Dollars and Sense: The Economics of AWS

Amazon Web Services offers operational benefits, but success hinges on careful planning and wise spending.
AWS: Deal or No Deal?

Go to an Amazon Web Services conference and you’re bound to hear about price cuts on any number of its public cloud services. And that Wal-Mart-esque discounting is often met with cheers from the audience.

But are AWS customers really getting a good deal? And how can they tell?

Without proper planning and modeling, Elastic Compute Cloud and Simple Storage Service costs can skyrocket. For example, an AWS bill for test-and-development workloads, which tend to be small and often can be shut down at night, is more predictable than that for customer-facing, in-production workloads. Enterprises must prepare for unexpected usage spikes and plan accordingly to keep a handle on costs.

The AWS total cost of ownership calculator, a free tool that lets enterprises calculate the cost of public cloud versus on-premises, offers some relief. But it’s only a starting point and may not offer a true estimate for all organizations, experts say. Not surprisingly, the tool makes AWS look like a bargain compared to running things on-premises.

The question still remains: Is AWS less expensive than other public cloud providers? And how does AWS measure up against Microsoft Windows Azure on pricing, as well as service-level agreements and support? The onus remains on cloud architects to research business needs, plan cloud environments and then closely monitor application usage to keep cloud costs under control.

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AWS Cost Containment Starts with Good Modeling

**An ongoing price** war among Amazon Web Services, Google, Microsoft and other cloud competitors is pushing down the price of on-demand compute resources. But that won’t keep public cloud costs from running amok if enterprise applications are not properly modeled in advance.

Careful application modeling prior to a production launch is the best way to blunt cloud sticker shock when you’re hit with an unexpected event, such as a surge in demand or a bug in the code.

If that modeling is mishandled, user behavior can negate the value of moving off of in-house hardware and software, said Todd Christy, managing director of technology at Slalom Consulting, a Seattle-based firm that, among other things, advises clients on public cloud computing.

Modeling really starts on the business side with three core criteria: scale, compute and networking. Volume and region determine scale. IT will need to identify events that spur traffic surges. Volumes may stay the same for years, but when something triggers a huge hit to an environment, the question is: Will it be 20x or 200x your normal volume?

Storage volumes and storage lifecycle drive compute power. Anything that pushes storage is important, especially if it is a real-time or short-term need. In addition, IT should consider both inbound and outbound demands on networking.

**Choose the right features for each app**

AWS offers roughly 30 core services to choose from, but an individual application may require 10 or fewer. Perhaps only two or three services will drive the cost of the application.

Most applications don’t need CloudFront, the AWS content-delivery network, for
example. But some do. That’s what IT teams need to find out early, Christy said.

In most organizations, initial AWS use has centered on test-and-development applications, which are typically low volume and can be shut down at night. Resource demands are small, so the cost to model these applications isn’t vast. Taking these apps into production, however, requires a clear understanding of their dynamics, especially if business growth is variable.

Experienced IT professionals who work with AWS agree that it’s easy to blow through a lot of money and resources if you’re not paying attention. “We’ve done performance testing, and we’ve learned that a lot depends on the language that the application is written in,” said Raymond Colenero, a cloud engineer at Medidata Solutions, a New York company that builds cloud services for life sciences.

“When we scale, we need to go larger with anything written in .NET versus Ruby,” he said. “.NET apps run on M3 large instances, where Ruby can run in M3.” Ruby is a more lightweight framework than .NET, so it consumes far fewer resources. On the other hand, it is less able to handle complex integration with back-end platforms, Colenero said.

A successful outcome in AWS starts with choosing the right application. If you choose an app that doesn’t need to scale, has a fixed utilization and already runs well in the in-house servers, then moving it to AWS probably won’t save anything, said Owen Rogers, a senior analyst at 451 Research, a New York-based consulting firm. This is especially true if your organization has a reasonably new server infrastructure.

“You can’t just throw everything in the garbage and move to the cloud,” Rogers said. “That’s a good reason to have a hybrid cloud. Use what you’ve got, and add cloud on top of it for the unexpected spikes in demand.”
CLOUD COMPUTING PRICE MODELS
IT organizations also face the challenge of sorting through different cloud provider pricing models, which can make costs unpredictable. All cloud providers charge for virtual machines and bandwidth; bandwidth usage is often difficult to control, because the IT team doesn’t always know what end users are downloading, 451 Group’s Rogers said.

Plus, cloud providers don’t use the same pricing schemes or even the same terminology. “CIOs are overwhelmed,” Rogers said.

There are a few defenses, however. For spikes in spending or surges, enterprises can use third-party tools to track anomalies. Companies such as 2nd Watch in New York, Cloudyn in Tel Aviv, and Cloudability in Portland, Oregon, sell analytic tools for AWS cost monitoring, usage and beyond.

Another notable tool comes from Houston-based Krystallize Technologies, which assesses an old installation and compares it to how it would run on a public cloud. It will also determine in real time how a deployment is working relative to its benchmark performance. CloudHealth in Boston is another small vendor that checks cloud costs and performance.

—Margie Semilof
Analyzing Cloud Costs With AWS’ TCO Calculator

It is deceptively difficult to calculate the true costs of cloud versus on-premises deployments, as demonstrated by a new tool recently made available by Amazon Web Services.

IT professionals say they will use the free Amazon Web Services (AWS) total cost of ownership (TCO) calculator to see a comparison of on-premises versus public cloud costs. Still, the true cost of cloud can be difficult to determine even with the calculator, especially after looking closely at the details and assumptions that the tool makes.

“I would use it as a reality check to make sure I’m asking the right questions,” said Scott McKay, CTO of ZappRx, a prescriptions management software startup in Boston that has struggled to decide between an on-premises infrastructure and going all in with AWS. “Then I’d double-check things,” he said.

McKay is right to take a cautious approach, say AWS channel partners and analysts.

No ‘one-size-fits-all’ approach

For one, the calculator won’t help with small deployments because it calculates rack and network switch costs as well as the price of server hardware.

Using the basic form of the AWS TCO calculator, then, a three virtual machine (VM) host with four cores, 32 GB of RAM and 1 TB SAN storage is priced at a total of $112,898 for server hardware plus overhead—not counting other costs like network bandwidth and storage capacity. That figure is ultimately compared against a total cost of $11,144 for AWS based on three-year reserved instance prices.

“For the midmarket, [AWS] probably did a pretty good job,” said Jared Reimer, co-founder of Cascadeo Corp., an IT consulting firm in Mercer Island, Washington. “Where the model clearly doesn’t work—and honestly should have errored out instead of giving a bad result—is in the case of a very small business.”
For a business with 10 servers and one cabinet, the AWS TCO calculator estimates savings of 80% to 90% by moving to AWS, but such a small business in reality would probably reject that math, Reimer said.

“They would say, ‘Look, we can save [colocation], and we can save hardware costs, but we’ve got to have an IT guy—that’s inevitable—so the cost savings aren’t going to be 90%; maybe they’re going to be 30% or 40%,’” Reimer said.

As deployments scale, however, those rack and switch costs don’t repeat for every VM, which leads to a more accurate comparison for midsize companies or projects.

There is also an advanced form of the AWS TCO calculator that takes into account things such as storage I/O and network peak-to-average ratios, but it, too, fails to account for some details that an existing Amazon Simple Monthly Calculator includes, such as Elastic IP addresses and load balancing.

Other calculations could be deceiving too, such as with network costs. A business that goes with AWS will still incur network expenses. “My clients almost never turn off their Internet connection when they use Amazon,” said Kyle Hilgendorf, a Gartner Inc. analyst. “In fact, the Internet connection often becomes even more important, and clients invest more there.”

**FIRST STEP ON A LONG JOURNEY**

Ultimately, the AWS TCO calculator is a useful tool for IT practitioners who know how to interpret and adjust the raw results as necessary. Still, neither Reimer nor Hilgendorf would recommend it be taken as gospel.

“[AWS] put a good foot forward, but there are things that they have to improve, and it does make their services look quite advantageous,” Hilgendorf said. “I have yet to come up with a scenario where I can show internal IT costs to be better than AWS.”

Such scenarios do, in fact, exist, Reimer said. One client with a 1,000-node Hadoop cluster in AWS, for example, found a cheap colocation facility, bought inexpensive power and deployed “disposable” white-box servers. The result was the same environment with better performance and lower cost.
While a startup with an influx of venture capital might be able to run its own internal infrastructure at a lower total cost than AWS, that doesn’t take into account the intangibles of cloud, Reimer said. Allowing high-priced developers to focus on value-generating activities, for instance, might make more sense than having them babysit an on-premises infrastructure.

In the end, this kind of TCO calculator can be picked apart because cloud versus on-premises cost analysis is so difficult, Reimer added.

“These numbers just aren’t as rigid and hard as we want them to be,” he said. —Beth Pariseau
AWS vs. Azure: Costs, Commitments and SLAs

**Longtime Windows Server** customers see Azure as the natural path to the cloud, but a side-by-side comparison with Amazon Web Services may show that move isn’t automatically the best one to make. AWS trumps Microsoft’s cloud in some areas, but falls short in others. Let’s look at some of the main points of comparison.

**FREE TIERS**
Public cloud free tier is a great way to get started in the cloud. Azure and AWS, both ranked as leaders in the infrastructure as a service space this year by Gartner Inc., offer free options. The free tiers provide basic support and limited resources with only a credit card and a phone number.

The free tiers are mostly for testing, though some companies combine them with paid cloud services to minimize costs, said James Staten, an analyst at Forrester Research Inc.

**AWS’ free tier** is a recurring monthly program with a maximum use cap. Some services, including Elastic Compute Cloud (EC2), Elastic Beanstalk (EBS) and Simple Storage Service (S3), are allowed for only 12 months.

New AWS EC2 users receive 750 hours of EC2 running Linux/Unix micro instance usage, and the same number of hours of EC2 running Windows Server micro instance usage and Elastic Load Balancing, plus 15 GB data processing.

The free tier also includes 30 GB of Amazon EBS Standard volume storage, plus 2 million I/Os and 1 GB snapshot storage. In addition, it includes 15 GB of bandwidth aggregated across all AWS services and 1 GB of regional data transfer, according to AWS.

The AWS free tier is discounted from customers’ monthly bills, and any workload charges that exceed the free tier cap are charged.
With Azure’s free tier, users get $220 worth of cloud services over 30 days, and then the resources are suspended, generally enough for a small instance. Exceeding the $220 limit doesn’t lead to additional charges, only suspended resources. However, those resources can be retained by customers who switch to a pay-per-use Azure subscription, said Henrik Johansson, director of professional services at nGenx, who spoke at a recent Citrix Synergy conference.

MSDN subscribers get up to $1,920 per year of additional Azure services, according to the Azure website. Microsoft also offers a broad program called BizSpark for startups that build Web apps; it provides free resources from Azure for three years.

**COMMITMENT PLANS**

AWS reserved instances (EC2) choices are based on expected usage—low, medium or high. They are available in one- or three-year terms for an upfront fee, which varies widely depending on the instance type, region, term and other factors. Longer terms and higher utilization rates lower hourly rate costs.

EC2 instances allow for movement to other availability zones within regions. It is simple to deploy but requires upfront planning, Johansson said.

Microsoft’s Azure commitment plans are based on non-refundable monthly paid or prepaid commitments; the minimum plan is $500 on a pay-per-month basis. These plans apply to all types of Azure resources with the exception of cloud storage, which was removed in April 2014.

“The [removal of storage] slips the value down a bit on their commitment program,” Staten said. “It’s still significantly more expansive and flexible than AWS revenue commitment plans, though.”

IT shops can work out discounts for between 20% to 32%, and Windows enterprise customers can probably negotiate bigger discounts because there are incentives for Microsoft’s sales partners to encourage Azure use, Staten said.

The Azure commitment plans are more broadly accessible and apply to a number of cloud services, including mobile back end and
streaming, Staten said.

With AWS discounts, IT professionals must know the size of the instance they plan to use and how many, in aggregate, that they’ll need.

“If you are wrong, there isn’t a clean recourse, other than selling those instances on the [reserved instance] market,” Staten said. “That isn’t ideal for enterprises, and that’s a growing pain AWS will experience as more enterprise customers use it.”

AWS, however, also offers instance types that don’t require as much upfront planning, including on-demand instances that let you pay for compute capacity by the hour with no long-term commitments or spot instances that allow you to bid on unused Amazon EC2 capacity to get rates far below standard prices.

### CLOUD COSTS
AWS and Azure use different naming conventions for the same types of features, thus complicating direct comparisons. Since the architectures and software designs aren’t the same, the performance is different. However, IT admins can do apples-to-apples comparisons with a known application configuration and measure it as it runs, Staten said.

“People often look at [cost] from a static perspective, where they compare the cost of an application that doesn’t ever change,” he said. “If you have that type of app that has no elasticity, it doesn’t belong in the cloud.”

IT pros can test workloads using each cloud provider’s cost calculator tools, or a third-party tool such as RightScale’s free cloud calculator, which allows an IT shop to see its running application costs.

Today’s cloud cost calculations show AWS is slightly cheaper than Azure, but costs can quickly get out of control.

The biggest cost gotchas with AWS are the many attractive AWS services and third-party products available in Amazon Marketplace, each with a per-hour cost, Staten said. There’s also the issue of software licensing.

“License issues won’t apply if you are 100% Windows or open source,” Staten said. “But if you bring in a vendor like Oracle, and we see this with them all the time, the Oracle license can blow up your [cloud] cost model.”

Oracle software was included in the Azure
discounted spend plans but is no longer included as of July 1, 2014.

While IT shops should seek out instances with the highest discount, cost per hour should not be the main factor, Johansson advised.

Staten concurred that **price shouldn’t drive cloud** choices. Companies should choose the platform that makes their IT staffers more productive and offers the most agility and best app delivery, he said.

**ABOUT THAT SLA**

In the cloud, there tends to be a blanket, take-it or leave-it service-level agreement (SLA). Many organizations are unaccustomed to this.

“Most enterprises read the SLA and immediately throw up on it, because they want to negotiate with a provider,” Staten said. “That’s the wrong approach.”

If you arrange a unique implementation in the cloud, it’s no longer **multi-tenant**, and you would need a unique SLA, he said. Negotiations between public cloud providers and customers often leave users with more responsibilities than they’d imagined. “That’s the uneven handshake of cloud consumption,” Staten said.

Amazon and Azure each provide a 99.5% guarantee for cloud services and virtual machines in their SLAs. AWS S3 and Azure Storage offer a 99.9% SLA. Amazon Route 53 comes with a 100% SLA, compared with a 99.99% promise for the Azure Traffic Manager SLA. AWS’s CloudFront and Azure CDN both come with 99.9% SLA.

**AZURE AND AWS SUPPORT**

Microsoft has plenty of partners that can deliver support, but AWS has only begun to prove itself in the enterprise support arena. AWS works with consulting firms, including Capgemini, 2nd Watch and Accenture, so IT shops can call enterprise service providers when there is a problem rather than dealing directly with AWS.

Third-party support is also a consideration, and **AWS has a massive ecosystem** in place.

Microsoft could gain an advantage if it turns all of its channel partners into Azure partners, but for now, there are plenty who have yet to be trained on Azure support. —**Bridget Botelho**
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