White Paper

Cloud-ready networks for Microsoft Cloud

For most enterprises, cloud is now a foregone conclusion. It's not a question of should we or shouldn't we, but how fast can we get there. And within their cloud reality, three main concerns stand out for most CIOs: performance, security, and cost. They want to ensure consistent performance for a better end-user experience, while keeping the user and the enterprise safe across all cloud activity, and of course, control the cost of a truly transformative change.

A bad network experience = a bad cloud experience

Migrating to the cloud is a challenge. Determining what workloads should move is tricky. And managing across on-premises infrastructure and cloud instances is complex. Yet these are areas that IT has its eye on and is working through. What is often not part of the cloud discussion—especially early on—is the network. At the end of the day, it's the network that can dictate the user experience, adversely affect cost, and create unforeseen security risks, and it's time enterprises got their network ready to accelerate their cloud vision.

Network challenges moving to the cloud

Existing networks not designed for cloud

Poor end-user experience impacts cloud adoption

Inhibitor for new initiatives like IoT and analytics

High WAN costs when data moves to cloud

New security exposures create risk

Slow to rollout new services and applications

It's a robust network that makes it possible to achieve performance, security, and manage cost in the move to cloud.

A cloud-ready network is critical to cloud success

With a cloud-ready network, you can:

Accelerate time-to-value and **maximize benefits** for Azure while achieving enterprise-level performance and security

Modernize the network to reduce cost, risk, and make it **flexible, resilient, scalable, and more secure**

Provide a **great user experience** for every app regardless of where the data or app sits, or where the user connects from

Lay a network and cloud foundation that **enables future initiatives** like digital workplaces, IoT, and analytics

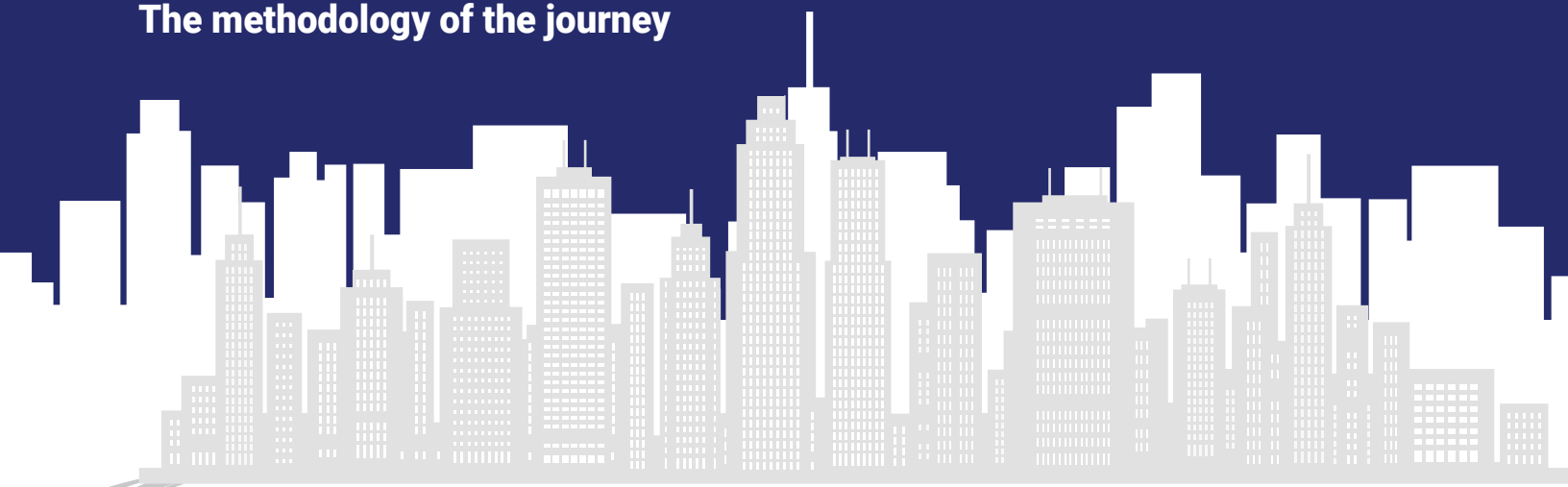
Enterprises can remove the roadblocks to their cloud vision and:

- Accelerate cloud adoption and vision
- Simplify and build cloud-ready networks
- Satisfy global requirements
- Enable innovation

Accelerating the client journey to Azure today—*and tomorrow*

NTT can assess and address the current state of the network and cloud usage, helping clients to protect their data and lower risk, while also identifying network requirements needed to accelerate their cloud journey. Ultimately, NTT helps clients deliver a solid plan for success and implement that plan, while driving towards transformational new services and capabilities like enhanced analytics and business insights.

The methodology of the journey



Drive insights and analytics

Are you leveraging analytics to manage consumption, refine processes, and develop new cloud services?

Plan for success

What hybrid operating models and services are needed to ensure ongoing successful adoption and end user experience?

Inspect key operational areas

Movement & capacity management

Are data and workloads optimally placed for performance and cost?

Cybersecurity

Are the right capabilities and controls in place to protect business, customer, and employee data, and applications?

Network performance

What is the end-to-end performance from an end user point of view?

Identify network requirements

To accelerate the cloud journey, what needs to happen from a networking perspective to make that successful?

Protect and lower risk

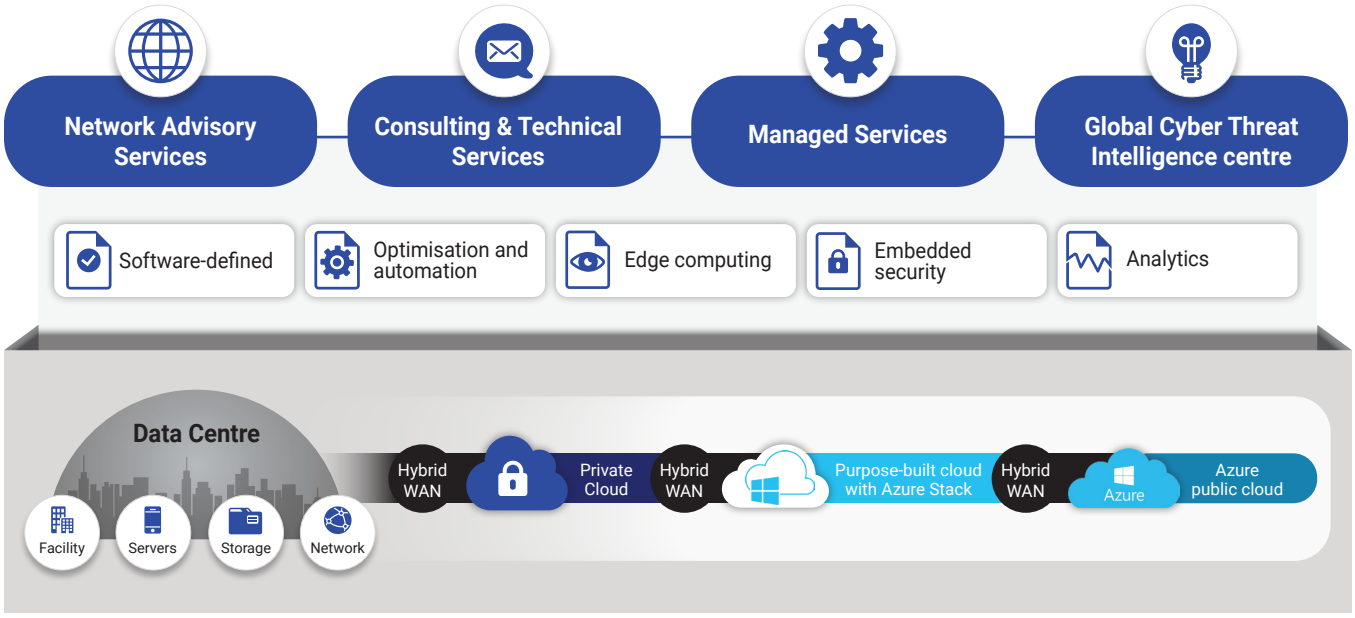
Are the appropriate policies for data, data classification, and associated security requirements in place?

Assess current state

What is cloud used for today, and what is the client's current network topology? How is the network performing?

NTT services for Azure success

NTT provides a full spectrum of services that help our clients build a cloud-ready network so they can leverage the full breadth of Azure features–from assessment, through consulting and technical services, to management, as well as security services. We help our clients achieve the flexibility of software-defined networking for better optimization and automation–from the center to the edge–in a way that's secure and delivers more business insights through detailed analytics. And we cover the entire spectrum of connectivity in cloud-ready Azure network too, from data center to private cloud, to purpose-built clouds with Azure Stack, to the Azure public cloud.



NTT is a Microsoft preferred partner for network readiness

NTT has the network expertise, knowledge, skills, global services, and partnerships to help enterprise businesses lay the foundation for a cloud-centric network in order to accelerate Microsoft Cloud adoption including Azure and Office 365. NTT has achieved Partner of the Year with Microsoft, and is a preferred networking readiness partner for Microsoft Cloud.

NTT Microsoft Cloud services

Plan and Design
Consulting services to plan cloud strategy, adoption and migration as well as optimized network architecture.

Build
NTT Technical Services to deploy the designed end-to-end architecture in terms of all network infrastructure, both hardware and software

Operate
NTT Managed Network Services to monitor and manage the underlying cloud optimized network infrastructure

Managed Azure Network Services
Includes VPN and ExpressRoute Management as part of a broader Managed Services package

NTT Network Services
Includes ExpressRoute Circuits, WAN, SD-WAN, Flexible InterConnect

NTT Exchange Provider Services
Includes Colocation and Data Center, E-Shelter Cloud Connect Service

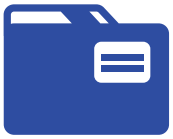
Security Capabilities for Microsoft Cloud

Security strategy and operational governance

Administrative control

User identity

Application security



Data

Device security

Operating systems

Network security

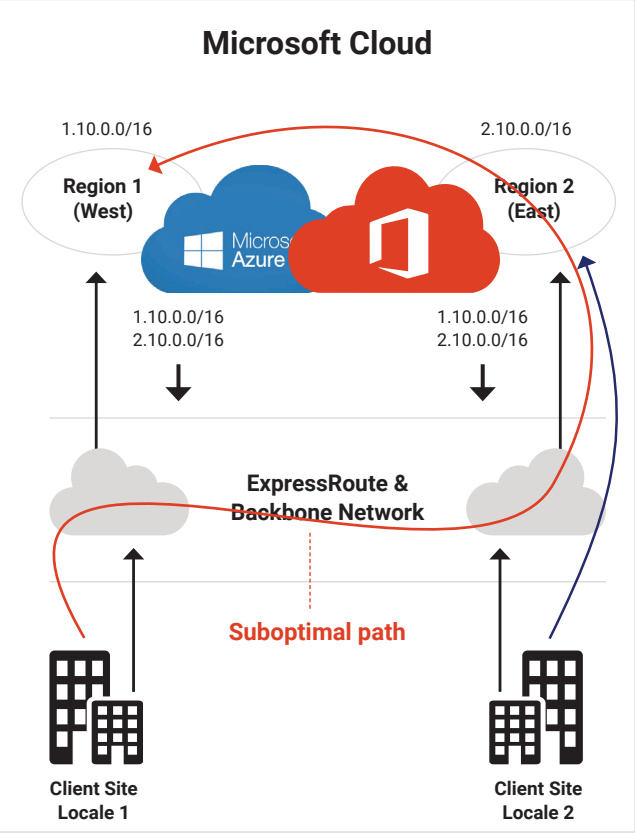
Perimeter security

Microsoft Cloud networking: architecture considerations

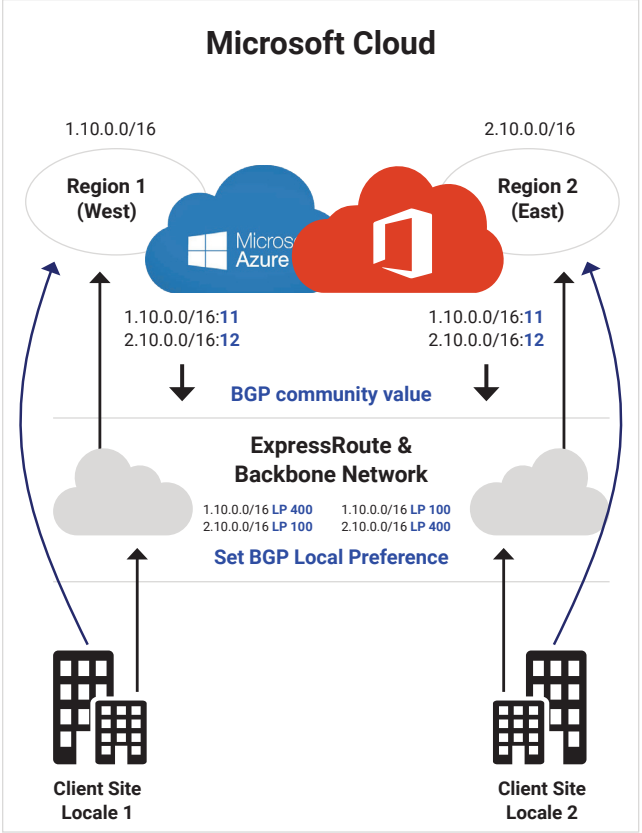
NTT can advise on the options for Microsoft network architectures as well as the network functions that can be designed and deployed as part of an optimized Microsoft Cloud environment. These include both connecting to the Microsoft Cloud and implementing networking functionality within Azure for a holistic solution. Our guidance includes multiple topics, such as virtual networking, security, edge environments as well as 3rd party virtual appliances.

A preview of the types of guidance that is available from NTT, can be seen in the illustrated graphic below, as well as on 7, 8 and 9:

ExpressRoute Routing - Client to Microsoft



Two different client locales connecting to Microsoft Cloud. Due to the way routes are advertised, client locale 1 is using a **suboptimal** path to reach its closest Microsoft Cloud node



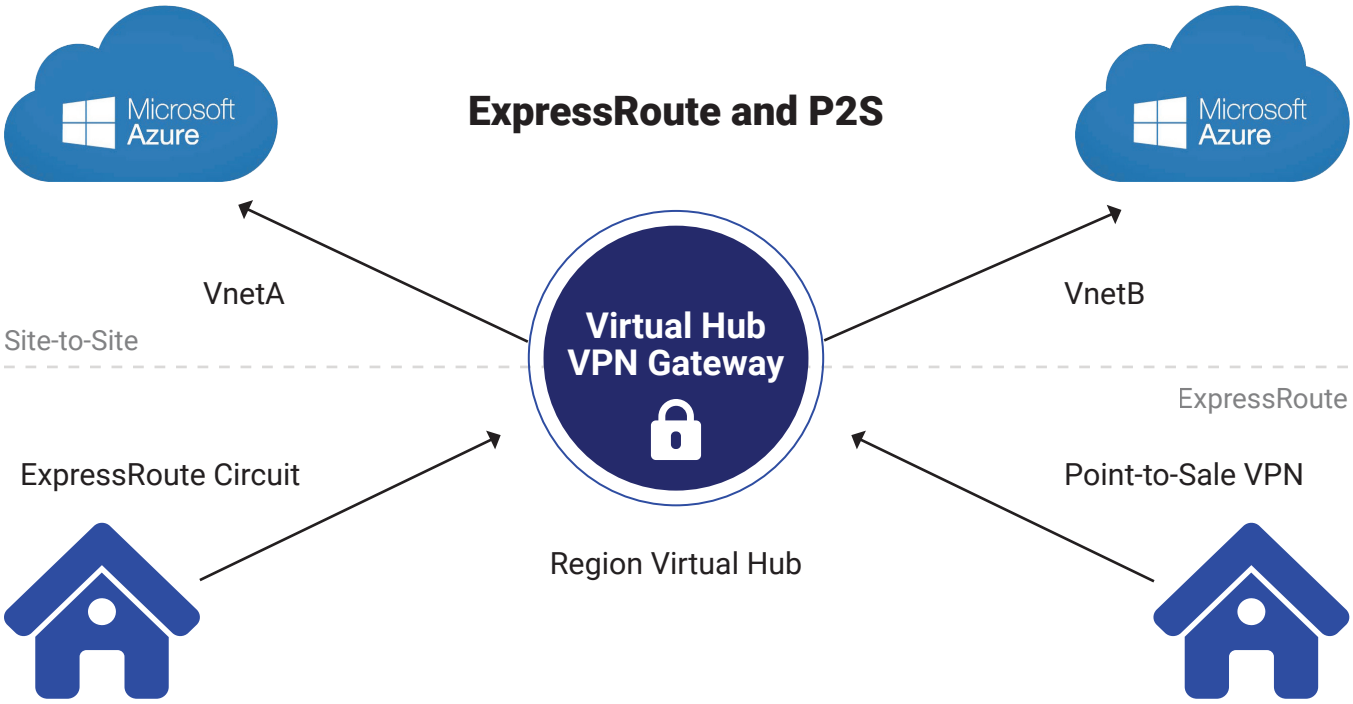
To resolve the suboptimal route, a combination of BGP **community values** to identify the geographic Microsoft region, and **local preference** metric to ensure the closest region is always used.

Microsoft Cloud networking: external architecture considerations

Now we'll spend a little time discussing network architectures and functions that can be designed and deployed as part of an optimized Microsoft Cloud environment, as well as some important Microsoft Cloud network capabilities.

Connectivity to Azure

NTT can help you choose the best connectivity design for your requirements. This includes:



Client considerations for ExpressRoute:

- ExpressRoute is based on MPLS and provides a secure connection without using the Internet backbone
- Link bandwidth: 1Gbps - 10Gbps
- Multiple deployment options
- Ideal when high SLA's and reliability are required for connectivity
- Provides predictable performance
- Highest data privacy

Azure Stack on-premises for hybrid cloud

Azure Stack is a designed for clients to deliver Azure-type services from their own on-premises data center. Azure Stack is based on the Azure cloud platform and supports multi-vendor hardware implementations.

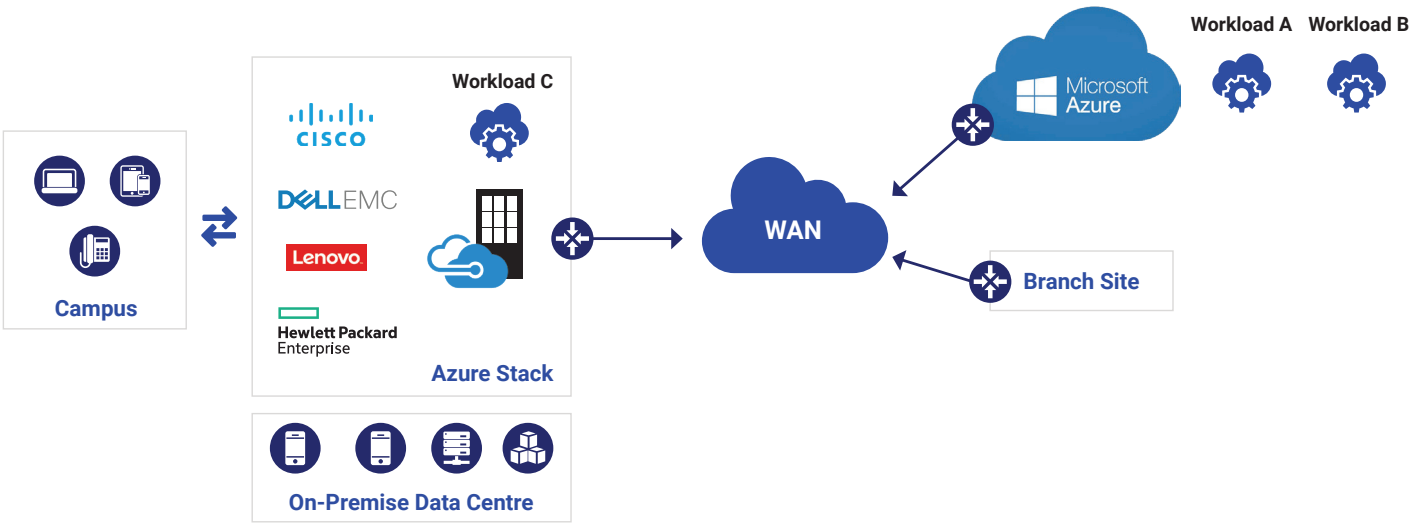
Recommendations for Azure Stack

Edge networks
Build edge cloud solutions to mitigate latency and bandwidth limitations

Regulatory requirement
Specific regulatory requirements might dictate local hosting of sensitive data. Azure Stack can replicate a cloud environment

Modelling cloud applications
Use Azure Stack to develop and test Cloud applications prior to Azure deployment

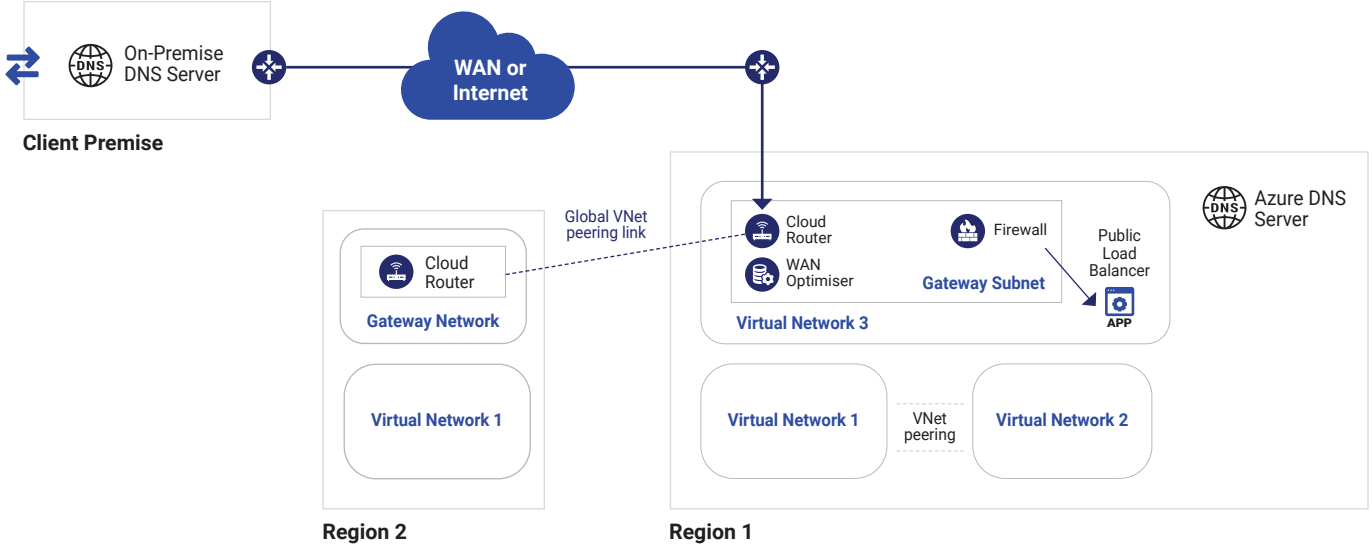
Hybrid cloud
To create a private cloud solution as part of a broader multi-cloud environment



Microsoft Cloud networking: features

Virtual networks

Virtual networks Serve as an isolation boundary and provide virtual segmentation and secure communication within Azure.



Features of Microsoft Cloud virtual networks

Connectivity - Connections to VNets can be made through Point-to-Site or Site-to-Site VPNs or by using ExpressRoute.

Security - Network Security Groups allow or deny traffic flows to and from VNets by source or destination IP.

Routing - Routing can be established using custom route tables or BGP routes.

Peering - To connect VNets, use VNet peering within same region, or Global VNet peering between regions.

Name resolution - Azure DNS or client's DNS Server can be used for name resolution.

Load-balancers and application gateway

Load Balancers are used in local Azure data centers to distribute incoming traffic to multiple virtual machines which provide the same service. Load Balancers also serve as the frontend to the Internet when configured with a Public IP address, eliminating the need to configure VMs with Public IP's. Load Balancers provide resilience and scale to cloud-based services.

Virtual appliances

Virtual appliances can be used to replicate on-premises equipment and functionality so the client can leverage existing skills and support structure, support more specialized network services, or use existing licensing agreements for network devices.

Security within Azure

When architecting network infrastructure for Microsoft Cloud, it is critical to consider and integrate security into all aspects of the architecture.

Network security
Deploy the appropriate security controls to protect Network architecture against security attacks.

Encryption
Protect confidential data by using data encryption.

Infrastructure protection
As cloud-based infrastructure becomes critical for businesses, it's important to manage who can access and change infrastructure.

Defense in depth
Provides layers of security to defend against concerted security attacks. Defense in depth consists of several layers including data, application, compute, network, perimeter, policies and access, and physical security.

Identity management
Provides the ability for users to connect to any application from any location using the same credentials.

NTT for cloud-ready networks

NTT managed networking services address all business challenges across the network. We go beyond traditional connectivity issues and tackles the entire spectrum of the network with global-scale coverage, high-speed connectivity to cloud, premier global partnerships, and providing data for both security and advanced analytics. We accelerate cloud adoption through transformational services that help our clients with hybrid WANs and data centers, cloud connectivity, and security for the ever-growing edge.

High speed connectivity to cloud

Network coverage in 190+ countries

Leading global partner with Cisco, Riverbed, F5

Supplies data for security and analytics

NTT has a long history of partnering with Microsoft around the world – a partnership that will continue to see ongoing investment by both companies for improved value to our joint clients.

With a network backbone that sees 40% of the world's traffic, NTT brings expertise around these externalities and applies it to Microsoft clouds like Azure and Office 365.

For more information about our services for cloud-ready networks for Microsoft Cloud, please contact at cloudnetworks@globalntt.com.

Together we do great things

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