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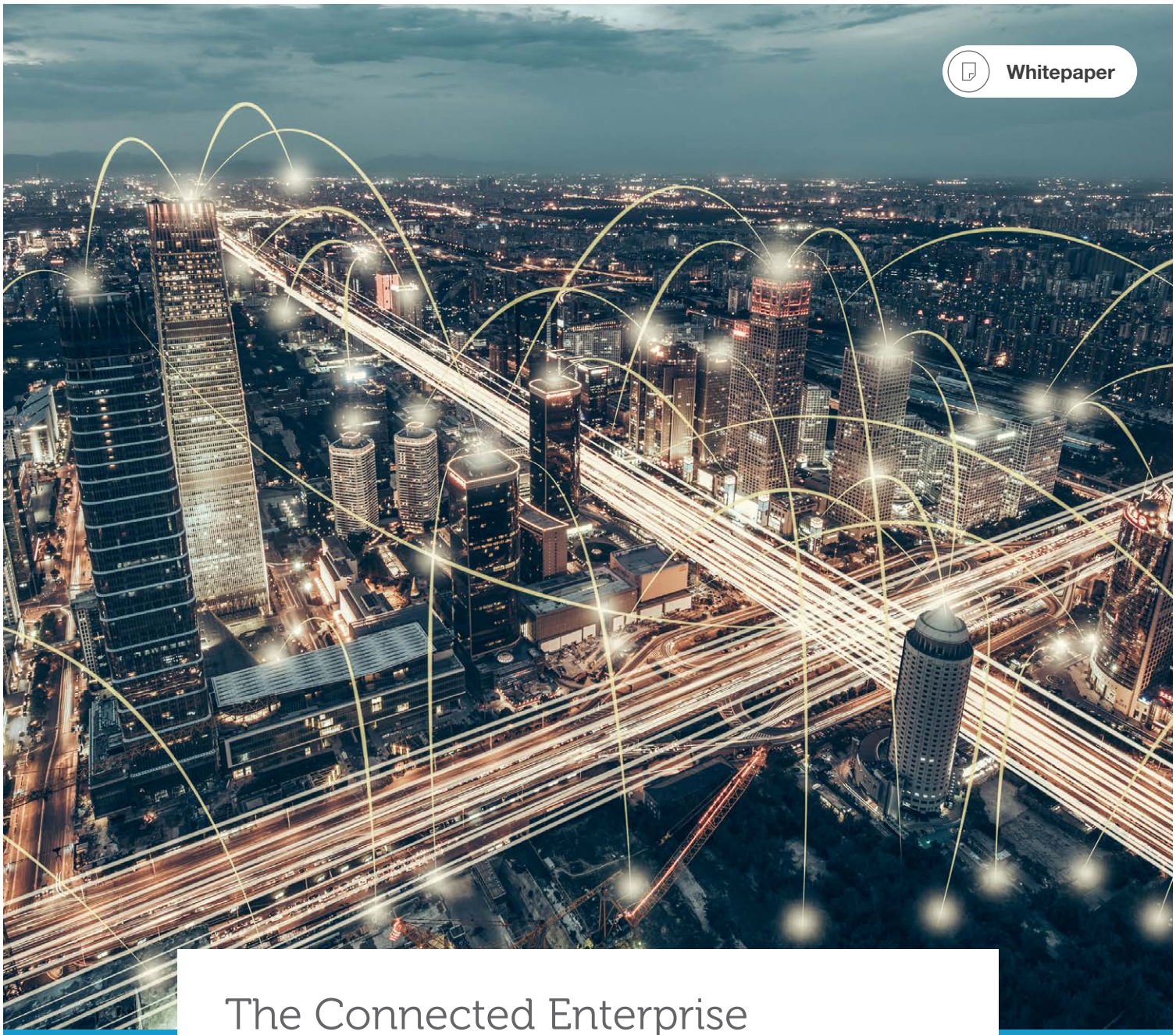

Whitepaper

The Connected Enterprise

Internet connectivity strategy for a hyper-connected world

How to maximise and future-proof connectivity in a hyper-connected world

EXECUTIVE SUMMARY

- Enterprise technology is changing at such a fast pace that businesses can no longer rely on traditional models to provide reliable, high-performance connectivity and meet the evolving needs of users
- Multi-cloud architectures, digital transformation initiatives and the impact of emerging technologies all place increasing strain on internet connectivity, which often lacks the agility to adapt to changing demands
- Cloud architects need to ensure they can provision new cloud-based applications and services, deliver access to public cloud platforms and meet increasing customer expectations – all without compromising necessary performance, resilience and security controls
- Interxion believes new models for internet connectivity are required to support enterprises and network operators in delivering their ongoing digital business strategies
- In this paper we examine the options available to IT architects and strategists to enhance and future-proof their business internet connectivity

INTRODUCTION

Challenging the status quo of enterprise connectivity

Enterprise technologies have transformed considerably in the last decade, and yet our approach to providing the internet connectivity underpinning their performance has in no way kept pace with these developments.

Ten years ago, cloud services were in their infancy; the Software–as-a-Service (SaaS) model was the province of only a few large enterprises and other early adopters. Today, the idea of an enterprise keeping all its applications, IT infrastructure and technology platforms on-premise is becoming increasingly archaic. Instead, businesses of all sizes across many diverse industries are reaping the benefits of cloud services. Such is its continued growth that IDC predicts worldwide spending on public cloud services and infrastructure will reach $160 billion in 2018.[1]

As the adoption of cloud computing has become more pervasive, enterprise reliance on cloud-based applications, compute and infrastructure is expanding at an ever-faster rate. With the omnipresent impacts of digital transformation, it's clear that enterprise IT needs are becoming increasingly cloud-centric. Against this backdrop, internet connectivity and access to cloud applications urgently need fresh, strategic attention.

SaaS applications are increasingly being utilised within enterprises and naturally rely on secure, reliable and fast connectivity. The more that businesses deploy SaaS for their day-to-day operations, the more reliant they become on connectivity to deliver continuous availability to everyday applications such as Salesforce, Office365 and Webex. As the stakes get higher for ensuring business uptime, the risk of any interruption in internet service carries further-reaching consequences.

Internet connectivity is critical for enterprise operations to function, and to present themselves externally, and the move towards digitisation brings a re-assessment of its value. Businesses are increasingly more reliant on the Internet as a channel - often their primary channel - to market. From single-click payment gateways to high definition video, businesses need responsiveness of service and certainty over the availability and resilience of the connection. Where these requirements are not met, the quality and reliability of how the business delivers services to its customers comes under question.

Connectivity strategy has always been an important component of business success, but the drive for digital transformation in enterprise has seen its role escalate beyond a supplied commodity service into a critical utility.

The question cloud and IT architects face today is whether their traditional network and connectivity architectures can provide the reliability and performance upon which today's bandwidth-intensive, business-critical and cloud-reliant systems depend.

Over the past months, Interxion has interviewed some of Europe's leading connectivity experts, as well as many of our business customers, to understand the network challenges that enterprises face today. This paper explores the strategic connectivity options available to enterprises and network operators, including whether traditional models and architectures are sufficient to support their digital business transformation.

[1] https:/www.idc.com/getdoc.jsp?containerId=prUS43511618

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The enterprise IT landscape – new services, new connectivity needs:

- The Software-as-a-Service (SaaS) industry will be worth more than $112 billion by 2019 according to IDC.[2]
- Three quarters of organisations believe nearly all their apps (more than 80%) will be SaaS by 2020.[3]
- Gartner predicts that worldwide Infrastructure as a Service spending is set to reach more than $45 billion in 2018.[4]
- According to Cisco, business IP traffic will grow at an annual rate of 21 per cent from 2016 to 2021.[5]

SECTION 1. FIT-FOR-PURPOSE ENTERPRISE CONNECTIVITY

Connectivity has become a major strategic consideration for enterprises seeking to improve the services they deliver. When operating a digital or cloud-first business, maintaining resilient connections should be a priority to maximise services and control risk. There is therefore a compelling business case for organisations using the Internet as their primary connectivity channel to plan ahead.

The last two decades have indeed served enterprise businesses well under the model of internet traffic handled by a single provider. Operated hand-in-hand with performance and availability SLAs, commitments for contention, upstream and downstream bandwidth; on paper, everything is in place. But the reality is that internet downtime and slow connection speeds still happen, and many businesses lack the transparency and ability to route their own traffic through multiple carriers or to multiple cloud-based services to alleviate these issues.

What's more, as enterprises source more and more services from the cloud, their network architecture grows increasingly complex, unwieldy and thus vulnerable to disruption. Research from RightScale finds that 81% of enterprises now have a multi-cloud strategy, with companies using an average of five public and private clouds, and Gartner predicts that a strategy that includes multiple IaaS and PaaS providers will become the common approach for 80% of enterprises by 2019, up from less than 10% in 2015.[7]

As cloud and network architects design their future infrastructure, they face new demands for simultaneous internet capacity from multiple directions, each as important as the next. Ensuring the availability of web portals, e-commerce shopping sites, social marketplaces and cloud-based call centres, are just a handful of the areas directly impacting revenue generation. It should be no surprise that business IP traffic is growing by 21 per cent annually, and that by 2021 traffic volumes will be three times what they were in 2016.[8]

Couple this with internal customer needs for 24/7 access to multiple SaaS-based business applications, unified comms and conferencing, plus the need to accommodate new regulation, data processing and workloads in public cloud infrastructure – in combination, a holistic picture of the future connectivity needs for the enterprise comes into focus.

In this context, the need to ensure fit for purpose connectivity with higher levels of availability, resilience and capacity, delivered through multiple carriers becomes clear.

Internet Exchanges (IX) have the potential to serve as a key element of the evolving enterprise architecture. IXs are a switching platform that allows a large number of carriers, content platforms, SaaS platforms and clouds to directly exchange traffic with one another. Typically, these are regional / metropolitan platforms providing access and interconnect between all the carriers within a region / metropolitan area. As such connecting to the IXs provides clear advantages for the enterprise, enabling hands-on control of connectivity and providing proximity to multiple high-capacity Internet and Tier 1 networks.

[2] https://www.cio.com/article/2984203/budget/2016-it-budget-predictions-a-cloud-on-the-horizon.html
[3] https://www.techrepublic.com/article/73-of-enterprises-will-run-almost-entirely-on-saas-by-2020-report-says/
[4] https://www.gartner.com/newsroom/id/3616417
[5] https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.html
[6] https://www.rightscale.com/lp/state-of-the-cloud
[7] https://www.gartner.com/binaries/content/assets/events/keywords/catalyst/catus8/a_guidance_framework_for_architecting.pdf

In combination with co-location data centres, they offer:

- Resilient access to multiple carriers and SaaS platforms, ensuring highly available connections and service
- Direct Layer 2 connectivity to multiple national and international carriers and peering providers, thereby ensuring enhanced responsiveness, resilience and performance, bypassing the public internet
- Secure, private and direct Layer 2 connectivity to SaaS platforms, ensuring agility and flexibility to create a multi-cloud environment and optimise cloud workloads without choking available bandwidth for other services

SECTION 2: AN (EX)CHANGE WILL DO YOU GOOD

IXs provide a highly-attractive alternative to traditional connectivity models. Typically located inside colocation data centres, which also provide access to public cloud infrastructure, security and related services, IXs offer carrier-neutral direct connectivity to multiple network providers, cloud and SaaS platforms. This enables reciprocal, cost effective and instant routing of internet traffic through the most efficient, lowest-latency route – holding the key to the ultimate network performance.

Industry perceptions on the suitability of IXs for enterprise network users suggest it is in a period of transition. Enterprises have historically opted to hand over control of traffic and network management to service providers in order to limit in-house responsibility for routing, peering and performance. Business priorities and reliance on the cloud, however, have fundamentally changed the balance of where control over network traffic should ideally reside.

For cloud architects, IXs provide exactly the type of highly-resilient network architecture on which new cloud and digital services depend. While enterprises typically have very different business objectives and goals from traditional participants in IXs (such as ISPs, CDNs and other carriers), these emerging enterprise business needs are fuelling an evolution in IXs too.

According to Delphine Masciopinto, CCO at France-IX

> *"The nature of IXs is changing and its user base grows beyond the usual suspects of internet professionals to include any business cloud user. The participants are using Internet-based applications, services and infrastructures to change the way they do business, and IXs offer a high performing platform for them to access these resources."*

> **Martin Eriksson, Interconnection Relations Manager at Swedish IX Netnod** adds
>
> *"We're currently in a maturity period. The original members [of IXs] are those that were really focused on Internet-as-a-Platform. As internet connectivity becomes more pervasive, a greater number of enterprises want to take control of how they connect."*

As the convergence point for many of the Internet's network operators, IXs combine multiple layers of redundancy offering scalability and performance for enterprise connectivity through peering relationships to national and international carriers coupled with significant cost efficiencies.

IXs are primarily located within colocation data centres, which also provide secure access to public cloud infrastructure through private networked gateways inside the data centre. This combination offers further advantage to enterprises – colocating enterprise infrastructure within an IX data centre facility provides immediate proximity to backbone Internet connectivity, as well as offering the capability to build hybrid and multi-cloud environments right on top of high-capacity connectivity.

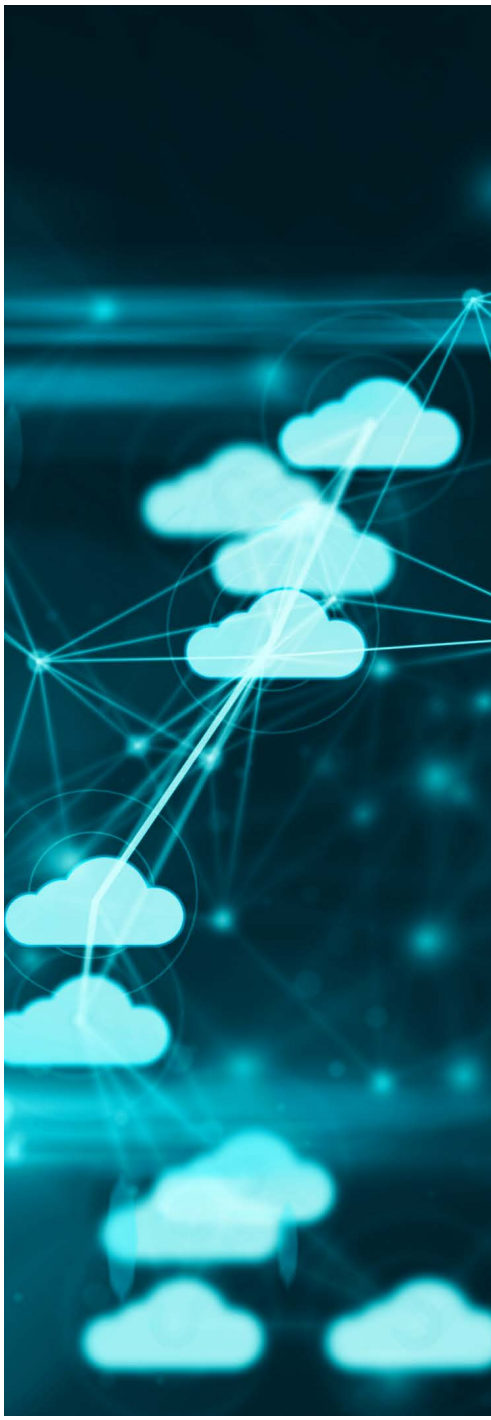
[8] https://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/complete-white-paper-c11-481360.html

Open to enterprise

As IXs mature, a greater number of enterprises are actively participating in peering networks. The IX representatives interviewed for this whitepaper, work with enterprise customers and members across a range of sectors, with a multitude of industry use cases:

- **Financial services;** IX participation serves the needs of retail, wholesale and intermediary organisations including online banking and payment service providers, card issuers, payments authorisers and banks. These businesses commonly process enormous volumes of daily transactions; maximising availability, resilience and responsiveness of their infrastructure is critical, with backbone connectivity enabling fast and secure payments. As financial technology and customer behaviour evolve in tandem, having the infrastructure in place to adapt and scale to growing demands for fast and instantaneous transactions presents a strong opportunity for financial services companies to outperform competitors in user experience and revenue growth.
- **Automotive;** Internet applications are disrupting the automotive industry as buyers increasingly expect seamless integration with connected devices both inside and outside of their vehicles. Manufacturers and vendors in this industry started looking at IXs as providers for global peering relationships across every corner of the globe, giving them the best possible latency across their infrastructure, to deliver fast and seamless experience for any of their connected or autonomous vehicles, wherever they might be in the world. The automotive industry is at a critical inflexion point – traditional car manufacturers are now competing with software companies for market share. The industry leaders will likely be those that can best adapt to consumer needs and integrate with their digital lifestyle and behaviours. Fast and reliable internet connectivity is crucial in this regard.
- **E-commerce;** Whilst the battle for bricks and mortar retail rages, online stores face increasing competition for consumers, with ever higher expectations, and from increasing geographic locations. On any given webstore the various components that operate simultaneously, ranging from front-end factors like graphics and advertising, to back-end elements such as cloud database, payments and security, are all a key part of how the customer interacts with the site. User experience is critical, and online retailers live and die on responsive and resilient infrastructure. Taking control of their traffic through IXs and forging peering relationships is vital in converting visits into purchases, and turning customer experience into their business advantage.

SECTION 3: PEERING AHEAD TO ENTERPRISE ADVANTAGE



Digital transformation presents vast new opportunities for enterprise, and cloud architects are instrumental in delivering the connectivity and resilience that successfully translates this vision into ongoing business. Taking control of network traffic is the first step in delivering the fundamental flexibility, reliability and scale to support transformation in every area across front, middle and back office.

Direct traffic exchange – or peering, which is primarily enabled through an IX – is fast emerging as a practical solution for enterprises seeking more robust, reliable and high-performance connectivity. Peering enables direct, high-capacity access to multiple carrier networks, offering both primary transit and backup connections on-demand, with both the flexibility to scale up and down, with the confidence and control that peering relationships offer for business resilience.

Reliable and high-performance connectivity is now essential across every type of enterprise business. Until recently, factors such as lower latency and provisioning high bandwidth were the concern of very specialised organisations, such as content delivery networks. Now, a greater range of organisations are seeking to establish a connectivity platform that better suits their evolving business's requirements.

> *"Peering is about guaranteeing outcomes. It's often not necessarily the case that our customers were having problems with their providers, but more that they needed to take control of their traffic in order to gain a business advantage. If you value connectivity and want to have control of the connectivity yourself, then peering is essential."*
>
> **Martin Eriksson,** at Netnod comments

Peering improves the risk profile of cloud-based enterprise IT. Connecting via a third-party can leave enterprises vulnerable to unscheduled downtime or other outages that can cripple their ability to provide critical digital services to internal and external customers. Because peering provides connections to multiple networks, users gain much greater levels of redundancy and resilience. IXs also help to mitigate the risk of impact from DDoS attacks by various means, redirecting traffic to DDoS protection services or increasing the attack surface, to ensure enterprises maintain normal operations.

Peer without fear

Peering is a model where organisations exchange internet traffic on a mutually-beneficial basis, facilitated by the IX hub which brings the network operators together – including provisioning access for enterprise networks. The benefits of peering include lower latency, scalability, greater resilience and a massively extended geographic footprint for high-performance network transit, thanks to the number and quality of relationships between the IX and its network partners.

Enterprise users are already adopting peering as part of their connectivity strategy, to enhance the performance of their internal and customer-facing applications and de-risk their reliance on single connectivity sources.

// **Michael Rabinowitz,** Director of Marketing & Strategy for Interxion's Connectivity segment points out,

The enterprises moving towards peering for the first time are those enterprises that have software or applications that they want to make available to a broad community and need to make sure that they have a highly-resilient and deterministic performance of their content or software."

// While **Delphine Masciopinto at France-IX** explains:

The main concern of current enterprises is often their web-based activities, as they're seeking better performance for customer-facing platforms. This is especially true of e-commerce companies for whom strong customer experience is essential. Peering provides direct access to the fastest routes for key services, with IP packets following the shortest path, offering low latency, speed and cost savings."

// **Jesse Robbers, CCO at Amsterdam's AMS-IX,** adds:

We're already seeing enterprise participation in our exchange, driven to a large extent by the expectation of customers and end-users for a fast, responsive experience. Enterprises are moving to platforms like Office365 and Salesforce, and therefore need to ensure the performance of the ecosystem."

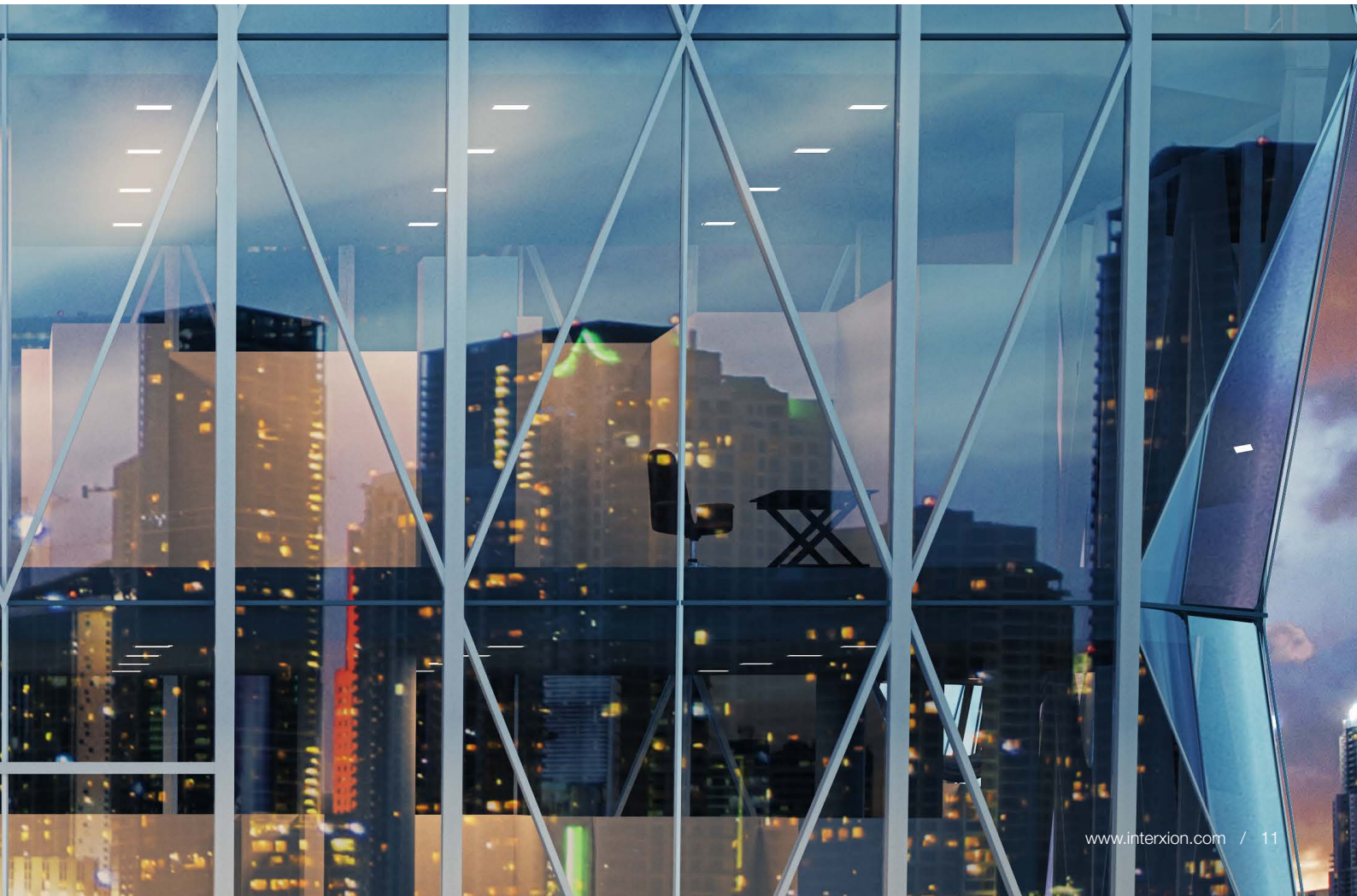
Support for your port

IXs are also aware of the growing business opportunity from enterprise users, and they are actively adapting their peering services to the wider business community.

Where once they may have provided little more than a port, which the user had to manage themselves, IXs are now providing a much greater range of support and value-added services, making them a feasible and attractive option for enterprise adopters. Many are working to simplify the peering process through standard bundles, while collaborations with Integrators and Managed Service Providers (MSP) present within the IX community are increasingly common as IXs seek to bridge the knowledge gap for architects to successfully design and deploy their connectivity strategy.

// As **Ivo Ivanov, CEO of DE-CIX International,** states:

Enterprises are looking to the future and seeing the value of multiple interconnections. They want to connect with each other and with multiple cloud and SaaS providers as well as with their customers and partners; resilient, secure, easy and everywhere. It's our job to present a range of services that can serve each enterprise's specific needs, make those services simple to access, and work with data centre partners like Interxion to offer the strongest community possible."



SECTION 4: GETTING STARTED WITH IX FOR ENTERPRISE

As Delphine Masciopinto at France-IX states: “For many enterprises, the greatest barrier to peering is simply getting started. Undoubtedly it requires a level of IT maturity and technical know-how, but the greatest leap is the foresight to take hands-on management of their connectivity.”

While the autonomous approach may require new skills and methodology for enterprise networking teams, Masciopinto adds: “Those that do make it a priority see how it can help them get the greatest benefit from their core cloud services and control of their traffic.”

The true challenge for rethinking enterprise connectivity often lies in aligning it to your current and future business needs. With this understanding in place, the following considerations offer useful guidance for building an IX into an enterprise network and connectivity strategy:

1. Identify priority applications and infrastructure

- Conduct analysis of IT usage across the enterprise and identify the key applications or infrastructure that would benefit from being connected directly to strategic networks or platforms
- Create a clear network map of which applications and workloads are running on which infrastructure
- Review your infrastructure strategy in context of new efficiency, flexibility and agility advantages from deploying through colocation within an IX enabled data centre facility

Having a clear view of which elements of IT are most critical will help to enhance the availability, resilience or performance of the applications.

2. Target networks, platforms and applications

- Identify the key networks, SaaS applications and business community partners with whom you require enhanced connectivity in terms of capacity, availability, resilience or performance
- Investigate how the IX’s network options fit with your enterprise’s network, with specific consideration of reach and proximity to your markets and customers
- Review the existing IX members and network operators to consider their ability to add value to your strategy – for instance, locations, network protocols, and community members
- Ensure that the target networks and platforms are members of your intended IX

Being certain that the IX’s network aligns with your connectivity strategy will help serve immediate and longer-term connectivity needs.

3. Conduct benefit analysis

- Ensure a clear understanding of the benefit and impact that you are looking to achieve and seek to quantify this where possible. Target metrics are likely to include enhanced responsiveness, resilience and availability
- Start with the customer in mind – identify where customers rely on internet service to prioritise systems and applications requiring high-reliability and high-performance connectivity
- Knowing the metrics you're seeking to improve and calculating sound estimates for improvement will ensure that you remain focused on the primary target, and are in a position to justify any incremental expenditure

Every enterprise has its own unique systems and processes, and benefit analysis will help you to scope your requirements. The scale of your enterprise's internet traffic volume and international transit requirements will help to build a sound business case for peering.

4. Engage with the peering community

- Engage with your local IX and take advantage of opportunities to enhance your peering network
- Find out what value-added services your IX provides. Typically, they provide workshops and roundtables for new participants that provide professional networking and educational opportunities
- Ensure your IX selection creates better connections for the services your business needs and facilitates access to the right relationships
- Once you've identified appropriate peering partners, prioritise the relationships most important to your business then build up based on requirements

Becoming active in your peering community will help you to understand how peering operates in greater detail and can often provide you with a network of similar organisations who are currently or who have recently adopted peering through an IX.

5. Acquire the necessary knowledge and skills

- Ensure that you have the appropriate networking skills and capabilities to be able to implement and operate a peering connection
- Often enterprises with significant networks will have the expertise in-house, whilst other smaller organisations may need to acquire the skills internally or work with a managed service provider or a systems integrator
- Upskilling or hiring additional support should be considered well ahead of selecting the right IX locations

Having clarity over which networking capabilities you have in-house or can source externally will help provide confidence and peace of mind that you're well prepared to take hands-on control of your network traffic and connectivity operations.

6. Start simple

- Start with simple network implementations. Deploy infrastructure in an initial colocation facility and acquire a connection to the IX. Many IXs provide Route Servers, to provide default peering routes, to simplify the initial configuration of peering. Leverage these capabilities
- Over time you may wish to fine tune and enhance your network, however this will often evolve as you acquire experience and understanding of its particular needs and patterns over time

The support of your colocation provider and IX partner will help you to navigate the complexities of peering and build the right network to suit your enterprise needs.

SECTION 5: ENTERPRISE EXCELLENCE IN CONNECTIVITY

As enterprises increasingly leverage IXs within their connectivity strategy, new performance benchmarks will be established for effective, timely and reliable network traffic management. From processing speed for front-end web transactions to traffic through-put between multiple international locations to user-experience and latency expectations for internal application users, the underlying connectivity and the ability for cloud architects and network managers to control it in tune with the business, will become a critical factor in sustaining business competitiveness.

The way we use the Internet for business is changing, and fast. Demands for a new approach to connectivity are emerging in every digital dimension - the proliferation of cloud-based services and growth of SaaS applications; the impact of new technologies, such as connected devices, artificial intelligence and analytics, offer up just some of the areas where traditional models will quickly fall short in both performance and reliability.

Consumer expectations too continue to fuel the need for flexibility and scale in enterprise connectivity, with direct implications for business revenue and reputation. High-availability, high-performance digital services, necessitate even faster and more responsive network connectivity to ensure consumers receive the very best online experience every time they engage with an enterprise and de-risk the possibility of service discontinuity.

// As **Kurtis Lindqvist, CMO of London Internet Exchange (LINX)** comments:

> *Customer expectations have shifted, but so have the applications and types of services they're using. Greater use of video and real-time applications has created demands for low-latency and reliability, and more interactive websites require good user experience. Peering offers a simple solution for enterprises to meet these new expectations."*

These considerations should go a long way towards convincing budget holders that connectivity is not only an IT issue, but one which cuts to the very heart of business strategy. Adopting a distributed approach to connectivity and introducing the greatest degree of speed and resilience to the network must be made a business imperative.

What businesses need, above all, is to be able to take control of their data and traffic as it moves through their own network and beyond – a near impossibility when relying on third-party connectivity. Peering is now an essential consideration for enterprise network decision-makers, delivering direct routes to customers and business partners up and down the supply chain through multiple ISPs, carriers, SaaS providers, content delivery networks and between other enterprises. This brings greater choice, reliability and performance; the essential foundations of tomorrow's digital business models.

As the advances of digital pervade our workplaces, our markets and our customers, every single data packet demands an optimised route to destination, with full integrity and security as standard. Only peering can deliver the performance and speed our internet-centric enterprises rely on to thrive.

To capitalise on these benefits, enterprises need to look to IXs that offer true communities of network and service operators. With many IXs now offering comprehensive support and expertise, there's every reason to investigate the new world of connectivity opportunities that will help enterprises excel in an increasingly digital age.

To find out how Interxion can help your business explore the benefits of IX connectivity and peering, visit **www.interxion.com**

About Interxion

Interxion (NYSE: INXN) is a leading provider of carrier and cloud-neutral colocation data centre services in Europe, serving a wide range of customers through over 50 data centres in 11 European countries. Interxion's uniformly designed, energy efficient data centres offer customers extensive security and uptime for their mission-critical applications.

With over 700 connectivity providers, 21 European Internet exchanges, and most leading cloud and digital media platforms across its footprint, Interxion has created connectivity, cloud, content and finance hubs that foster growing customer communities of interest. For more information, please visit **www.interxion.com**

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