A LEADER WITH HIS HEAD IN THE CLOUD

Andy Jassy has turned AMAZON WEB SERVICES into the tech world's reigning provider of cloud-computing services. Can he defend that crown against aggressive competition?

By Leena Rao

MAJOR LEAGUE BASEBALL uses Amazon's cloud to send real-time updates of player statistics to fans in all 30 of its stadiums. Regulator FINRA uses it to store and analyze more than 30 billion stock market transactions a day. Netflix relies on it to stream billions of hours of video every month to 50 million customers in 60 countries. And given their reliance on Amazon, these big institutions have something else in common: In a sense, they all work with Andy Jassy.

While the world knows Amazon as an e-commerce steamroller, its cloud-computing division, Amazon Web Services (AWS), is now just as dominant in its own field, with almost three times the market share of its nearest

Jassy brought AWS to life just as the market for cloud services took off.

PHOTOGRAPHS BY **JOSÉ MANDOJANA**

competitor (see graph). AWS is a behind-the-scenes partner for more than 1 million customers, from tiny mom-and-pop shops to *Fortune* 500 leviathans, providing online infrastructure to support their websites, applications, inventory management, and databases. And since its inception 12 years ago, AWS has been shaped, led, and sold to customers by Jassy, a 47-year-old transplanted New Yorker who's been at Amazon since he finished his Harvard MBA.

The business world learned just how big AWS was in April, when Amazon for the first time broke out its numbers in a quarterly earnings report. AWS was not only profitable, Amazon said, but on track to earn $6.3 billion in revenue in 2015.

That announcement shone a spotlight on Jassy's accomplishments, but he didn't celebrate the milestone—at the time he was flying from Seattle to the Midwest to meet a customer. There's no time to bask in accolades, because AWS faces substantial new challenges, including growing competitive threats from cash-rich rivals like Google and Microsoft. Jassy says he knew this time would come: The surprise is that it took so long. "I don't think any one of us ever imagined we would have as much of a headstart as we did," he says.

JASSY, AMAZON'S senior vice president of web services, came to Seattle and joined the company in 1997. His background was in marketing and business development, not engineering, but Rick Dalzell, Amazon's chief information officer at the time, says Jassy exhibited some promising traits, including a photographic memory and a passionate competitive streak. (The latter quality is on display at Jassy's house, where the married father of two has built a downstairs sports bar where he can follow his beloved New York Rangers, Mets, and Giants.)

Jassy earned positive reviews early on for leading Amazon's music sales efforts, and in 2002 he was chosen as one of Jeff Bezos's "technical assistants"—staffers who train for senior executive roles by shadowing Amazon's CEO for a year or longer. It was during this stint that AWS first took shape in Jassy's mind.

At the time the cost of storing and processing digital information was a burden and an obstacle for many businesses. Data centers were cumbersome and expensive to build and often came with costly service contracts attached. Amazon, however, had in-house expertise in this field: To keep its e-commerce marketplace running smoothly, the company was constantly building new data centers.

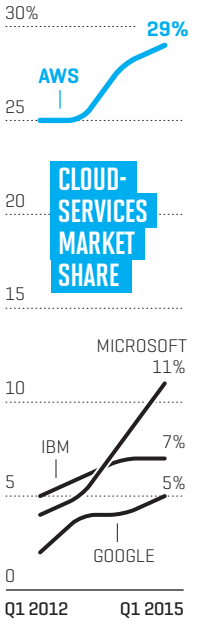
Jassy envisioned that Amazon could share its know-how and infrastructure with other businesses over the web, managing computing power for them so they could keep costs down—a concept now known as a "public cloud" model. Inspired, he labored over a pitch memo to convince Bezos and Amazon's board that the company could build a business around this idea. (Per Amazon's traditions, the memo couldn't run longer than six pages.) The idea of renting computing power from another company was almost unheard of, but Jassy had a key backer in Dalzell, who recalls arguing that "we're going to invest in this anyway," since Amazon would always need data-center resources for itself. In October 2003, Jassy got the green light.

Over the next 2½ years, Jassy's development team hewed to two principles. Amazon's service would be "pay for what you use" rather than require customers to buy a fixed amount of infrastructure upfront. The idea, Jassy says, was that "any individual in his or her dorm room should have access." And the system would be quickly scalable so that customers whose web traffic or data needs suddenly increased could instantly get access to more space on AWS's network.

In early 2006, just as the concept of cloud computing was gaining traction in tech circles, Amazon's cloud offering went live. Jassy focused his sales efforts on smaller firms and startups, companies for whom building data centers was financially impossible. Early adopters included file-sharing service Dropbox and lodging network Airbnb; as those outfits grew, they burnished AWS's reputation for being able to scale up. But AWS's breakthrough came in 2009, when media-streaming giant Netflix became the first big public company to operate 100% on AWS infrastructure. Netflix remains AWS powered today, using 30,000 to 50,000 "instances" (essentially, virtual

AMAZON OWNS THE CLOUD—AT LEAST FOR NOW

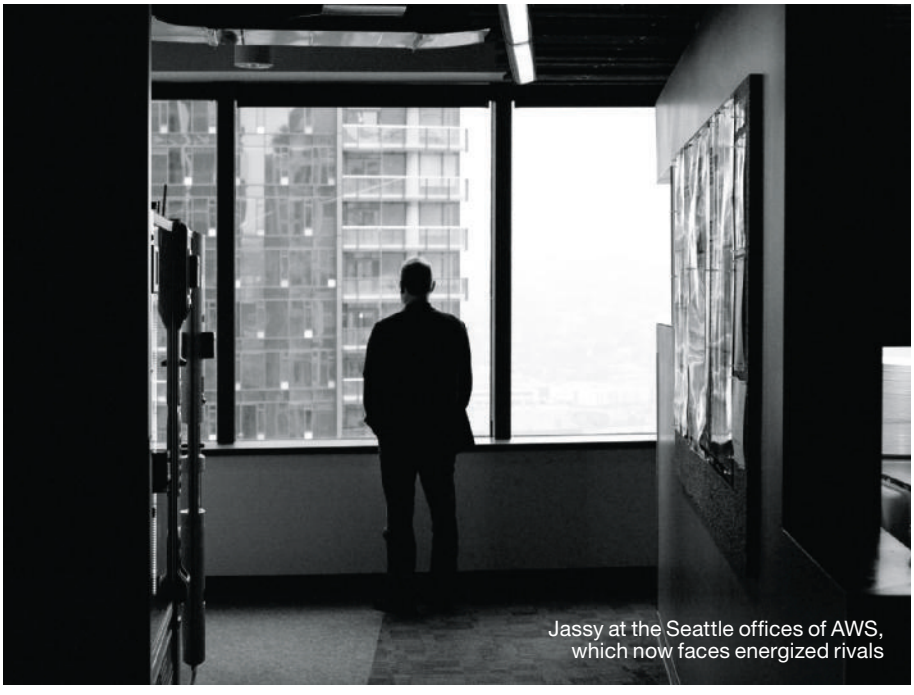
Amazon Web Services (AWS) built a big lead in market share in the early days of cloud computing; Microsoft, Google, and others aim to narrow the gap.



GRAPHIC SOURCE: SYNERGY RESEARCH GROUP

servers) to help viewers keep up with Kimmy Schmidt and Francis Underwood.

Netflix's adoption also gave other big companies and institutions the confidence to try AWS. Its heavyweight corporate customers now include Samsung, Comcast, and pharmaceutical giant Novartis, to name just a few. In 2013, AWS won a contract from the Central Intelligence Agency—a classified deal that became public knowledge when a competitor sued the government over it. Once that news broke, Jassy recalls, "a lot of companies would say, 'Well, if the security and performance is good [enough] for the CIA, then it's probably good enough for us.'"


Jassy at the Seattle offices of AWS, which now faces energized rivals

ANALYSTS WHO follow Amazon estimate that AWS's sales have risen roughly 40% a year since 2008. But AWS no longer has the field to itself. Microsoft's Azure public-cloud product and Google's Platform cloud made their commercial debuts in 2012 and 2013, respectively; database experts IBM and Oracle have also ramped up their own cloud efforts.

All these competitors are growing fast, but Microsoft is making particularly big strides. Amazon's crosstown rival makes much of the software bigger companies use for in-house data centers, and touts a "hybrid cloud" approach that coordinates cloud and on-site information. Senior vice president Scott Guthrie, who runs Azure, sees the field becoming a three-horse race (with Google as the third pony). "I give [AWS] credit for pushing the cloud earlier than others," Guthrie says, "but I don't think this is a market that's winner take all."

Microsoft and Google are also doing something that's familiar to any retailer who has ever competed with Amazon.com: They're engaging the incumbent in a price war. Kim Weins, vice president of marketing at Rightscale, a service that helps developers manage cloud services, estimates that AWS customers now pay half as much for the same services as they did at the beginning of 2013 and that Google's prices have fallen 62% over that span. The decline partly reflects falling hardware prices, Weins says, but competitive price cutting has also been a major factor.

To shore up its lead, AWS has added new features to its own hybrid-cloud product, Direct Connect, and is more aggressively marketing it; it's also offering email management and the ability to collaborate on documents. "Every incremental feature helps make the AWS platform stickier for customers," says Lydia Leong, an analyst at research firm Gartner.

Leong and other tech analysts see Amazon's decision to unveil AWS's numbers as a statement to clients and competitors alike that AWS has the scale and profitability to remain dominant. But some in corporate finance perceive it as a subtle FOR SALE sign. Jim Osman, president of investment research firm Edge Consulting Group, says AWS is a good spin-off candidate, given its strong balance sheet and the disparity between its services and Amazon's core e-commerce business. Jassy's take? "I've learned at Amazon in my 18 years to never say never about anything," he says, "but I don't anticipate that."

Instead, he's focusing on rebuffing his competitors, and contemplating the prospect with confidence. "We've operated for a lot longer and have a much, much larger-level scale than the other providers," Jassy says. "You learn lessons you just can't learn until you get to that level."

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