



EQUINIX

EQUINIX PERFORMANCE HUB™

FAST, CONSISTENT AND
RELIABLE NETWORK AND
APPLICATION PERFORMANCE
FOR THE ENTERPRISE

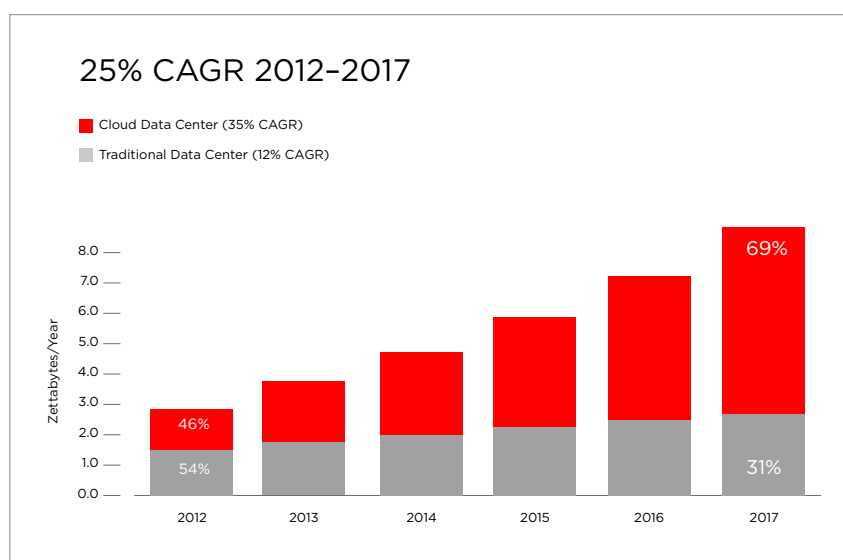
SOLUTION BRIEF

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CLOUD COMPUTING: FORECASTING A HAIL STORM OF DATA

Global cloud traffic is forecast to grow 25% CAGR between now and 2017, to 7.7 zettabytes a year.¹ Increasingly data center traffic comes from users accessing cloud applications for streaming video, collaboration software, and connected devices. It's clear that traffic growth is moving towards cloud data centers (data centers with network and cloud providers). Given all these trends, can your enterprise handle this explosion of cloud traffic and still deliver a consistent quality of experience (QoE)?



Why Equinix?

We build data centers that allow you to build your business. We are the global leader in data center solutions. Our **International Business Exchange™ (IBX®) data centers** are cloud data centers that offer direct and scalable connectivity to cloud providers. By partnering with Equinix you can extend your network with direct Layer 1, Layer 2 or Layer 3 private or public connectivity. There's no need to go through multiple ISPs or carriers.

We have 95+ colocation centers on five continents, which we call Platform Equinix™ - high performance data centers with world-class security and 99.999% uptime.

Benefits of Platform Equinix:

- Scalability – As your business scales you need data centers that can deploy quickly
- Global Reach – Your data lives where you need it most, close to your customers
- Choice – We have the broadest selection of over 950+ networks
- Ecosystems – Connect with over 4,400 customers and partners inside Equinix IBX data centers

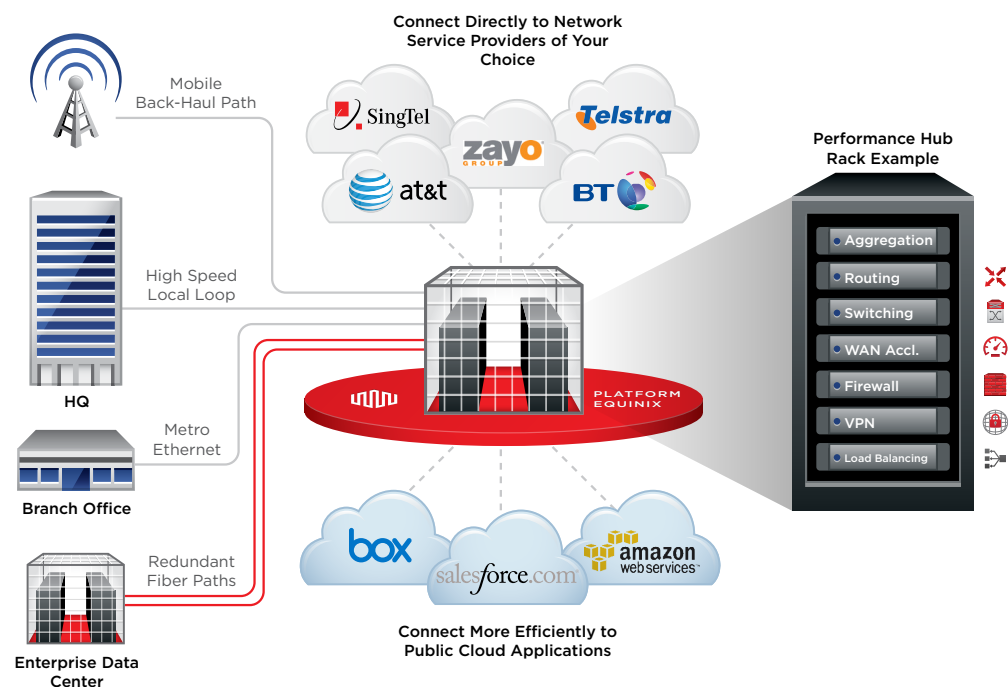
This document provides details on various use case requirements for enterprise and a reference architecture that will assist Equinix customers in deploying a distributed, highly optimized, cloud-ready network architecture utilizing Performance Hubs (PHs) located in Equinix IBX data centers around the world.

1. Cisco® Global Cloud Index (2012 – 2017)

EQUINIX PERFORMANCE HUB: THE NETWORK REIMAGINED

Enterprises demand a lot from their networks. You need a robust, secure and distributed network that can meet your on-premises and cloud application performance needs. The Equinix Performance Hub satisfies that demand by simplifying your WAN and allowing your enterprise to securely and reliably connect to the network and cloud providers directly.

Equinix Performance Hub is an extension node of your enterprise network into an Equinix IBX that enables your enterprise to securely and reliably connect to the network and cloud providers using off-the-shelf networking and other equipment. It provides globally consistent security and QoE to your users, while significantly reducing Total Cost of Ownership (TCO).



Benefits

- Move to Cloud – Enables easy private cloud deployment, secure and direct connectivity to public clouds, laying the foundation of a hybrid cloud.
- Efficient Network: Simplifies the network and provides access to the cloud and the Internet without hair-pinning traffic only via select locations.
- Improves Quality of Experience (QoE): Optimizes network and application QoE by offering higher throughput and low latency, and deploying close to end-users.
- Provider Choices: Provides connectivity to 950 networks, 450 cloud providers and 600 IT service providers.
- Higher Manageability: Provides the agility, security and visibility needed to take control of the network.

PERFORMANCE HUB USE CASES

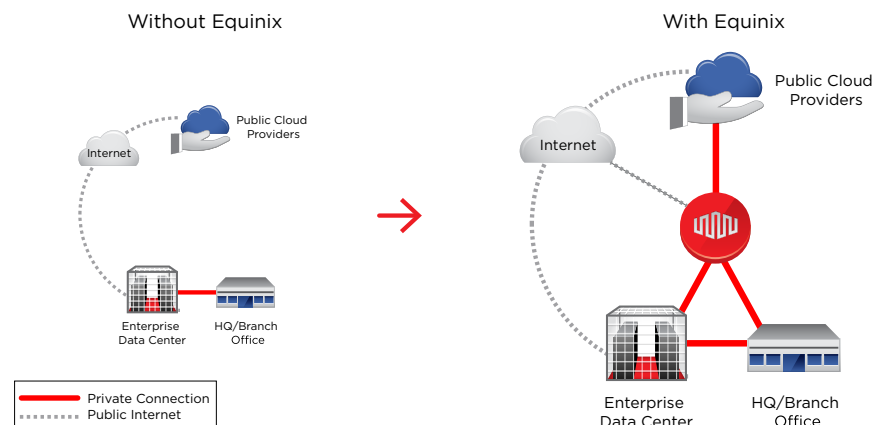
Use Case 1

Private & Direct Connectivity to Cloud

Connecting directly and privately to cloud providers increases your bandwidth, ensures low latency connectivity to cloud infrastructure and bypasses the shared public internet path to cloud providers. Be closer to cloud providers and your users, while opening up exciting new possibilities in hybrid cloud computing.

With Platform Equinix and Performance Hub you can:

- Leverage various cloud providers as if they are part of your own infrastructure
- Bypass the public Internet for faster, private access to public cloud



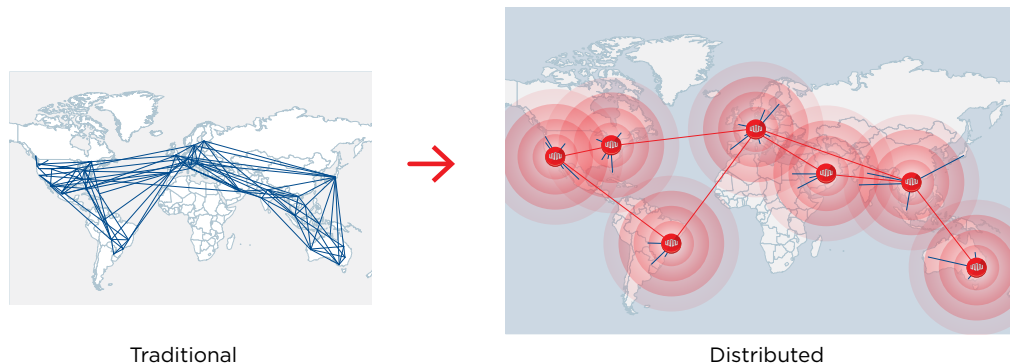
Use Case 2

Network Re-architecting

The carrier-neutral data centers that make up Platform Equinix offer an unmatched choice of networks, IT service providers, cloud platforms, and locations worldwide.

With Platform Equinix and Performance Hubs your enterprise can:

- Replace costly, outdated MPLS and Optical (DWDM) circuits with high capacity, low cost Metro-Ethernet circuits and save significantly.
- Increase bandwidth, reduce latency and lower administrative costs while managing fewer circuits.



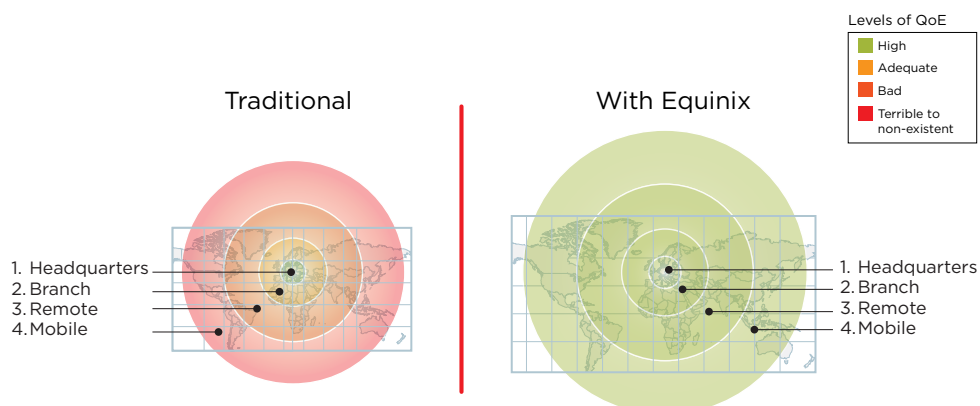
Use Case 3

Consistent Application QoE Across Regions

Quality of Experience (QoE) is the end-user performance experience. It's a simple equation: Application performance + network performance = QoE.

With Platform Equinix and Performance Hubs, you can:

- Distribute your IT infrastructure as well as your cloud infrastructure closer to regional Equinix Performance Hubs, thereby providing consistent application QoE to your users.
- Monitor both network and application performance.
- Deliver QoE anywhere, on any device while running more applications.

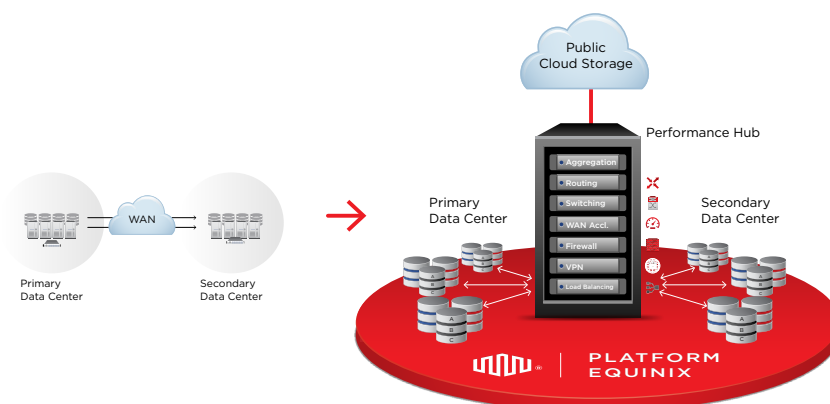


Use Case 4

Simplify Disaster Recovery (DR) Strategy

Disaster Recovery (DR) is an important part of every enterprise's strategy for providing high availability service to customers and end users. An effective disaster recovery plan includes data center availability, distance from primary data centers, latency, accessibility, future capacity and cost.

Build a comprehensive DR strategy with Platform Equinix and Performance Hub. Our global footprint, unmatched choice of networks and highest availability rating ensures uninterrupted service and recoverability for your business.

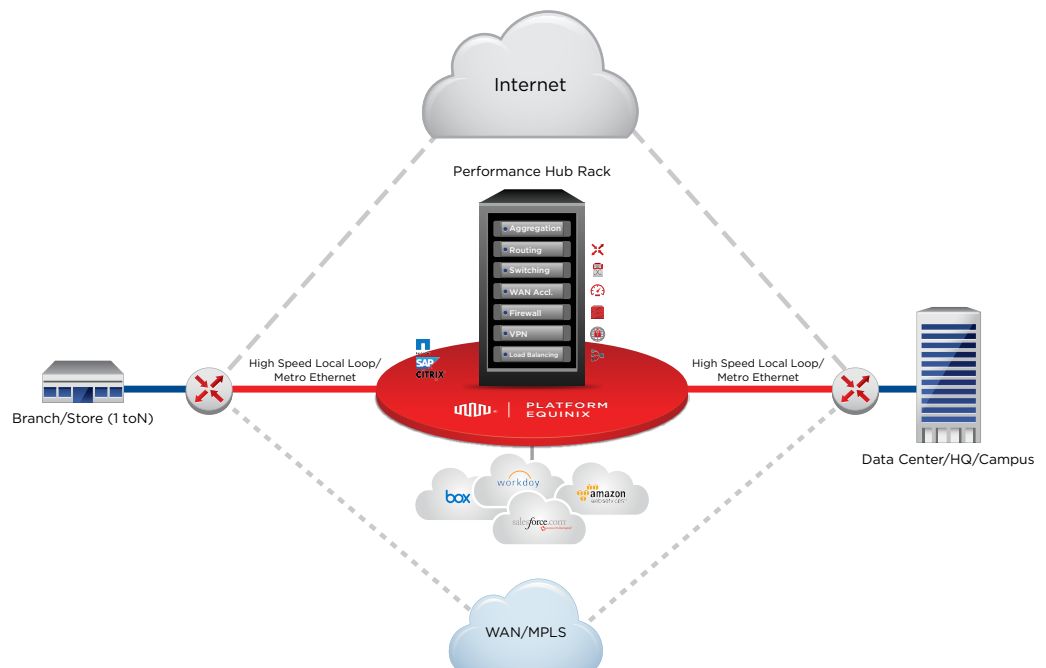


EQUINIX PERFORMANCE HUB: SOLUTION OVERVIEW

Between idea and execution there is a plan, a methodology to achieve specific objectives. Equinix Performance Hub solution framework provides a reference architecture that allows you to build out a highly secure, reliable, and optimized performance hub infrastructure.

Our solution provides design guidelines that demonstrate how enterprises can integrate key Equinix and partner technologies (such as carrier neutral IBX's, colocation services, networking, security, load balancing, WAN optimization and management technologies) into your data center architecture that supports IT initiatives (such as WAN optimization, virtualization and application deployments in public, private and hybrid cloud environments).

Equinix Performance Hub architectures conform to the Equinix Validated Design (EVD) process of end-to-end system level testing and documentation for delivery of high quality solutions.



Equinix Performance Hubs are usually deployed in close proximity to specific end-user communities. Prime locations for Performance Hub deployments include carrier neutral data centers such as Equinix that host an expansive mix of service providers at the major interconnection and exchange points of these providers (this is where core infrastructure nodes reside and where the primary network backbone routes are established).

Enterprises can choose to connect headquarters and branch office locations to the nearest Equinix IBX data centers via high speed local loop or Ethernet connectivity. Within the IBX, enterprises would deploy network equipment and be able to connect to network and cloud providers.

PERFORMANCE HUB ARCHITECTURES

The Equinix Performance Hub supports two architectures:

Enterprise WAN Architecture: This architecture enables enterprises to significantly reduce network latency, increase bandwidth and improve application performance in a highly secure and cost-effective solution.

Cloud Connector Architecture: This architecture enables enterprises to securely and reliably connect to industry-leading public cloud providers via private direct connections.

Enterprise Deployment Scenarios:

Enterprises can connect locations to Equinix Performance Hubs in the following ways:

Enterprise WAN Scenarios

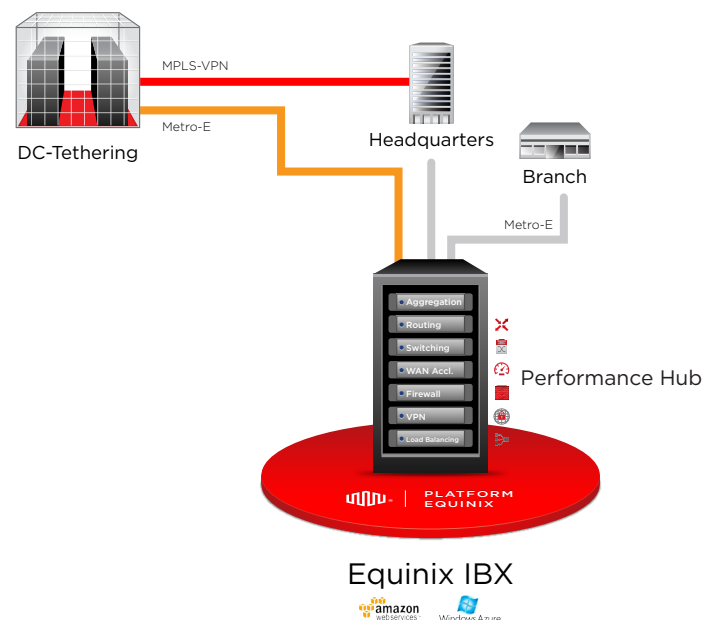
- **Scenario 1 (S1):** Tether an existing enterprise data center to closest IBX
- **Scenario 2 (S2):** Connect HQ & Branch office locations to closest IBX
- **Scenario 3 (S3):** Connect Inter Regional Branch offices via IBX Interconnect

Cloud Connector Scenarios

- **Scenario 4 (S4):** Direct connect to public cloud providers through Performance Hub
- **Scenario 5 (S5):** Connect to On-premises resource and public cloud through Performance Connectivity

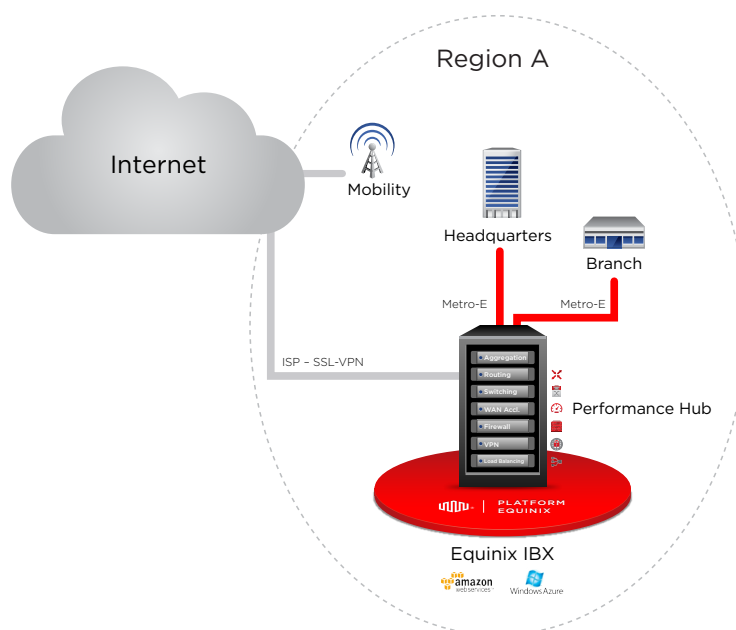
Scenario 1: Tether an existing enterprise data center to closest IBX

In this scenario, enterprises can tether their existing data center into the closest Equinix IBX data center with an Equinix Performance Hub through metro-ethernet Layer 2 connectivity. Enterprise locations can still access their existing infrastructure through their corporate data center and use Equinix Performance Hub to off load connectivity to specific low-latency sensitive on-premises applications and move them to Equinix IBX and also leverage various cloud-based applications hosted in that data centers.



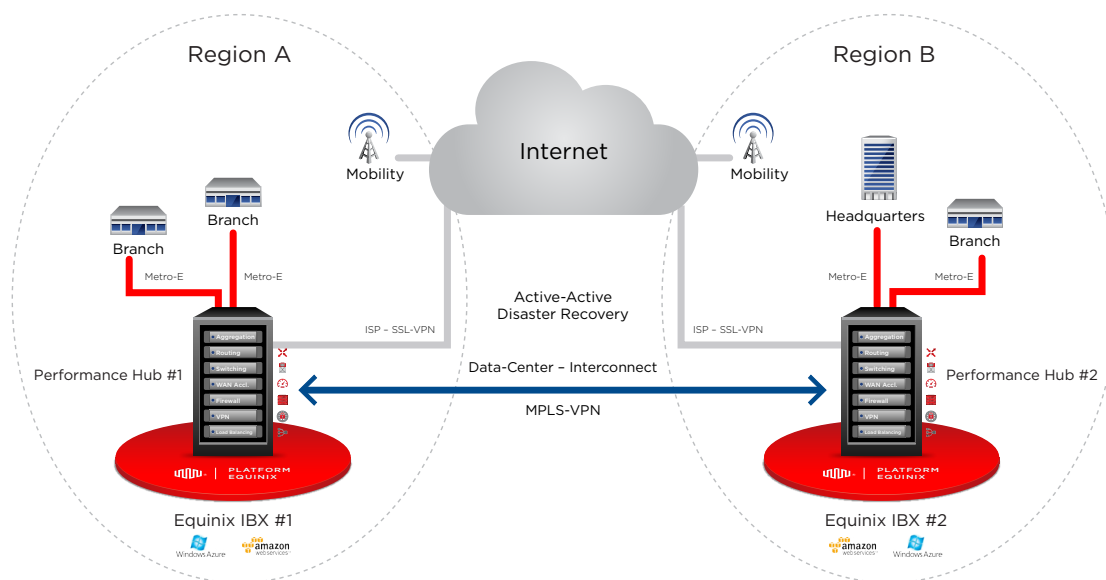
Scenario 2: Connect HQ & Branch office locations to closest IBX

In this scenario, enterprises can connect their locations within a metro region to the closest Equinix IBX data center with an Equinix Performance Hub through High speed local loop or Metro-Ethernet Layer 2 connectivity. Enterprises can host their highly critical or latency sensitive applications at the IBX data center and leverage wide connectivity choices of ISP's, network and cloud providers.



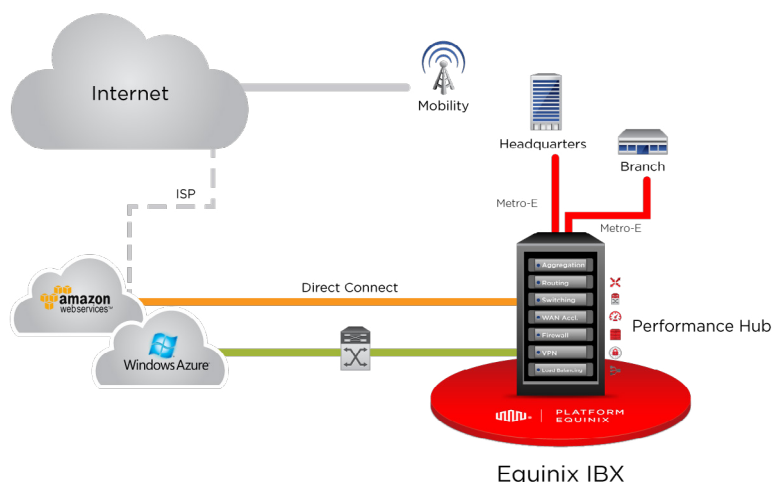
Scenario 3: Connect Inter Regional Branch offices via IBX Interconnect

In this scenario, enterprises can connect their locations within a metro region to the closest Equinix IBX data center through high speed local loop and Metro-Ethernet Layer 2 connectivity and Interconnect multiple geographical locations using Equinix Performance Hub at each Equinix IBX data center location, leveraging wide connectivity choices of ISP's, network long-haul providers and cloud providers.



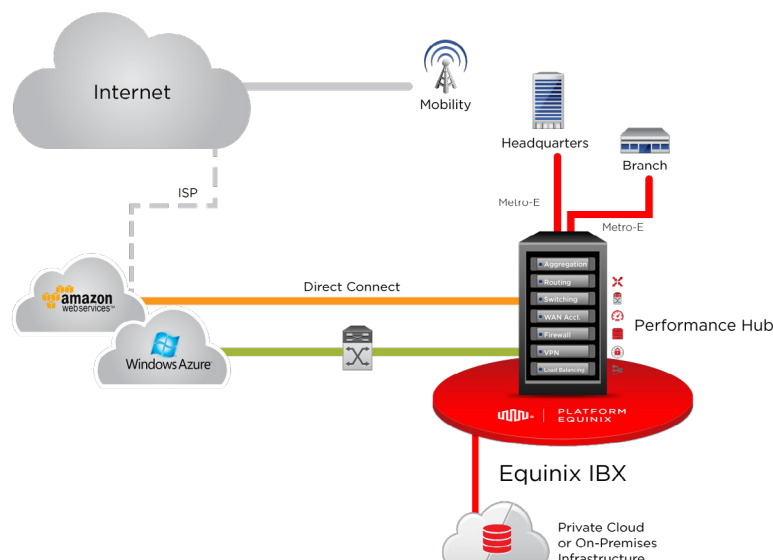
Scenario 4: Direct connect to public cloud providers through Performance Hub

In this scenario, enterprises can directly connect to public cloud providers such as Amazon Web Services (AWS) and Windows Azure through Equinix Performance Hub located at the closest Equinix IBX data center.



Scenario 5: Connect to on-premises resource and public cloud through Performance Connectivity

In this scenario, enterprises can directly connect to public cloud providers such as Amazon Web Services (AWS) and Windows Azure through Equinix Performance Hub. They can also build their own private cloud infrastructure at the closest Equinix IBX data center.



Mapping Use Cases to Deployment Scenarios

- ☐ Enterprise WAN Scenarios
- ☐ Cloud Connector Scenarios

Use Cases	Deployment Scenarios
A. Network Re-architecting	S1. Tether an existing enterprise data center to closest IBX
B. Consistent Application QoE Across Regions	S2. Connect HQ & Branch office locations to closest IBX
C. Simplify Disaster Recovery (DR) Strategy	S3. Connect Inter Regional Branch offices via IBX Interconnect
D. Direct Connectivity to Cloud	S4. Connect to public cloud providers via direct connect
E. Private and Public Cloud Connectivity	S5. Connect to on-premises resource and public cloud through Performance Connectivity

EQUINIX VALIDATED DESIGN (EVD)

Data centers are big, complex and sometimes intimidating. You want to know that deployments work before fully committing all your resources. The Equinix Validated Design (EVD) is a solutions validation program that tests infrastructure and application designs before customer deployment.

EVD is also a solutions framework for you to design and build your own Performance Hubs. Detailed design and implementation guidelines enable you to integrate networking, compute, storage and network services, and deploy in industry-leading Equinix IBX colocation facilities. Achieve WAN optimization and securely connect to the industry's leading public cloud providers. It also sets the stage for enterprises to easily build hybrid cloud deployments in the future.

Solution Components

The table below summarizes the components that constitute the PH architecture. The hardware and software solution components are recommendations based on EVD benchmark results. Customers are at liberty to choose other products according to their preferences.

Components	Description	Enterprise WAN			Cloud Connectors	
		Scenarios			Scenarios	
		S1	S2	S3	S4	S5
Equinix IBX	Flexspace, Power, Cabinets & Cooling & X-Connect	X	X	X	X	X
Network Services	Long Haul Connectivity (MPLS-VPN)	X		X		X
	Ethernet (Private Line or VPLS)	X	X	X	X	X
	Localloop Connectivity (MPLS-VPN or VPLS or Metro E)	X	X	X	X	X
	Internet Connectivity		X	X	X	X
Network Equipment	Routing – Juniper MX-5		X	X		X
	Switching – Alcatel-Lucent – 7210	X	X	X	X	X
	Firewall – PaloAlto 5020		X	X		X
	SSL-VPN – PaloAlto 5020		X	X		X
	Load-Balancer – A10thunder1030		X*	X*		X
	WAN Acceleration – Silver Peak VX2000/8000		X	X		X
Network Performance Management	Thousandeyes.com – SaaS application (Latency Measurements Between Locations)	X	X	X	X	X
	Logicmonitor.com – SaaS application (Monitoring, Collecting, Alerting, Trending, Reporting)		X*	X*		X
Application Performance Management	Appneta – APM (Trace, Path, App, Flow, View)		X*	X*	X	X
Compute & Storage (Equinix IBX Rack)	Dell PowerEdge R720		X*	X*		X
	Vmware ESXi.5.x Hypervisor		X*	X*		X
	Netapp FAS series – Storage		X*	X*		X
Compute & Storage (Public Cloud)	Amazon Web Services (EC2) – Public Compute				X	X
	Amazon Web Services (S3) – Public Storage				X	X

**Optional: Needed for Applications Hosted in Equinix IBX Rack*

PERFORMANCE VALIDATION: SUMMARY

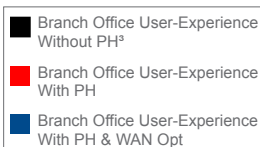
Branch User-Experience Across Metros

US – East to West

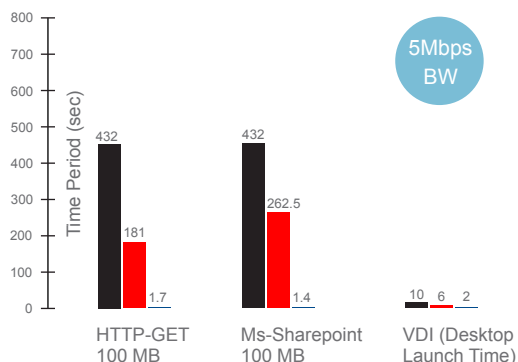
Ave-Latency for Baseline = 200 ms

Ave-Latency to IBX's = 80 ms

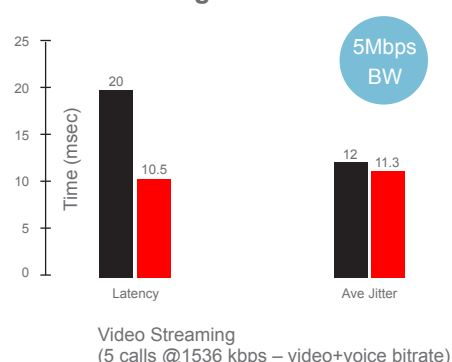
Hosted In IBX²



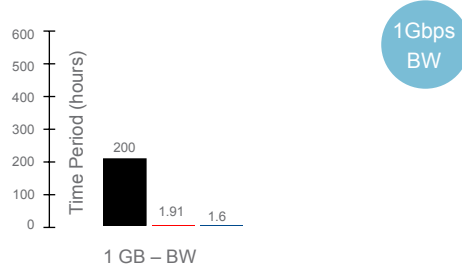
HTTP/MS-SP/VDI



Video Streaming



Oracle Data-Guard – (400GB) Replication

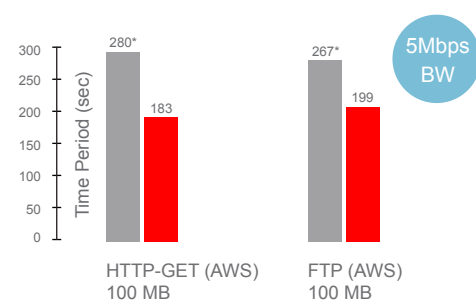
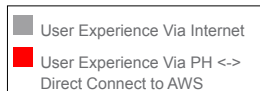


Public Cloud User-Experience Across Metros

US – East to West

Ave-Latency to IBX's = 80 ms

Direct Connect to AWS⁴



2. Hosted at IBX – Applications hosted in US- East - Equinix - IBX / for Baseline - Hosted in HQ

3. Baseline (without Equinix IBX) - P2P - Branch-to-HQ connectivity over WAN circuits within/across metros (US – East to West)

4. Applications hosted in AWS

* Estimated figures

Note: Baseline effective throughput is calculated based on typical p2p WAN latencies

EQUINIX CONSULTING SERVICES

Data centers are probably not your core competency. That's alright, because it's all we do. Equinix Consulting Services can guide you through every step of the way, performing detailed business analysis, technical analysis, and provide recommendations to optimize network and application performance.

What We Do

We offer two types of assessments. The first is a 1–2 week high level “IT Assessment” to determine if a Performance Hub solution fits into your environment. The second optional engagement is an in-depth engagement lasting 6–8 weeks called the “Performance Hub Strategy and Architecture.” This structured engagement helps to define the strategy and includes a phased approach to Discovery, Assessment, Plan, Low-level-Design and Solution Architecture.

A complete engagement includes a summarization of the current network environment, high-level future state architecture, business case and benefits. This provides the foundation and justification for implementing a Performance Hub in your enterprise.

Customer Engagement Model



**Average time periods*

For More Information

<http://www.equinix.com/platform-equinix/performance-architecture/network-performance-hubs> or contact us at Email: global-ask-ph@equinix.com

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About Equinix

Equinix, Inc. (Nasdaq: EQIX), connects more than 4,400 companies directly to their customers and partners inside the world's most networked data centers. Today, enterprise, cloud, networking, digital media and financial services companies leverage the Equinix interconnection platform in 31 strategic markets across the Americas, EMEA and Asia-Pacific.

By connecting directly to their strategic partners and end-users, customers are forming dynamic ecosystems inside Equinix. These interconnected ecosystems enable companies to optimize the performance of their content and applications and protect their vital digital assets.