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The Power of Access PoPs Network Resiliency and Cost Efficiency

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With the ubiquity of IP networking, innovative approaches aimed at improving network resiliency, scalability, security, performance, and cost efficiencies have become a central focus of Internet Service Providers (ISPs). One area of innovation influencing how ISPs are architecting their networks is making the strategic shift from large Points of Presence (PoPs) to deploying Access PoPs as a more effective and efficient design. This new concept not only bolsters network resiliency, but also reduces operational costs, offering a win-win solution for ISPs and their customers.



PoPs – a defined location where servers are housed and interconnected with other providers – are integral to telecommunications and the IT ecosystem, as they function as strategic hubs in network infrastructure, aggregating data traffic, connecting different networks, applying intelligent functionality and automation, and reducing latency. PoPs enable efficient data transmission, facilitate network resilience through redundancy by interconnecting with multiple providers in a single location, and offer the ability to cache and accelerate content delivery, cloud access, and much more. This is truly a vital role in network scalability as it allows telecommunications providers to adapt to changing demands and expand their services. Typically, ISP PoPs are distributed across various locations to provide robust and resilient regional coverage, contributing to the accessibility and availability of telecommunications services. Their role in network monitoring, data security, interconnection, and cost-efficiency make them a pivotal part of providing a reliable and secure telecommunications platform.

Taking lessons from the backbone Internet operators across the U.S., ISPs, CSPs, and large enterprise businesses can apply industry best practices to take greater control of their networks by deploying Access PoPs as well. The same benefits of improved network performance, scalability, security, and more apply, bringing scalability and privacy to the forefront of digital infrastructure operations for nearly any business. ISPs have traditionally relied on large PoPs to facilitate their network operations. While large PoPs may serve their purpose effectively in the initial stages of network development, they often become stumbling blocks as the network expands, as they can be costly to maintain and challenging to scale. This ultimately leads to potential service disruptions and inefficiencies.

Enterprise businesses that understand the various network architectures of the ISPs that serve them tend to benefit. Companies that recognize resiliency, redundancy, diversity, and distributed architectures know the questions to ask, the routes to review (e.g., requesting KMZs), and take a deep dive look “under the hood,” so to speak, to assess service capabilities and ensure the greatest amount of uptime for their digital business needs.

As a result, ISPs and their end-user customers realize that Access PoPs provide a more agile approach to network infrastructure. Core PoPs that sit as central hubs for a network operator can leverage Access PoPs that serve as smaller, more strategically positioned locations to extend network reach while also creating resilient network “rings,” which ensure uninterrupted connectivity even in the face of common disruptions. Access PoPs act as distributed nodes that work in conjunction with larger existing PoPs – typically core PoP locations – forming a network that is not only more resilient, but also flexible and efficient. ISPs can strategically place these Access PoPs to create even more redundancy within their network. This ensures that if one segment of the network is compromised due to a fiber cut or other issues, data traffic can automatically reroute through alternative paths, minimizing service disruptions. This enhanced resilience is invaluable in ensuring consistent connectivity for both residential and business users, directly impacting an ISP’s credibility as a service provider to be trusted.

Organizations that understand this underlying architecture can work with their ISPs to take advantage of these benefits. For instance, they can leverage Access PoPs to provide better localized connectivity to the Internet, cloud services, and other data packet-heavy applications such as content, AI/ML and more. With today’s reliance on data and access to the public and private cloud, they, too, must leverage more sophisticated solutions to manage the data exchange between business locations and endpoints to improve network performance and reliability.

For ISPs, Access PoPs also lend themselves to more efficient network segmentation. This functionality not only enhances the quality of service but also minimizes the risk of complete service disruption. For instance, network segmentation allows ISPs to isolate issues to specific network segments, resolving problems more swiftly while ensuring a higher quality of service for end-users and, ultimately, a better customer experience. In the odd case that a disruption does happen, taking the approach of Access PoPs allows for the ISP to resolve the issue with optimal speed. Considering the benefits of network segmentation, an enterprise network working with an ISP or operator with smart network configurations such as core and Access PoP network capabilities can leverage the failovers to remain completely operational. With the increased resilience and improved service quality that Access PoPs provide, ISPs can offer a more reliable service to their customers. This not only boosts customer satisfaction but also enhances the reputation of the ISP in a highly competitive market.

Apart from redundancy, cost savings is one of the most significant advantages of Access PoPs. By owning and managing Access PoPs instead of leasing larger, more expensive facilities, ISPs can significantly reduce recurring operational costs. This approach promotes cost efficiency over the long haul, which can lead to more competitive pricing for consumers and increased overall profitability for ISPs.

Other ways enterprises can leverage Access PoPs to improve network performance, reduce latency, and enhance user experience is to directly connect to cloud providers – which benefit companies that rely on a hybrid, multi-cloud, private and/or public cloud. In doing so, the most direct path to those services is typically delivered more efficiently, reducing latency for the distributed applications and services. And since the PoPs are smaller and typically connected with a network ring architecture, they also provide direct and secure access to a variety of network-based services, including the connection to edge computing models, and accelerate access to IoT and 5G networks with minimal latency. Call centers, in particular, should opt for Access PoP solutions to ensure an always-on and

always-connected experience. Access PoPs typically allow for rerouting requests in case of data center connection failures, ensuring service continuity and minimal service interruption. An “under the hood” review of how an ISP will deliver your service will provide customers with roadmap options for data traffic routing.

As with any network architecture, there are benefits and challenges. For instance, when implementing an Access PoP architecture, configurations in the access control implementation are important to understand. If the configurations are off, it could cause inconsistency issues due to the various ways data is transported within a company. Considering all the ways data flows is important. For instance, consider how data flows to the cloud, on-prem or off-prem managed servers, mobile networks, and WiFi. Errors in configurations could cause delays, and the additional access points could also increase security risks.

Designing your network with distributed Access PoPs ensures that access control systems are well-equipped to adapt to technological changes, updated applications, and increased security checks. Working backward from a compliance standpoint may be required to ensure the ever-changing nature of technology can be worked with and adapted in the most dynamic ways.

As with any solution, the more access points you have, the greater the risk. For instance, most ISPs have robust network monitoring solutions at each point of entry into their network, helping them to detect and proactively keep out inappropriate access. ISPs layer additional security measures, monitor DNS records, and verify data traffic in and out of its network. ISPs that implement a layered security solution on top of their Access PoPs can better help customers pinpoint where problems and issues are located within their network – or even with their individual employees.

The transition from large PoPs to Access PoPs represents a crucial milestone in the evolution of telecommunications infrastructure conventions. Access PoPs are not only smaller and more strategically positioned, but they also offer increased network resiliency and significant cost savings for the ISP, which can be passed along to customers as well. The ability to own and operate Access PoPs empowers ISPs to create more efficient, segmented, and reliable networks, ultimately benefiting both the provider and their customers.

As the demand for internet services continues to grow, enterprise networks and ISPs alike must adapt to the changing landscape by embracing innovative solutions like Access PoPs. By doing so, they can ensure the uninterrupted flow of data, reduced costs, and, most importantly, an exceptional customer experience that keeps them ahead of the competition. Access PoPs are more than just a technological advancement; they are a strategic investment in the future of network resiliency and cost efficiency.