

The Okta logo is rendered in a bold, lowercase, blue sans-serif font. The letters are thick and rounded, with a consistent weight throughout. The 'o' and 'a' have a slightly wider base, while the 'k' and 't' are more vertical. The overall appearance is clean and modern.

# okta

Scaling Okta to  
10 Billion Users

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## A Paradigm Shift in Scale for Identity and Access Management

**10 Billion users?** No, that's not a typo.

It's not just about maintaining every unique identity on the planet. It's about every identity that every organization on the planet must maintain. How many organizations maintain data about your own identity, and authenticate you? 10? 20? 50?

When Okta thinks about scale, and where we need to be in the future, we think about it in the billions of users. Our vision is to connect every user, every application, every organization and every device. From the start, Okta has made decisions in our platform architecture that move us down the path of supporting this broad vision.

This is a sea change from on-premises identity platforms of the past. On-prem platforms are expensive, time consuming to setup, and hard to maintain. These platforms are deployed per customer, and are designed to scale for an individual customer, and the onus for scaling it as needed is on the customer. Okta's architecture is designed to dynamically scale system-wide. With proprietary techniques we have developed on top of today's leading cloud infrastructure technology, we have designed a platform that gives us the potential for limitless scale.

Being able to scale is only one part of the equation. Today's users expect a seamless experience while IT adapts to an increasing demand. Interruptions and downtime can severely hurt organization's productivity. Okta is built to handle this challenge with a guaranteed 99.9% uptime, and zero planned downtime. Furthermore, Okta has maintained a 100% global uptime in the last 2 years, with no major service disruption, as it scaled 640% in the amount of authentications per month it needed to handle. Okta is never taken offline for updates or maintenance, and you can see an updated status of Okta's availability at all times by going to [trust.okta.com](https://trust.okta.com).

We are at just the beginning of this journey of scaling the actual user count on Okta. Along the way, we have always architected Okta for greater usage than where we were at that time. At 1 million users, we were ready for 5 million. At 10 million, ready for 50 million. The architecture we have in place today is designed for scaling up to reach over 100M users. We don't plan to stop there. As we onboard customers that have greater and greater scale requirements, we have the team and technology in place to get us to even greater levels. Some examples of customers taking advantage of Okta's scale are Engie, a European electric utility company, which has over 150,000 employees authenticate using Okta, and a large entertainment company that leverages the Okta platform to connect its entire 18M employees, contractors, and sub-contractors base.

## Proven Ability to Rapidly Scale

Okta has a proven track record of extreme scale. In the past year, the volume of authentications on Okta have tripled. Okta’s customer base grew in 2016 from roughly 1,500 to 2,500 customers, with an increasing percentage coming from large scale employee use cases (lower user count, high transaction volume) and large B2B and B2C use cases (high user count, lower transaction volume per user). Users access the service from all 195 countries worldwide. Okta rolled out international CDN support to handle high performance from anywhere in the world, and there are thousands of users accessing applications through Okta from countries like the Philippines, South Africa and Peru.

Office 365 has particularly pushed the envelope in scale, alone generating over 46M user logins during a 30 day period on Okta.

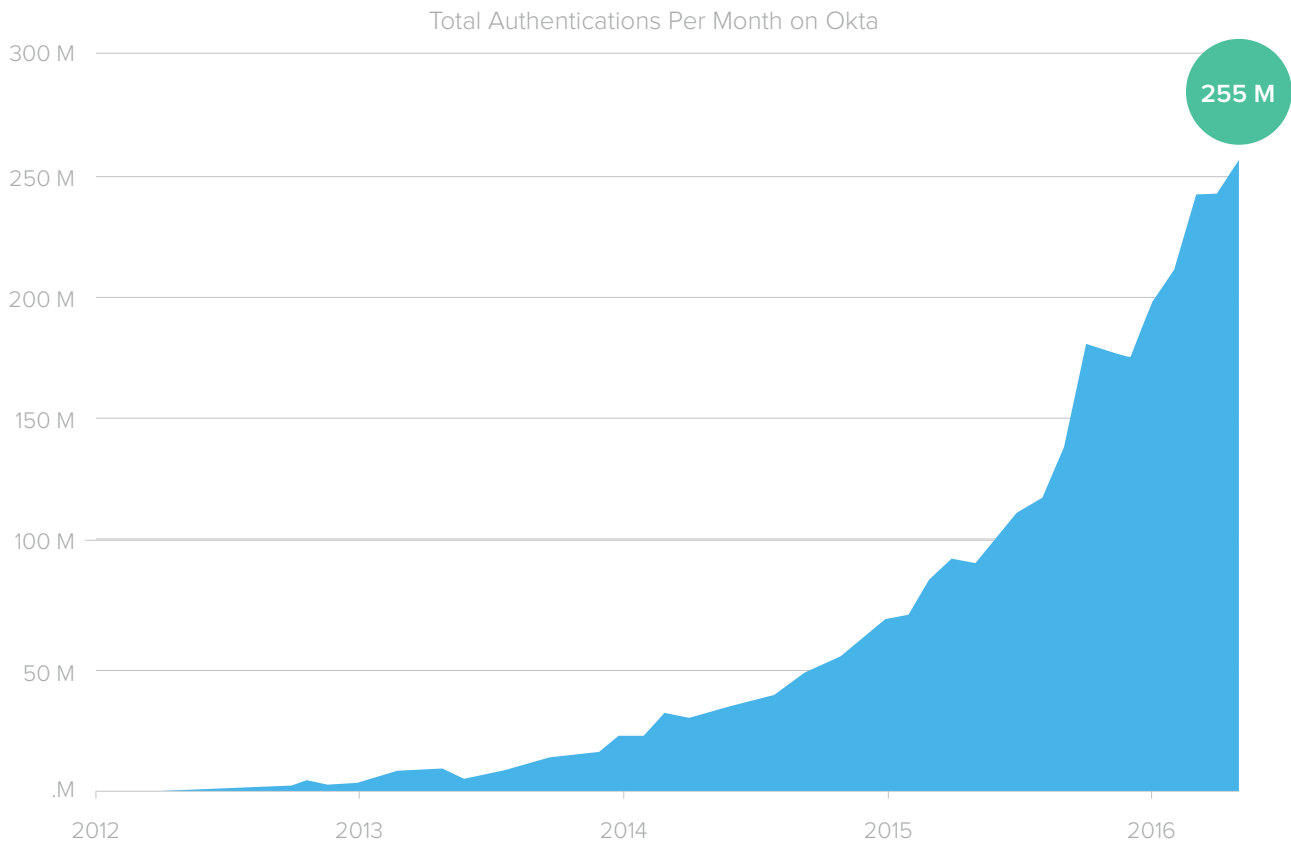
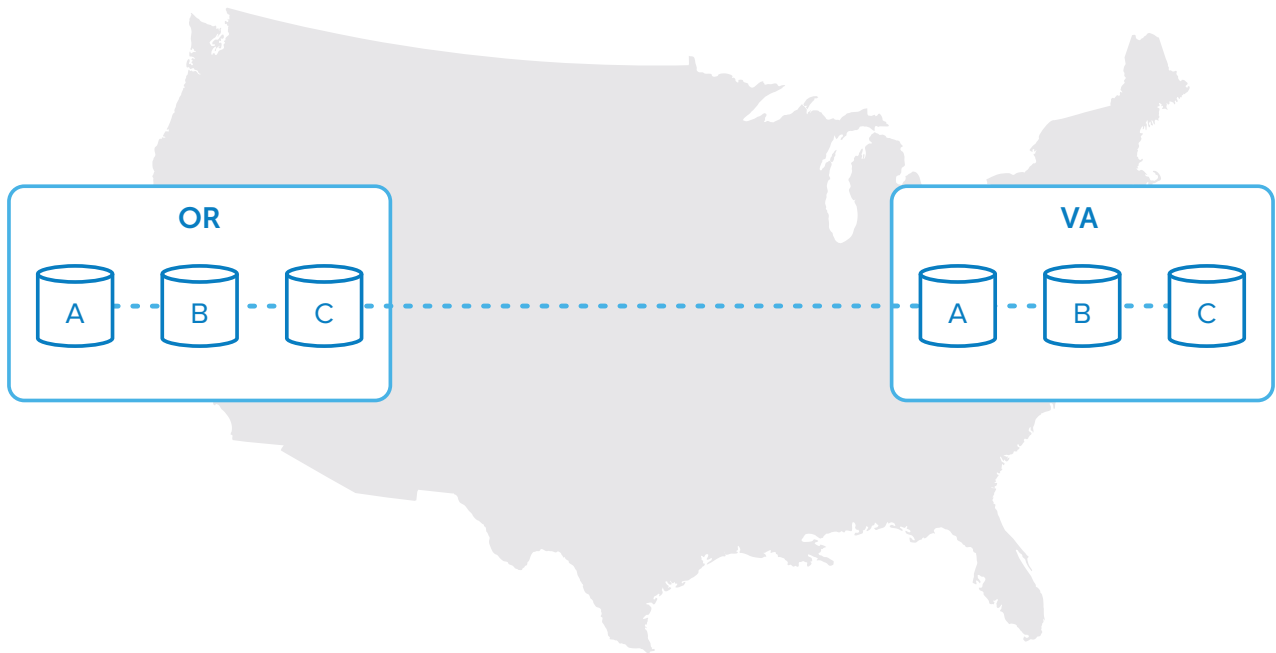


Figure 1: Rapid increase in authentications processed by Okta

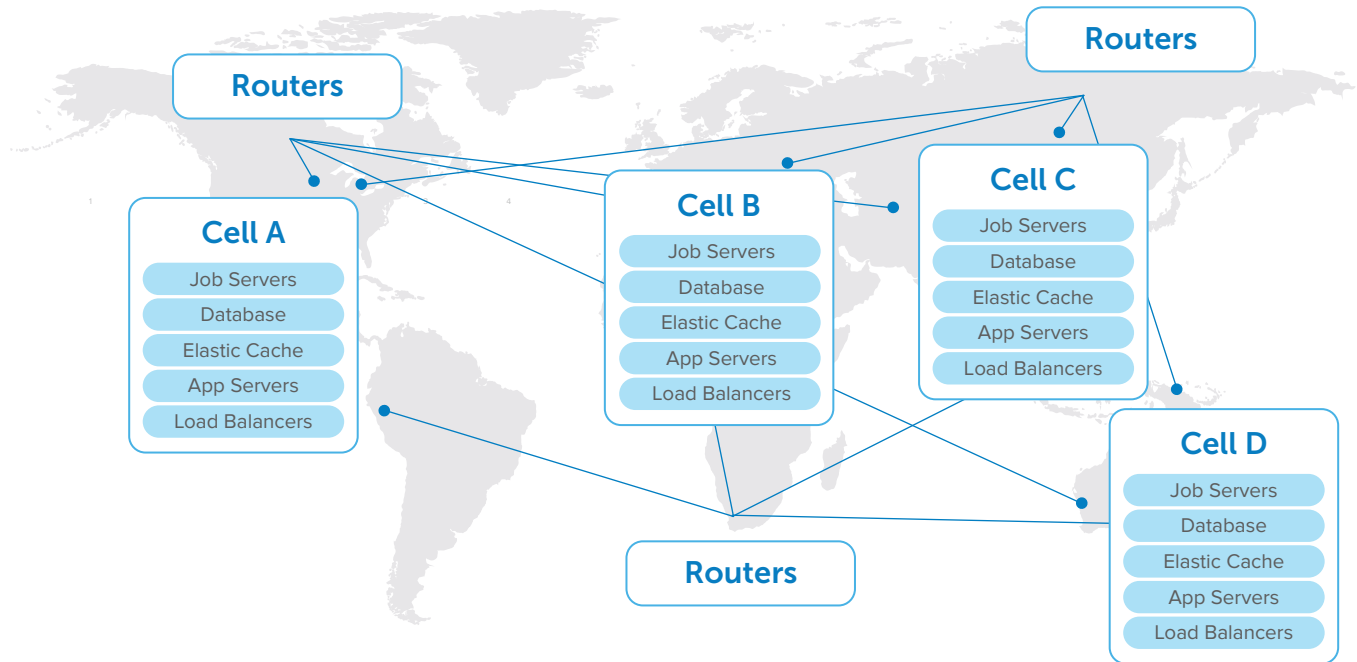
Okta’s architecture that was in place until mid-2014, and supported much of this scale, consisted of six availability zones on Amazon Web Services. These zones were in 2 geographic regions to support extreme redundancy and high availability. The architecture also enabled more powerful virtual machines on AWS to be spun up and deployed without taking the service offline.



**Figure 2: Okta’s architecture up to mid-2014 consisted of 6 redundant availability zones on AWS.**

Given Okta’s goals of going far further in global scale, in 2014 Okta began work on a major platform update to support another magnitude of growth.

## Preparing for 10 Billion Users on Okta



**Figure 3: Okta has bundled the entire 6-zone architecture into a “cell”. Cells can easily be spun up for scale, performance, global footprint and other requirements.**

Today, Okta has over 20 million users on the platform, and authenticates 450k users per hour which translates to 10.8M authentications per day. Already, Okta’s engineering team has successfully tested the platform for a 3x increase on current loads. The number of objects in our database is generally not as much of a limitation as the transaction volume. In particular, authentications are the greatest load on Okta, and therefore the volume of authentications we can handle is the metric we look at the most. Okta has run controlled tests for a transaction load of 1.2M user authentication per hour. It is important to note that even in such a high load we are still not fully utilizing Okta’s scale capabilities.

Since we are aiming for billions of users and authentications, in 2014 we rolled out a new platform architecture that will get us to extreme scale. We call this architecture “cells”. A cell is a self-contained instance of the entire Okta service. Cells have several advantages:

- Risk Mitigation—Any fault in infrastructure is contained within a cell using a High Availability (HA) architecture, and even in case of an entire datacenter going down, another cell in a different geography takes ownership of the affected accounts within an hour.

- Staged Deployment and Rollback—We can rollout code one cell at a time or rollback on just one cell, instead of the entire service. This decreases the surface area of potential issues that could arise from a code update.
- Infrastructure Provider independence—We gain the flexibility to deploy Okta on Google Compute, Microsoft Azure and additional zones and regions of AWS.
- Geographical Isolation—We can guarantee that your data stays within relevant political borders.
- Horizontal Scalability—We can now add a cell to increase capacity quickly. We also have the capability to split a cell to double the capacity for tenants on the original cell. In addition, not all tenants are hosted on the same cell, so we can avoid the point of diminishing returns on performance.

Today, Okta is already hosted on 5 cells, including one dedicated cell for Europe and one cell that is HIPPA compliant. Okta is the only IAM provider to achieve Level 2 CSA STAR attestation, and already obtained ISO 27001 certification for its information security management system. In the very near future, we plan to expand this. We are capable and ready to roll out cells for other requirements. Examples include:

- New Geographic locations—Cell for keeping data in the Asia Pacific
- A cell designed for additional regulatory compliance, such as FedRAMP, is already in progress
- Additional cells for increased scale (with zero planned downtime for customers)

## Beyond Architecture, How We Manage Scale

An architecture built for scale is a necessity, but equally important is the people, processes and tools in place to test, monitor and actively scale the service vertically and horizontally.

Okta runs on AWS virtual infrastructure. However, we do not just “trust” AWS to deliver the performance needed by the service. We actively monitor the CPU, memory, disk space and threads on all the load balancers, web application servers, job servers, cache servers and database servers that the service runs on. In addition, Okta monitors the ongoing performance of the application, including authentication performance, response codes, agent health, job statistics and application errors.

As this data comes in and is interpreted, many of the requirements to scale are automated. Okta can deploy more servers automatically as needed and tear down servers that are not performing all without any disruption to the service.

Although much of this is automated, a good amount depends on the deep experience of the Okta operations team to know how to interpret this data and take the correct action to maintain high performance. The Okta operations team is staffed 24/7 to always have a member of the team actively monitoring the service and ready to take any action as needed.

## Okta Vision and Focus on Customer Success

As you can see, Okta has seen a remarkable increase in customers and usage in the last several years. The ability to meet these demands is not simple. It takes the right team, the right architecture, the right processes, and probably most of all, a complete focus on customer success.

Customer success is Okta's number one priority as a company. As we have scaled up, and have brought on new customers that have pushed us to new levels of scale, we have worked closely with them to ensure their deployments and go-live dates are smooth and as uneventful as possible. We work with our customers and partners that are doing Okta deployments to be ready to respond and react to events that happen that are just not possible to predict.

The new approach we are taking is markedly different from the old approach of separately scaled infrastructure for each customer. It is far more powerful, more resilient, and more scalable, but it must be managed by the right team. It's this combination of technology and people that has made Okta a leader in identity and access management.

### About Okta

Okta is the foundation for secure connections between people and technology. By harnessing the power of the cloud, Okta allows people to access applications on any device at any time, while still enforcing strong security protections. It integrates directly with an organization's existing directories and identity systems, as well as 4,000+ applications. Because Okta runs on an integrated platform, organizations can implement the service quickly at large scale and low total cost.

More than 2,000 customers, including Adobe, Allergan, Chiquita, LinkedIn, MGM Resorts International, and Western Union, trust Okta to help their organizations work faster, boost revenue, and stay secure.

[www.okta.com](http://www.okta.com)