



EQUINIX

ENABLING THE MOBILE ECOSYSTEM

EQUINIX WHITEPAPER



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ENABLING THE MOBILE ECOSYSTEM

Mobile network operators (MNOs) are scaling their infrastructures as fast as they can to try to satisfy today's insatiable appetite for mobile content while ensuring a high-quality user experience. In the face of commoditization, they are also looking for new ways to monetize their networks through new services. At the same time, mobile service enablers and content and application providers are constantly seeking ways to increase performance of applications that require ever greater bandwidth.

The problem for MNOs is that with their current architecture, they face a significant gap between traffic growth projections and their ability to scale. This gap mirrors what happened to the wired Internet approximately 14 years ago as data demands exploded. And as was true 14 years ago, the problem isn't solely one of speed to the end user device. Writes Glenn Fleishman in *Ars Technica*¹, "...speed isn't actually the main reason why every carrier in the developed world is trying to extend the life of 3G networks by speeding them up, and build 4G networks as fast as equipment and financing is available. It's all about congestion and capacity, not speed."

To enable the mobile ecosystem to deliver high-performance, high-value, and clearly differentiated end-to-end mobile broadband solutions, the industry needs a more efficient, more scalable reference architecture that makes it easier, faster and less expensive for MNOs to scale their capacity to meet demand. This whitepaper details the elements of such an architecture.

1. <http://arst.ch/hc7>

GROWTH, PROFITABILITY, AND PERFORMANCE

Mobile traffic is growing exponentially. Forecasts include:

- A 40.8 percent CAGR for mobile backhaul applications² by 2014
- 55 percent year-over-year growth of the worldwide smartphone market³ in 2011, doubling again by 2015
- 44 billion cumulative mobile app downloads⁴ by 2016
- A 27.2 percent CAGR for the global machine-to-machine (M2M) wireless network services market⁵ from 2010 to 2014

According to the Cisco Visual Networking Index⁶:

- Global mobile data traffic will increase 26-fold between 2010 and 2015, growing at a CAGR of 92 percent and reaching 6.3 exabytes per month by 2015.
- The average smartphone will generate 1.3 GB of traffic per month in 2015, a 16-fold increase over the 2010 average of 79 MB per month.
- There will be nearly one mobile device *per capita* by 2015—more than 7.1 billion mobile-connected devices, including machine-to-machine modules.
- Two-thirds of the world's mobile data traffic will be video by 2015.

Regional forecasts feature equally impressive mobile growth projections. According to ABI, wireless revenues surged in Latin America, with carriers enjoying 40.3 percent growth year-over-year—about double the worldwide average of 20.3 percent.

In Europe and Asia, which lead the charge for messaging adoption over a decade ago, consumers have embraced advanced mobile data services as a way of life. In Italy, Telecom Italia delivered *15 times* more mobile data traffic in 2010 than in 2007. China Unicom's 3G system saw a 62 percent traffic boost *in a single quarter*, from Q1 to Q2 of 2010. And Europe's TeliaSonera expects mobile data traffic to *double each year* for the next five years.

All this growth should be exciting news for MNOs, except that Ovum and other industry analysts predict that global Average Revenue Per User (ARPU) for mobile subscribers will continue to drop steadily through 2015. The decline, which started in 2010, is happening across developed and developing regions. For example, in the U.S. it will decline about \$1 per year, from \$49 to \$44. During the same period in Africa, ARPU will decrease from a global low of \$9.73 to an even lower \$6.89.

These trends suggest that as subscriber growth levels off, MNO revenues will come under tremendous pressure unless they rely on M2M, advanced applications, and new monetization models—all of which will require large investments in bandwidth.

On the application side, MNOs have been grappling with latency issues, which lead to customer dissatisfaction. Most smartphone users don't need analyst reports to validate the impact of this problem, but published stories and reports provide validation. In 2010, for example, a provider in Europe had to offer cash back to iPhone customers frustrated by a lack of 3G access. And many carriers are responding to rapid data growth by eliminating unlimited data plans⁷. While such a move may be an act of survival for the MNOs, it won't encourage customer loyalty until MNOs and service enablers collectively bring to market more sophisticated, tiered pricing structures that allow consumers to pay only for the applications they want.

2. http://www.heavyreading.com/details.asp?sku_id=2540&skuitem_itemid=1257

3. http://www.idc.com/research/viewfactsheet.jsp?containerId=IDC_P8397

4. <http://www.abiresearch.com/press/3668-44+Billion+Mobile+App+Downloads+by+2016#>

5. <http://www.technavio.com/content/global-m2m-wireless-network-services-market-2010-2014-0>

6. http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481360_ns827_Networking_Solutions_White_Paper.html

7. http://www.cio.com/article/686734/Survey_Video_Dominates_Mobile_Traffic

THE LIMITATIONS OF THE CURRENT ARCHITECTURE

To understand how a new reference architecture can help MNOs meet the challenge of cost-effectively scaling their infrastructures, it's useful to understand the limitations of the current infrastructure.

A Single IP Service Provider

Many MNOs have been strangled by outsourcing IP connectivity, especially single source (or “single-homed”) purchasing of IP services from one provider. In this “best effort” model, MNOs have no direct connection to their key traffic sources, such as Google, Facebook or Pandora. This means they can't be assured of optimal performance. And once packets move from their infrastructure onto the provider's network, they lose visibility and can't differentiate traffic in order to prioritize the delivery of voice, video, messaging, and mission critical applications.

With a single IP service provider, an MNO is limited to relatively few Internet access points, which may not map to population densities. This results in heavy traffic congestion and over-utilization of existing connections, which in turn creates a high-cost cycle of provisioning more access in these same inefficient locations.

A single IP service provider also limits the MNO's ability to negotiate better prices and creates a single point of failure for mission-critical services hosted in cloud environments.

MNO-Run Applications and Services

MNOs often house their own applications, such as voicemail, messaging, and storage, in multiple data centers located far from population densities. This invariably results in greater latency, which can lead to poor customer experience. In addition, it's extremely expensive to manage multiple data centers in multiple remote locations, and the procurement process for bringing new services online is long, complex and costly. Ultimately, the transport of these applications across long backbone links puts additional strain on available capacity.

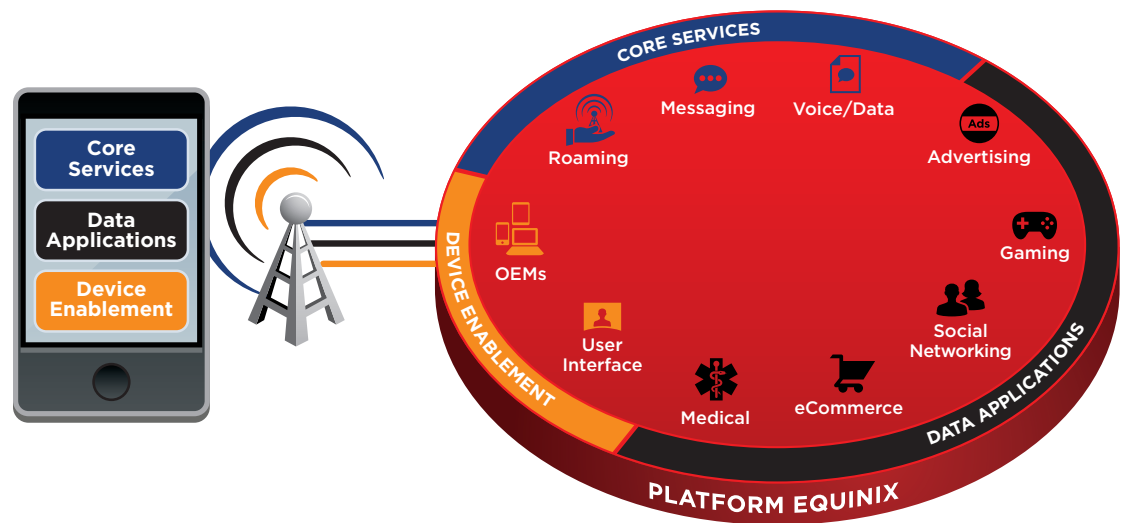
Mobile Backhaul

A problem that particularly affects MNOs in North America is the need to acquire backhaul from multiple providers that have no standard, well-publicized locations. Anecdotal evidence indicates that in many metros and situations, it can take three to six months to track down the provider with the best lit building relative to the MNO's network footprint, and then figure out the best way to connect the two networks. This expensive and time-consuming process is often further complicated and made even more expensive by the involvement of third parties in connecting the services.

THE INFRASTRUCTURE SOLUTION FOR MOBILE OPERATORS

A more efficient architecture for the mobile infrastructure is multiple neutral data center hubs, or “mobility centers,” that house dynamic ecosystems of service sellers and buyers that span the entire mobile value chain, from network service providers to social networking, digital content, cloud and financial services companies, to enterprises.

A mobility center providing direct access to key mobile value chain partners



EFFICIENCIES IN COST AND OPERATIONS

The mobility center model offers MNOs significant efficiencies in cost and operations.

Neutrality and Direct Connections

As a neutral host to multiple IP service providers, the hub enables MNOs to connect directly—peer—with the major traffic sources instead of purchasing IP transit. Access to multiple service providers also translates into a highly competitive IP transit marketplace, where MNOs have the opportunity to negotiate better rates. Direct access, accomplished with a simple cross-connect or Exchange Platform inside the hub, also delivers unprecedented speed in provisioning new access, reducing operational and lost opportunity costs.

Roaming and Interoperability

The hub can also provide direct access to an array of roaming, interoperability and messaging service enablers and providers. Direct access ensures greater uptime and availability of these core MNO revenue generators.



Mobility centers enable new solutions through direct connectivity to mobile ecosystem partners

Colocating Applications and Services

Amazon's⁸ sales via mobile devices topped \$1 billion in 2010, and Facebook's⁹ 250 million active mobile users are twice as active as non-mobile users—encouraging more than 200 mobile operators in 60 countries to work to deploy and promote Facebook mobile products. Instead of hosting their applications and services in expensive, remote data centers, MNOs can drive down costs and improve performance and customer satisfaction by consolidating their data centers into fewer mobility centers and centralizing their applications, content and services there. When the hubs are located in major metropolitan areas, MNOs can also reduce their operational costs for managing their data centers while increasing application performance.

Reducing Overall Network Traffic

Instead of overpaying for additional capacity to expand an inefficiently architected network, mobility centers enable MNOs to reduce overall network traffic on the backbone by locating applications near high customer densities and connecting directly to the top mobile traffic destinations. For example, instead of using the backbone to take traffic generated in Chicago to an application that terminates in Seattle, the MNO can colocate the application in Chicago and reduce the backbone load. Similarly, with direct connections to sites like Facebook and Twitter within the hub, mobile customers in high-density areas can access a local instance of these sites faster and further reduce the backbone load.

Backbone Service Procurement

When it does become necessary to purchase additional backbone services to connect regional markets, mobility centers provide MNOs with a competitive marketplace where they can aggregate their purchasing to drive down costs and reduce provisioning time, reducing operational and lost opportunity costs. They can also select between multiple providers to optimize cost and performance. Various network architectures lead to different topologies with varying impacts on redundancy, latency, and cost. Having more options enables MNOs to pick the network that works best for their specific requirements.

Mobile Backhaul Procurement

Time Warner Cable's mobile backhaul business¹⁰ grew by more than 300 percent in 2009 with analysts predicting total sales will reach \$3.6 billion in 2012. Mobile backhaul is often an Ethernet service, and mobility centers offer the possibility of creating an Ethernet exchange, a competitive marketplace where MNOs can aggregate purchasing, purchase and provision capacity in near real-time, and reduce operational and lost opportunity costs.

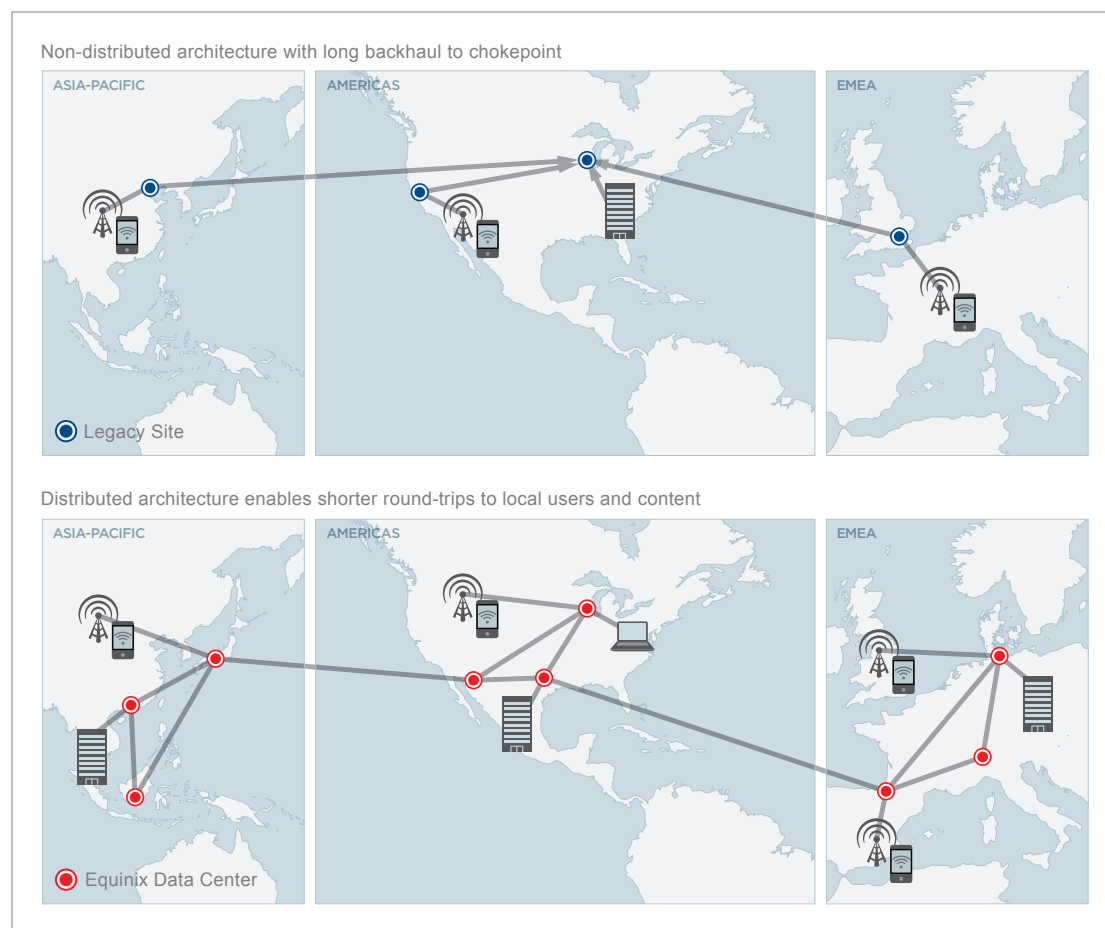
8. <http://www.internetretailer.com/2010/07/22/amazon-tops-1-billion-mobile-sales-past-year>

9. <http://www.facebook.com/press/info.php?statistics>

10. <http://www.accedian.com/blog/news/backhaul-time-warner-cables-fastestgrowing-business/>

EFFICIENCIES IN NETWORK PERFORMANCE

In addition to driving down network and operational costs, mobility centers offer MNOs a significant performance advantage over an inefficient architecture built using a single provider. The flat, distributed architecture—based on peering and direct interconnections—is similar to the way the Internet works today and enables MNOs to localize traffic, creating the shortest distance between users and destinations, and offloading traffic from the MNO's network as quickly as possible.



Equinix Mobility Centers create a distributed architecture for improved network performance

This performance advantage delivers two critical benefits. First, because it enables MNOs to scale more cost-effectively, they can scale to keep pace with demand, dramatically accelerating and increasing return on investment. Second, better performance translates directly into a better customer experience, and customers reward a positive experience with increased loyalty.

NEW REVENUE OPPORTUNITIES

The proximity of the entire mobile ecosystem in the mobility center creates new revenue opportunities by facilitating partnerships among the world's most innovative service providers, including music, video, and advertising companies, as well as white label enablers for messaging and location-based services. And once these partnerships are established, the hub makes it easy to implement the new services with simple cross-connects and scale these services while maintaining high performance and availability.

Another important way that the hub architecture helps MNOs generate additional revenue is through new, differentiated services. With direct connectivity to service providers, MNOs have the ability to control their traffic in ways that were previously impossible. They can now prioritize some traffic types over other traffic types and offer differentiated service access models, including business-class services for specific applications such as video-conferencing.

PLATFORM EQUINIX— CREATING MOBILITY CENTERS

The foundation of Platform Equinix is 95+ state-of-the-art IBX data centers—mobility centers—in 31 leading business markets across 5 continents. Each IBX is strategically located near major metropolitan areas and serves as a neutral operating location for carriers, more than 50 MNOs, and 4 of the 5 smartphone platforms. Each IBX also creates a dynamic ecosystem of service sellers and buyers that spans the entire mobile value chain. In total, Platform Equinix now connects more than 4,000 companies worldwide, including more than 950 network service providers, an array of enterprises, and social networking, digital content, cloud and financial services companies.

The number and variety of mobile service providers, enablers, and enterprises that have joined Platform Equinix has created a self-sustaining momentum of competitive advantage for all participants. For example SEVEN Networks' Open Channel™ mobile traffic optimization solution deployed from Platform Equinix recently received the GSMA's 2011 Global Mobile Award for Best Mobile Technology Breakthrough. SEVEN helps carriers and handset manufacturers deliver an enhanced mobile experience through its push-based software platform and applications that deliver data to devices in a way that is network efficient. The ability to rapidly add server hardware and new deployments across Equinix's global platform, as well as the ease of establishing new peering relationships with global content providers via the Equinix Internet Exchange, is helping SEVEN grow rapidly while making it easier for customers to deploy SEVEN's services.

“As SEVEN has expanded and established business relationships with the mobile community, direct network connectivity has become a critical component of our infrastructure,” said Ross Bott, chief executive officer of SEVEN Networks. “We chose Equinix for its network density, wide range of services and impeccable reputation. Additionally, the power of Equinix’s global platform paired with its growing ecosystem of mobile customers ensures SEVEN can run a profitable business while pursuing new market opportunities.”

As innovators like SEVEN continue to join the ecosystem, MNOs have the ability to quickly form new partnerships and establish early-mover advantage by bringing new services to their customer base.

To thrive, the mobile industry needs to consider a fundamental architectural change that will allow MNOs to:

- Connect directly to major sources of data, such as content, applications and cloud services
- Connect directly to enablers of mission-critical services in a way that is massively scalable and highly available
- Increase customer satisfaction and adoption through performance increases made possible by optimized network architecture
- Find new lines of business through a marketplace of the most innovative companies in mobile and Internet

Approximately 14 years ago, the existing Internet infrastructure faced similar growing pains, and Platform Equinix has served as the architectural model for how peering via neutral data centers can provide unparalleled scaling of capacity for rapid growth and enable the successful scaling of broadband data services, video delivery, and cloud connectivity. Today, many of the world's leading mobility companies are looking to Equinix to do the same for mobile data networking, helping them to achieve the capacity and rapid scaling they need while reducing long-term operating costs.



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About Equinix

Equinix, Inc. (Nasdaq: EQIX), connects more than 4,000 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.