

Dot AWS: Aiding Amazon's rollout of IPv6



Amazon applied for 76 TLDs in the first round of the new gTLD program, including a number of Dot Brand TLDs. It is the company's plans for one of those Dot Brands – .AWS – that may transform how companies view their Dot Brand assets moving forward, as **Heath Dixon** explains.

Heath Dixon is Amazon's Senior Corporate Counsel for Registry, Registrar and Domains

It was an interest in debating that first drew Heath Dixon to the idea of a legal career. Heath's initial plans to channel his skills into litigation were replaced by a new passion for law and technology. He had been fortunate to join a law firm in the early 2000s that had been "early to recognise that the internet would evolve quicker than law and regulations, and therefore that businesses required a different type of legal support".

Heath began working at Amazon in 2010, initially on hardware, software, and services, before moving to his current position. In this role, Heath leads the legal team that supports Amazon's TLD Registry Business, from policy analysis and development, to enforcement, and compliance with laws and ICANN contracts. Heath sits on the Board of the Brand Registry Group, Inc., a non-profit membership organisation supporting Dot Brand registry operators and future applicants. We spoke to him about the company's exciting plans for using its .AWS Dot Brand to support its transition to Internet Protocol version 6 (IPv6).

What is IPv6?

IPv6 is the most recent version of the Internet Protocol that controls the identification and network traffic of devices across the internet. It was created to address the shortfall of IP addresses left under IPv4, and includes some additional security and performance improvements. IPv4 IP addresses are made up of 4 numbers (up to 3 digits each) separated by a dot, e.g. 127.0.0.1. The huge growth of the internet in the past 20 years has led to the near exhaustion of the IPv4 address pool, hence the need for a new more scalable version. In contrast to IPv4, IPv6 includes letters as well as numbers, and strings of 8 groups of up to 4 characters, e.g. 2001:0db8:0000:0000:0000:8a2e:0370:7334. Expressed another way, an IPv6 address is 128 bits compared to 32 bits for IPv4.

Many of the world's mobile and network providers have already switched to the IPv6 protocol, but deployment for websites and web hosting providers has been slow in most countries. As such, companies continue to offer services on both IPv4 and IPv6 to ensure connectivity for all internet.

What has Amazon's interest and approach been to the Dot Brand?

Having founded Amazon online, Jeff Bezos had always understood the value of owning our domain namespaces, so Amazon applied for 76 TLDs in the first round of the new gTLD program, including brand and generic names such as .AWS, .KINDLE, .BOOK, and .BUY. New TLDs opened opportunities to innovate for our customers. In particular, the Dot Brand applications enabled us to build on the trust we have built with customers.

On the one hand, we took an entrepreneurial approach in terms of the generic applications, which also include strings such as .SECURE and .BOT. On the other, as part of Amazon's trademark team, our Registry and Domains teams applied for Dot Brands for brand protection. That said, protecting brand equity is only part of the value of Dot Brands. We also see them as technical assets that enable innovation.

We understand you have plans to use .AWS to support an important project within the business. Can you explain what you are doing with .AWS and why?

The AWS marketing team initially used .AWS for marketing pages, such as our high-profile BUILDON.AWS campaign. But when we acquired .AWS we knew we also wanted to eventually use it for all of our services. However, our customers depend on the functionality of the amazonaws.com domain that we currently use for service endpoints (URLs for the entry points for connecting programmatically to AWS services). We will therefore continue to support endpoints on that domain as long as customers use them (which effectively means we will support them forever). Because we never deprecate existing functionality that customers are still using, we needed a solid business reason for customers to want to start using new names.

Our legacy endpoints are IPv4. As IPv6 adoption has grown, our customers have asked for IPv6 service endpoints, which we have been enabling for a subset of AWS services. However, we encountered an issue: if you add IPv6 capability to the zone file for an IPv4 endpoint (i.e. adding an AAAA record in addition to the A record), and a customer is only setup for IPv4, it can break the customer's ability to use those endpoints. To solve this, we decided to create a new set of domain names to serve as dual-stack endpoints, i.e. endpoints which serve both IPv4 and IPv6 addresses. However, we only wanted to create new endpoints one time, so we needed to choose domains we could permanently commit to support IPv6.

We recognized that our desire to have customers use .AWS for services aligned with our need for new domains to support IPv6 for our customers. Once we decided to use .AWS for our dual-stack endpoints, the next step was to decide upon the naming structure and formalise our approach.

How did you tackle the naming convention and structure?

Creating a brand-new set of .AWS domains for these endpoints represented a greenfield opportunity to redesign our current endpoint naming structure (which grew up organically over time) to improve upon some limitations and inconsistencies in it. For example, the existing endpoint structure presents APIs differently for some services, which is something we wanted to streamline to make it more predictable for developers.

We support AWS services through AWS Regions, such as US East (N. Virginia) (us-east-1), which is the default Region for API calls. So, a foundational question for us was whether to structure our domains around the regions or the services: i.e. [service].[region].AWS or [region].[service].AWS

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The benefit of using region codes instead of service names at the second level is that it builds in greater resilience: if a region endpoint domain name goes down, the impact would be limited to the specific region; a service endpoint domain name would take out an entire service globally. Because this structure would contain the service impact to one area, traffic can be more easily rerouted to avoid customer impact.

Why did you choose to use .AWS domains instead of just using a set of new domains in legacy TLDs?

Beyond a clean slate for development, there are multiple clear security and stability benefits from using our Dot Brand, which was very appealing to AWS leadership. Operating .AWS through a dedicated AWS registry entity provides us an additional layer of control that enables those security and stability benefits.

As registrant, registrar, and registry for .AWS, with end to end control over the domains, we are not dependent on any external provider's infrastructure and security protocols, and we don't need to worry about a TLD needing to satisfy the differing requirements of external registrants. We can set up the underlying infrastructure and protocols for .AWS in whatever way makes the most sense for our customers and our security and operational priorities.

Minimising internal and external dependencies also enables us to be more resilient in the event of a problem with any endpoint domains. When we need to solve problems quickly, we can get every stakeholder in the same room to work them through.

When using external registries, you have little control if, for instance, law enforcement decides to shut down a domain name because the structure looks similar to a malicious site. This happened in 2019, when a registry suddenly shut down an AWS customer's legitimate domain without warning because it fell within a botnet algorithm-generated domains list. That's bad enough, but if the shutdown domain was one of our service endpoints, the impact would cascade through customers. By using .AWS, and being the registry operator, we directly receive abuse complaints and shutdown requests and can investigate and respond ourselves.

We also virtually eliminate the risk of customers inadvertently hardcoding a mistyping of an endpoint domain. Because malicious actors can register typos of domains we use for current IPv4 endpoints to try to capture this traffic, we currently must defensively register large volumes of typo domains and proactively watch new registrations. Because no one else can register a .AWS domain, dual-stack endpoints won't have this vulnerability. We should be able to significantly reduce our volume of new defensive registrations, bringing cost savings along with the security benefits.

When will you roll this out?

We've already started. Our goals include launching 20 services on dual-stack endpoints by the end of the year and we are on track to achieve that. The objectives for the project go all the way up to the leadership team. Having that internal buy-in has helped us to prioritise the project and to get the teams to put it on their roadmaps.

What does success look like and how will you measure it?

Success will simply be having the dual-stack IPv4/IPv6 endpoints up and running on .AWS for delivering all AWS services for all of our customers that want to use them.

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In the domain industry the standard metric for evaluating the success of a TLD is the volume of domains under management. From our perspective the success of a Dot Brand (and really any new gTLD) needs to be measured completely differently based on the purpose of the TLD. The purpose of Dot Brand is not generating income from registrations, it is about deploying an asset to effectively serve customers or support the business, so you have to measure the effectiveness of the deployment at serving customers.

Because we are tying registrations to AWS regions, we only need to register a limited number of .AWS domain names. We are intentionally restricting the number of registrations that way because it's operationally simpler and more robust for service delivery than a larger number would be. However, that small number of domains will soon support IPv6 access for all customers across all AWS services. When you understand that the metric for success is the volume of use of the domains, not the volume of registrations, supporting all AWS services will be a tremendous win for our TLD – and more importantly, our customers.

Of course, while the service teams will only have a small set of domains, it doesn't mean we won't use the rest of the Dot Brand. In fact, that small service footprint leaves more names available for other use cases. For example, the AWS marketing team will continue to make use of the possibilities of .AWS with no availability constraints or need to register domains in advance, which also counts as successful use from a brand protection perspective.



Did you have any major challenges with using your Dot Brand?

Yes. The major challenge was China. As part of its laws regulating domain names used within the country, China's Ministry of Industry and Information Technology (MIIT) requires that all domain names and all TLDs used to deliver services within China be licenced by MIIT. Furthermore, such TLDs also need to have a local instance of the registry systems located in China, and must route all traffic through MIIT, enabling them to regulate content delivered through the TLD and associated domains.

Chinese regulation isn't unique to Dot Brands, but it is important to consider how to manage that as part of a Dot Brand roll-out strategy, as you likely don't want all your global traffic to be delivered on domains subject to MIIT regulation. While using .AWS in China would have maintained a consistent naming structure for service endpoints globally, we ultimately decided it was more important to use a different set of domains for China so that MIIT regulations were limited to domains used to deliver services in China. For our AWS customers this means they will need to use different, new dual-stack IPv6 service endpoints in China, but these will follow a similar structure, sitting on a different TLD.

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Dot Brand Observatory

—Powered by Com Laude—

To see if a branded Top Level Domain is right for your company, request a free assessment: experts@comlaude.com.

To read Dot Brand use cases, visit: observatory.domains.

Do you have any advice for other brand owners?

Deploying a Dot Brand offers you the opportunity to take a step back and re-evaluate your URL naming structure. You can avoid prior ‘mistakes’ and develop a rationalised, more consistent structure. There’s no one-size-fits-all approach for how you should do it, so you can take the time to think big – to consider how you should organise it to best meet your needs, rather than only making incremental improvements around your existing naming structure. Don’t underestimate the opportunity!

Find the right balance between getting names launched quickly and putting names to their best use. Having a strategy for assigning generic and technical terms will help minimize regrets from suboptimal use of important terms. At the same time, denying teams the ability to use desirable terms when they are interested in your Dot Brand, or employing a burdensome approval process, will discourage adoption of the Dot Brand and push teams

back to the speed and simplicity of legacy TLDs. The more rapidly you can develop the strategy before you open registrations up across the enterprise, the more decisive and efficient you can be with registering and using names. Starting by defining the purpose(s) of the TLD and how you will measure success will expedite strategy development.

What do you see happening next for Dot Brands?

We monitor the evolution of Dot Brands closely through our membership of the Brand Registry Group (BRG), where we engage regularly with other Dot Brand owners to share learnings and best practices, encouraging further activation and innovation of Dot Brands. Adoption has been slow but steady for the Dot Brands, with only a few companies at the vanguard, so there is still some

work to do when it comes to encouraging adoption of Dot Brands. Nevertheless, Dot Brand usage has been steadily increasing and we expect that trend to continue.

Currently, outside of Dot Brand owners, these TLDs tend to be seen as just for novelty or vanity projects, or only for defensive brand protection, rather than as launchpads for innovation. And Dot Brand owners frequently face challenges communicating the value of those assets internally and championing their use. There’s a big difference between the difficulty of coming up with theoretical use case ideas as part of the ICANN new gTLD application, for example, and the difficulty (and expense) of implementing them. The day-to-day reality of most businesses is to be cautious, and budget and resource issues can also delay implementation, more so over the last year of uncertainty created by the pandemic.

But as developers and the internet community see AWS using its Dot Brand for IPv6 endpoints, and as more tangible examples of how TLDs can be used beyond websites and email are launched by more Dot Brand owners, I believe the internet community will come to see the pent-up value in these TLDs. I also believe that as more companies see that value, they will begin to imagine the possibilities for using existing or future Dot Brands for service delivery and other novel technical applications. Dot Brands will become more familiar and increased adoption will drive further innovation.

Amazon is in the process of developing dual-stack endpoints that will be able to serve IPv4 and IPv6, which customers can move to as soon as they are ready to implement IPv6. For further information on the process, you can view the public [AWS documentation](#) (such as [Amazon EC2 service endpoints](#) or [Using Amazon S3 dual-stack endpoints](#)).