



Partner with Equinix for faster cloud access

Transfer data more efficiently and improve network wait times by moving strategic parts of your IT infrastructure to an Equinix data center

Due to the increasing volume of cloud traffic, the network connection between you and your cloud partners is more important than ever. And no matter how good your hybrid cloud infrastructure is, the time it takes to process requests and the number of requests you can handle at once depend on how efficiently the network connection can transfer information.

As your company works hard to keep ahead of both demand and the competition, long network wait times can kill any forward momentum your business is making. Consider re-evaluating your approach to hybrid-cloud applications and look closely at interconnection at the cloud edge. It's time to think outside your on-premises data center.

Principled Technologies engineering staff set up a hybrid cloud infrastructure running a distributed e-commerce application with the back-end database server residing on a technology stack consisting of privately owned resources. These resources included virtualized compute, NetApp® storage, and F5 BIG-IP® networking resources connected to order-entry clients residing in the Amazon Web Services™ (AWS EC2) public cloud. Next, we compared application (order entry) response times and file transfer speeds in three hybrid-cloud connectivity scenarios to see how much of a difference it can make to bypass a shared public internet connection and switch to a secure, dedicated, high-speed network connection between you and your cloud partners.

We found that the hybrid IT architecture, with private infrastructure components hosted in an Equinix International Business Exchange™ (IBX®) data center interconnected to AWS via AWS Direct Connect,¹ dramatically increased application processing, providing faster interactions with the web application, while decreasing network wait times and data transfer times.

Increase
order processing
potential by up to
48%*



Decrease
application wait times
by up to
41%*



Reduce
network-related
wait times by up to
96%*



**compared to a shared public connection*



Principled isn't just a word; it's our philosophy. We are a transparent and independent third party you can trust. Our fact-based marketing collateral tells the truth about what we found and shows our hands-on work through detailed methodologies.²

Keeping everything on premises

For the first two hybrid-cloud connectivity scenarios, our engineers set up a web application leveraging the AWS public cloud for distributed order-entry traffic-source client systems. This application housed its data in an on-premises database server, backed by NetApp storage, within our data center in Durham, NC, while AWS housed the order-entry traffic production clients. We protected this data by placing our database server behind an F5 BIG-IP 4000 gateway appliance, which allowed us to limit the types of traffic that could access our server.

Scenario 1 configuration: ISP shared public connection

The first testing scenario involved data stored at our local site. The clients that accessed this data via web application were hosted in the AWS cloud and connected to the public internet through an internet service provider (ISP). Processing orders and transferring large files on this public internet fiber connection meant our prioritized workflows traveled with everything else on the public internet, so we could not know which route or detours the information took before reaching its destination.

ISP shared public connection diagram



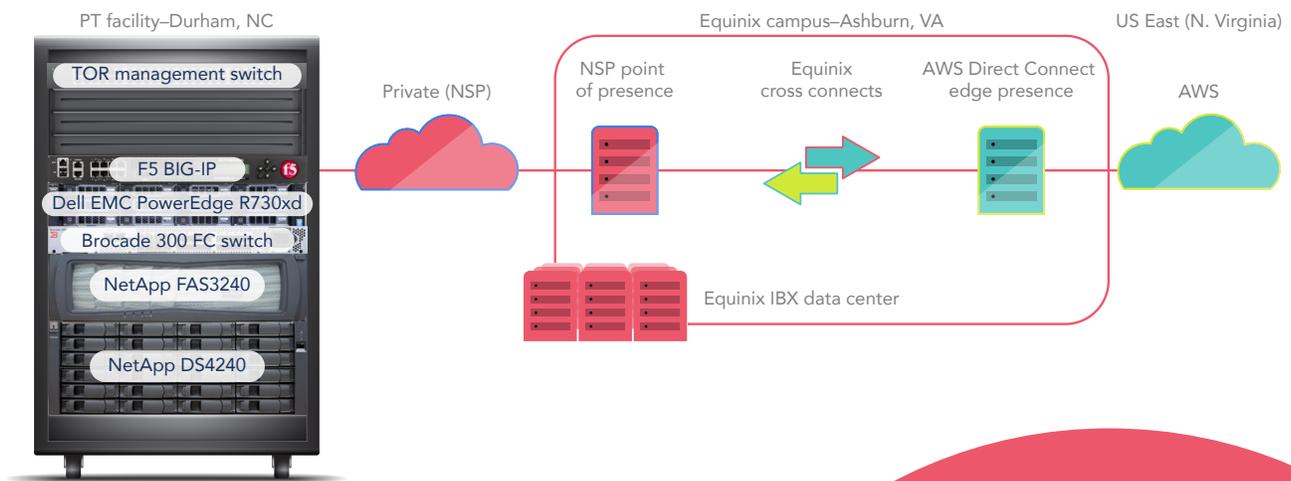
Secure your public connection

We used the F5 BIG-IP to hide the true IP address by implementing network address translation and traffic forwarding to a "virtual pool" that contains our database server. It prevents the server from direct exposure to incoming internet traffic, and allows you to forward only the traffic coming in on the TCP ports you define within the forwarding rules.

Scenario 2 configuration: NSP to Equinix to AWS Direct Connect

We kept our database server, private virtualized compute, backing NetApp storage, and F5 BIG-IP 4000 appliance on premises for the second testing scenario, but switched to a network service provider (NSP) with a private, dedicated fiber Ethernet connection to Equinix and AWS Direct Connect. We also used the F5 Big-IP to establish an AWS-required BGP session so we could route packets from the AWS private network to the private network at Principled Technologies over our dedicated private connection. This allowed us to split our prioritized workload traffic apart from our public “everyday” business traffic. So, activities that involved employees streaming media, clients or coworkers uploading or downloading large files, and normal business usage didn’t affect our scenario response times because we bypassed the crowded public internet connection.

NSP private connection diagram



AWS Direct Connect: Private access to the public cloud

According to Amazon, “Using AWS Direct Connect, you can establish private connectivity between AWS and your data center, office, or colocation environment, which in many cases can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based connections.”³ Equinix IBX data centers provide AWS Direct Connect access across the globe.⁴

Optimize performance

The Equinix Solution Validation Center™ (SVC™) provides a sandbox where you can safely progress from testing to analysis to implementation and production. SVC also has technology experts and Global Solutions Architects™ who can help your company make technology decisions that suit your specific business. In our case, they helped us test our connections and made sure everything worked.⁵

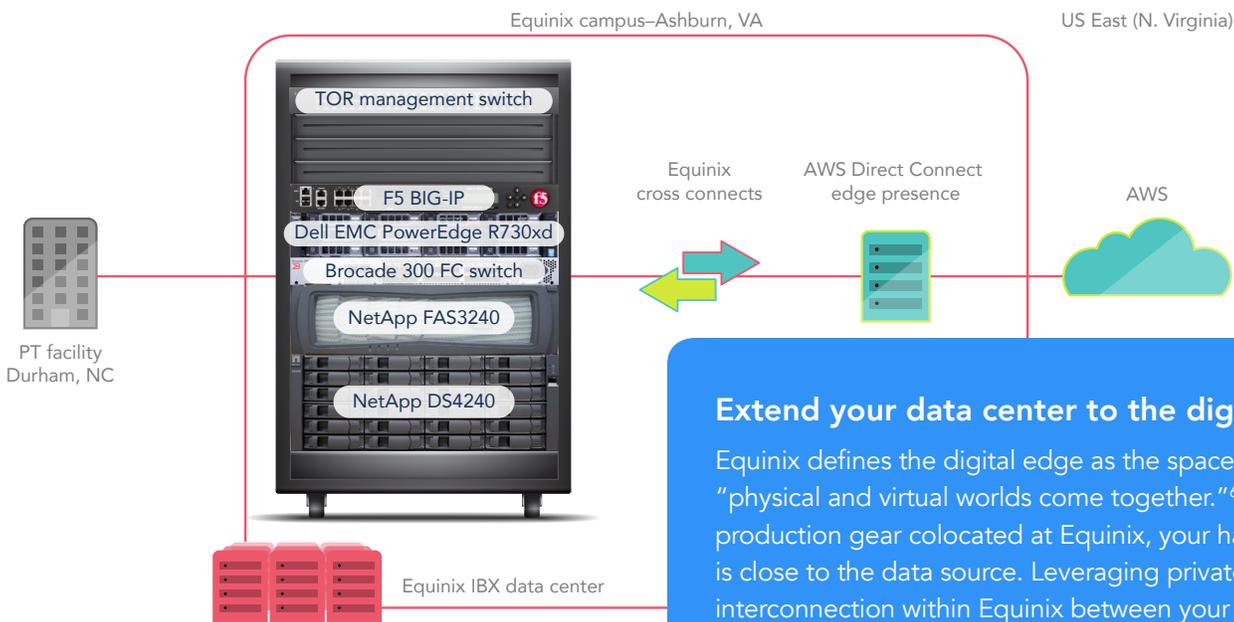
Think outside your on-premises data center

Your company devotes a lot of time and money to building and maintaining an IT infrastructure that provides the compute power needed for your mission-critical apps. But all that effort is wasted if your data is traveling on the same crowded public cloud highway as everyone else in the world. Your Ferrari isn't going to get you to your destination any faster than the public bus stuck next to you. While a private lane may be faster because it's not congested, it's still far away from the cloud edge. In fact, keeping your data center in house can put you at a distinct disadvantage when time is of the essence.

Scenario 3 configuration: Equinix to AWS Direct Connect

In our third testing scenario, we moved the private components of our hybrid cloud infrastructure to an Equinix IBX data center, interconnecting the infrastructure with AWS Direct Connect within the colocation facility (a data center where cloud partners run their own infrastructure in close proximity to one another). We used the F5 BIG-IP to establish both the Border Gateway Protocol (BGP) session to AWS and as an intermediary device that connected us to our remote stack via our dedicated connection. Our engineers found that establishing this Performance Hub[®] at Equinix offered a more stable, predictable, lower-latency, and higher-throughput option for connection to the cloud than the public ISP configuration, with better transactional database performance than both the ISP and dedicated NSP connections we tested.

Equinix colocation diagram



Extend your data center to the digital edge

Equinix defines the digital edge as the space where “physical and virtual worlds come together.”⁶ With your production gear collocated at Equinix, your hardware is close to the data source. Leveraging private, direct interconnection within Equinix between your collocated infrastructure and service providers (like AWS) can provide replication, failover, and backup capabilities.

Accelerate sales and growth

Moving to an Equinix facility can improve your ability to connect quickly with more than AWS. According to Equinix, cross connects are direct, secure physical connections at an Equinix IBX data center that “[deliver] direct access to a dynamic ecosystem of business partners, content companies and network and cloud providers — under one roof.”⁷

The NetApp FAS3240

According to NetApp, “FAS storage systems simplify your storage with leading data management; they quickly respond to changing storage needs across flash, disk, and cloud with industry-leading data management.”⁸

Improve network performance, reliability, and security

According to Equinix, establishing a Performance Hub at Equinix “gives you the ability to efficiently deploy resources at the edge, closest to your end users, enabling a whole new level of global network performance.”⁹

Handle more business

How does the network connection you’re using affect the speed of business? We compared order entry response times to see. Our test results show that conducting business over a private, high-bandwidth fiber connection in an Equinix IBX data center increased our order processing potential by up to 48 percent. We found that moving strategic compute, networking, database, and storage components to Equinix increased the number of requests we could handle at once and provided faster interactions. This allowed us to maintain control over our hardware and reap the benefits of having strategic parts of our IT infrastructure in an Equinix IBX data center with an AWS Direct Connect location.

Increase order processing potential

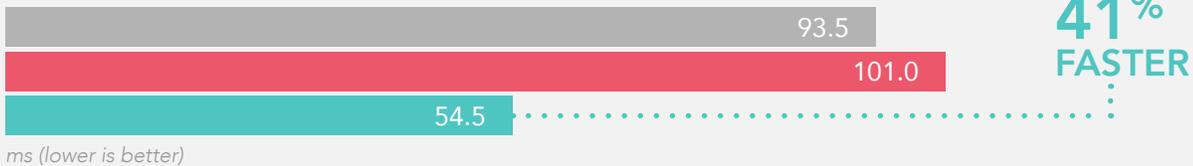
- ISP shared public connection
- NSP to Equinix to AWS Direct Connect
- Equinix to AWS Direct Connect

Total orders per minute



Reduce application wait times

Average application latency



Transfer data efficiently

How does the network connection you're using affect the flow of information? We uploaded and downloaded 5GB high-definition (HD) video files to see. Our test results show that the public 1 Gb fiber internet connection was slower, possibly due to inefficient routing or network congestion and resultant TCP windowing, which negatively affects file transfer times. Conversely, transferring data over a private, dedicated, 1 Gb high-bandwidth fiber connection allows for larger data packets and faster transfers, which could account for the dramatically reduced amount of time required to move data where we wanted it to go.

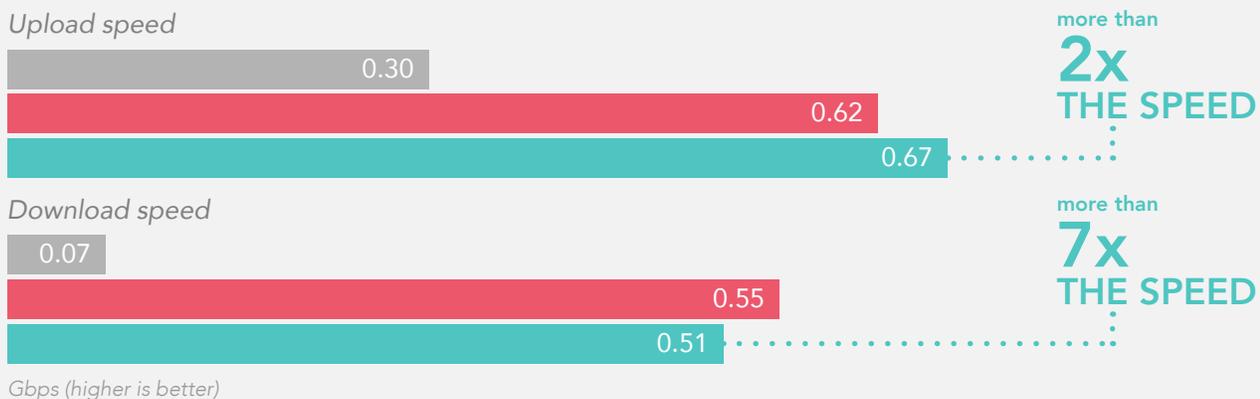
What is TCP windowing?

Transmission control protocol (TCP) windowing dynamically adjusts the size of blocks of data in a packet to suit the reliability of the network connection.

Decrease file transfer times



Increase network throughput



Reduce network wait times





Image provided by Equinix

Conclusion

Of the three hybrid-cloud connectivity scenarios we tested, colocation delivered the biggest benefits. Moving the privately held compute, storage, and networking components of our hybrid cloud infrastructure to an Equinix IBX data center provided significant improvements to application processing speeds. It also provided faster interactions with the web application and decreased network wait times and data transfer times. Leveraging a colocated hybrid environment allowed us to maintain control and ownership of strategic parts of the IT infrastructure while enjoying the benefits of secure, private access to public clouds, such as AWS, through direct interconnection. When you partner with Equinix, you are truly thinking outside your on-premises data center.

- 1 AWS Direct Connect FAQs, accessed June 28, 2018, <https://aws.amazon.com/directconnect/faqs/>
- 2 Principled Technologies website, accessed June 15, 2018, <http://www.principledtechnologies.com>
- 3 Amazon AWS Direct Connect, accessed July 25, 2018, <https://aws.amazon.com/directconnect/>
- 4 Equinix Amazon Web Services (AWS), accessed July 25, 2018, <https://www.equinix.com/partners/AWS/>
- 5 Equinix Solution Validation Centers, accessed June 26, 2018, <https://www.equinix.com/services/consulting/solution-validation-center/>
- 6 Business is Moving to the Edge, accessed July 16, 2018, <https://www.equinix.com/digital-edge/>
- 7 Equinix Cross Connects Data Sheet, accessed June 26, 2018, <https://www.equinix.com/resources/data-sheets/cross-connects/>
- 8 NetApp FAS Storage Systems Resources, accessed August 2, 2018, <https://mysupport.netapp.com/info/web/ECM-LP2676498.html>
- 9 Performance Hub Infographic - What's in Your Rack, accessed June 29, 2018, <https://www.equinix.com/resources/media/performance-hub-infographic/>

Read the science behind this report at <http://facts.pt/a5220x> ►



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