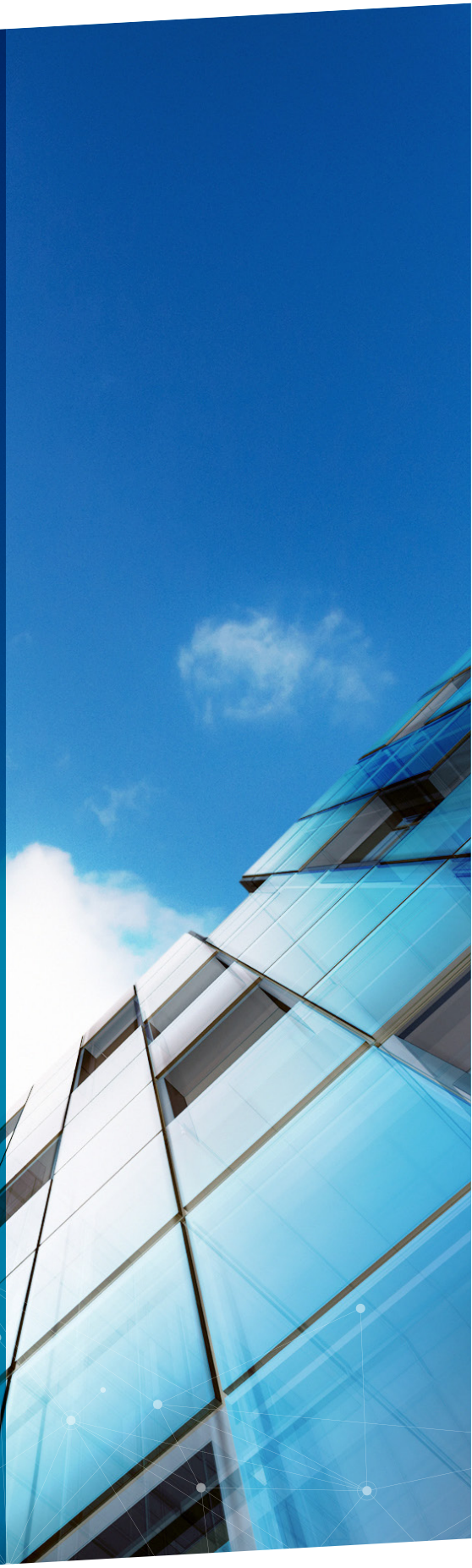
PANDUIT®
infrastructure for a connected world

DISTRIBUTED CLOUD INFRASTRUCTURE INSIGHTS

Learn how changing cloud consumption models impact infrastructure decisions.



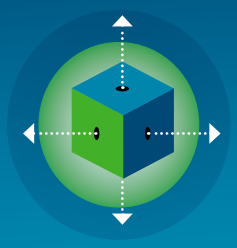
12 FREQUENTLY ASKED QUESTIONS ABOUT DISTRIBUTED CLOUD ARCHITECTURES

The cloud fundamentally changed how enterprises consume IT. Now, enterprises are fundamentally changing how they leverage the cloud. Increasingly, they are shifting from a public cloud-only model to a hybrid or distributed cloud deployment model.

As a result, savvy cloud service providers must quickly pivot to provide enterprise customers the services they want — when and where they want to consume them. We've assembled this **eBook of 12 questions and answers** to the reasons behind the rise in distributed cloud architectures, the steps that cloud providers are taking to ensure enterprise customers can access the services they need, and how to design a physical infrastructure to support a best-in-class distributed cloud architecture.

Featured Topics

SECTION 1: RISE OF DISTRIBUTED CLOUD ARCHITECTURES



In 2020, 72% of organizations surveyed repatriated applications due to performance and/or cost.[1]

1 What is a distributed cloud architecture, and how does it differ from hybrid IT?

Hybrid IT combines an on-premises environment, private cloud services, and public cloud. It gives organizations flexibility with where they run applications and workloads while also enabling centralized management of the underlying infrastructure.

In a **distributed cloud architecture**, the full IT stack—compute, network, and storage resources—is distributed as cloud services across a private cloud, public clouds, and at the edge. For end-users, the distributed infrastructure appears as a single cloud entity. Management, governance, and updates are the sole responsibility of the originating public cloud provider. Thus, distributed cloud architectures extend the range and use case for public cloud in ways that hybrid IT doesn't. This is a key reason why industry analyst Gartner has hailed distributed cloud as the next generation of cloud computing.

2 What trends are driving the shift to distributed cloud architectures?

Organizations are facing unprecedented pressure to innovate faster and take advantage of next-generation technologies such as the Internet of Things (IoT), artificial intelligence, and data analytics platforms. They also are wrestling with a sudden and significant shift to remote workforce models as a result of the global pandemic and are struggling to keep remote employees connected and productive while working from anywhere. And although the world is now more connected than ever before, numerous regional data privacy regulations have been enacted that dictate where information must be stored, and whether that information can travel outside that jurisdiction.

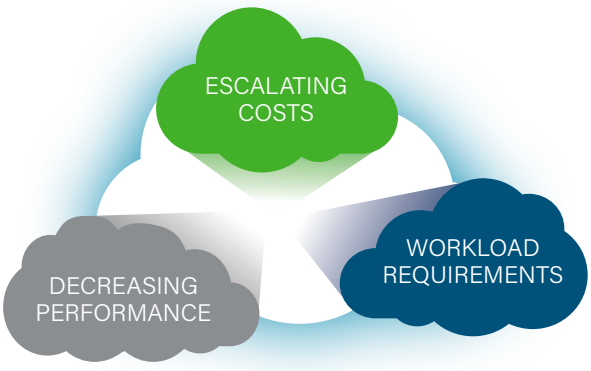
Distributed cloud architecture is an emerging approach that enables cloud organizations to help organizations overcome the obstacles that these changing needs present. Placing cloud infrastructure proximate to users enables providers to meet changing cloud consumption patterns head-on in order to mitigate latency, support data sovereignty, and keep remote employees connected and productive while working from anywhere.

3 What is cloud repatriation, and how is it impacting cloud service providers?

Cloud repatriation, which is also known as unclouding, is the process of reverse-migrating application workloads and data from the public cloud to a private cloud located within an on-premises data center, or to an MTDC/colocation provider.

It's complex, and it involves more than just relocating the same infrastructure configurations that companies were using prior to public cloud adoption. Cloud repatriation is about taking advantage of new opportunities and deciding what is most efficient and suitable for the workloads in a company's infrastructure. According to IDC[2], it has grown increasingly popular in recent years: 80% of companies plan to repatriate at least some of their workloads that are currently hosted in the public cloud.

LEADING CLOUD REPATRIATION DRIVERS:



SECTION 2: CLOUD SERVICE PROVIDER STRATEGIES FOR SUCCESS

4 What are business decision-makers asking about distributed cloud infrastructures?

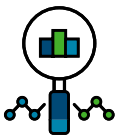
Many organizations have opted for a hybrid IT model comprised of a private cloud and one or more public clouds. This approach allows them to leverage the agility and flexibility of the public cloud, while also locating operations near users in order to meet security, performance, or compliance requirements. However, hybrid IT also presents inherent complexity that not every organization is prepared to manage.

Distributed cloud architectures close the gap between private and public clouds in order to deliver all the benefits of the public cloud along with location-dependent cloud use cases.

By choosing a cloud provider that boasts an expertly designed distributed cloud developed with best-in-class infrastructure, organizations can:

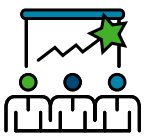
MEET REGULATORY AND COMPLIANCE MANDATES

Local, federal, and international data privacy regulations can dictate where a user's personal information must be stored, and whether that information can travel outside that jurisdiction. A distributed cloud architecture provides the ideal foundation for edge computing—running servers and applications closer to where data is created and used.



LEVERAGE NEXT-GENERATION TECHNOLOGIES

Artificial intelligence/machine learning, telecommunications, analytics platforms, and other modern technologies process huge amounts of data in real-time. Distributed cloud architectures solve critical tasks in processing as close to the data root as possible to decrease latency and cut bandwidth usage.



IMPROVE USER EXPERIENCE

Distributed cloud helps to solve for the last-mile bandwidth issues that can impact user experience (think video conferences and SaaS applications), which means that services become faster and more responsive.

MANAGE COSTS

Because distributed cloud infrastructure can be managed via a single control plane, organizations can reduce the complexity and cost associated with internal teams managing elements of a hybrid IT environment.

The distributed cloud retains technical, financial and operational benefits of the cloud while enabling greater performance, redundancy, security, and regulatory compliance.

5 How are cloud service providers shifting their go-to-market strategies in response to distributed cloud architectures?

Many organizations continue to run workloads that cannot move to the public cloud. However, these organizations still want easier development, faster innovation, and an efficient scale, all while simultaneously reducing their technology risk. Fortunately, distributed cloud architectures provide more opportunities for organizations to run workloads wherever it makes the most sense. They are changing their consumption models to include public clouds, colocation/multi-tenant data centers, and edge environments.

As a result, the relationship between the major public cloud providers and the next tier of public cloud providers such as systems integrators, telcos, MSPs, and asset-heavy SaaS providers is changing. Once considered to be competitors, these providers are now forming partnerships in order to expand their infrastructure-as-a-service offerings and extend them to on-premises data centers/ private clouds and edge environments.

6 What opportunities do distributed cloud architectures present for MTDC providers?

With more organizations moving from a public cloud-only model to a hybrid IT model or a distributed cloud approach, MTDC operators have been presented with opportunities to acquire new tenants, as well as in some cases forming partnerships with cloud operators in order to help them better serve their customer base.

MTDC operators have been focused on finding ways to accommodate cloud service providers and attract an ecosystem that will help generate demand. This has meant building data centers to cloud service provider requirements, expanding to new locations, and enhancing local and international connectivity options.

Additionally, MTDC operators also have been launching platforms for on-demand access to networks and remote ticketing systems. The focus has been on enabling seamless across facilities, as well as providing simpler ways to access partner ecosystems.

SECTION 3: DISTRIBUTED CLOUD PHYSICAL INFRASTRUCTURE CONSIDERATIONS

7 How does distributed cloud impact physical infrastructure design?

While distributed cloud architectures bring multiple benefits for operators and end-users, their fast-rising popularity also creates challenges for teams tasked with optimizing, managing, and protecting these environments.

With more connected devices, more applications and data, and the underlying infrastructure spread across edge sites and multiple clouds, operators must rethink their design and delivery model in order to leverage the cloud effectively while ensuring performance, reliability, and security. In a traditional cloud computing architecture, the compute, and storage of all data is centralized. The cloud is able to leverage its massive compute and storage capability for large-scale data analysis and data storage. In a distributed cloud architecture, the intelligence of the infrastructure continues to reside in the cloud, but latency-sensitive data is processed as physically close to where the data is being produced. This reduces latency and bandwidth requirements but also increases the need for compute power at the edge.

8 What are the key physical infrastructure decision points for a distributed cloud architecture?

Following are five key considerations cloud operators must keep in mind when designing a distributed cloud architecture:

LATENCY

In a distributed cloud architecture, critical processing tasks are located closer to end-users, which eliminates the need to transmit data back to centralized network servers. As a result, services become faster and more responsive. However, this shift from a centralized model to a distributed model brings with it a whole set of new networking and infrastructure requirements for controlling latency and enabling performance. High-density rack servers, higher speed top-of-rack switches, and space-optimized cabling infrastructure enable operators to deliver a reliable, secure, and overall improved end-user experience.

The average cost of IT downtime?
$300,000 per hour[2]

COMPLEXITY

Simply said, more connectivity and more users connecting to the infrastructure supporting a distributed cloud create more management complexity for operators (think more screens, more sensors to monitor, and more data to examine). Reducing complexity requires systems that can render powerful hierarchical and subcomponent diagrams of data center and network infrastructure. These help administrators get the visibility, control, and governance needed to improve capacity planning and energy consumption, isolate troubleshooting, and minimize downtime in order to meet service level agreements.

TIME-TO-MARKET

Meeting the increased demand for distributed cloud architecture deployments in a timely fashion can be challenging for cloud operators who have historically worked with large, centralized cloud ecosystems. The ability to accelerate time-to-market by quickly deploying critical distributed architecture is central to success. This is one reason why many are opting to implement interoperable, converged infrastructure solutions that streamline the process of designing, specifying, installing, and managing increasingly complex physical infrastructures.

SAFETY AND SECURITY

Given that resources in a distributed cloud architecture are often scattered across multiple geographic locations including colocation facilities, implementing a heterogeneous means of addressing security and safety is key. Leading technology partners are developing groundbreaking electrical safety technology to help build a safer data center infrastructure.

SUSTAINABILITY

Centralized cloud architectures consume significant amounts of energy, produce a lot of carbon emissions, and cause significant electronic waste. Conversely, distributed cloud architectures shift computation to the edge, which reduces the amount of traffic sent to the cloud and can significantly reduce energy use and carbon emissions.

However, delivering on the sustainability promise of distributed cloud architectures still requires leveraging more efficient approaches to consuming data center power and space. Sustainability-focused infrastructure providers offer solutions that increase density and manage containment more effectively. Additionally, by using low-impact systems to limit the active movement of air over servers, operators can mitigate the need to cool the entire facility.

9 How can physical infrastructure solutions support distributed cloud architectures?

The right physical infrastructure partner should have the experience, expertise, and solution set required to enable cloud services providers the need to overcome key challenges, along with the ability to scale cloud infrastructure globally and consistently.

Distributed cloud infrastructure providers should be focused on helping cloud operators accelerate and simplify design and deployment cycles, minimize environmental impact through efficient energy management and waste reduction, and implement solutions with safety and security for people and places in mind.

SECTION 4: BUILDING AN INFRASTRUCTURE-ENABLED CLOUD

10 How is Panduit helping cloud services providers succeed?

With manufacturing and continuity of supply on a global scale, Panduit has the expertise and the reach to provide innovative solutions to support the infrastructure design and deployment objectives of cloud operators—anywhere, anytime.

Following are the five pillars of the Panduit Distribute Cloud Infrastructure Promise:

1. Faster time-to-market backed by highly available, easily deployable solutions.

With the rise in demand for distributed cloud architectures, the ability to deploy infrastructure quickly is a critical success factor. Panduit Cloud Infrastructure solutions are designed to support this fast-moving cloud architecture evolution by reducing assembly and installation time by up to 60%.

2. Global reach supported by a worldwide partner ecosystem, sustainable supply chain with regional in-market capabilities.

Panduit operates globally and executes locally. Our global presence, backed by the Panduit ONE Partner Program, ensures continuity of supply on a global scale. Our extensive manufacturing capabilities are distributed across nine different locations. In addition to our extensive partner and distributor community, we have nine warehouses to help facilitate and augment the fulfillment operations of our distribution partners.

3. Innovative solutions that drive usability and enable cloud requirements for performance at scale.

At Panduit, innovation is in our DNA. We have a rich history of technical advances realized through our engineering expertise, along with our deep understanding of market needs and challenges developed through ongoing customer engagement and collaboration. Panduit infrastructure solutions are standards-based and backed by industry-leading warranties to ensure reliability and dependability.

4. Environmental stewardship through a focus on carbon footprint reduction and sustainable product innovation.

Panduit delivers cloud infrastructure solutions for the environmentally aware economy through a focus on carbon footprint reduction, support for the circular economy, reduction in waste, and sustainable product innovation. With carbon neutral certified manufacturing and a LEEDS-certified Headquarters facility, we are a CO_2 reduction leader, maintain an ISO accredited supply chain, and design for RoHS and WEEE compliance.

5. Safety and Security for people and places inside operating environments.

Panduit is committed to ensuring a safe and secure operating environment for employees and partners. Our intelligent infrastructure supports site security through electronic access control and environmental monitoring. Our electrical infrastructure solutions, which are unique in the cloud applications space, provide grounding and bonding to protect against electrical accidents. In addition, absence of voltage technologies support personal safety while boosting employee confidence and productivity.

11 What physical infrastructure solutions does Panduit provide for distributed cloud architectures?

Cloud service providers need distributed cloud infrastructure that is designed to maximize performance, streamline management, and minimize downtime. And they need it to be readily available and quick to deploy. Panduit provides a comprehensive inventory of infrastructure solutions that enable timely data center construction that are environmentally aligned and designed and delivered with reliability and consistency in mind.

RACKS AND CABLE MANAGEMENT

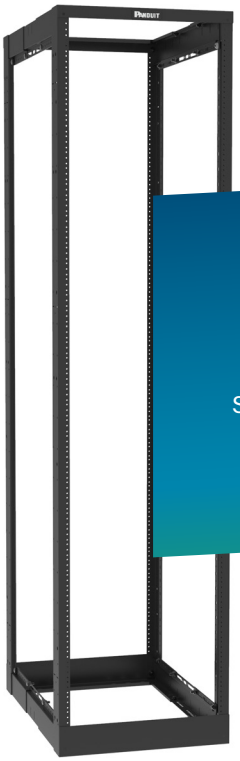
Panduit equipment racks boast tool-less adjustable rails, flexible and adaptable cable management solutions, and overhead pathways that enable drop placement and ensure proper bend radius, which ensures that infrastructure is delivered on schedule, can be quickly deployed and remains reliable over time. In addition, it enables effective optimization of space, power, and cooling resources.

Adjustable depth 4 Post Rack

The Adjustable Depth 4 Post Rack is a multiple depth rack that combines the stability of a cabinet with the accessibility of an open rack to provide maximum flexibility when designing the network layout. The Adjustable Depth 4 Post Rack is part of a complete rack and cable management system for managing and protecting networking technologies. Each rack has 39 different depth options from 23 inches to 42 inches in 0.5 inch increments.

Net-Contain™ Universal Aisle Containment System

Reclaim underutilized cooling capacity, reduce energy expense, and reduce lower operating expenditures with the versatile containment system with the Net-Contain™ Universal Aisle Containment System. The system includes an independent support structure, sliding doors, vertical blanking panels, and roof structure. This flexible offering can be configured in hot aisle and cold aisle containment and supports cabinets of varying sizes and designs.



See the Panduit Adjustable 4 Post Rack

POWER DISTRIBUTION

Intelligent, or networked, power distribution units, are a new solution designed to help operators resolve problems before they occur by monitoring and providing real-time insight into power consumption, environment, and system integration. They help with uptime, capacity planning, and cost reduction.

SmartZone™ G5 PDUs

SmartZone™ G5 PDUs monitor the data center power and the environment by continuously scanning for electrical circuit overloads and physical environmental conditions that place critical IT equipment at risk. By monitoring physical access points, they increase cabinet security to protect your systems and data. And with access control supported by our SmartZone™ Intelligent G5 PDU platform, only authorized and qualified personnel can access cloud assets.

PATHWAYS

FiberRunner™

The FiberRunner™ Cable Routing System is built to separate, route, and protect fiber optic and high-performance copper cabling. With a maintained minimum of a 2 inch bed radius, fittings are made to better protect cables from being bent or damaged. These routing system fittings are constructed to withstand higher temperatures and provide less harmful elements and smoke in the material.

Wire Basket

The Wire Basket Overhead Cable Pathway System is composed of pathways, splices, mounting brackets, and accessories that can be configured for a wide range of applications and are ideal for both data center and cloud environments.

FIBER SOLUTIONS

Fiber Optic Panels, Cassettes, and Enclosures

Panduit provides advanced bandwidth and mission-critical physical infrastructures with comprehensive fiber optic systems that deliver high performance, reliability, and scalability. Designed to enhance any fiber optic system, no matter the configuration or application, the assortment of Panduit fiber optic panels, cassettes, and enclosures meets virtually any need.

ELECTRICAL INFRASTRUCTURE

VeriSafe™ Absence of Voltage Tester

The VeriSafe™ Absence of Voltage Tester ensures a safe and secure operating environment for employees and partners by verifying the absence of voltage before equipment is accessed. This makes it easier for qualified electrical workers to determine an electrically safe environment in a fraction of the time required by hand-held portable test instruments.

Cable Cleat Solutions

Cable cleat solutions ensure cables remain contained in the event of a short circuit fault to minimize disruption and damage to personnel and property. Uniquely engineered for ease of installation and available in a range of applications and harsh environments, Panduit cable cleats meet the needs of any project while providing on-the-job productivity, reliability, and safety.

Grounding & Bonding

Leverage grounding & bonding to maintain system performance and protect personnel and equipment with high quality, visually verifiable connections, and dedicated grounding paths.

12 How can I connect with Panduit to discuss my distributed cloud infrastructure needs?

Scaling cloud infrastructure globally, consistently, rapidly, and safely with limited environmental impact requires a partner built to deliver against these requirements.

To learn more about how Panduit delivers a proven physical infrastructure that is foundational to cloud services architecture, or to get in touch with a Panduit distributed cloud infrastructure expert, visit panduit.com/cloud-infrastructure.

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Sources:

[1] 2021, Survey Report, State of Hybrid Cloud and Migration, Virtana

[2] ITIC 12th annual 2021 Hourly Cost of Downtime Survey, Information Technology Intelligence Consulting Corp.