CONNECTIVITY: SERIES 1

NAVIGATING THE CHALLENGES OF CONNECTIVITY IN TODAY'S DIGITAL AGE

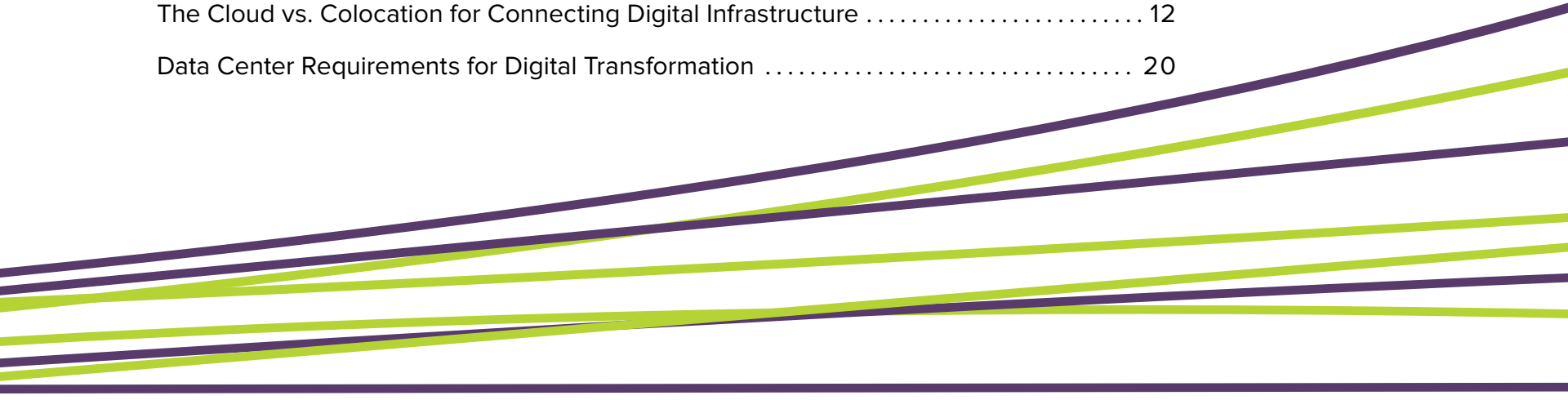
DC BLOX

connected data centers for digital business

"As IT executives develop the blueprints to deliver on their digital transformation initiatives, the growing challenge of connecting to a myriad of partners, providers and platforms looms. Digital infrastructure is becoming increasingly distributed and CIOs need to figure out how to get away from legacy systems that work against the agility needed to win in today's business environment. A Tier 3 colocation data center with rich connectivity warrants serious consideration as a strategic component of IT's future digital architecture."

— Bill Thomson – VP of Marketing and Product, DC BLOX

Navigating the Challenges of Connectivity in Today's Digital Age



Digital Transformation and the Challenge of Data Center Connectivity

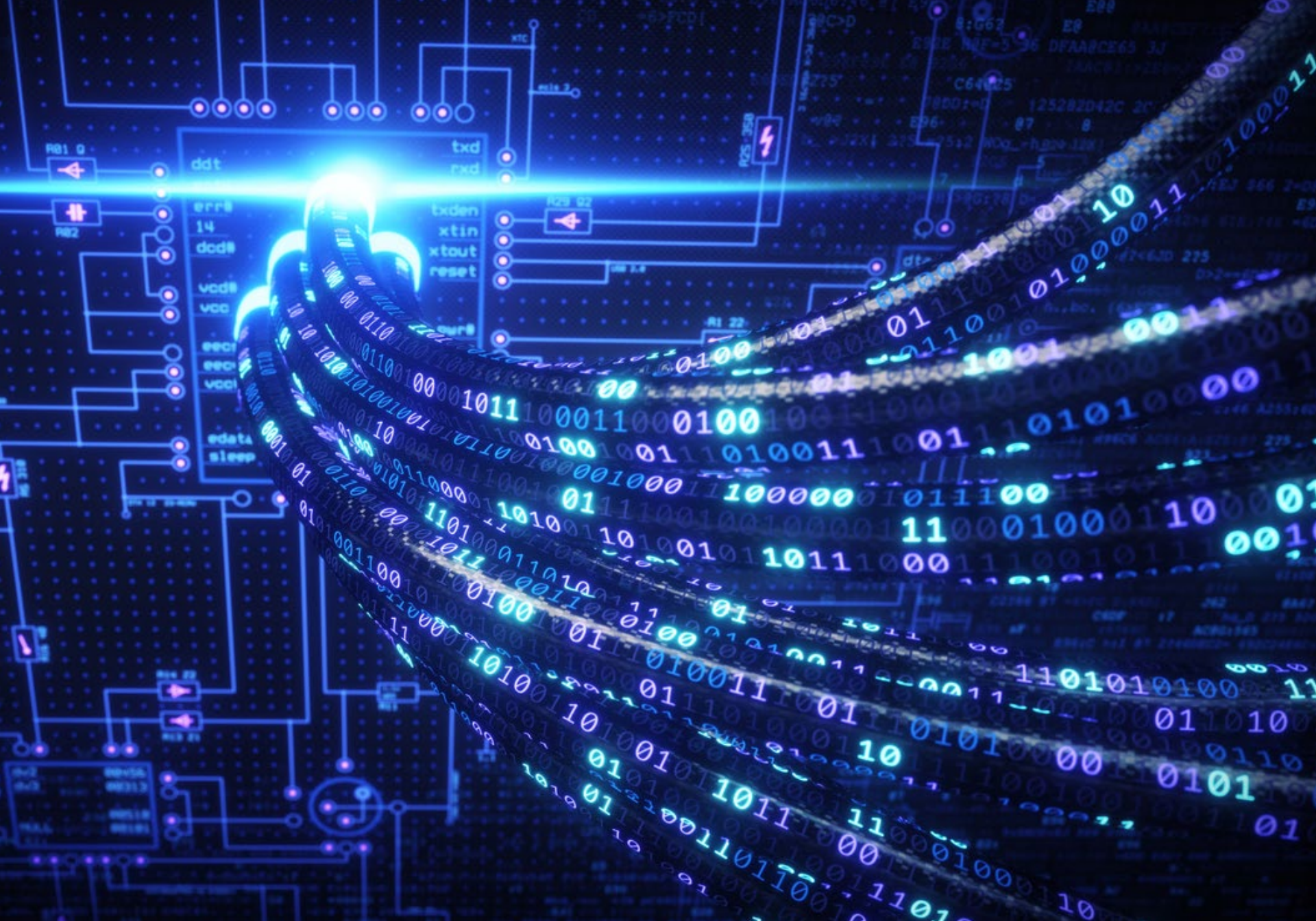
The job of the IT executive is changing. Rapidly. Digital transformation, driven by the accelerating advances and proliferation of technology, is impacting every industry and disrupting many. The business needs IT to help accelerate growth and avoid serious competitive threats. So, IT executives now sit in the C-suite with a strategic mission to leverage technology to improve efficiency, decision making, business reach, customer satisfaction and profitability. The digitalization of business is separating the winners from the losers faster than ever. The stakes could not be higher. CIOs need to figure out how to get away from legacy infrastructure that works against the agility needed to win in today's business environment. Part of that legacy infrastructure may include the company's own data center.

So, what's the CIO to do? Let's start from the beginning.

What is Digital Transformation?

Digital transformation is the integration of digital technology into all areas of a business, fundamentally changing how you operate and deliver value to customers.

Digital transformation goes beyond IT and the traditional data center. It takes legacy models of operating and infrastructure and transforms them into lively digital-engagement models. Digital first, a communications theory invented by online content publishers, bypasses traditional print media in favor of the newer media channels. It provides a perfect illustration for the broader theme. Digital first emphasizes giving customers the information they want to access online, creating opportunities for self-service so they can transact when it's convenient for them – 24/7/365. Business meetings, shopping, financial transactions and many more segments of expanding value in day-to-day living are taking place through digital channels.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Using technology to enhance business is not new, it's just the increasing pace by which new technology is being introduced. Creating new platforms, defining new paradigms, enabling new experiences. It's an exponential growth curve that is changing business forever. If there was ever a time for IT to lead, it is now.

Why is Digital Transformation Important?

Those who don't adapt face the possibility of extinction. It's a harsh reality. The statistics tell the story.

- A stunning **52% of the Fortune 500** have disappeared in the last 15 years, many from failure to reinvent.
- The **tenure of the old guard** Fortune 500 companies is diminishing. The average lifespan of companies on the S&P in 2019 is slightly over 20 years, down from 33 years in 1964, and the trend is accelerating.
- Companies turning over last year include Barnes & Noble, Eastman Kodak, Sears, and the New York Times. They were all outperformed by more digitally advanced competitors in their industries.
- The **International Data Corporation (IDC)** projects 40% of all tech spending will go to digital transformations, reaching $2 Trillion in 2019.

> *Only one-quarter of the companies we surveyed have a clear understanding of the new and under-performing digital touchpoints. Yet 88% of businesses say they are undergoing a digital transformation.*
> *- Altimeter*

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Examples of Digital Business Transformation

IT is definitely in the hot seat, but the rewards are there when your company gets things right. "Digital innovators," says Forrester, "actually rewrite the rules of business, and they do it to improve customer outcomes while simultaneously improving operational objectives."

OnePlus Systems' Smart Dumpsters

OnePlus Systems, based in Northbrook Illinois, is the original manufacturer of container fullness and control systems. These systems equip containers with sensors designed to weigh them and to transmit information to a central database, where a routing application schedules pickup only when they are full.

Imagine now five companies bidding in a municipality for a waste removal contract. The company deploying OnePlus Systems' solution outperforms and out-prices the competition. When a company deploys technology that changes the underlying economics of the market, the competition must transform too.

Caterpillar's Predictive Diagnostics "Repair Before Failure"

Caterpillar, the heavy machinery manufacturer, provides a telematic predictive diagnostic hardware system that operates on the premise that prevention is better than cure. It builds sensors into their equipment that will alert fleet owners when something like a transmission is at risk. Caterpillar provides a strategy on how to cut costs in half or more by following early maintenance strategies.

Caterpillar pursued this new technology specifically to ward off competition, and it obviously raises the bar for any unfortunate company they are up against.

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Obstacles to Digital Transformation within the Enterprise

After surveying over 1000 business decision makers, **Riverbed** found that five of the most significant barriers when working towards a better digital strategy include:

1. Budget constraints (51%)
2. Overly complex or rigid legacy IT infrastructure (45%)
3. Lack of full visibility across the digital or end-user experience (40%)
4. Lack of available or appropriately-skilled personnel (39%)
5. Lack of buy-in from leadership on prioritizing digital initiatives (37%)

The report also revealed that 77% of global decision makers believe it's important for businesses to actively invest in improving digital experiences within the next year. Some key areas business decision makers suggest investing in are modernizing networks and infrastructure, better monitoring and managing user digital experience, improving service desk capabilities, and accelerating application development.

With an increasingly distributed IT infrastructure, it's no wonder that modernizing networks and infrastructure are so critical to their success and are at the top of their to-do list.

A Key Challenge with Digital Transformation

Mobile users want to consume services from wherever they are. IT departments need to leverage SaaS applications and public cloud infrastructure to avoid costly and time-consuming on-premise deployments. Databases must be managed securely in the company's data center. Information needs to be shared with partners. Data must be protected off-site. So, for a business planning their digital strategy, let's review the components and relationships that may be involved.

Partners

Business is frequently done in cooperation with partners. For example, supply chains require the exchange of orders, inventory, shipment schedules, pricing and invoicing and interconnectivity is required to facilitate the exchange of this information digitally.

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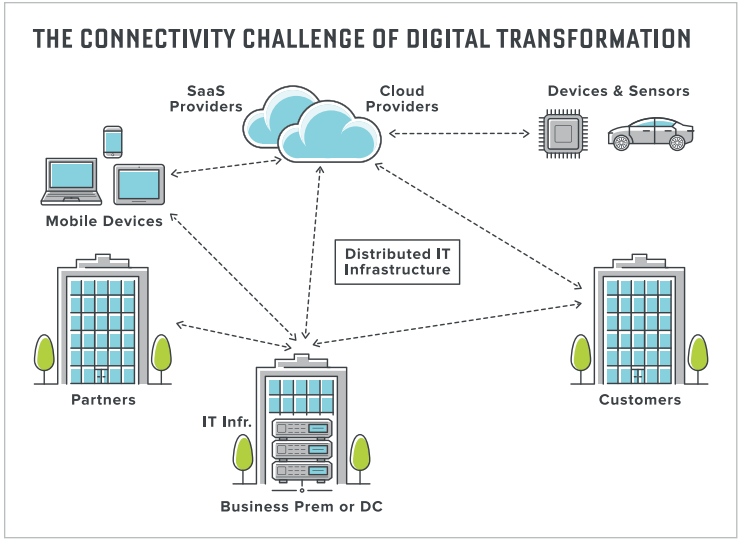

Mobile Apps

Applications may need to extract data from a remote system and to present it to the mobile user from anywhere and then to execute and manage transactions such as purchases and deliveries.

Cloud Providers

E-Commerce, remote data backup, databases, Internet-of-Things and websites are just a few of the myriad of applications and services that are running in cloud environments. And in hybrid IT environments, there may be interaction between private cloud or legacy systems running in company-owned data centers and public cloud apps. Businesses are also increasingly using multiple cloud providers to optimize a variety of use cases.

SaaS Providers

Services like Salesforce, ADP and Microsoft Office 365 support millions of users and are accessed from wherever those users are located, worldwide. Of course, users expect performance as if they were accessing a local system. In addition, interaction may be required with company-developed business applications.

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Devices & Sensors

The Internet of Things (aka IoT) is resulting in a proliferation of devices requiring the movement of data across networks. Think about a home automation system that allows users to control thermostats and security cameras from a mobile phone. Current projections are 25 billion devices will be connected in the next five years. According to the **McKinsey** 2017 Enterprise IoT Executive Survey, 96% of companies expect to increase their IoT spending over the next three years.

Customers

Providing access to your business's services 24/7/365 at the convenience and location of the end customer is a main objective of digital transformation initiatives. Pushing out user interfaces far beyond the company's data center, while enabling rapid, secure access to sensitive data is at the core of the challenge.

With the spreading of IT infrastructure far and wide, and an increasingly distributed ecosystem of partners, how will the IT organization connect it all? The local communications provider may be able to address connections from the company-owned data center to some components, but they are often limited in their reach, and there are few alternative options. Can the provider supply private connections directly to your public cloud providers? Can they supply the bandwidth needed for high-volume applications? Will they provision a low-latency connection to an Internet Exchange to access hundreds of other providers? How quickly can they provision the services you need?

Many businesses are recognizing the folly of trying to connect everything from their company-owned data center. So, they are moving infrastructure to public cloud providers instead, believing that they can address their connectivity challenges. But is that a realistic assumption?

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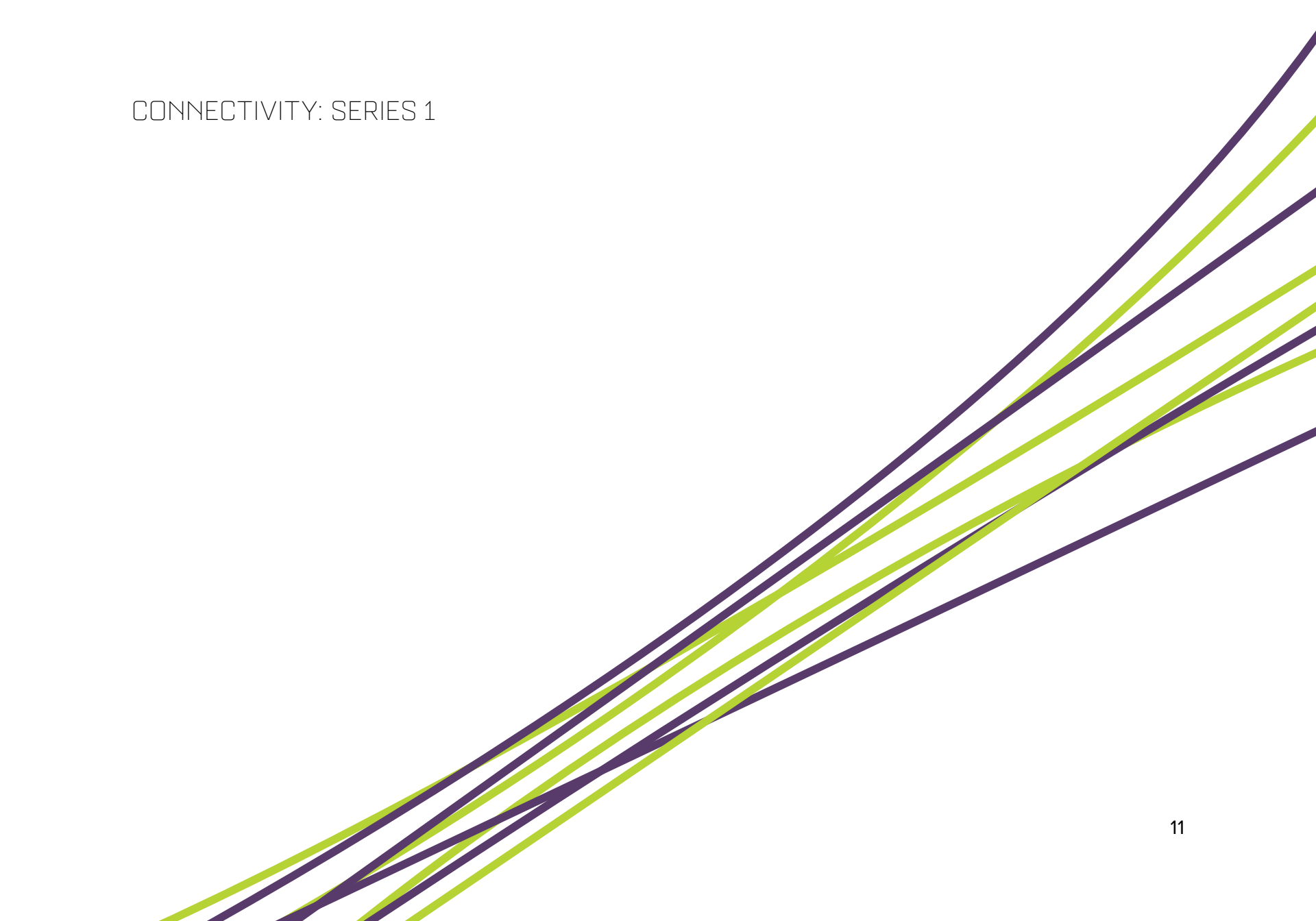

The Cloud vs. Colocation for Connecting Digital Infrastructure

As IT executives develop the blueprints and architecture needed to deliver on their digital transformation initiatives, the growing challenge of connecting to a myriad of partners, providers and platforms looms. Digital infrastructure is becoming increasingly distributed and local communications providers from a company-owned data center may not be able to meet the bandwidth, latency, location and cost requirements necessary to realize their digital goals.

Many IT organizations have leveraged the cloud to deploy scalable infrastructure and are now hoping it will address their growing connectivity needs. Let's explore some of the challenges of leveraging the cloud for connectivity across an increasingly distributed IT environment, and how a **colocation data center** can play a key role in meeting the need to connect all the infrastructure and partners required of today's digital business.

Why Businesses Are Moving to the Cloud

According to Gartner, the **Worldwide Public Cloud Service Revenue Forecast** for IaaS is expected to reach $39.5B in 2019, and to jump another $10.4B reaching $49.9B by the end of 2020. The lure of scalable infrastructure on demand, capital avoidance, and outsourced management is driving applications out of the company's data center and is enabling new services to be developed specifically on cloud platforms.

Cloud solves a myriad of problems, but with the potential benefits come new challenges.

Challenges in Moving to the Cloud

Determining which workloads are appropriate for the cloud and how to address the connectivity requirements of the business's current and future plans is an important issue in planning IT's evolving architecture. There are many factors to consider including downtime and availability, application conversion time and cost, security and privacy, cost


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management and containment, application performance and meeting compliance requirements. Not all applications will be suitable for cloud environments. In addition, the challenge of connectivity across all of the distributed components of IT's evolving infrastructure have to be factored into the decision on where workloads should live.

Cloud Connectivity Challenges

While it's true that the cloud may enhance connectivity when compared to the options available from a business's own data center, there are still challenges inherent in cloud implementations for companies considering cloud-first or cloud-only strategies.

Complexity

Configuring and managing network services to connect to the myriad of partners, business locations, applications and devices in today's digital environment can be daunting. Amazon Web Services, Microsoft Azure, Google Cloud and others have sophisticated sets of networking services to accommodate a variety of use cases, including private connections from business locations, content delivery networks, load balancers, firewalls, VPNs and more.

The responsibility to set up, test and manage these services rests with the customer and can be challenging without deep cloud networking expertise. That is especially true if a business needs to connect to services hosted by multiple cloud providers.

Cost

Cost is another issue with public cloud network services. Network costs are unpredictable. For example, AWS may charge for port hours, numbers of connected endpoints, data processing, data transfer and distance depending upon the type of service. Moreover, multiple services or networks may be involved.

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Predicting and limiting these costs can be difficult even with the help of provider calculators. In addition, the usage-based pricing inherent to most cloud providers' network services tends to favor more intermittent traffic rather than continuous loads.

Performance

Performance challenges are another public cloud provider network consideration. With geographical availability limits on cloud infrastructure, data from end users, devices or applications may need to travel over multiple networks, including the public Internet and over distances that result in poor application performance due to latency.

Content delivery networks may help but may again increase the cost and complexity beyond the benefit. For these reasons, there are limits to the applications that can be feasibly moved to the cloud.

The Colocation Data Center's Role in Digital Infrastructure

So far, we've considered the connectivity challenges of a business-owned data center, and established that, though the cloud offers great benefits to IT, it does not solve all of the connectivity challenges to IT's distributed assets and not all applications are suitable for cloud environments. Let's now look how a carrier-neutral, Tier 3-rated multi-tenant data center with rich connectivity can become an integral part of IT's digital infrastructure.

A multi-tenant data center offers the opportunity to move compute and storage infrastructure into a colocation facility that is highly connected to the networks you need to support today's distributed IT, while also leveraging the cloud for suitable applications.

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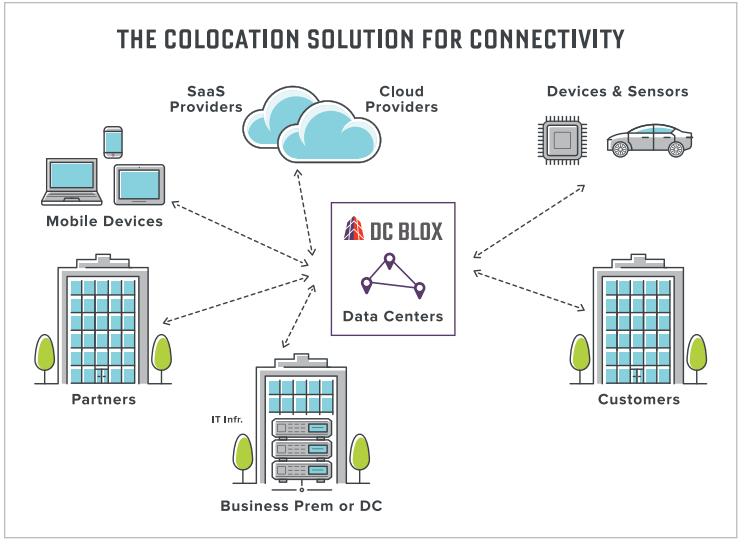

Infrastructure within the data center can then connect with cloud apps in a hybrid-cloud or multi-cloud model, while also connecting to all the other partners, providers and platforms needed to support other elements of your business's services.

A strong data center partner can enable the agility needed in today's fast-moving IT environment and should serve an important role in IT's future digital architecture.

Reliability

Maintaining 100% uptime is the goal for all organizations. Check for a multi-tenant data center provider with at least a Tier 3 rating (per **Uptime Institute's** standards), redundant power distribution and resilient networks with physically diverse routes and latency guarantees.

A good data center provider is happy to inform potential clients of their SLAs and reliability record. Often, the reliability of a modern Tier 3 data center will far exceed an older company-owned facility. When attempting to gain information from a cloud provider, it may be difficult to get the topology or architecture of their network. SLAs are available for some services, but businesses won't likely see much of a service credit if those SLAs are not met.

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Security & Privacy
Placing company infrastructure in a secure data center, rather than a cloud environment, enables more control, visibility, and accountability. The customer manages the digital security infrastructure as well as the appropriate policies and procedures. The data center provider should be able to describe the multiple layers of physical security in place to protect your company's equipment.

A data center provider like DC BLOX that offers Cloud Storage enables businesses to back up data from their primary storage systems and also enables the copying of stored data to a secondary site for geographic diversity and additional data protection.

Application Performance
Multi-tenant data centers can improve application performance in several ways. Performance may be improved through the customer's deployment of specialized hardware. Cloud providers offer standard platforms that may not meet application performance requirements.

In addition, tuning certain platform parameters may help application performance when you are in control of the hardware, versus the more limited options available on a cloud provider's platform.

Finally, application performance can be enhanced by deploying compute resources in data center locations physically close to end customers where no cloud provider data centers are available. Cloud data centers and even their content delivery locations tend to be located only in major metropolitan areas.

Compliance
A secure multi-tenant data center with appropriate certifications housing company-owned infrastructure can often enable businesses to more readily meet their

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compliance requirements than business owned data centers or cloud alternatives. With the added control of data on company-owned servers and business processes fully managed by the company, passing compliance audits are much more straightforward.

Connectivity
Connectivity is where a modern, richly connected, multi-tenant data center shines. With proximity to high-speed optical fiber paths, you can get anywhere from there. And you can get there fast. Yet, at the same time, you can protect your sensitive data by keeping it on your own equipment in a secure facility and know exactly where it is. You can deploy workloads where they make the most economical sense, and still privately connect to applications running in the cloud.

A local multi-tenant data center partner that focuses on robust connectivity also has the expert staff to design and implement the network to meet your requirements. Find a partner with proven expertise and look for following attributes:

Carrier Neutral
To meet clients' varied connectivity needs, the data center provider should build in a variety of carriers. A network fabric connecting each data center location offers clients their choice of carriers across the entire provider's footprint.

High Bandwidth Connectivity
Data centers should have high-capacity bandwidth of at least 100Gbps. Businesses often cannot get this capacity from their business location.

Private Network Fabric
Data centers should supply private, low latency connectivity from every data center to multiple Internet Exchanges to enable access to hundreds of providers for a truly global reach.

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Software-Defined Network
Data centers should enable rapid provisioning of network services to match the speed of today's digital business.

Cloud Provider Connectivity
A multi-tenant data center should provide direct private connections to all major cloud providers and support hybrid and multi-cloud configurations.

Local Support
Data centers should have proven expertise in networking and connectivity. A client must have access to knowledgeable staff to help design, configure and manage network connections. This reduces the burden on your existing staff and eliminates the need to hire hard-to-find qualified staff.

Cloud vs. Colocation: Final Thoughts

The digital revolution continues to accelerate and nobody without a crystal ball can tell where it's going. A few things are certain though and one is that the days of managing everything from a company's local data center are rapidly coming to an end. The need to engage and connect to an increasing number of entities is a principle you can count on.

Digital infrastructure is scattering everywhere, and you need to connect to it. Businesses need partners that provide them the agility and expertise to navigate, attack and respond. So, consider how a local colocation data center partner can sit at the core of your business's digital infrastructure to ensure you're ready for the challenge. And buckle your seat belt!

Data Center Requirements for Digital Transformation

Strategic Data Center Partnerships Accelerate Digital Transformation

A strategic data center partnership is one of the smartest relationships a business can form in developing their digital transformation strategy. It's true for any company looking to overcome the constraints of their legacy infrastructure to accelerate their digital business goals. Secure and reliable power and space are fundamental, but connectivity enables the agility necessary to grow.

In addition, more companies are realizing the challenges of capitalizing and resourcing their own internal data center operations. Outsourcing to a data center partner allows businesses to focus their resources on core business imperatives.

IT infrastructure is becoming increasingly distributed and connectivity across the ecosystem of partners, providers and platforms requires flexibility, speed and capacity. A company-owned data center with limited connectivity partner options may not be able to get you there. The public cloud provides an enterprise with many advantages, but connectivity across the full ecosystem can still be costly and complex.

Your plans should include a reliable colocation data center with rich network connectivity at its core providing a firm foundation for your digital infrastructure.

Data Center Requirements for Your Digital Transformation Strategy

In choosing a strong data center partner to meet your digital business goals, you should consider the following criteria:

Reliability

A robust data center provider supports Uptime Institute's Tier 3 standards which ensures concurrent maintainability. That means that the data center has two power distribution paths to customers' equipment, and one path can be taken

CONTINUED | Data Center Requirements for Digital Transformation

off-line without impacting operations. Thus, there are dual UPS feeds to every cabinet and N+1 UPS systems, power generators and cooling systems ensuring sustained, reliable operations in the event of a utility power failure.

A data center provider can be a key partner to support your disaster recovery and business continuity objectives. All DC BLOX data centers are connected by a private network, which means that computing infrastructure can be placed in two data center facilities for geo-redundancy. DC BLOX data centers are located far enough away from each other (generally 100-200 miles) to be on different power grids, but close enough to be drivable to access equipment when needed. In a disaster recovery configuration, the unlikely failure of one site can result in a fail-over to infrastructure in the secondary site. You can use two DC BLOX data centers as your company's primary and secondary sites, or just a single location as a disaster recovery site to your own primary facility.

Furthermore, DC BLOX's low-latency private optical network enables active/active synchronization across data centers for a continuous availability solution. With a distance of about 100 miles between locations and a latency guarantee of less than five milliseconds across the DC BLOX network, a VLAN can be stretched across sites for a true layer-2 adjacency solution.

Security & Privacy

Physical security is the first step. A secure data center will provide overlapping obstacles to intrusion:

- 24x7x365 manned security desk
- Vehicle gate and perimeter fencing
- Layered security between the perimeter to each cabinet
- CCTV at the perimeter, ingress/egress, office, data hall, and cabinets

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DC BLOX's Huntsville and Birmingham data centers also support enhanced security built to CUI (Controlled Unclassified Information) standards. CUI is defined by the U.S. federal government as unclassified information relating to the interests of the government or outside entities it believes should be protected.

Additionally, securing data can simply mean geographic redundancy. A company's data is its lifeblood. IT has the responsibility to store and protect that data and to do so economically. DC BLOX Cloud Storage is a great solution for backing up data from within any one of its data centers or from a business's premises. Getting data off-site protects the company's information in the event of a major disaster at its primary site. DC BLOX also provides replication across data centers for even greater geographic diversity.

Application Performance – Edge Capabilities
Companies need their applications to perform at peak efficiency and low latency. DC BLOX's data centers enable businesses to bring in specialized hardware and software configurations not available with standard cloud platforms to accelerate application performance.

With its presence in markets such as **Chattanooga, TN**, **Huntsville, AL** and **Birmingham AL**, and a private network with low latency connectivity to Internet Exchanges and Cloud Providers, DC BLOX has truly extended the edge. Edge Computing means enabling applications that require local processing close to end users, and DC BLOX is well positioned to serve customers in these key cities.

Compliance
All DC BLOX data centers are SOC 2 Type 2 certified. SOC (Service Organization Controls) 2 is a reporting option for entities such as data centers, focused on internal controls that are relevant to security, availability, processing integrity, confidentiality, and privacy. SOC 2 compliance attests that

CONTINUED | Data Center Requirements for Digital Transformation

DC BLOX has put in place the necessary internal controls to prove to its clients that their data is being handled securely and by industry standards. Type 2 reporting has confirmed evidence of compliance over time showing that DC BLOX consistently meets its goals.

Connectivity

Having access to reliable, secure colocation space and power for your business's computing infrastructure is important, but achieving your digital business goals requires an enhanced level of connectivity. DC BLOX is a carrier-neutral provider welcoming all carriers to provide services from its connected and distributed data centers.

Carriers in DC BLOX data centers include CenturyLink, Comcast, AT&T, Zayo, Cogent, EPB and TeliaSonera – and more. Since there may be different carriers in each of DC BLOX's data centers, the company offers a unique Virtual Cross Connect product.

A Virtual Cross Connect enables a connection from a customer's cabinet in one DC BLOX data center to connect over DC BLOX's private optical network, to a carrier in any other DC BLOX data center. The real value, however, is that the Virtual Cross Connect is the same price as a standard cross connect within a data center.

DC BLOX offers MEF-compliant Ethernet services including EVPLs and E-LANs. This means that our private network can support private connectivity to any infrastructure across its footprint, and can also provide low latency connectivity from every DC BLOX data center to the Southeast Internet Exchange at 56 Marietta St. where cross-connects are available to hundreds of providers ensuring truly global connectivity.

DC BLOX's private data center network is resilient and protected, guaranteed with a 100% availability SLA and maximum latency commitments.

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The rapid migration to cloud computing and the need to deploy hybrid cloud configurations has driven DC BLOX to enable private, secure connections with its partner Megaport, from each of its data centers to all major cloud and SaaS providers.

DC BLOX is equipped for high-bandwidth applications. Each data center provides a minimum of 100Gbps connectivity with a capacity of up to 8.8Tbps on some routes.

Today's digital business requires frequent and sometimes rapid network additions or changes to partners, providers and platforms. Having built a software-defined network fabric, DC BLOX is able to provision customer connections in minutes, rather than days or weeks.

A major problem with the rapid adoption of new technologies and the growing dispersion of platforms and partners is finding the skills necessary to drive your company's initiatives.

Partnering with a company like DC BLOX means that, in addition to world-class facilities, you are getting access to experts that will design and implement connectivity services according to your complex business requirements. Access to these highly-skilled resources and capabilities relieves pressure on the enterprise and frees up already time-strapped staff.

Do You Have a Data Center Partner for Your Digital Transformation?

DC BLOX is pushing the edge into smaller growing cities that have not had local Tier 3-rated data centers with rich connectivity available to them previously. It's safe to say that many businesses in those cities have not had the infrastructure needed to execute on their digital business goals.

Digital transformation requires a re-imagination of your business to address growing competitive opportunities and increasing customer expectations. You'll need partners to

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walk with you on your digital journey and DC BLOX is ready to help!

To find out more about how DC BLOX can assist your enterprise achieve its digital transformation initiatives, contact us. We'd love to hear from you.

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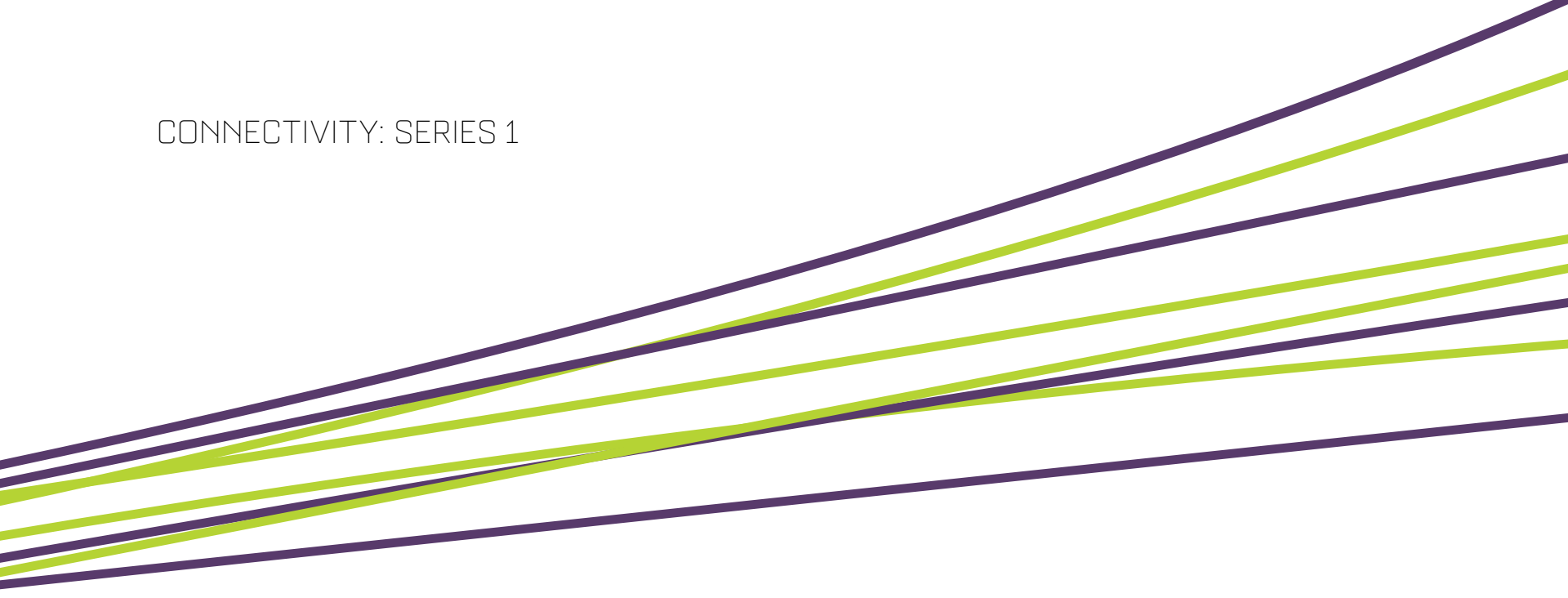

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