# Brief: The Public Internet Isn't Your WAN

## Four Leading Indicators From The Cloud Giants Show Why They Don't Solely Rely On It, And Neither Should You

by Andre Kindness
June 13, 2016

## Why Read This Brief

Most digital transformation initiatives are doomed from the start. Why? The network platform won't be good enough to support them. Infrastructure and operations (I&O) leaders have eschewed traditional wide-area network (WAN) options such as MPLS or ethernet in favor of all-internet strategies to control costs. Amazon, Facebook, Google, and other cloud juggernauts popularized this idea by delivering services over the internet. Take note: These same companies have made a 180-degree turn in their strategies regarding the importance of the network to their businesses and aren't using the internet as their only transport. Four indicators from cloud providers show that the business-grade network is core to the digital business and a hybrid network infrastructure is the best strategy.

## Key Takeaways

**A "Good Enough" Network Strategy Lags Behind Public Cloud Strategy**
Business and I&O professionals have been pushing network teams to embrace an all-internet strategy. However, cloud providers have shifted from internet-only platforms to hybrid network strategies that embrace internet, carrier services, and their own networks.

**Today's Global Carrier Networks Can't Keep Up With Current Demands**
Current connections, bandwidth, and transport technologies can't keep up with today's mobile, data, and cloud demands. Tier 1 cloud providers are in a network arms race as companies enhance their current networks by digging trenches for fiber connections, dropping lines across the ocean floor, and testing drones and balloons for aerial connectivity.

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by Andre Kindness
with Christopher Voce, Aaron Kinch, and Diane Lynch
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## Digital Transformations Will Shatter Networks That Aren't Ready

Businesses that aspire to deliver new digital customer experiences while achieving digital operational excellence will largely depend on internet-of-things (IoT) technologies. The success of the transformation initiatives will hinge on gathering data from the IoT, analyzing the information, and responding to customers' wishes or to business operation needs almost instantaneously and in the context of the moment.[1] Cisco, for example, estimates that the amount of IoT data generated by 2019 will be 507.5 zettabytes, 49 times the estimated total data center traffic.[2] Attempting to accommodate the IoT with traditional business infrastructure will break a "good enough" internet-only WAN; because of capacity restrictions, it simply can't support tomorrow's customer intimacy, data movement, and application mobility needs.

### Enthusiasm Breeds Extreme Positions, Both In The Cloud And In Your Network

At the dawn of public cloud platforms, the business world did far more than just take notice; many technologists and business professionals predicted that enterprises would completely dump their data centers in favor of cloud platforms. Yet years later, only 29% of infrastructure decision-makers at enterprise firms have leveraged public cloud platforms, utilizing them, on average, for only 8% of enterprise servers.[3] Cloud adoption will continue to grow, but not as the result of an extreme, all-public-cloud strategy; hybrid platforms will host enterprise applications and data.[4]

A similar early irrational perspective exists in the networking world for WANs. Over the past couple of years, pundits have written articles predicting the death of dark fiber, ethernet, and MPLS. These articles typically settle on two main points: 1) Businesses are paying too much for business-grade connection and transport technologies and 2) businesses don't need to waste the resources to manage that part of the infrastructure. These writers argue that I&O leaders should use a less expensive, internet-only WAN option or a good-enough network because they work well for:

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› **Cloud providers.** Amazon, Facebook, Google, and other cloud providers have been the measuring sticks against which many enterprise business or technology management organizations evaluate their technology management operations or infrastructures. Dropbox, Microsoft Skype, Salesforce, and other software-as-a-service (SaaS) providers have built their businesses based on providing services over the internet. Infrastructure-as-a-service (IaaS) providers simply offer virtual private network (VPN) connectivity to the cloud platforms; application developers begin their application development projects using this method.

› **Users at home.** Respondents to a recent Forrester survey were more likely to indicate that they were satisfied with their technology at home (66%) than the technology at work (49%).[5] Many times, we've heard business leaders and other technology management teams suggest that they have great connections at home supporting VoIP, gaming, and video streaming through public internet connections such as DSL and cable modems.

› **Mobile devices.** Because of bring-your-own-device (BYOD) programs, an increasing number of employees are using their own phones and tablets with internet connections to get their work done. In 2015, 61% of mobility decision-makers at enterprises prioritized rolling out new mobile-based products and services, and 62% prioritized increasing their budgets to pay for more apps.[6]

## Four Leading Indicators Verify The Value Of Business-Grade Networks

Over the past two years, Forrester has started to hear from networking professionals that their CIOs or other executives haven't seen much value in the network. This diminished view of the network's value as simple plumbing has given rise to mandated internet-only strategies. This means that I&O professionals have to look for ways to shift satellite locations and branch offices off MPLS or similar technologies to public internet connections such as DSL or cable modems. However, over the past three years, we've seen four leading indicators from tier 1 public cloud providers that show that a good-enough network, such as an all-internet strategy, isn't good enough to win, serve, and retain customers. These public cloud providers now:

1. **Offer direct-connection options to customers.** Initially, IaaS providers offered VPN capabilities in their cloud compute and storage platforms. As an increasing number of application developers started to move applications from pilot phases to production, many of them found that VPN connections weren't good enough and voiced their concerns.[7] In 2014, three direct-connection options emerged from large providers: Amazon Direct Connect, Google Direct Peering, and Microsoft ExpressRoute. These new connections allow enterprises to connect their private networks directly into a cloud provider's own router. These options also offer enhanced security functions like traffic inspection, dedicated bandwidth, and other network policies that are not possible with VPN connections. Even SaaS companies now offer direct connections through colocation services such as Equinex.

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2.  **Augment carrier connectivity with their own WANs.** Using internet-only connections, cloud providers had difficulties with inter-data-center connections, including capacity and optimization issues.[8] As a result, these companies have taken a more balanced approach to augmenting carrier and internet connectivity by deploying their own WANs. Laying fiber across the ocean floor can cost up to $90,000 per kilometer; Facebook has bought a stake in a group laying fiber cable across the Indian Ocean floor.[9] Google has since followed with a $300 million fiber roll across the Atlantic Ocean floor. And the oceans aren't the only places the cloud providers are taking network ownership: At the Amazon Web Services (AWS) 2015 re:Invent conference in Las Vegas, Amazon shared that the company has various companies digging trenches and laying long-haul fiber between its regional data centers.

3.  **Invest heavily in direct connections to their customers.** Facebook and Google each started by offering digital information to consumers, and later to businesses, through web pages, applications, and mobile operating systems. But in a world of mobile moments, this isn't enough.[10] Much of what these providers can or can't deliver is dependent on telecoms, internet service providers (ISPs), and carriers that have contextual information and haven't shared it.[11] Google started offering fiber connections for residences in 2012 and deployed Wi-Fi access points in multiple cities.[12] Now, using satellites, balloons, and drones, Facebook and Google are in an arms race to bring connectivity to remote and rural areas.[13] Companies value the ability to connect with their customers directly.

4.  **Are developing solutions to compensate for underpowered WANs.** At the AWS 2015 re:Invent conference, Amazon announced a new service and product called Snowball, a 50-terabyte storage device that was ready for shipment.[14] Using a 10-gigabyte connection on Snowball, customers can upload data to the device, ship to Amazon, and have the data uploaded to S3. Assuming no inefficiencies, the download, transport, and upload of data should take three days to move from private data to Amazon's storage platform. This would require an unfettered 3-GbE connection if the company took the same amount of time to upload the data through a WAN link. Amazon's investment underscores the fact that there's a significant customer need and that WAN links can't keep up with enterprise traffic and data; it's faster to move data by shipping.

## Take A Cue From Cloud Giants — Ready Your Network For Engagement

I&O professionals will need to pivot away from good-enough to business-grade networks. Forrester's digital business imperative requires a strategy to support a customer's experience ecosystem — a fabric of connections among a company's customers, employees, partners, IoT devices, and operating environment.[15] The new customer experience (CX) ecosystems must be highly flexible, scalable, and dynamic and must focus obsessively on delivering customer value through digital assets. To do this, I&O leaders need to revisit their network:

›   **Technology.** In our report on the five principals of virtual network infrastructure, Forrester outlines a network architecture and technologies to enable that ecosystem.[16] Cloud providers have been building their networks using this mindset.

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› **Mindset.** There's more involved than the architecture and the underpinning technologies — you must build your network to put your business' customers front and center. The cloud giants use the principles captured in Forrester's customer engagement network vision to ensure that they build the technology in their business-grade networks to win, serve, and retain customers.[17]

**Recommendations**

## How To Execute On Building A Business-Grade WAN

Doris Lessing, an English novelist and poet, once said, "Things are not quite so simple always as black and white."[18] Nothing could be truer when it comes to network infrastructures and architecture. As a result, business networks will leverage multiple transport and connections technologies to best match their business requirements. To do this, I&O professionals should:

› **Target regions with expensive carrier costs first.** China, India, and several other countries have high carrier costs. Instead of tackling re-architecting the entire WAN, companies with limited resources tell Forrester they've had quick returns on investment and gotten more executive support by breaking the projects down into small geographies and trying new technology in those with higher connectivity costs.[19] These I&O teams then carried their successes to other geographies with proof of their effectiveness.

› **Consider costs and tradeoffs of reducing a MPLS or similar services.** While internet connections can cost less than MPLS, there's a tradeoff for everything. Traditional security measures, such as DMZs and firewalls that were once centralized within a data center, have to relocate to each internet portal with an internet-only WAN. I&O professionals should calculate the extra costs of this new architecture and subtract them against any cost savings from reducing or eliminating managed links.

› **Transition their back-up link into an active-active WAN.** Due to the critical nature of keeping remote locations connected, organizations have backup links in standby mode. Whether anyone uses them or not, your company is paying for them and wasting money. Overlay solutions and carriers can make it easy to shift that backup asset into active link and provide a quick return on investment for the I&O group to highlight.

› **Use WAN overlays instead of hardware when possible.** For many organizations, deploying hardware can take up to two years between the design and deployment. This might be the right choice for your company if the technology is new and you need to work out the kinks, but it leaves a long period before you can deliver enhanced services for the business. When possible, bridge the gap by leveraging software or services from a provider such as Nuage Networks.

› **Push SaaS and nonessential traffic through internet connections.** Don't waste expensive MPLS or ethernet networks on nonessential business traffic, employee traffic, or guest traffic. Use MPLS-VPN only for traffic that needs policies wrapped around the packets. SaaS providers have point-of-presence (PoP) sites around the world that might help you deliver services closer to your customers.

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› **Let the business prioritize the applications.** I&O professionals typically prioritize traffic and, ultimately, means applications. They often make assumptions for sales offices, research and development sites, hotels, or manufacturing plants that have significantly different business-critical applications. Leading I&O teams have developed close relationships with lines of business and business units to not only create SLAs for them but also establish the business criticality of applications. This insight helps them set network policies for similar sites.

› **Consider creating connection points that serve multiple offices.** Don't assume every office or location needs an internet connection. Instead of managing a connection for each office, which for some companies could mean thousands, some I&O teams have created regional connections that serve multiple sites. This can greatly reduce management overhead. Colocation facilities like Equinex and Interoute can provide customers with a central marketplace of connections and services.[20]

› **Make equal investments in monitoring.** Typically, monitoring is an afterthought, installed only when problems arise. In the digital world, automation is key and is essentially a closed-loop system. A closed-loop function consists of three parts: infrastructure (network equipment from companies like Arista and Brocade); orchestration software (a controller like OpenDaylight); and monitoring (a monitoring system from a company like NetScout or Veriflow).[21]

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# Endnotes

[1] The IoT will transform business models, differentiate products, enhance operations, and create powerful new forms of customer engagement. See the "TechRadar™: Internet Of Things, Q1 2016" Forrester report.

[2] Source: "Cisco Global Cloud Index Projects Cloud Traffic to Quadruple by 2019," Cisco press release, October 28, 2015 (https://newsroom.cisco.com/press-release-content?articleId=1724918).

[3] Source: Forrester's Global Business Technographics® Infrastructure Survey, 2015.

[4] Today, it's unlikely that any single cloud platform (public or private) will give developers everything they want. According to Forrester's Global Business Technographics Infrastructure Survey, 2015, 29% of I&O enterprise decision-makers have adopted and manage public cloud, 33% use hosted private cloud, and 43% use an internal private cloud. Sixty-five percent say they already use more than one public and/or private cloud platform, indicating that the hybrid cloud is a reality today. See the "The Forrester Wave™: Hybrid Cloud Management Solutions, Q1 2016" Forrester report.

[5] Source: Forrester's Global Business Technographics Telecommunications and Mobility Workforce Survey, 2016.

[6] Source: Forrester's Global Business Technographics Mobility Survey, 2015.

For more information about mobile-based products and services, see the "The Mobile App-ocalypse Is Coming: Are You Ready?" Forrester report.

[7] Although you can implement security controls and encrypt all communications, the connections run over the public internet and are still a "best effort" delivery model. Best effort focuses on just getting packets to their destination as best the system can, with little regard for protecting a particular packet versus other traffic packets. If pieces of information drop along the way, the application can experience delays or must fill in the holes on its own. See the "Beware The Pitfalls Within Networking For Hybrid Cloud" Forrester report.

[8] Carriers and telecom companies not only transport multiple clients' traffic over the same link but also oversell the capacity of the link, assuming that not everyone will use it at the same time. The concept is similar to that of memberships at health clubs or airline seats.

[9] Source: Amit Chowdhry, "Google Invests In $300 Million Underwater Internet Cable System To Japan," Forbes, August 12, 2014 (http://www.forbes.com/sites/amitchowdhry/2014/08/12/google-invests-in-300-million-underwater-internet-cable-system-to-japan/#6bb2e6dd8f73).

Source: Source: Ryan W. Neal, "Underwater Internet Cables: 'Submarine Cable Map' Shows How The World Gets Online," International Business Times, March 5, 2014 (http://www.ibtimes.com/underwater-internet-cables-submarine-cable-map-shows-how-world-gets-online-1559604).

[10] A mobile moment is a point in time and space when someone pulls out a mobile device to get what they want in their immediate context. See the "Mobile Moments Transform Customer Experience" Forrester report.

[11] At Mobile World Congress, Mark Zuckerberg, Facebook's CEO, told the assembled crowd of telecom operators, mobile manufacturers, and tech executives that there were still far too many people in the world without access to the internet. He wanted to bring low-cost internet to them. Source: Natalie Gagliordi, "MWC: Mark Zuckerberg talks free Internet, VR and the killer app for 5G networks," ZDNet, February 22, 2016 (http://www.zdnet.com/article/mwc-mark-zuckerberg-talks-free-internet-vr-and-the-killer-app-for-5g-networks/).

[12] Source: Google (https://fiber.google.com/about/).

[13] Facebook's Connectivity Lab is working to develop new technology solutions for internet connections. Source: Neeraj Choubey and Ali Yazdan Panah, "Introducing Facebook's new terrestrial connectivity systems — Terragraph and Project ARIES," Facebook, April 13, 2016 (https://code.facebook.com/posts/1072680049445290/introducing-facebook-s-new-terrestrial-connectivity-systems-terragraph-and-project-aries/).

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Google's Project Loon uses high-altitude balloons placed in the stratosphere at an altitude of about 20 kilometers (12.4 miles) to create an aerial wireless network with up to 4G-LTE speeds. Source: Google (https://www.google.com/loon/).

[14] Source: "AWS re:Invent," Amazon Web Services (https://aws.amazon.com/new/reinvent/).

[15] This report sets out the vision of digital as a catalyst for your business transformation to win, serve, and retain customers in the age of the customer. The future of business is digital. See the "The Digital Business Imperative" Forrester report.

[16] For more information on virtual network infrastructure tenants, see the "Virtual Network Infrastructure" Forrester report.

[17] For more information on design criteria for a customer engagement network, see the "Brief: Best Practices In Deploying A Customer Engagement Network In Retail" Forrester report.

[18] Source: Kat Lister, "Here Are 10 Books To Empower And inspire You," Marie Claire, April 23, 2015 (http://www.marieclaire.co.uk/blogs/548648/10-books-to-empower-you-on-world-book-night.html).

[19] Source: Forrester client inquiries and projects.

[20] For more information on colocation services, see the "Vendor Landscape: Colocation And Data Center Services" Forrester report.

[21] For more detailed information, see the "The Data Center Network Evolution: Three Core Network Management Tools" Forrester report.

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