# Maximising Network Performance with AI-Driven Internet Connectivity

Nikhil Batra
Senior Research Director
Telecom Practice , IDC Asia/Pacific

Enterprise-grade internet addresses organisations' need for reliable, and consistent connectivity. This Spotlight explores the solution in depth and examines Singtel's AI-driven routing capability in enhancing performance.

## Making the shift to internet for business connectivity

The enterprise network environment has grown in complexity in today's digital era. Besides simply connecting enterprise data centres, headquarters, and branch offices, networks are critical for accessing a wide range of cloud services and software-as-a-service (SaaS) applications.

FIGURE 1: Digital enterprise connectedness

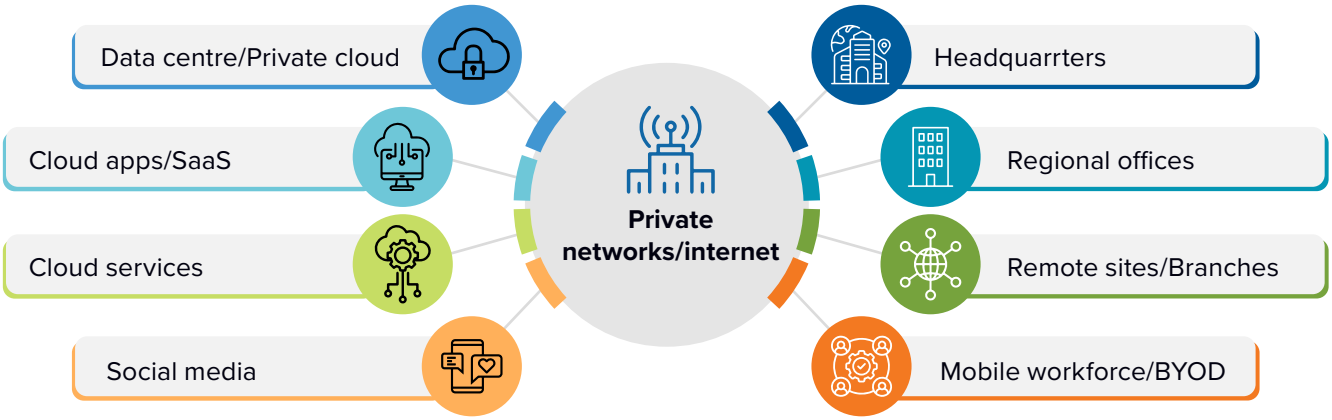
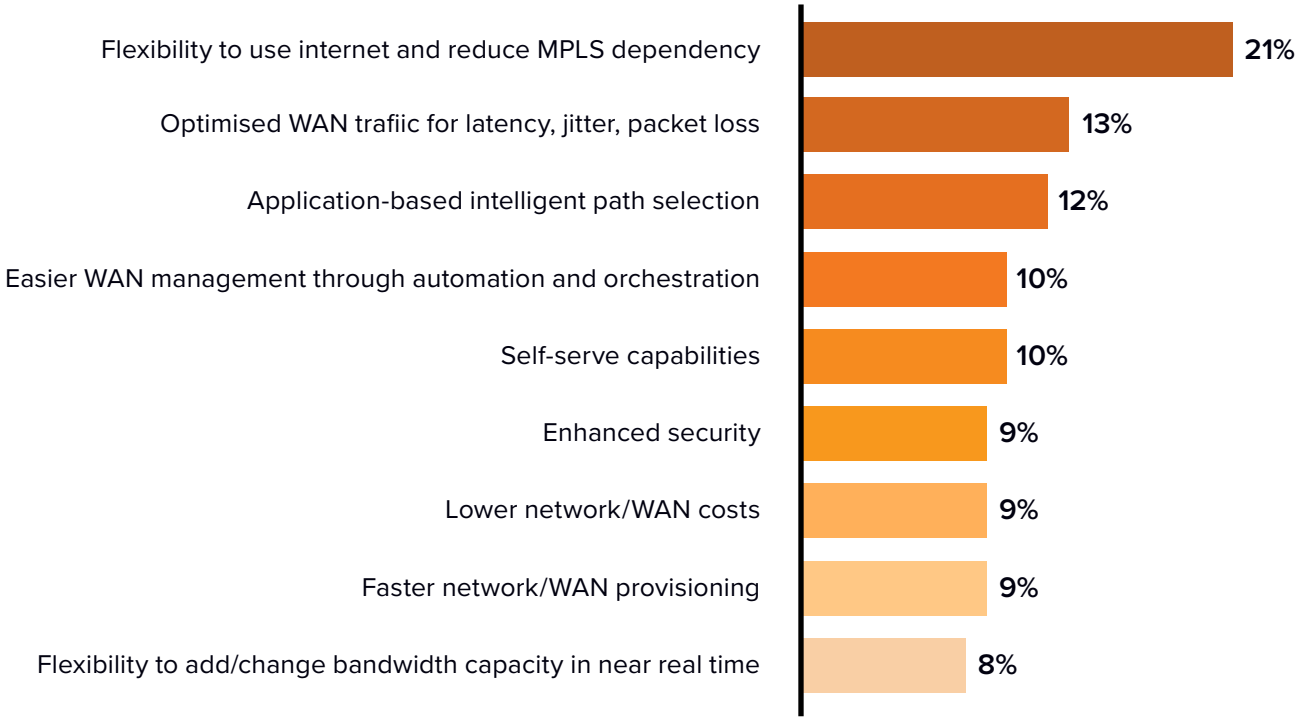


FIGURE 2: Top Factors driving SD-WAN adoption in Asia/Pacific




Source: IDC Asia/Pacific Enterprise Connectivity Survey 2023, n=700

However, streamlining the data flow, and ensuring reliable connectedness, both within and outside the organisation while managing exploding bandwidth requirements have become a major challenge.

To address these growing data requirements and manage operational costs, organisations are increasingly turning to the internet as part of their connectivity mix. Leveraging software-defined wide area network (SD-WAN) enables businesses to integrate cost effective options like the internet into their connectivity mix. In fact, the ability of SD-WAN to facilitate the use of the internet and reduce enterprise dependency on multiprotocol label switching (MPLS), was identified as the top driver of SD-WAN adoption in Asia/Pacific **(Figure 2)**.

But the internet's inherent, best-effort characteristics add to the already growing list of enterprise connectedness challenges and introduces more complexity in the quest for reliable and predictable network performance.

## Challenges of relying on the internet for business connectivity

The internet operates as a global network of interconnected devices and networks, allowing for data transmission across diverse pathways. Unlike MPLS, which offers dedicated, private connections, internet connectivity relies on public infrastructure, which can vary significantly in performance and reliability, giving rise to a number of challenges.

**Inconsistent performance across geographies**

*Varying latency and speed:* MNCs often operate with branch offices across different regions, with varying levels of infrastructure quality. Different types of connections have different performance characteristics (e.g. fixed versus mobile versus satellite), resulting in inconsistent performance.

*Network contention and congestion:* It also depends on network hops and peering agreements between

ISPs, which can result in unpredictable application performance and impact business continuity.

**Complex multi-ISP environments**

*Increased operational complexity:* Managing multiple ISPs and technologies across different branch offices adds many layers of complexity to network management. This means dealing with, and managing varying levels of service quality, support responsiveness, and service level agreements (SLAs).

*Lack of unified network view:* Sourcing connectivity from different service providers results in an organisation using multiple portals for monitoring underlay performance, resulting in a fragmented view of the network, often highlighted as the biggest challenge in managing a multi-vendor environment.

*Increased management overheads:* Limited integration across disparate operations management systems results in inefficient incident management and slow time to resolution (TTR).

**Fragmented security**

*Inconsistent security postures:* Each ISP may have different security protocols and capabilities. This can lead to gaps in security coverage, making MNCs

vulnerable to cyber threats, especially if data traverses multiple networks with varying security measures.

*Compliance challenges:* Different countries have different data regulations. Ensuring compliance for the entire organisation when using multiple ISPs can be complex.

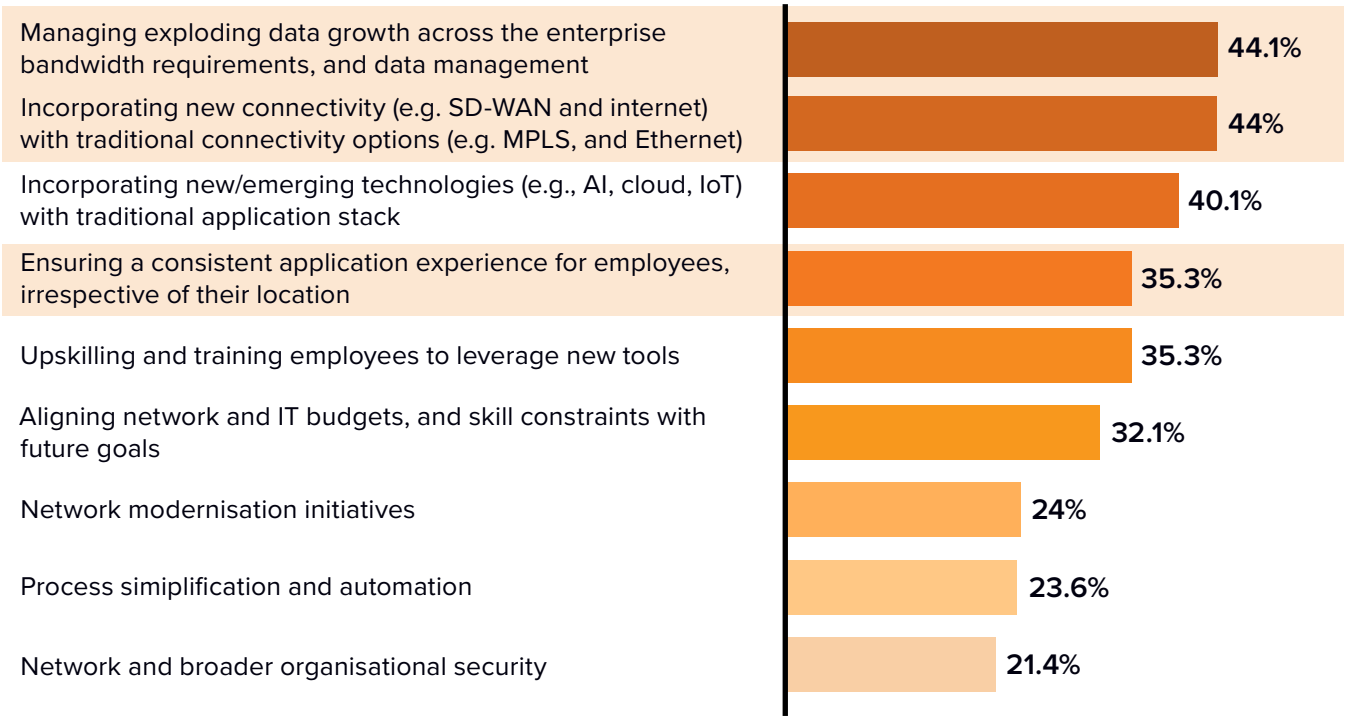
**Limited quality of service (QoS) guarantee**

*Lack of control over traffic management:* Unlike MPLS, internet-based connections lack the necessary QoS guarantees. This results in unpredictable and unreliable connectivity.


> “Managing the exploding bandwidth requirements, incorporating fixed and wireless internet as part of the enterprise connectivity mix, and ensuring a consistent application performance and user experience for employees were three of the top five challenges faced by organisations on their enterprise networks.”

IDC’s *Asia/Pacific Enterprise Connectivity Survey* also highlights that managing the exploding bandwidth requirements, incorporating fixed and wireless internet as part of the enterprise connectivity mix, and ensuring a consistent application performance and user experience for employees were three of the top five challenges faced by organisations on their enterprise networks **(Figure 3)**.

FIGURE 3: Organisations' top three enterprise networking challenges in the last 12 months




Source: Asia/Pacific Enterprise Connectivity Survey, IDC

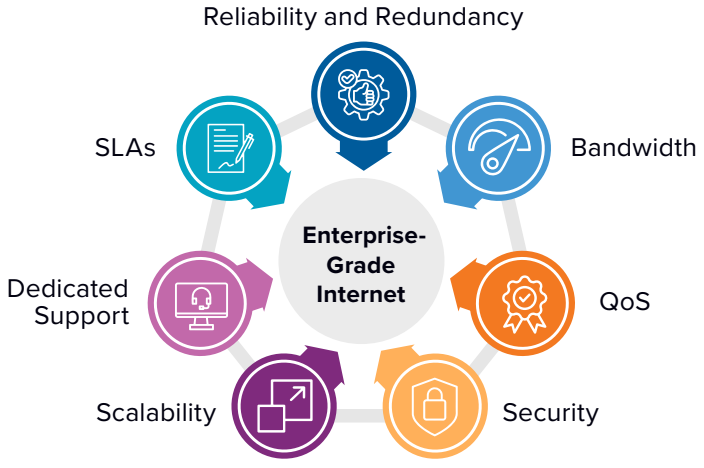
Given these challenges, IDC has seen increased focus and demand for internet connections that are more reliable and capable of offering similar functionality to a dedicated connection. This class of internet is referred to as enterprise-grade internet access.

## Building resilience with enterprise-grade internet

IDC defines enterprise-grade internet as high-quality, reliable, and robust internet connectivity services designed to meet the needs of large organisations. **Figure 4** summarises the key characteristics that differentiate enterprise-grade internet from other shared broadband services.

**Reliability:** Enterprise-grade internet is expected to provide near-constant uptime and minimal service disruptions. Redundancy and failover options are typically included to ensure continuity of service.

FIGURE 4: IDC enterprise-grade internet access taxonomy – 7 key characteristics




Source: IDC, 2024

**High bandwidth:** Enterprises require significant bandwidth to support their operations, which may involve data-intensive tasks, video conferencing, unified communications as a service (UCaaS), cloud services, and more. Enterprise-grade internet is required to offer higher-bandwidth options to accommodate these needs.

**Quality of service:** QoS features allow organisations to prioritise and manage network resources for specific scenarios, such as within the service providers' network or from site to cloud, ensuring that critical applications and workloads receive the necessary bandwidth and latency for optimal performance.

**Security:** Enhanced security measures, such as firewall and intrusion detection systems, are often integrated into enterprise-grade internet offerings to safeguard data against cyberthreats.

**Scalability:** Enterprise internet services should be designed to scale with the growth of an organisation.

**Dedicated support:** Enterprises typically require dedicated customer support with rapid response times to resolve issues promptly. This is especially important when there is an outage.

**Service-level agreements:** SLAs guarantee certain performance metrics, such as uptime, latency, as well as mean time to respond (MTTR).

## Adapting internet connectivity for diverse site needs

In an organisation, connectivity requirements for different sites vary significantly due to factors like site criticality, traffic types, and user base. Data centres, headquarters, branch offices, hub and spoke sites, remote sites, and temporary/pop-up sites, each have unique needs, from supporting high-volume data flows to ensuring reliable access for field teams. It is essential to select the right type of internet access for each location for optimal connectedness across the organisation. **Table 1** provides examples of sites and possible connectivity choices.

However, managing different internet connectivity across a range of site types can be a complex challenge, requiring careful coordination to ensure consistent performance and reliability.

Table 1: Site types and possible connectivity choices

| Site classification | Key characteristics | Primary internet connectivity options | Secondary/backup connectivity options |
|---|---|---|---|
| **Headquarters** | Heavy traffic loads; need reliable connectivity for critical business applications | DIA | Secondary DIA or fixed broadband |
| **Branch sites** | Medium traffic load with cloud-connectivity requirements | DIA for larger branch sites; fixed broadband for smaller branch sites | Fixed broadband |
| **Critical hub sites** | Key aggregation point linking several branches; reliable connectivity needs for minimising disruptions | DIA | Secondary DIA or fixed broadband |
| **Small spoke sites** | Small branch characteristics; basic connectivity and moderate traffic requirements | Fixed broadband | Mobile (4G/5G) broadband |
| **Remote sites** | Remote sites with limited connectivity options | Fixed wireless access, or LEO satellite connectivity | Mobile (4G/5G) broadband |
| **Temporary sites** | Pop-up or temporary sites needing connectivity for a limited period | Mobile (4G/5G) broadband | Mobile (4G/5G) broadband |

# Singtel Global Internet – an AI-driven routing solution for edge-to-cloud traffic optimisation

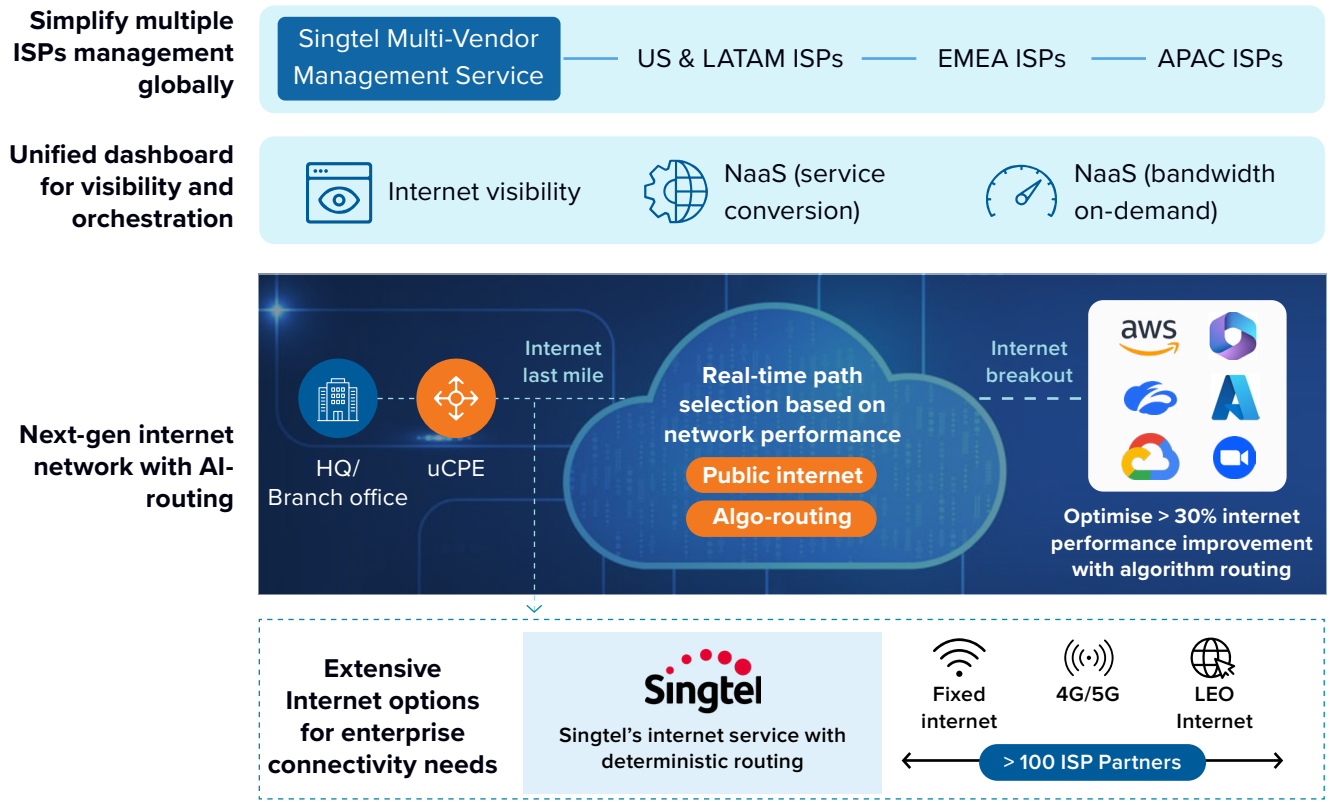
Singtel's Global Internet, part of the Singtel CUBΣ portfolio, aims to break down network silos to deliver a unified suite of connectivity solutions. The service is designed to support digital enterprise needs, and ensure reliable connectivity for distributed teams, cloud applications, and multi-site enterprise businesses. With a focus on optimising internet performance and simplifying multi-vendor management challenges, Singtel's Global Internet solution is tailored to organisations seeking to leverage the internet for their regional and global operations.

## Building blocks of Singtel's Global Internet

**Comprehensive internet services portfolio with global coverage**

Singtel partners with over 100 ISPs globally to offer a range of internet access options, including 36 enhanced internet points of presence (PoPs), dedicated internet access (DIA), fixed broadband, 4G/5G wireless broadband (including fixed wireless access), and low earth orbit (LEO) satellite internet.

FIGURE 5: Algo-routing is the core of Singtel's Global Internet solution




Source: Singtel, 2024

The service spans 633 PoPs in over 200 cities, including partner ISPs in Asia/Pacific, Europe, Middle East & Africa (EMEA), US, and Latin America. This allows organisations to choose the most suitable connectivity option for each site to ensure reliable internet access across different geographic locations.

**Algo-routing: AI-driven traffic optimisation and path selection**

Algo-routing is the core of Singtel's Global Internet solution, utilising AI to dynamically route traffic based on real-time network conditions. The technology, aimed at optimising application traffic network performance, allows organisations to use their existing internet connections for last-mile connectivity, while resolving the middle-mile bottlenecks as illustrated in **Figure 5**.

*Dynamic path selection:* Monitors and evaluates network conditions in real-time, dynamically routing traffic through the most optimal path for both site-to-site and site-to-cloud connectivity.

*Site-to-site optimisation:* Prioritises traffic between geographically dispersed sites to enhance data speeds for superior connectivity experience.

*Deterministic routing for critical applications:* Ensures consistent service levels for latency-sensitive workloads like video conferencing, and cloud applications. The solution also offers direct peering with cloud providers such as AWS, Microsoft Azure, and Google Cloud.

Overall, Algo-routing is designed to address the inherent unpredictability of internet traffic routing to achieve lower latency, reduced jitter, and minimised packet loss, and enables Singtel to offer guaranteed SLAs for its global internet solution.

**Value-added offerings**

In addition to the underlay connectivity and management tools, Singtel's Global Internet portfolio also includes the following to help organisations leverage the internet for business purposes:

*Internet performance planning tool:* This tool provides insights into, and tracks the performance of, various ISP networks over time. It allows organisations to compare the internet performance of different ISPs and make informed choices when selecting an underlying connectivity partner for their branch connectivity requirements.

*On-demand connectivity:* Bandwidth on-demand provides businesses with an option to adjust their bandwidth requirements in near real time to accommodate spikes in traffic for different scenarios such as holiday sales, or disaster recovery use cases.

*Easy service conversion:* Singtel allows existing customers to move from traditional MPLS to Global Internet service without changing the last mile through a self-service portal, making it easy and convenient for organisations to move from expensive MPLS to cost effective internet links.

*Integrated security:* Singtel also provides a wide range of cybersecurity solutions aimed at safeguarding businesses from emerging threats. This includes DDoS protection for the internet, which effectively monitors traffic patterns, detects harmful traffic, and filters it out while ensuring legitimate requests are processed.

**Simplified multi-vendor management**

Managing a multi-vendor network environment is often one of the biggest enterprise challenges due to multiple portals, fragmented visibility, and different standards and processes across a variety of service providers. Singtel's Multi-Vendor Management System (MVMS) aims to simplify this by offering:

*Unified connectivity providers:* Manage both underlay and overlay connectivity from diverse providers across different regions.

*Proactive monitoring and support:* Continuously track network performance and receive real-time alert in the event of an issue, enabling swift resolution.

*Integration with operations management systems:* Provides integration with operations management platforms such as ServiceNow for automated ticket logging, which aims to streamline the resolution process.

*Empower Portal - unified dashboard with actionable insights:* Provides a comprehensive view of network performance across multiple subscribed ISPs. This centralised platform offers organisations a singular view of their network inventory, performance metrics, and incident management.

## Singtel's Global Internet can help organisations gain a business edge

Singtel's AI-driven routing capability seeks to dynamically optimise internet routing for improved performance, latency, and reliability.

**Optimised and predictable network performance**: The Algo-routing technology aims to provide more than 30% improvement* in internet performance through real-time dynamic path selection and traffic optimisation.

**Increased cost efficiency**: Singtel's global network allows businesses to leverage their local internet connections for last-mile connectivity while using the Singtel backbone for long-haul traffic, resulting in lower costs.

**Simplified management**: Unified dashboards enable businesses to manage multiple ISPs through a single, API-driven platform, resulting in simplified operations, and enhanced network visibility. IDC's Asia/Pacific Enterprise Connectivity Survey 2023 highlights that multi-vendor network management, observability, and visibility is a big challenge for organisations. In fact, the study shows that over 68% of organisations in the Asia/Pacific use an average of two to three different portals for operations, management, and reporting purposes. Singtel's unified dashboard can help organisations address this management challenge.

*Dependent on the specific traffic path from source to destination

## Key considerations for a seamless global internet experience

While Singtel's Global Internet solution offers many benefits, organisations should keep the following in mind:

**Coordination with multiple ISPs**: Even with a unified platform, managing multiple ISPs across different geographies may still be challenging given varying service levels, local regulations, and compliance requirements. While the Singtel platform mitigates this to an extent, careful planning and integration are still required.

**Performance variability across access types**: Using 4G/5G or LEO internet can introduce performance variations, particularly in locations with uneven mobile or satellite coverage. Though Algo-routing can help optimise traffic for the middle-mile, organisations should carefully evaluate the most suitable access type for the last mile for each site.

Overall, Singtel's Global Internet solution, featuring AI-driven Algo-routing capabilities, provides a comprehensive approach for enterprises looking to optimise global operations, improve cloud performance, and efficiently manage complex multi-site networks.

> "Singtel's Algo-routing ensures more than a 30% improvement* in internet performance through real-time dynamic path selection and traffic optimisation."

## Key factors to consider when selecting a connectivity partner

IDC believes that the demand for enterprise-grade internet services will continue to increase as business reliance on broadband internet grows further. As various industry-specific use cases evolve, enterprises will expect more from communications service providers (SPs) to provide cheaper and faster alternatives to dedicated internet access connectivity that offers similar capabilities and features.

Organisations should consider the following four key factors when evaluating the service provider:

**Geographic coverage**: Ensure that the SP's network (including partner networks) aligns with your organisation's geographic footprint, particularly in cities and countries with limited ISP options.

**Integration with cloud providers**: Evaluate how well the internet solution platform integrates with existing cloud posture, and provides reliable connectivity to cloud services and SaaS applications.

**Unified management and observability**: Examine the capabilities of the management platform to support multi-vendor management for enhanced operational efficiency and visibility.

**Performance guarantees**: Review the SLAs around internet performance, latency, and packet delivery to ensure they meet your business's operational requirements.

The right connectivity partner and type of internet service can help mitigate the challenges posed in performance, security, and operational complexity, and enable organisations to leverage the internet for mission-critical business workloads.

## About the IDC Analyst

**Nihkil Batra**
**Senior Research Director, Telecom Practice**
**IDC Asia/Pacific**

Based in Australia, Nikhil focuses on telecom service provider and tech vendor strategies, along with enterprise services across the A/P region. In his role, Nikhil works with the regional telecom teams to produce intelligence reports, market insights, and contributes to various consulting projects for leading regional telcos and tech vendors.

More about Nihkil Batra

## Message from the Sponsor


**Singtel Global Internet** offers a comprehensive suite of Internet-driven network solutions designed for enterprises, delivering performance, scalability, and reliability on par with MPLS.

This next-generation internet network uses AI-driven routing to optimise edge-to-cloud traffic across a resilient infrastructure that spans 633 Points of Presence (PoPs) in over 200 cities. Continuously analysing real-time network conditions, it dynamically selects the most efficient paths for workloads, ensuring consistent service quality and superior internet performance, even during peak demand. The intelligent routing prioritises critical traffic, reduces costs, and maximises the value of existing internet connections, while effectively addressing middle-mile bottlenecks.

Complementing this, the Singtel Multi-Vendor Managed Service offers a unified dashboard for seamless global management across multiple ISPs, providing enhanced visibility and streamlined orchestration.

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