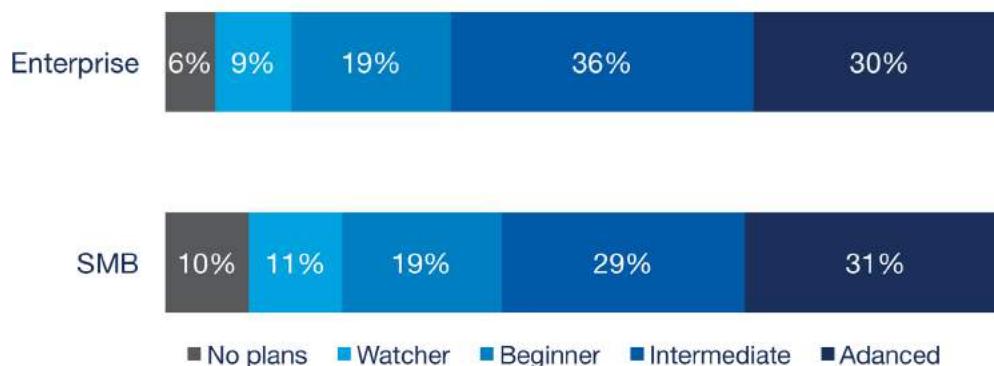
Cloud Maturity of Respondents



Source: RightScale 2018 State of the Cloud Report

When comparing cloud adoption in large and small companies, it is interesting to note that for the first time in 2018, a larger portion of enterprise respondents are in the two most mature stages — Intermediate and Advanced.

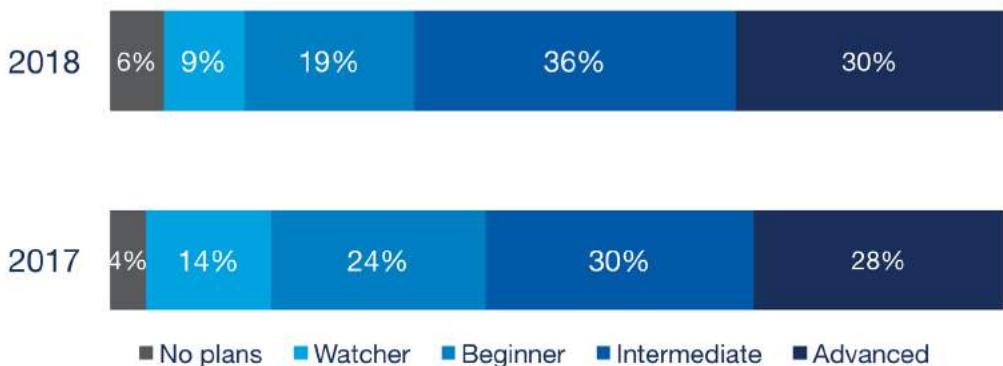
Cloud Maturity by Company Size



Source: RightScale 2018 State of the Cloud Report

In the last year, many enterprises have progressed from the Watcher and Beginner stages to the Intermediate stage — now representing 36 percent of respondents in 2018 vs. 30 percent in 2017.

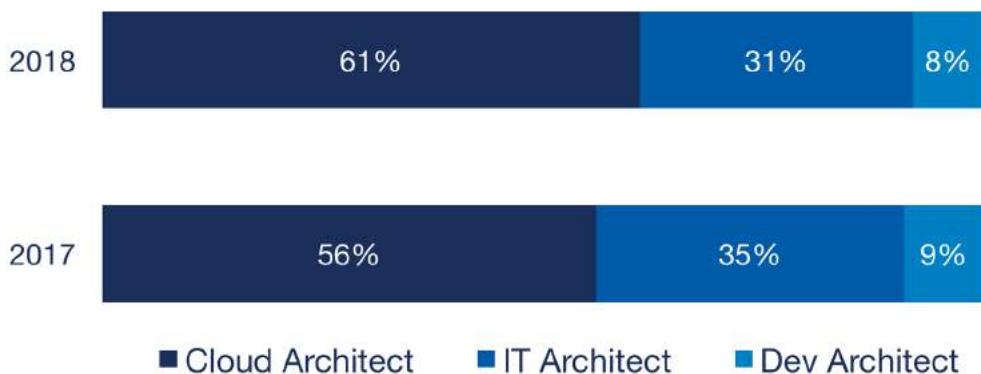
Cloud Maturity of Enterprises



Source: RightScale 2018 State of the Cloud Report

As cloud maturity has increased, the role of cloud architect has emerged. Among respondents with an architect role, 61 percent identify themselves as cloud architects in 2018 vs. 56 percent in 2017.

Architect Roles

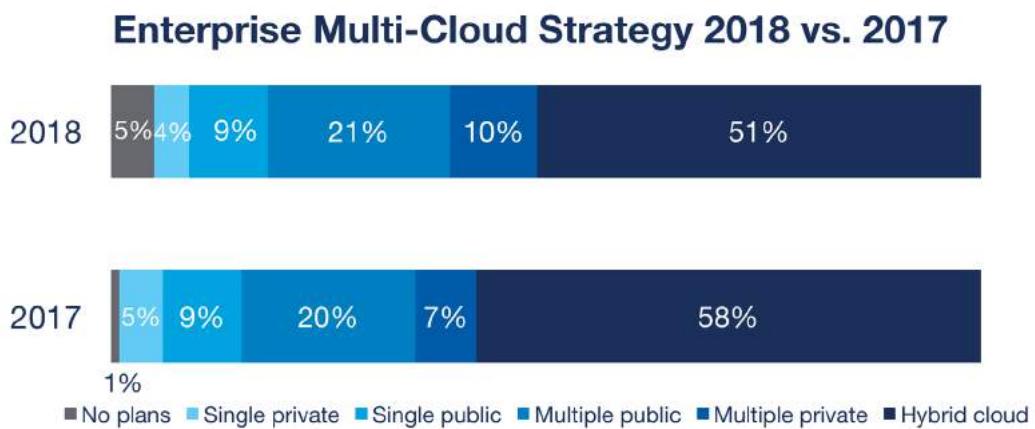
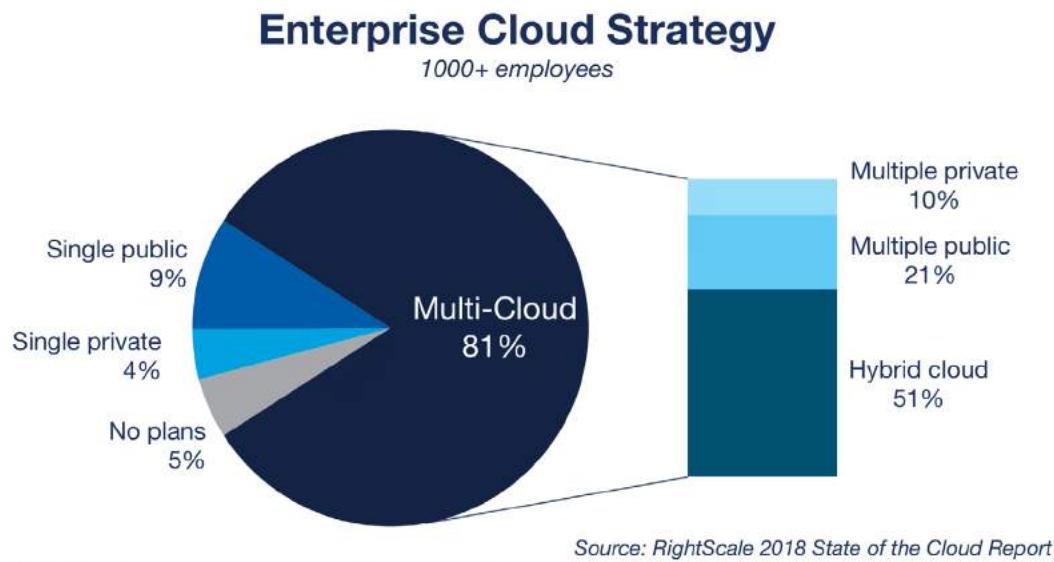


Source: RightScale 2018 State of the Cloud Report

Key Findings

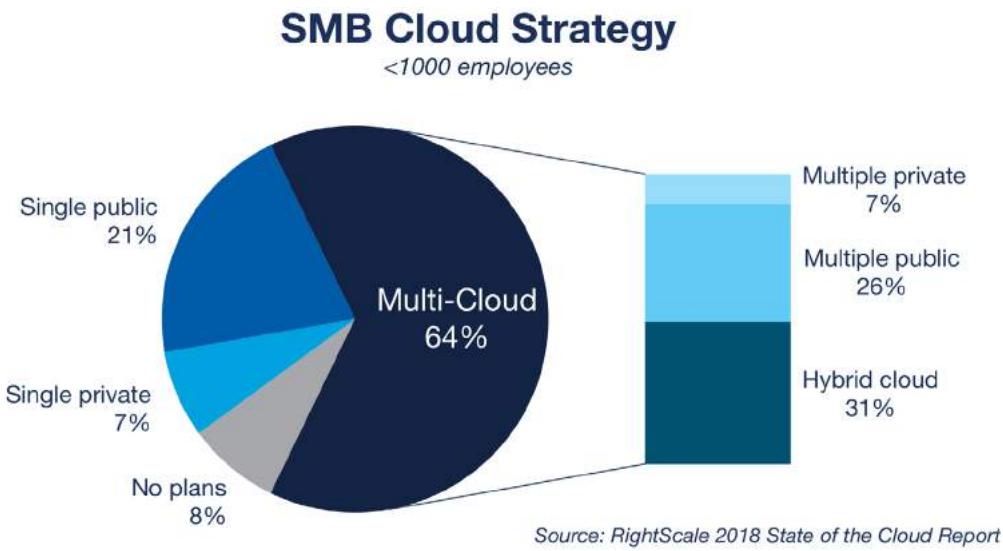
81 percent of enterprises have a multi-cloud strategy.

The percentage of enterprises that have a strategy to use multiple clouds is 81 percent (vs. 85 percent in 2017) as those planning a hybrid cloud strategy fell to 51 percent (from 58 percent in 2017). There was a slight increase in the number of enterprises with a strategy of multiple public clouds or multiple private clouds.



Source: RightScale 2018 State of the Cloud Report

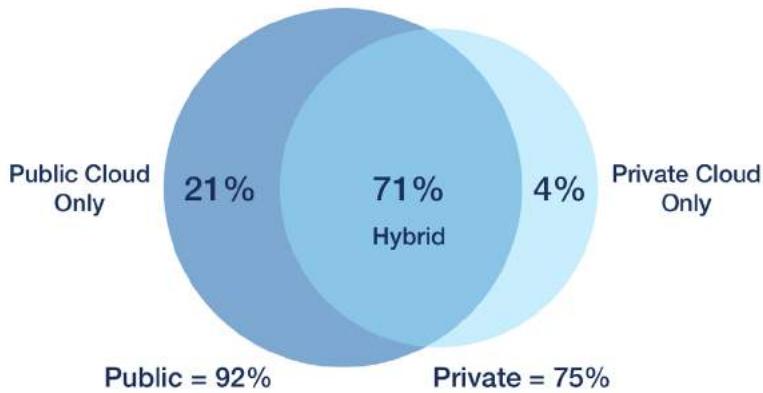
SMBs lean toward public cloud, with almost half (47 percent) preferring either single or multiple public clouds.



96 percent of respondents now use cloud.

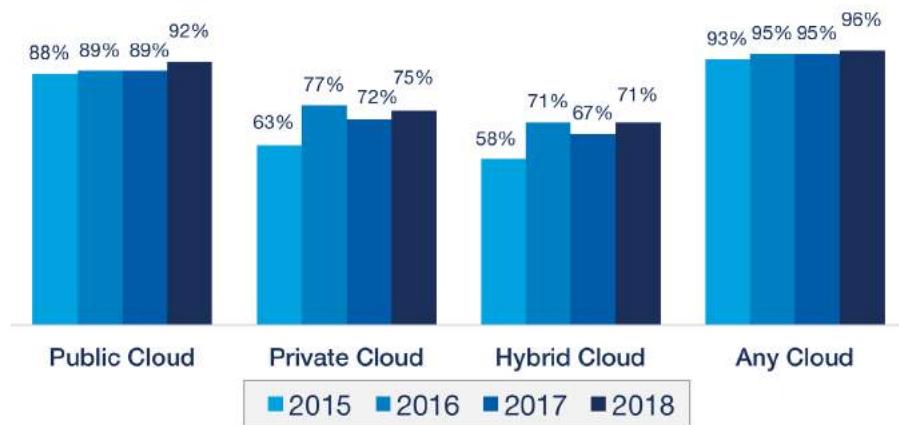
In the 12 months since the last State of the Cloud Survey, we've seen both public and private cloud adoption increase. The number of respondents now adopting public cloud is 92 percent, up from 89 percent in 2017. The number of respondents now adopting private cloud is 75 percent, up from 72 percent in 2017. As a result, the overall portion of respondents using at least one public or private cloud is now 96 percent.

96% of Respondents Are Using Cloud



Source: RightScale 2018 State of the Cloud Report

Respondents Adopting Cloud Trend



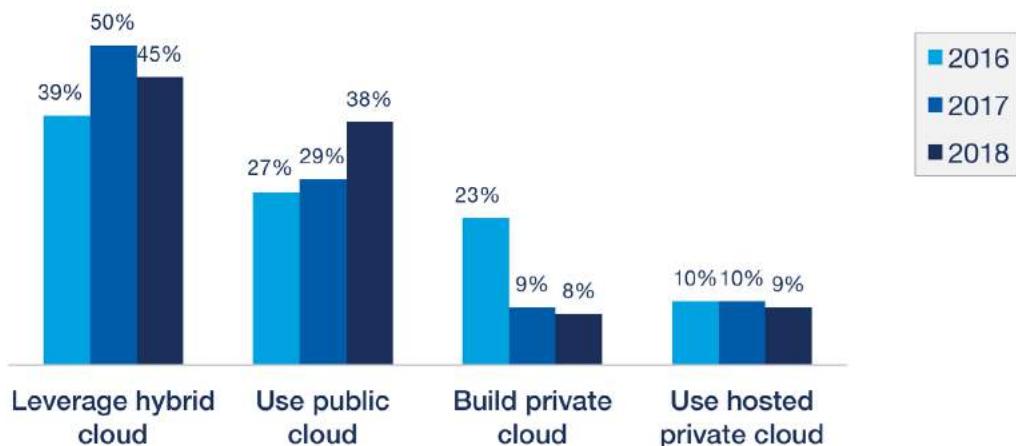
Source: RightScale 2018 State of the Cloud Report

More enterprises are prioritizing public cloud in 2018.

Among enterprises, the central IT team is typically tasked with assembling a hybrid portfolio of “supported” clouds. This year, many more enterprises see public cloud as their top priority, up from 29 percent in 2017 to 38 percent in 2018. Hybrid cloud still leads the to-do list, but has decreased as a top priority for enterprises, declining from 50 percent in 2017 to 45 percent in 2018.

Only 8 percent of enterprises are focusing on building a private cloud, and 9 percent see their top priority as using a hosted private cloud.

Top Priority for Enterprise Central IT



Source: RightScale 2018 State of the Cloud Report

Organizations leverage almost 5 clouds on average.

On average, survey respondents are using 4.8 clouds across both public and private. Respondents are already running applications in 3.1 clouds and experimenting with 1.7 more.

Public + Private Clouds Used	Average	Median
Running applications	3.1	3.0
Experimenting	1.7	1.0
Total	4.8	4.0

Source: RightScale 2018 State of the Cloud Report

Among companies that use public cloud, they are already running applications in an average of 1.7 public clouds and experimenting with another 1.0 public clouds. While fewer companies are using private clouds, those that do use more, running applications in an average of 2.0 private clouds and experimenting with an additional 1.0 private clouds.

Average Clouds Used	# Public Among all <i>public</i> cloud users	# Private Among all <i>private</i> cloud users
Running applications	1.7	2.0
Experimenting	1.0	1.0
Total	2.7	3.0

Source: RightScale 2018 State of the Cloud Report

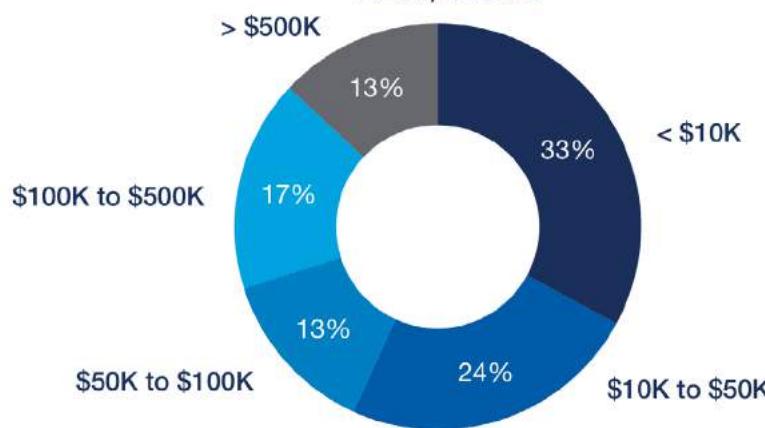
Enterprise cloud spend is significant and growing quickly.

As use of public cloud has grown, so has the amount of spend. Public cloud spend is quickly becoming a significant new line item in IT budgets, especially among larger companies. Among all respondents, 13 percent spend at least \$6 million annually on public cloud while 30 percent are spending at least \$1.2 million per year. Among enterprises the spend is even higher, with 26 percent exceeding \$6 million per year and more than half (52 percent) above \$1.2 million per year.

SMBs generally have fewer workloads overall and, as a result, smaller cloud bills (half spend under \$120 thousand per year). However, 13 percent of SMBs still exceed \$1.2 million in annual spend.

Monthly Public Cloud Spend

All respondents



Source: RightScale 2018 State of the Cloud Report

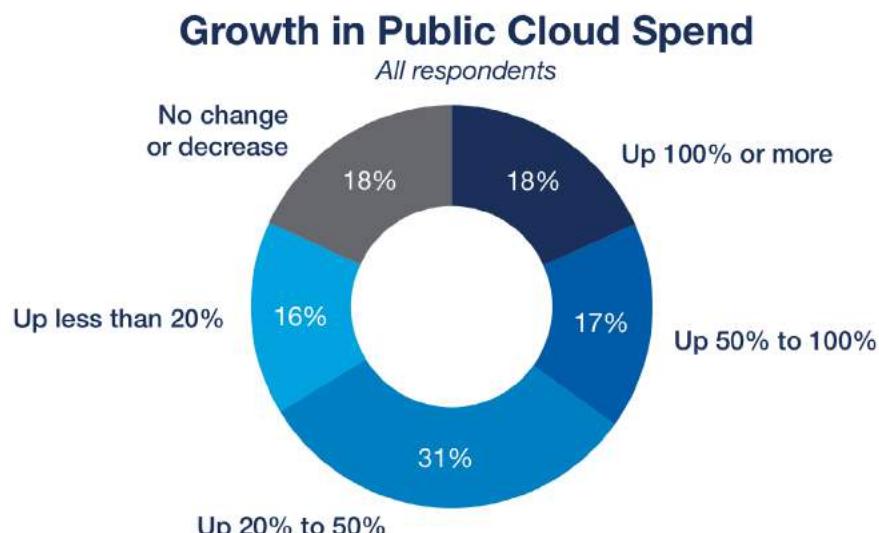
Monthly Public Cloud Spend by Company Size



Source: RightScale 2018 State of the Cloud Report

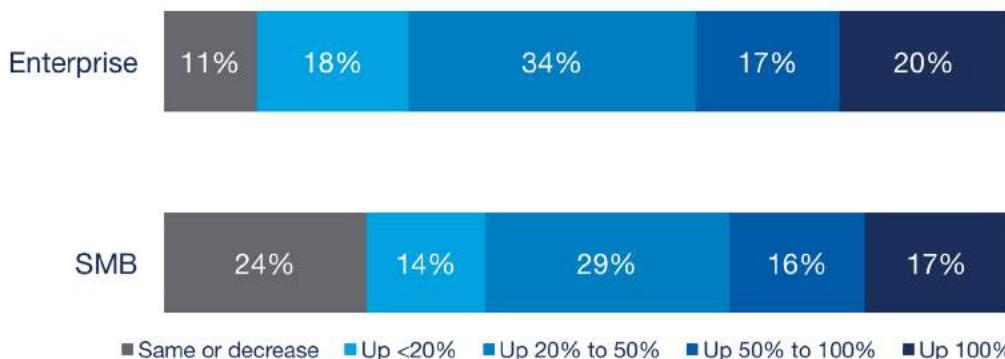
Enterprises are not only using a lot of public cloud, but also planning to rapidly grow public cloud spend. 20 percent of enterprises will more than double their public cloud spend in 2018, while 71 percent will grow spend at least 20 percent.

Smaller organizations will also grow public cloud use. 17 percent of SMBs will more than double their public cloud spend next year, and 62 percent will grow spend at least 20 percent.



Source: RightScale 2018 State of the Cloud Report

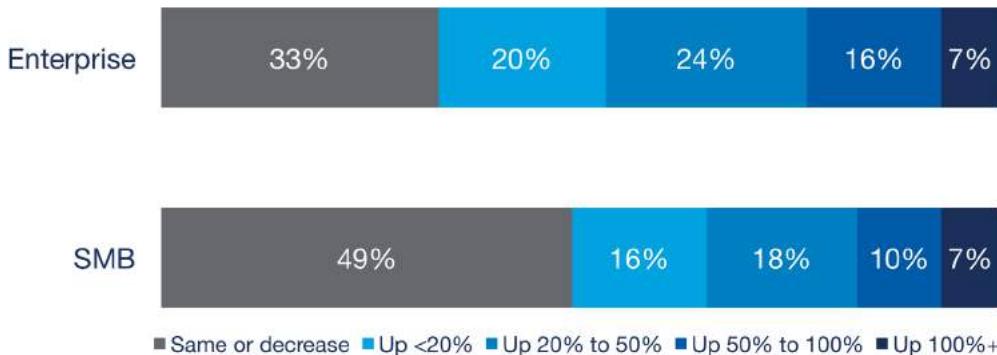
2018 Public Cloud Spend Growth by Company Size



Source: RightScale 2018 State of the Cloud Report

In contrast, private cloud use will grow more slowly for all sizes of organization. Only 7 percent of each group (enterprises and SMBs) is planning to double its use in 2018. Fewer than half of enterprises (47 percent) and 35 percent of SMBs plan to grow private cloud use by more than 20 percent.

2018 Private Cloud Growth by Company Size



Source: RightScale 2018 State of the Cloud Report

Public vs. Private Cloud Growth for Enterprises



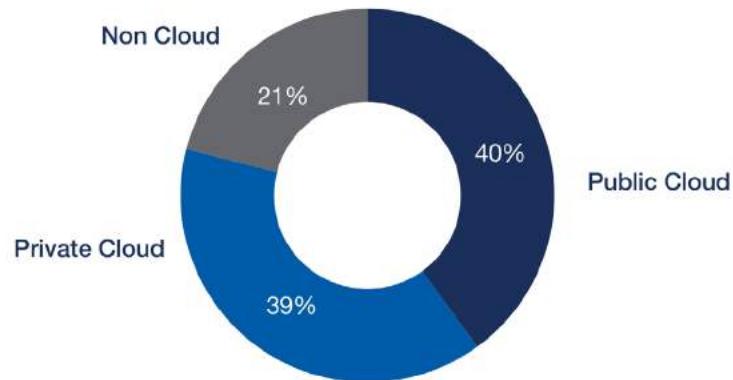
Source: RightScale 2018 State of the Cloud Report

Companies run a majority of workloads in cloud.

Companies now run 79 percent of workloads in cloud, with 40 percent of workloads in public cloud and 39 percent in private cloud. It's important to note that the workloads running in private cloud may include workloads running in existing virtualized environments or bare-metal environments that have been "cloudified."

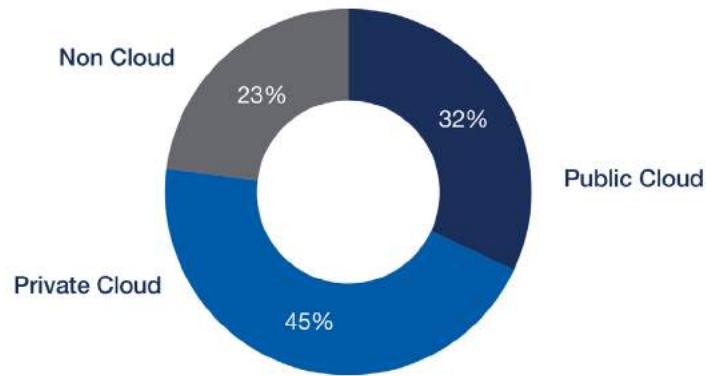
Enterprises run 77 percent of workloads in cloud with more in private cloud (45 percent) vs. public cloud (32 percent). SMBs run 80 percent of workloads in cloud with more in public cloud (48 percent) vs. private cloud (32 percent).

% Workloads in Cloud



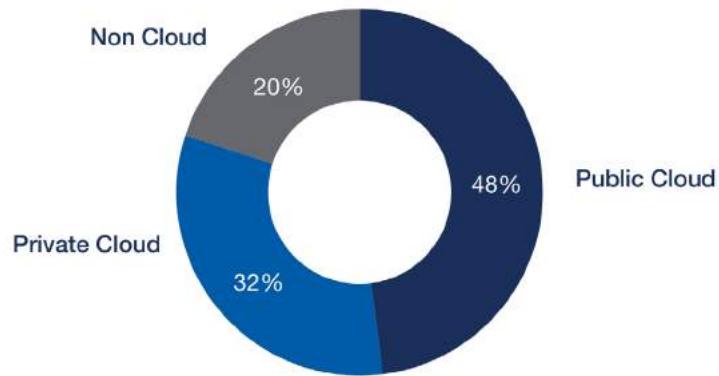
Source: RightScale 2018 State of the Cloud Report

% Enterprise Workloads in Cloud



Source: RightScale 2018 State of the Cloud Report

% SMB Workloads in Cloud



Source: RightScale 2018 State of the Cloud Report

Most enterprises have a central cloud team.

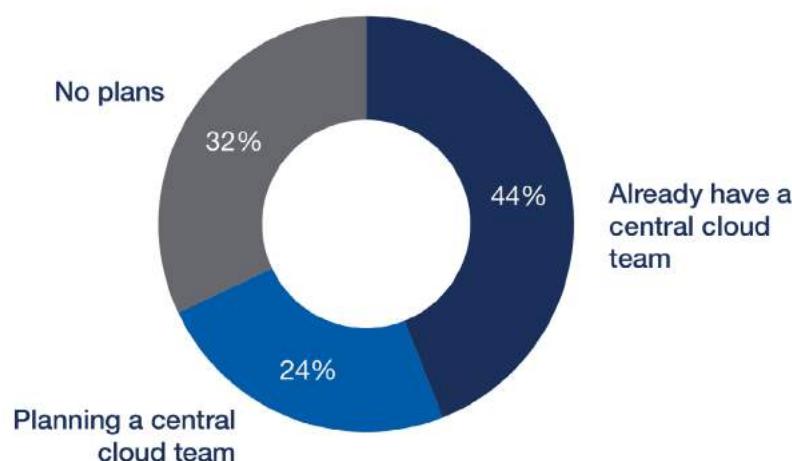
As companies adopt cloud-first strategies, they are increasingly creating a centralized cloud team or a “Center of Excellence” for cloud. These teams provide centralized controls, tools, and best practices to help accelerate the use of cloud while reducing costs and risk.

Overall, 44 percent of companies already have a central cloud team.

Enterprises have an even stronger need for centralized governance within their larger organizations: 57 percent of enterprises already have a central cloud team with another 24 percent planning one. Even among SMBs, 31 percent have a central cloud team, with 24 percent planning one.

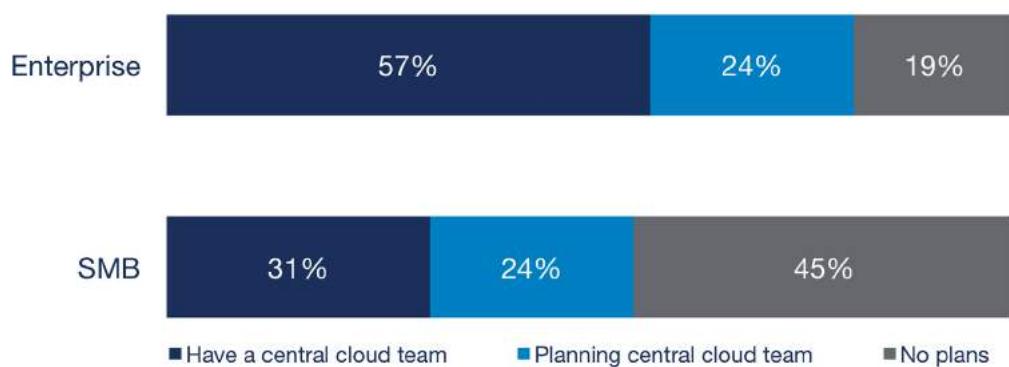
Organizations with Central Cloud Team

All respondents



Source: RightScale 2018 State of the Cloud Report

Central Cloud Team by Company Size



Source: RightScale 2018 State of the Cloud Report

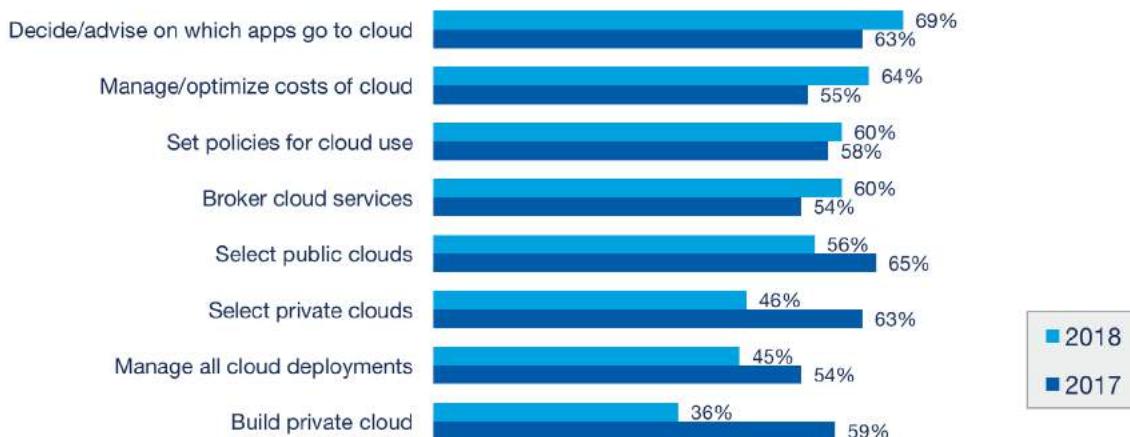
Enterprise central IT teams shift role to governance and brokering cloud.

This year we saw enterprise central IT take a stronger cloud governance role in advising on which applications move to cloud (69 percent in 2018 vs. 63 percent in 2017), managing costs (64 percent in 2018 vs. 55 percent in 2017), setting policies (60 percent in 2018 vs. 58 percent in 2017), and brokering cloud services (60 percent in 2018 vs. 54 percent in 2017).

In contrast, this year enterprise central IT is taking a significantly smaller role in choosing public and private clouds and in building private clouds.

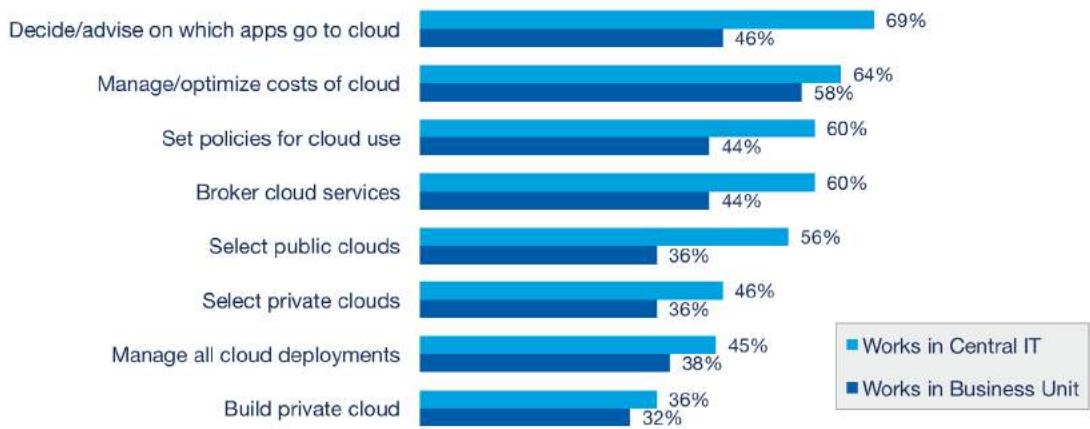
However, there is now a significant gap between the view of central IT and that of the business units they support. Respondents in business units within the enterprise are less likely overall to delegate authority to central IT, but are in close agreement that central IT should manage and optimize cloud costs.

Enterprise Central IT View of Role



Source: RightScale 2018 State of the Cloud Report

Enterprise Views of Role for Central IT

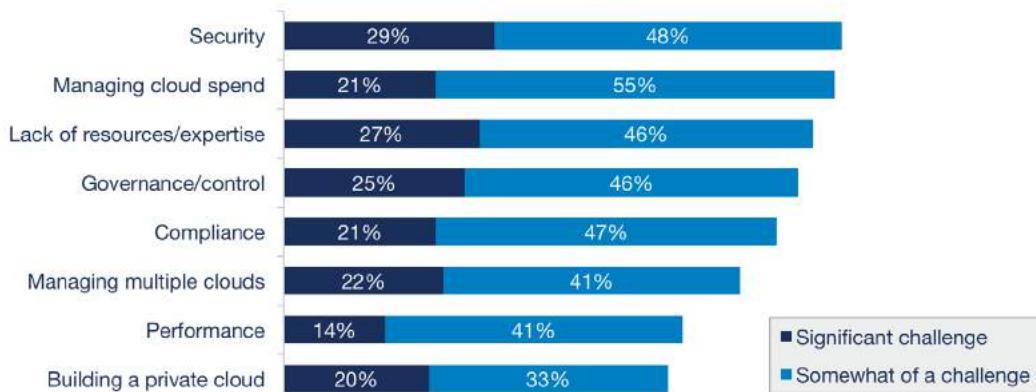


Source: RightScale 2018 State of the Cloud Report

Top cloud challenges in 2018 are security and spend.

In 2018, security and spend are the top challenges. Security is a challenge for 77 percent of respondents, while 29 percent see it as a significant challenge. Managing cloud spend is a challenge for 76 percent of respondents, while a smaller 21 percent see it as a significant challenge.

Cloud Challenges

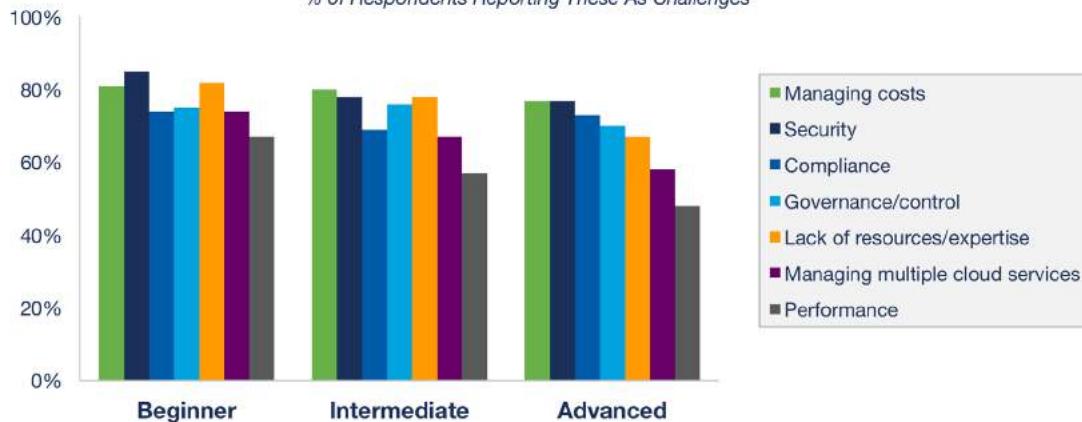


Source: RightScale 2018 State of the Cloud Report

As companies become more experienced with cloud, the top challenge shifts. Security is the largest issue among cloud beginners, while cost becomes a bigger challenge for intermediate and advanced users.

Challenges by Cloud Maturity

% of Respondents Reporting These As Challenges



Source: RightScale 2018 State of the Cloud Report

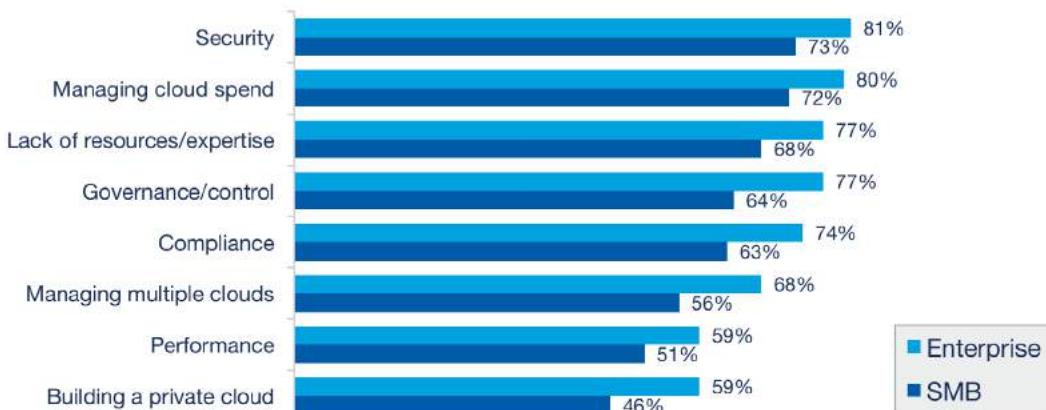
Top 5 Challenges Change with Cloud Maturity

Place	Beginner	Intermediate	Advanced
#1	Security (85%)	Managing costs (80%)	Managing costs (77%)
#2	Lack of resources/expertise (82%)	Security (78%)	Security (77%)
#3	Managing costs (80%)	Lack of resources/expertise (78%)	Compliance (73%)
#4	Governance/Control (75%)	Governance/Control (76%)	Governance/Control (70%)
#5	Compliance (74%)	Compliance (69%)	Lack of resources/expertise (67%)

Source: RightScale 2018 State of the Cloud Report

Company size also plays a role, with enterprises citing more challenges across the board than SMBs.

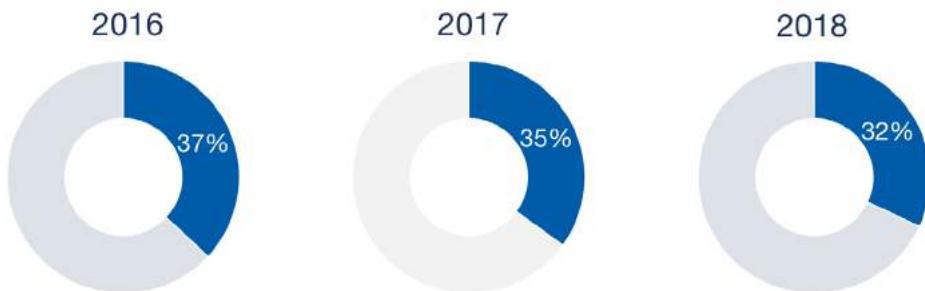
Cloud Challenges by Company Size



Source: RightScale 2018 State of the Cloud Report

Even among enterprise central IT teams, who typically have the most responsibility for security, there has been a significant decline in security concerns among this group over the last few years, declining further to 32 percent in 2018.

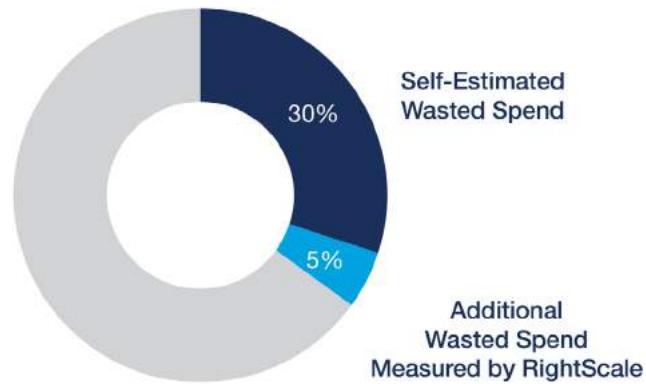
Enterprise Central IT Rating Cloud Security as Significant Challenge



Source: RightScale 2018 State of the Cloud Report

Significant wasted cloud spend drives users to focus on costs.
Even though managing cloud costs is a top challenge, cloud users underestimate the amount of wasted cloud spend. Respondents estimate 30 percent waste, while RightScale has measured actual waste at 35 percent.

% of Cloud Spend Wasted

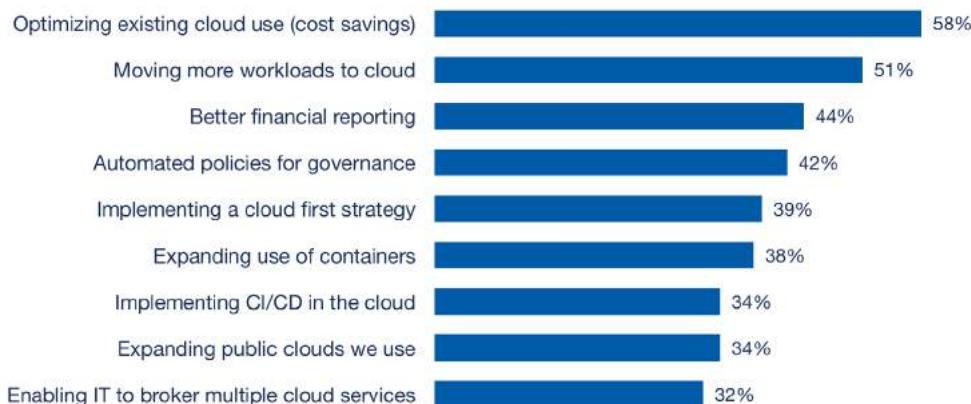


Source: RightScale 2018 State of the Cloud Report

With managing costs as one of the top challenges, organizations are focusing on gaining control of spend. Optimizing cloud costs is the top initiative for the second year in a row, increasing from 53 percent of respondents in 2017 to 58 percent in 2018.

Moving more workloads to cloud is the second most cited initiative this year (5 percent), followed by other cost and governance priorities: better financial reporting (44 percent) and automated policies (42 percent).

Cloud Initiatives in 2018



Source: RightScale 2018 State of the Cloud Report

Cloud Initiatives 2018 vs. 2017



Source: RightScale 2018 State of the Cloud Report

Optimizing costs is especially important for mature cloud users with 65 percent of intermediate users and 69 percent of advanced users citing it as a key initiative for 2018.

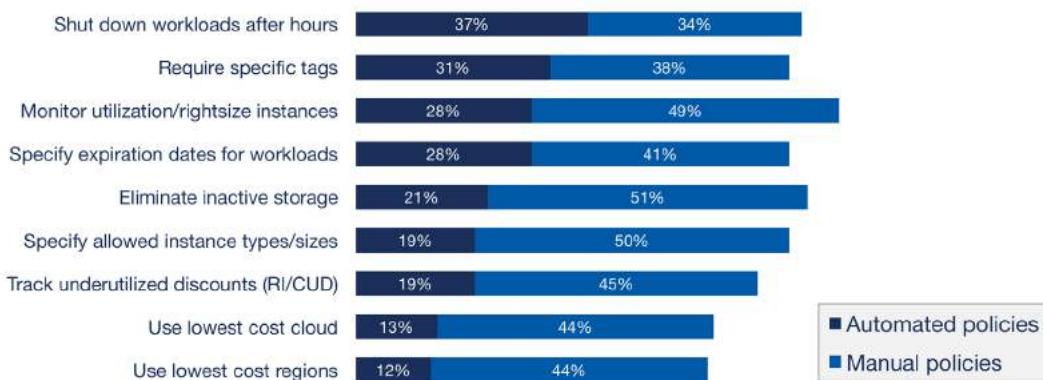
Top 2018 Initiatives by Cloud Maturity

Place	Beginner	Intermediate	Advanced
#1	Move more workloads to cloud (49%)	Optimizing existing cloud use/cost savings (65%)	Optimizing existing cloud use/cost savings (69%)
#2	Optimizing existing cloud use/cost savings (46%)	Move more workloads to cloud (61%)	Implement automated policies (53%)
#3	Implement a cloud first strategy (39%)	Better financial reporting (49%)	Better financial reporting (52%)
#4	Better financial reporting (38%)	Implement automated policies (47%)	Move more workloads to cloud (51%)
#5	Implement automated policies (34%)	Implement a cloud first strategy (45%)	Expand use of containers (50%)

Source: RightScale 2018 State of the Cloud Report

Despite an increased focus on cloud cost management, only a minority of companies have begun to implement automated policies to optimize cloud costs, such as shutting down unused workloads or selecting lower-cost cloud or regions. This represents an opportunity for increased efficiency and increased savings, since manual policies are difficult to monitor and enforce.

How Companies are Optimizing Cloud Cost



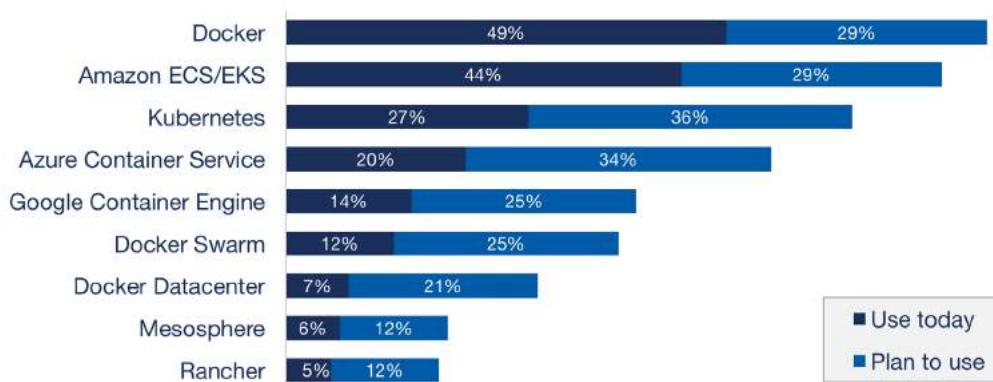
Source: RightScale 2018 State of the Cloud Report

Container use is up: Docker is used most broadly while Kubernetes grows quickly.

With the steep rise in the use of containers, Docker continues to show strong growth. Overall Docker adoption increased to 49 percent from 35 percent last year (a growth rate of 40 percent). Kubernetes, a container orchestration tool that leverages Docker, saw the fastest growth, almost doubling to reach 27 percent adoption.

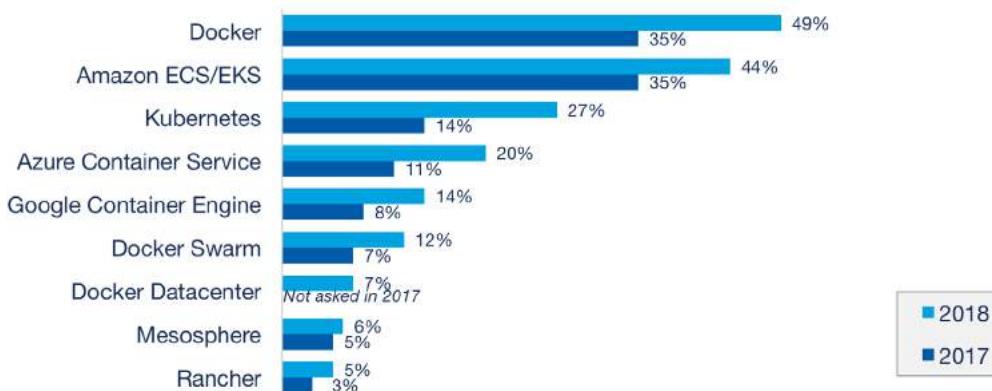
Many users also choose container-as-a-service offerings from the public cloud providers. The AWS container service (ECS/EKS) followed close behind Docker with 44 percent adoption (26 percent growth rate). Azure Container Service adoption reached 20 percent due to a strong growth of 82 percent, and Google Container Engine also grew strongly (75 percent) to reach adoption of 14 percent.

Respondents Using Container Tools



Source: RightScale 2018 State of the Cloud Report

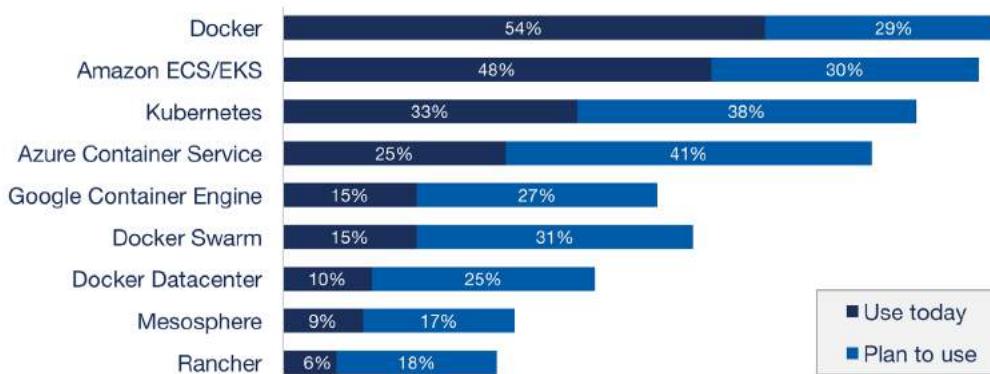
YoY Respondents Using Container Tools



Source: RightScale 2018 State of the Cloud Report

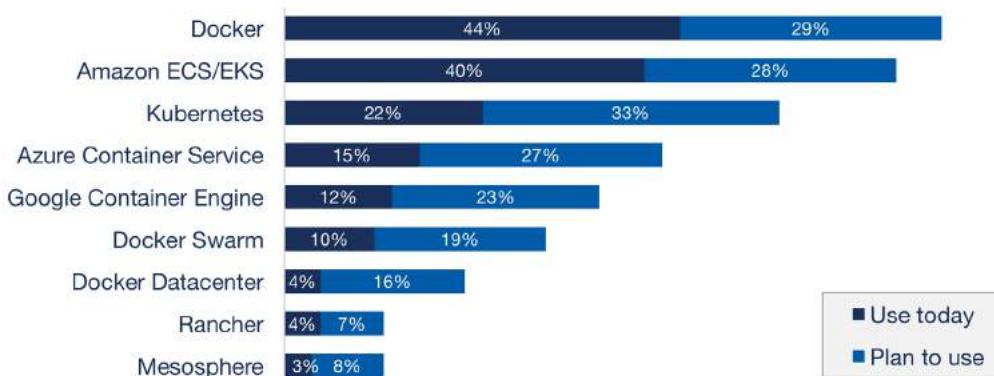
A higher percentage of enterprises adopt all container tools as compared to SMBs, with Docker reaching 54 percent adoption among larger companies. Enterprises are showing strong interest in Azure Container Service, with 41 percent planning to use it on top of the 25 percent using it today. SMBs are showing the most future interest in Kubernetes, with 33 percent planning to use it on top of the 22 percent using it today.

Enterprise Respondents Using Container Tools



Source: RightScale 2018 State of the Cloud Report

SMB Respondents Using Container Tools



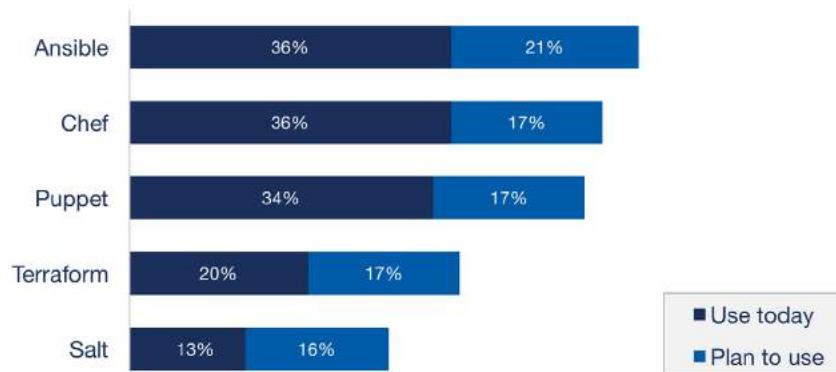
Source: RightScale 2018 State of the Cloud Report

Use of configuration tools grows, with Ansible showing strongest growth.

As part of adopting DevOps processes, companies often choose to implement configuration management tools that allow them to standardize and automate deployment and configuration of servers and applications.

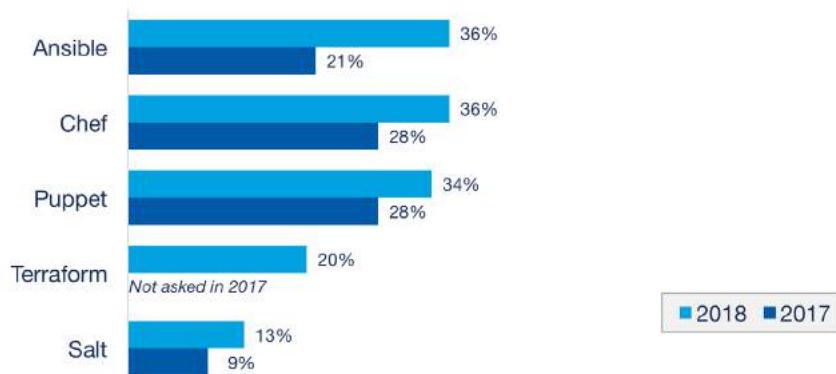
Among all respondents, Ansible and Chef are tied with 36 percent adoption each, followed by Puppet at 34 percent adoption. Ansible showed the strongest growth since last year, up 71 percent in adoption. Chef grew 29 percent, and Puppet grew 21 percent.

Respondents Using Configuration Tools



Source: RightScale 2018 State of the Cloud Report

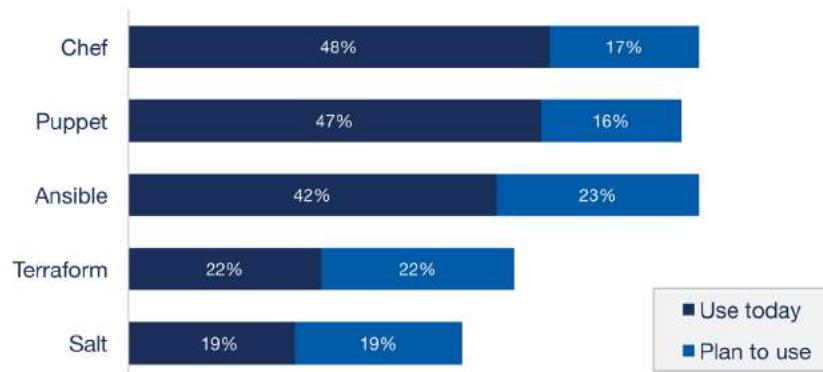
Respondents Using Configuration Tools



Source: RightScale 2018 State of the Cloud Report

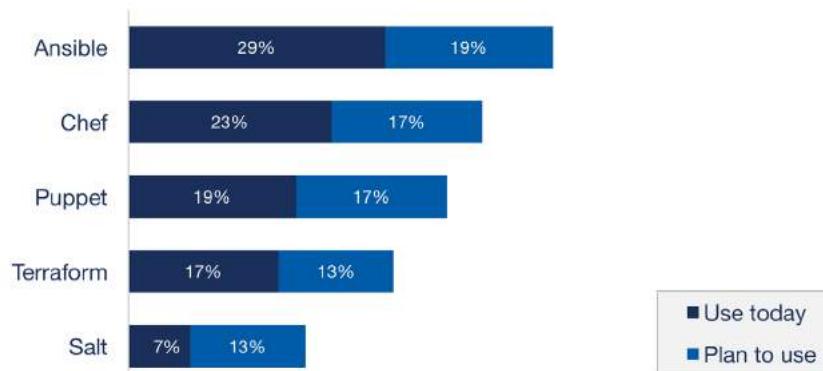
Among enterprise though, Chef (48 percent) and Puppet (47 percent) hold the top two positions, while Ansible follows with 42 percent adoption. Ansible leads handily among SMBs with 29 percent adoption, followed by Chef and Puppet.

Enterprise Respondents Using Configuration Tools



Source: RightScale 2018 State of the Cloud Report

SMB Respondents Using Configuration Tools



Source: RightScale 2018 State of the Cloud Report

Both Public and Private Cloud Adoption Grows

We asked respondents to tell us which clouds they were using and whether they were running applications in cloud, experimenting with cloud, planning to use cloud, or had no plans to use cloud. Most respondents are using more than one cloud so totals will add up to more than 100 percent.

It is important to note that adoption (the percentage of respondents that use a particular cloud) is only one of the factors that influences revenue growth for the cloud provider. Other factors include the number of VMs running as well as other cloud services being used.

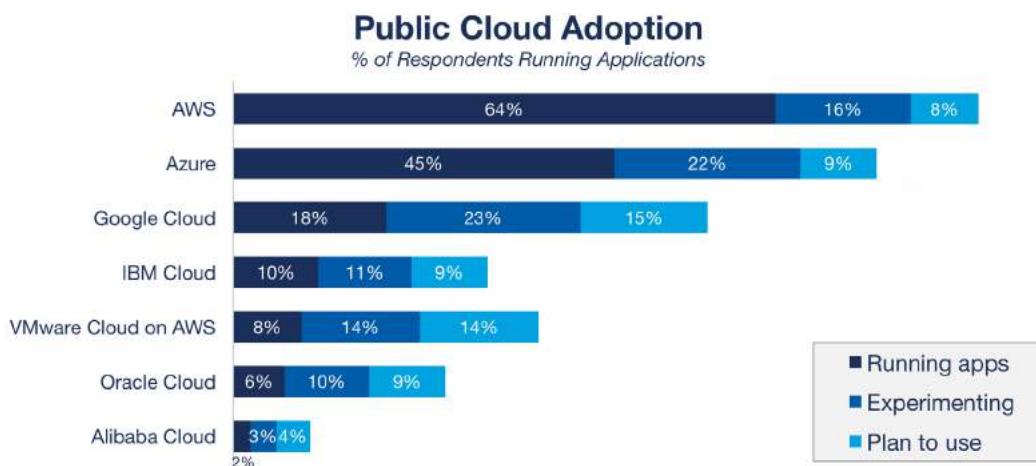
Azure continues to grow quickly and reduce the AWS lead, especially among enterprises.

In 2018, AWS continues to lead in public cloud adoption, but other public clouds are growing more quickly. Azure especially is now nipping at the heels of AWS, especially in larger companies. In 2018, 64 percent of respondents currently run applications in AWS, up from 57 percent in 2017 (12 percent growth rate).

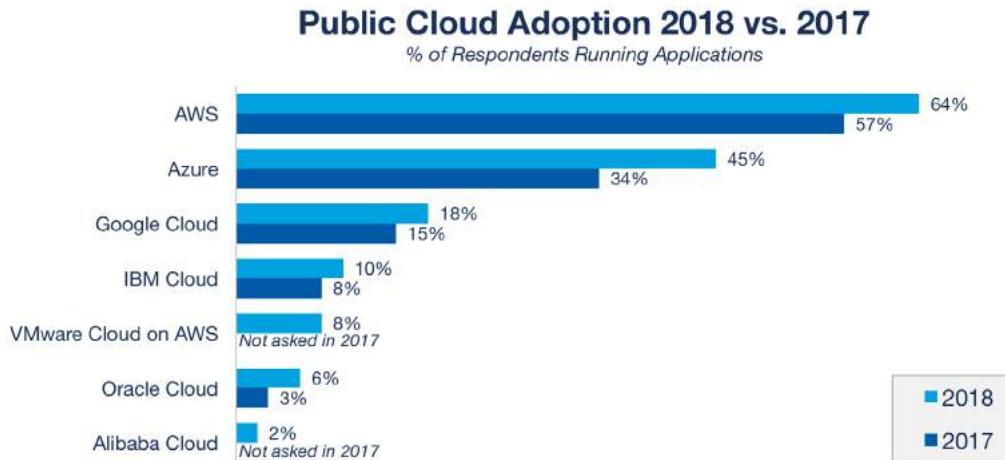
Overall Azure adoption, however, grew more quickly from 34 to 45 percent (32 percent growth rate) to close the gap with AWS. As a result, Azure adoption has now reached 70 percent of AWS adoption, up from 60 percent last year.

Google maintained its third place position, growing from 15 to 18 percent adoption (20 percent growth rate). VMware Cloud on AWS was used by 8 percent of respondents, a strong showing in the first year of availability.

We can also gauge interest and potential for future adoption by measuring respondents who are experimenting or planning to use particular clouds. This year there was a higher percentage of respondents experimenting or planning to use Google (38 percent), followed by Azure (31 percent), and VMware Cloud on AWS (28 percent). This indicates a potential for Google to accelerate adoption in future years as the respondents' experiments and plans come to fruition.



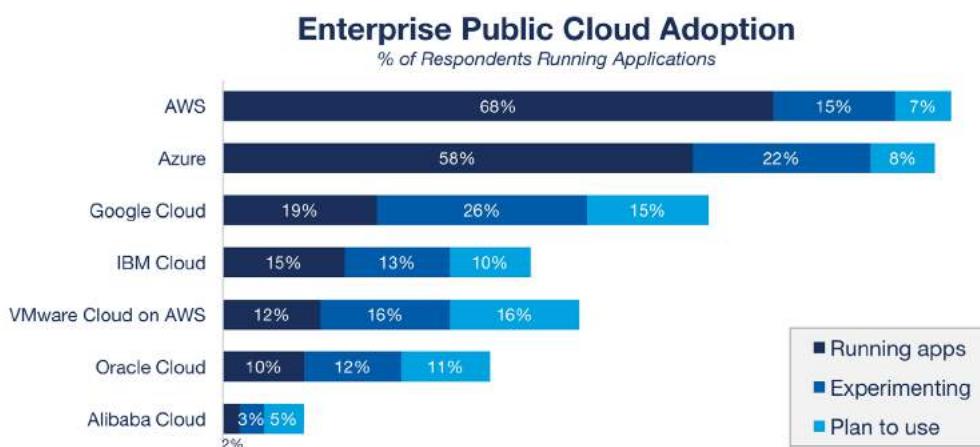
Source: RightScale 2018 State of the Cloud Report



Source: RightScale 2018 State of the Cloud Report

Among enterprises, Azure did even better. Azure increased adoption significantly from 43 percent to 58 percent (35 percent growth rate) while AWS adoption in this group increased from 59 percent to 68 percent (15 percent growth rate). Among other cloud providers that were included in the survey last year, all saw increased adoption this year with Oracle growing fastest from 5 to 10 percent (100 percent growth rate), IBM Cloud from 10 to 15 percent (50 percent growth rate), and Google from 15 to 19 percent (27 percent growth rate).

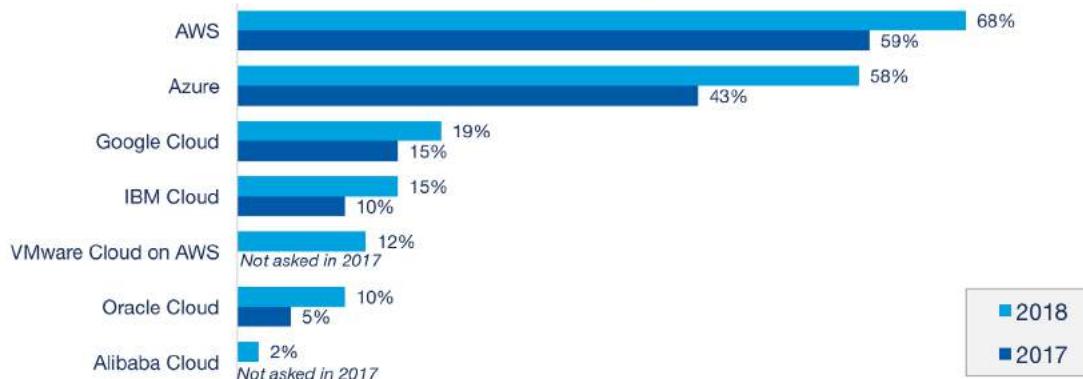
Enterprise respondents with future projects (the combination of experimenting and planning to use) show the most interest in Google (41 percent).



Source: RightScale 2018 State of the Cloud Report

Enterprise Public Cloud Adoption 2018 vs. 2017

% of Respondents Running Applications



Source: RightScale 2018 State of the Cloud Report

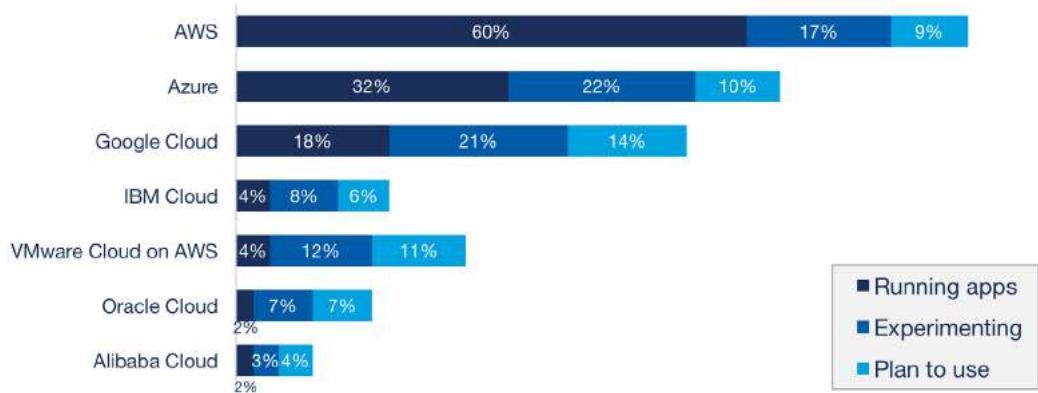
Among SMBs, AWS holds a larger lead over Azure. AWS grew from 55 to 60 percent adoption (9 percent growth rate), however Azure still grew more quickly from 25 to 32 percent (28 percent growth rate). Azure is at just over half the adoption of AWS (53 percent) among these smaller companies.

Google was up from 15 to 18 percent (20 percent growth rate) to also gain ground on AWS, while other cloud providers included in last year's survey were flat or down.

SMB respondents with future projects (the combination of experimenting and planning to use) show the most interest in Google (35 percent) followed closely by Azure (32 percent).

SMB Public Cloud Adoption

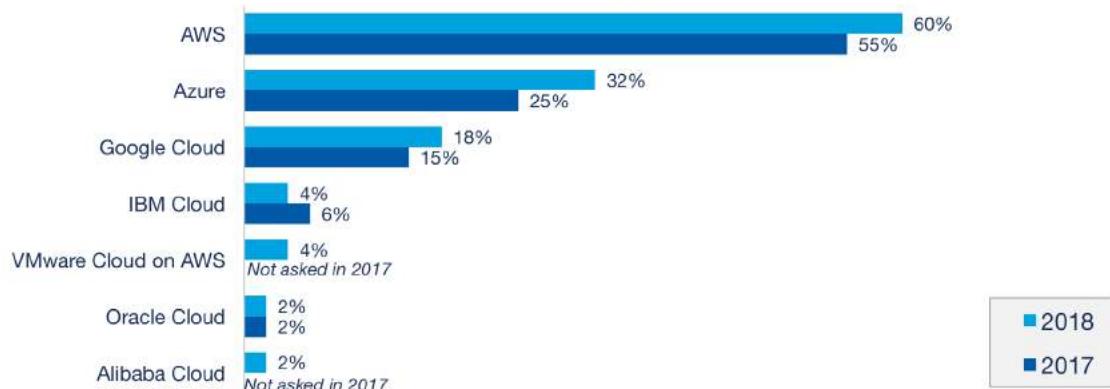
% of Respondents Running Applications



Source: RightScale 2018 State of the Cloud Report

SMB Public Cloud Adoption 2018 vs. 2017

% of Respondents Running Applications



Source: RightScale 2018 State of the Cloud Report

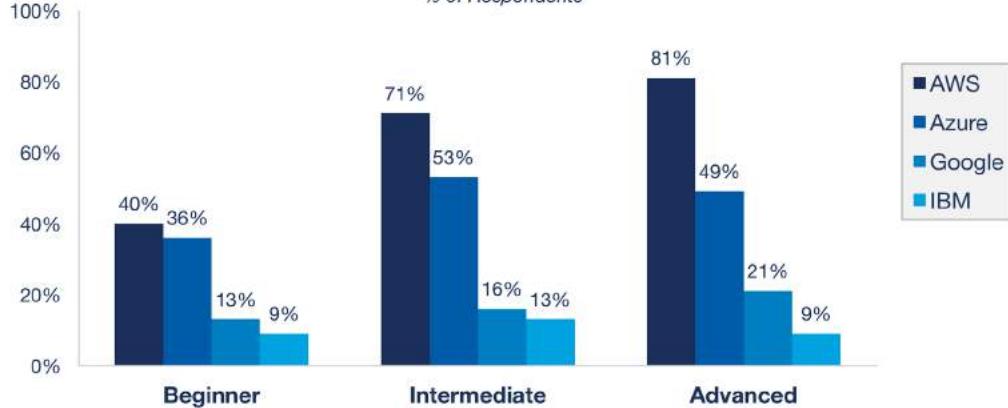
Enterprises starting on their cloud journey use Azure slightly more than AWS.

The cloud maturity of an organization typically correlates to the length of time that it has been using cloud. That correlation is due to the time it takes to build cloud expertise and create processes and best practices across the organization. Because AWS was the first large-scale cloud provider, AWS is used more frequently by advanced (i.e., longer-term) cloud users. Across all respondents, 81 percent of advanced cloud users leverage AWS vs. 49 percent using Azure.

What becomes more interesting is to look at which clouds are chosen by users who are just starting their cloud journeys now. Here we see that AWS and Azure are very close, with 40 percent of cloud beginners choosing AWS vs. 36 percent for Azure.

Clouds Used by Cloud Maturity

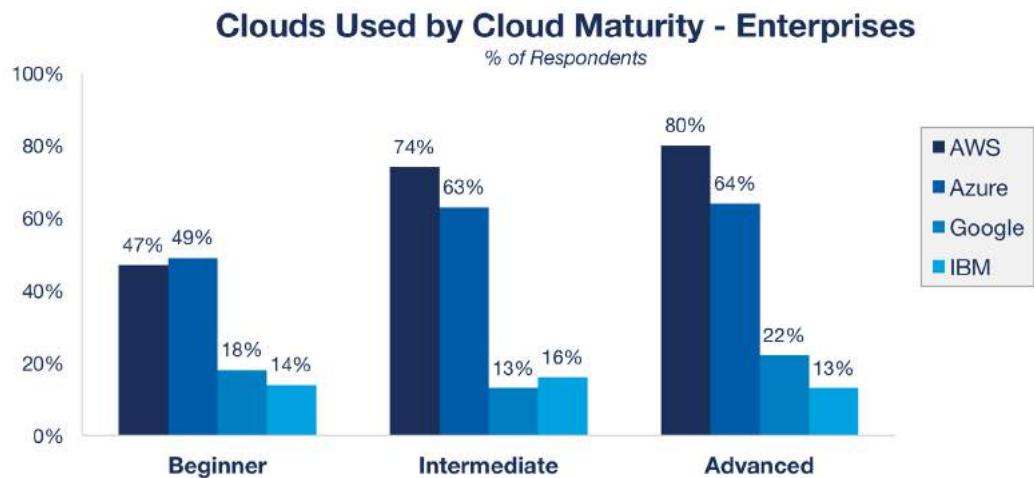
% of Respondents



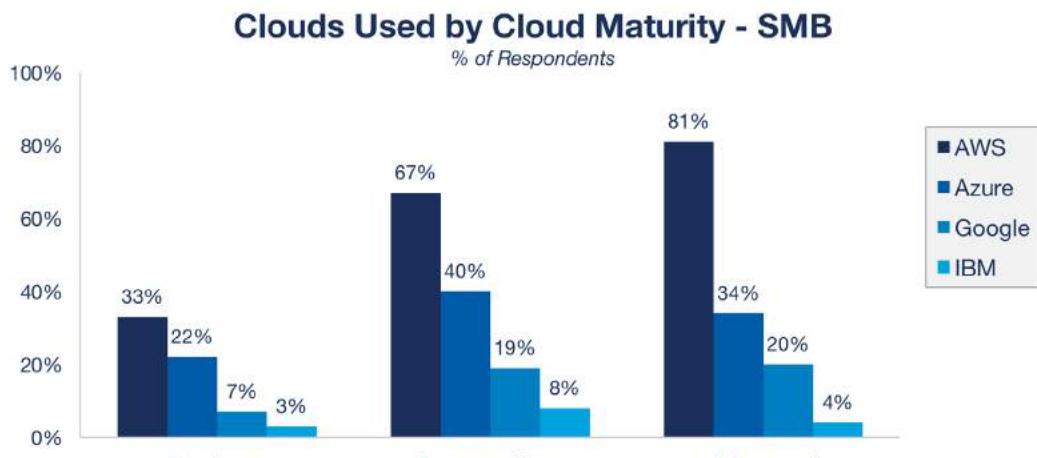
Source: RightScale 2018 State of the Cloud Report

Among cloud beginner enterprises (more than 1,000 employees) Azure shows a slight lead (within the margin of error) with 49 percent adoption vs. 47 percent for AWS.

Among SMB cloud beginners, AWS holds a significant lead, gaining 33 percent adoption vs. 22 percent for Azure.



Source: RightScale 2018 State of the Cloud Report

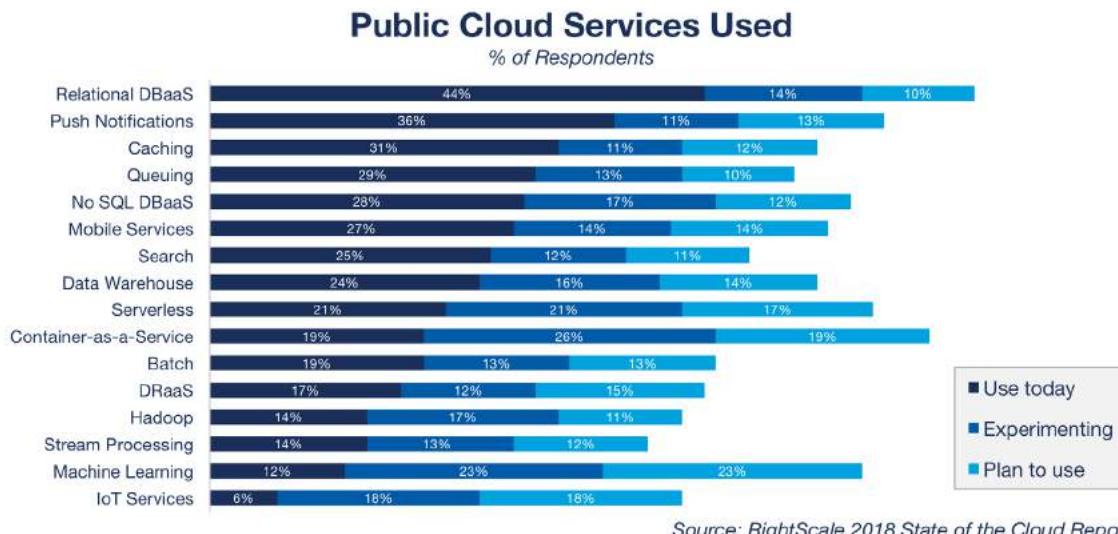


Source: RightScale 2018 State of the Cloud Report

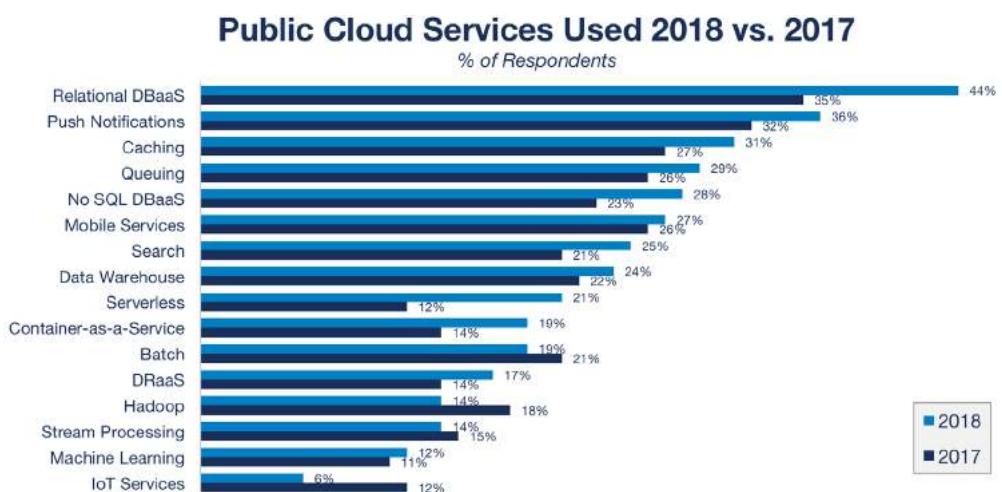
Serverless is the top-growing extended cloud service.

A significant number of public cloud users are now leveraging services beyond just the basic compute, storage, and network services. Among the most popular extended services, relational DBaaS, push notifications, and caching continue to hold the top three positions in 2018.

Future interest can be gauged by looking at the respondents that are experimenting with or plan to use a particular service. Machine learning garners the top scores for future interest. While only 12 percent currently use machine learning, 46 percent are considering it for the future. Just behind is container-as-a-service (45 percent), serverless (38 percent), and IoT (36 percent).



Year over year, serverless was the top-growing extended cloud service with a 75 percent increase over 2017 (12 to 21 percent adoption). Container-as-a-service was the second highest growth rate at 36 percent (14 to 19 percent adoption). SQL and NoSQL DBaaS were third and fourth (26 and 22 percent growth rates), but achieved this growth starting from a much larger base of use, with 35 and 23 percent adoption, respectively, in 2017.

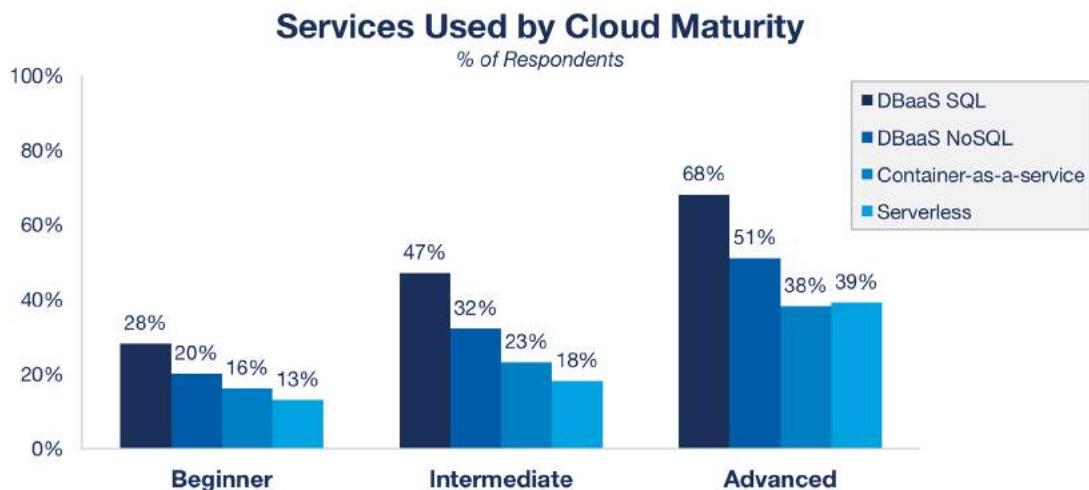


Top Growing Cloud Services

Place	Service	Growth Rate	2017 Use	2018 Use
#1	Serverless	75%	12%	21%
#2	Container-as-a-service	36%	14%	19%
#3	DBaaS SQL	26%	35%	44%
#4	DBaaS NoSQL	22%	23%	28%
#5	DRaaS	21%	14%	17%

Source: RightScale 2018 State of the Cloud Report

Unsurprisingly, as organizations mature, they are more likely to use these extended cloud services. Serverless, though, shows a significant jump between intermediate and advanced users, more than doubling in adoption from 18 percent to 39 percent.



Source: RightScale 2018 State of the Cloud Report

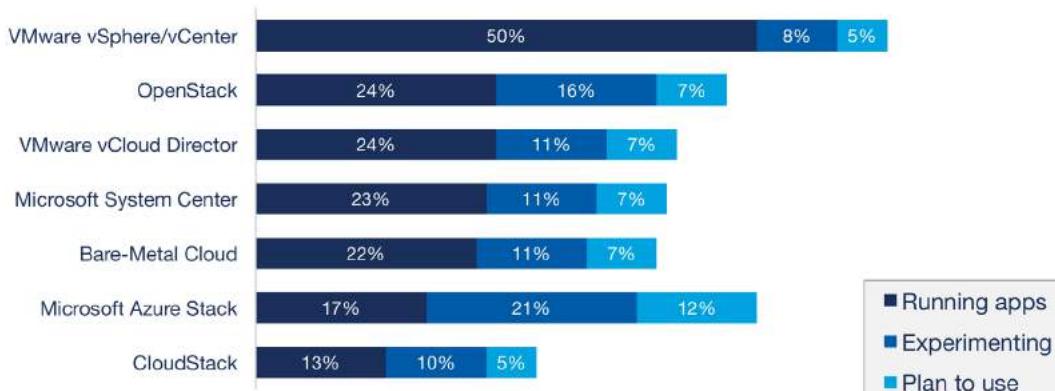
Private cloud adoption grows across the board.

In contrast to last year's survey when we saw private cloud adoption flatten, the 2018 survey shows that adoption of private cloud increased across all providers.

Overall, VMware vSphere continues to lead with 50 percent adoption, up significantly from last year (42 percent). This includes respondents who view their vSphere environment as a private cloud — whether or not it meets the accepted definition of cloud computing. OpenStack (24 percent), VMware vCloud Director (24 percent), Microsoft System Center (23 percent), and bare metal (22 percent) were all neck and neck. Azure Stack was in the sixth slot, but showed the highest percentage of respondents that were experimenting or planning to use the technology.

Private Cloud Adoption

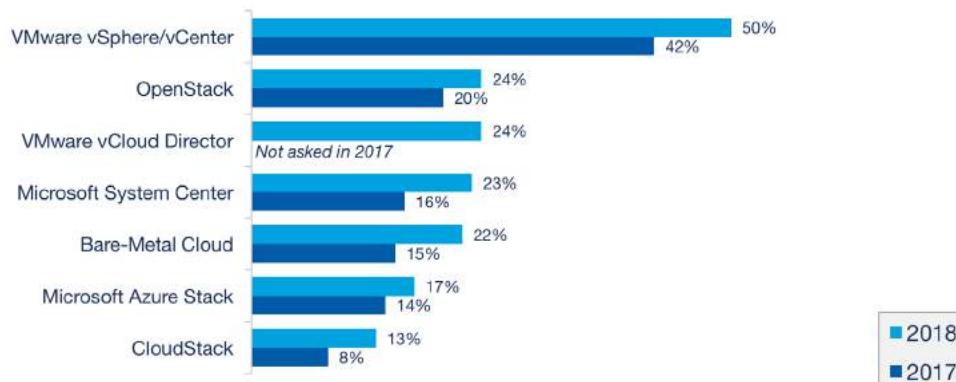
% of Respondents Running Applications



Source: RightScale 2018 State of the Cloud Report

Private Cloud Adoption 2018 vs. 2017

% of Respondents Running Applications



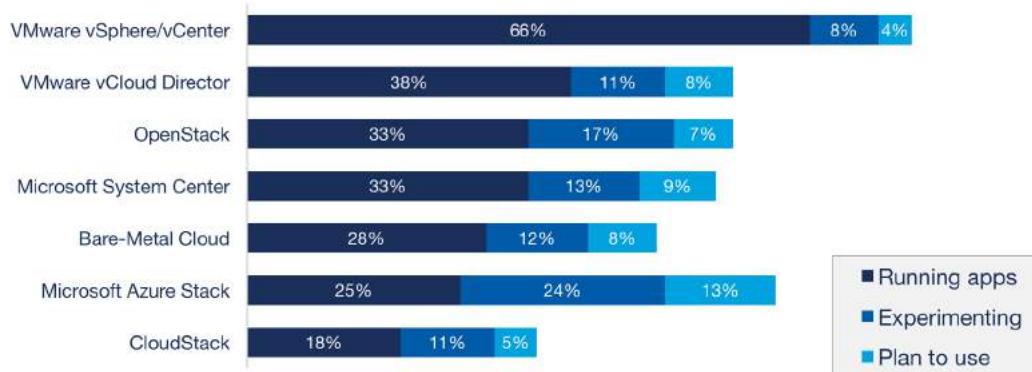
Source: RightScale 2018 State of the Cloud Report

Among enterprises, vSphere leads with 66 percent adoption, and VMware vCloud Director takes the second slot at 38 percent adoption. OpenStack and Microsoft System Center are tied at 33 percent adoption. Although Azure Stack ranks sixth in current usage by enterprises, it leads the way at 37 percent among respondents who are experimenting with and planning to use private cloud.

All private clouds showed increases among enterprises this year, but CloudStack showed the highest growth rate by doubling over last year, albeit on lower adoption, from 9 to 18 percent.

Enterprise Private Cloud Adoption

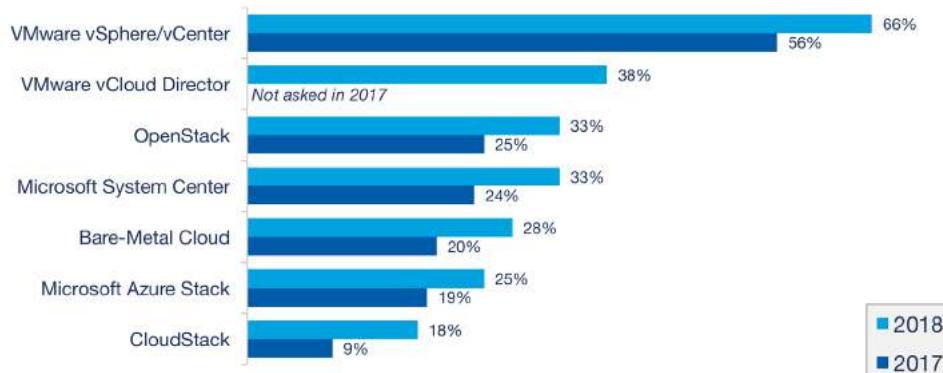
% of Respondents Running Applications



Source: RightScale 2018 State of the Cloud Report

Enterprise Private Cloud Adoption 2018 vs. 2017

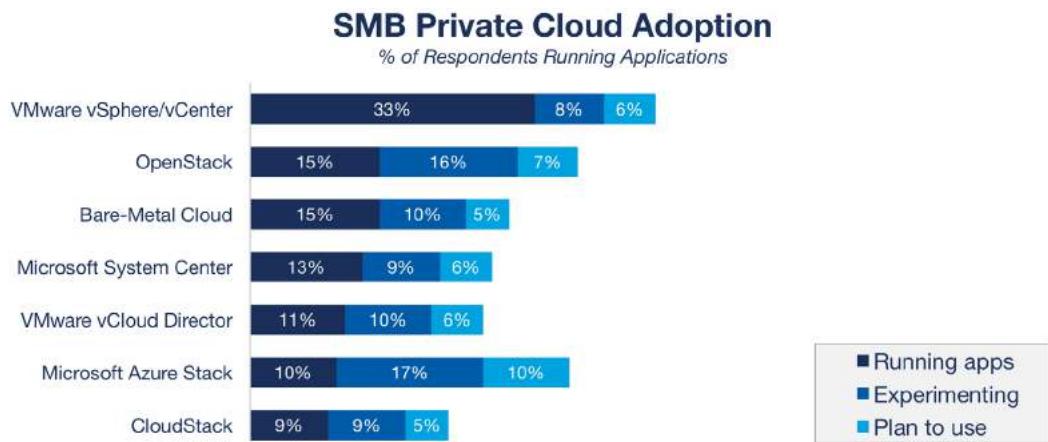
% of Respondents Running Applications



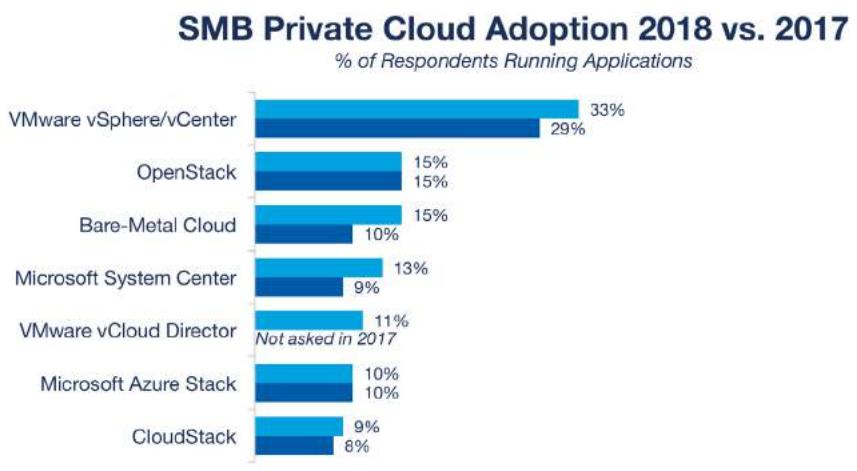
Source: RightScale 2018 State of the Cloud Report

Private cloud adoption by smaller organizations is lower overall than for enterprises. While VMware vSphere/vCenter (33 percent) is still the top option, OpenStack takes second place in this group with 15 percent of respondents already running applications. This year Microsoft Azure Stack continues to have mindshare with 27 percent of SMBs experimenting or planning to use it, and OpenStack also has garnered strong interest with 23 percent of enterprises experimenting or planning to use it.

Year over year, Microsoft System Center and bare-metal cloud showed the largest increases. OpenStack and Azure Stack were flat over last year.



Source: RightScale 2018 State of the Cloud Report

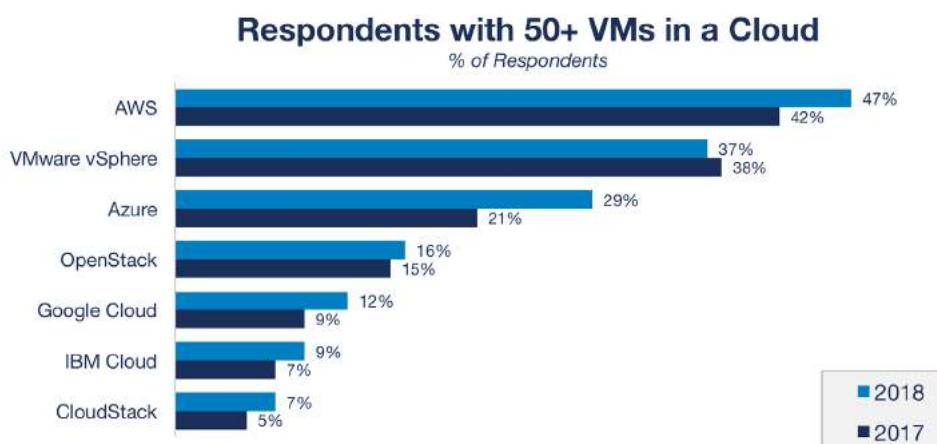
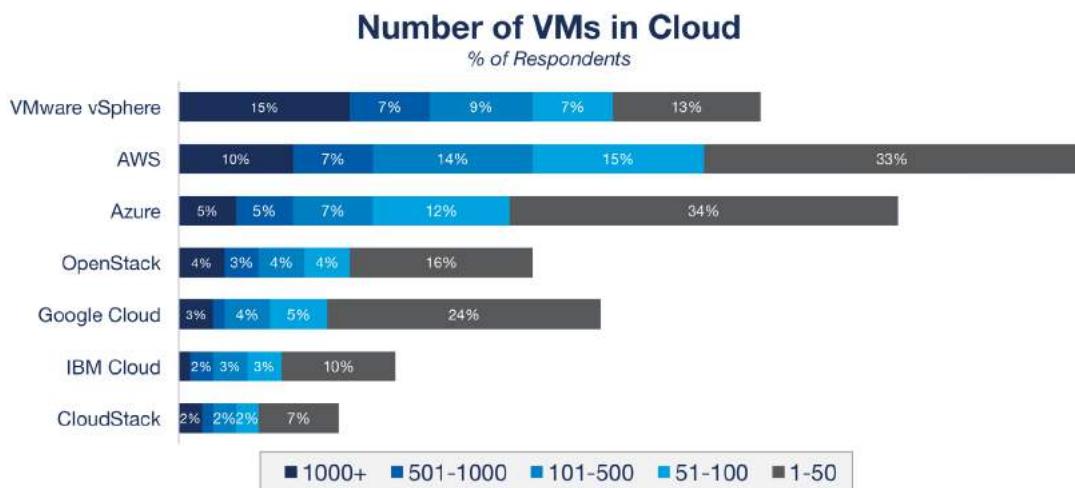


Source: RightScale 2018 State of the Cloud Report

vSphere has most users with 1,000+ VMs, but AWS leads in 50+ VMs; Azure grows footprint faster.

The adoption numbers above indicate the number of respondents that are running *any* workloads in a particular cloud. However, it is also important to look at the number of workloads or VMs that are running in each cloud. The following charts show the number of VMs being run across the top public and private clouds.

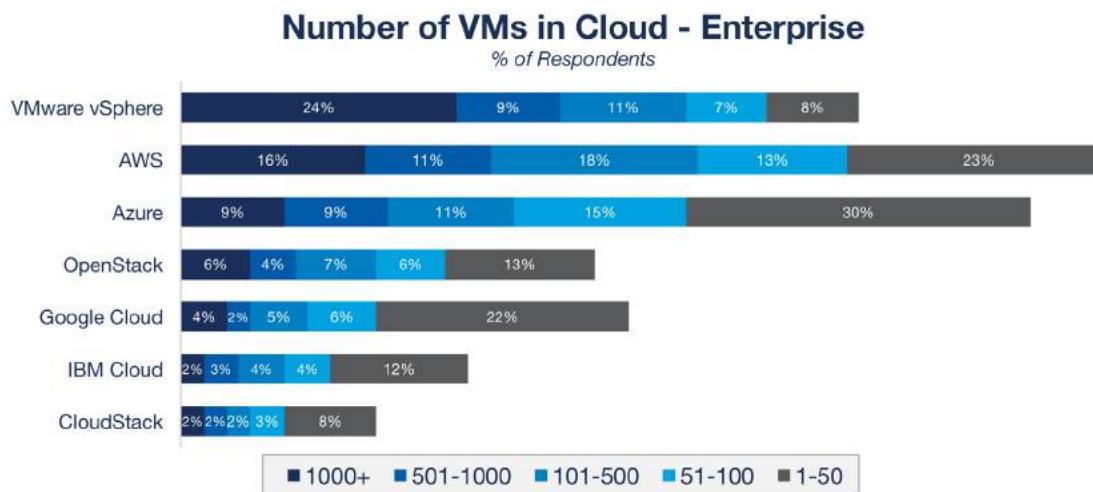
Among all respondents, 15 percent of respondents have more than 1,000+ VMs in vSphere as compared to 10 percent in AWS. However, AWS leads in respondents with more than 50 VMs, (47 percent for AWS vs. 37 percent for VMware). In third position, Azure shows stronger growth, increasing respondents of more than 50 VMs from 21 to 29 percent.



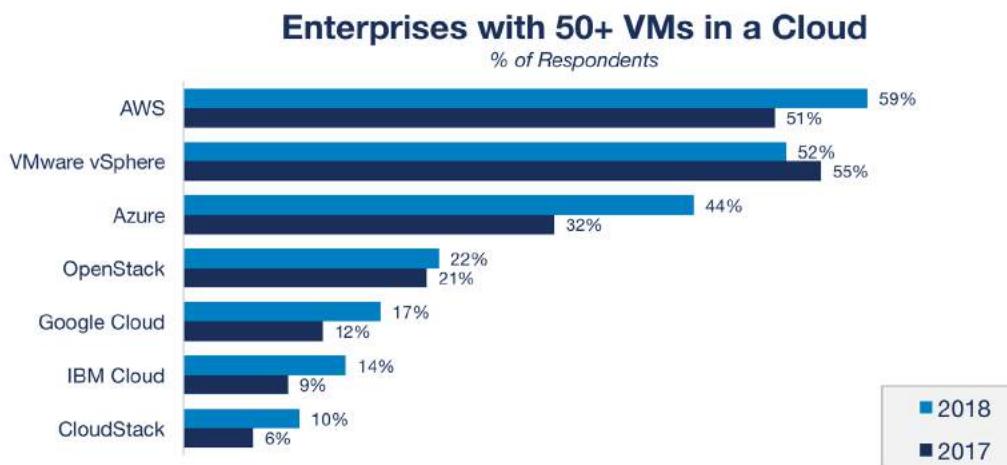
Source: RightScale 2018 State of the Cloud Report

Among enterprises, who have larger numbers of workloads, 24 percent have more than 1,000 VMs in VMware vSphere as compared to 16 percent in AWS and 9 percent in Azure.

When looking at enterprises with 50+ VMs, AWS leads (59 percent) followed by vSphere (52 percent), and Azure (44 percent). Azure tightened the gap by increasing respondents with 50+ VMs by a 38 percent growth rate from 2017 to 2018. AWS showed a 16 percent growth rate for this metric while vSphere declined slightly. Other cloud providers improved on smaller numbers.

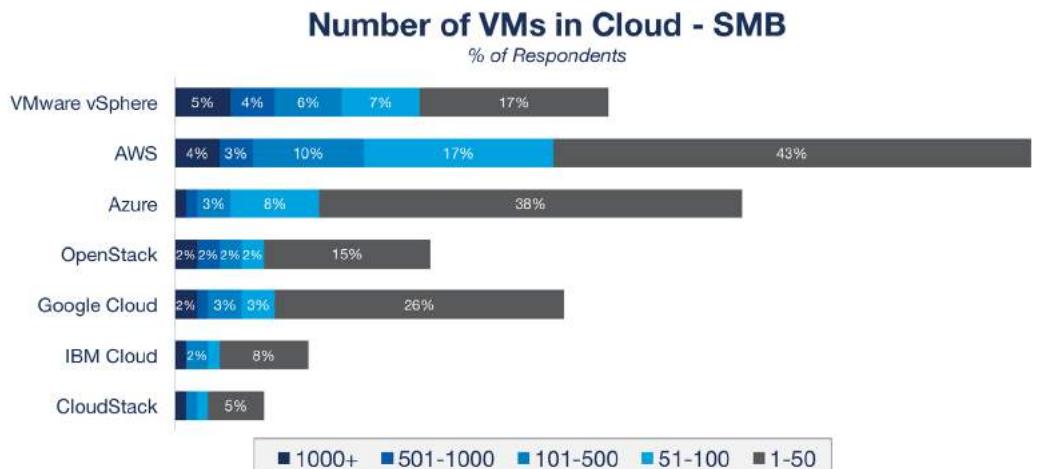


Source: RightScale 2018 State of the Cloud Report

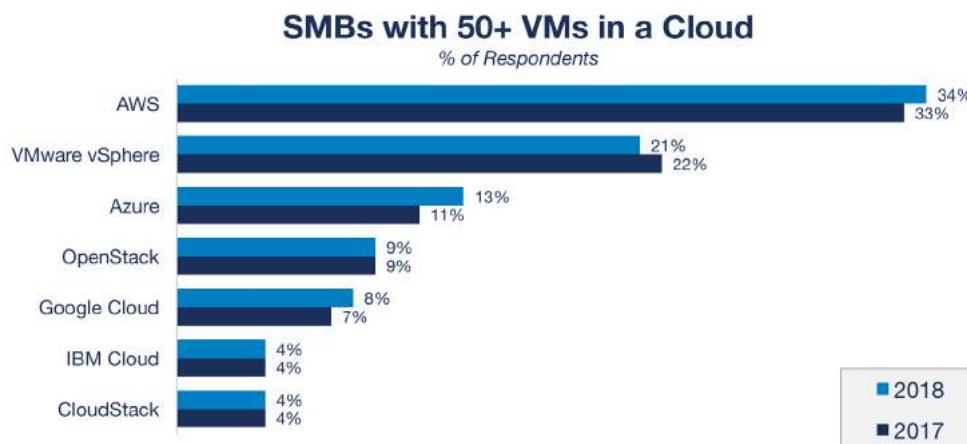


Source: RightScale 2018 State of the Cloud Report

Among SMBs, VMware vSphere had a slight lead over AWS among those respondents with more than 1,000 VMs (5 percent vs. 4 percent). However, AWS led VMware vSphere in the number of respondents running more than 50 VMs (34 percent vs. 21 percent). Year over year was relatively flat within the margin of error.



Source: RightScale 2018 State of the Cloud Report



Source: RightScale 2018 State of the Cloud Report

Public cloud scorecard for enterprises: AWS leads, Azure closes in.

While public cloud found its initial success in small forward-thinking organizations, over the past few years the battle has now shifted to larger enterprises. AWS has been moving quickly to address the needs of enterprises, and Microsoft has been working to bring its enterprise relationships to Azure. Google and IBM are also focusing on growing their infrastructure-as-a-service lines of business and continue to increase adoption.

The following scorecard provides a quick snapshot showing that AWS still maintains a lead among enterprises with the highest percentage adoption and largest VM footprint of the top public cloud providers. However, Azure is showing strength by growing much more quickly on already solid adoption numbers. IBM and Google are growing strongly as well but on a smaller base of users.

AWS vs. Azure vs. Google vs. IBM Enterprise Scorecard

Area	AWS	Azure	Google	IBM
% Adoption	68%	58%	19%	15%
YoY Growth in Adoption	15%	35%	26%	50%
% Adoption in Beginners	47%	49%	18%	14%
% with Footprint >50 VMs	58%	44%	17%	14%
YoY Growth in Footprint > 50 VMs	14%	38%	42%	56%

█ AWS leads
█ Other vendors lead AWS

Source: RightScale 2018 State of the Cloud Report

Summary: As Public and Private Cloud Grow, Organizations Focus on Governing Costs

The 2018 State of the Cloud Survey shows that multi-cloud remains the preferred strategy. Almost every organization is using cloud at some level, with both public and private cloud adoption growing. On average, companies are using or experimenting with nearly five public and private clouds with a majority of workloads now running in cloud.

However, public cloud is increasingly becoming the top focus among enterprises, and as a result public cloud use is growing more quickly — with the addition of new customers, an increase in workloads, and an increase in the number of services used.

This expansion in cloud use is driving public cloud spend higher, with large increases expected in 2018. Cost was the number one cloud challenge for intermediate and advanced cloud users. As a result, spend continues to be the top initiative for 2018 as even more organizations are turning their efforts to cost optimization efforts. There is still much room for improvement as 35 percent of cloud bills are wasted due to inefficiencies, and few organizations have yet implemented automated policies to help address these issues.

Enterprise central IT teams are taking a stronger role in cloud adoption, creating central cloud teams or a Center of Excellence. The role of these central teams is focused on cost management and governance as well as advising business units on workloads that should move to cloud. However, business units seek stronger autonomy, except in the area of cost optimization where they look to the central IT team for assistance.

The use of DevOps continues to increase, driving further adoption of container and configuration tools. Docker grew strongly again this year, and Kubernetes showed even stronger growth as a container orchestration solution. Many users are also adopting container-as-a-service offerings from AWS, Azure, and Google.

AWS still leads in public cloud adoption but Azure continues to grow more quickly and gains ground, especially with enterprise customers. Among enterprise cloud beginners, Azure is slightly ahead of AWS. Google maintains the third position, and VMware Cloud on AWS did well in its first year of availability. Adoption of Oracle Cloud is still small, but is growing well in the enterprise.

Cloud provider revenue is driven not just by adoption (percentage of companies using the cloud), but also the number of workloads (VMs) deployed, and the use of other extended cloud services.

Respondents continue to run more VMs in AWS than in other public clouds. However, Azure is growing quickly here as well to reduce AWS's lead.

VMware vSphere continues to lead as a private cloud option (both in adoption and number of VMs) followed by VMware vCloud Director. OpenStack is third, but Azure Stack (sixth place) stands out with the strongest interest level.

A Resource for Cloud Cost Optimization

While the benefits of cloud are clear, the on-demand nature of cloud use often results in uncontrolled cloud costs, requiring a completely new approach to managing and optimizing spend. In the white paper, *Optimizing Cloud Costs Through Continuous Collaboration*, we provide recommendations on how to:

- Identify where you are wasting spend
- Realize immediate savings in operating costs
- Collaborate to reduce future cloud costs
- Use tagging as a foundation for ongoing cost management
- Automate waste prevention

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About RightScale

RightScale enables leading enterprises to accelerate delivery of cloud-based applications that engage customers and drive top-line revenue while optimizing cloud usage to reduce risk and costs. RightScale Optima is a collaborative cloud cost management and optimization solution that enables organizations to take automated action to reduce cloud spend across the enterprise. The RightScale Cloud Management Platform is a comprehensive solution that enables IT organizations to deliver instant access to a portfolio of public, private, and hybrid cloud services across business units and development teams while maintaining enterprise control.

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