

The background features a vibrant, abstract design with overlapping, wavy bands of color in shades of blue, green, yellow, orange, and red. On the right side, a bright white light source radiates outwards, creating a starburst effect with sharp, colorful rays that fan across the entire image.

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Let's go

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The bridge to possible

ENCC: Cloud VPN

From Click-Ops to Automation

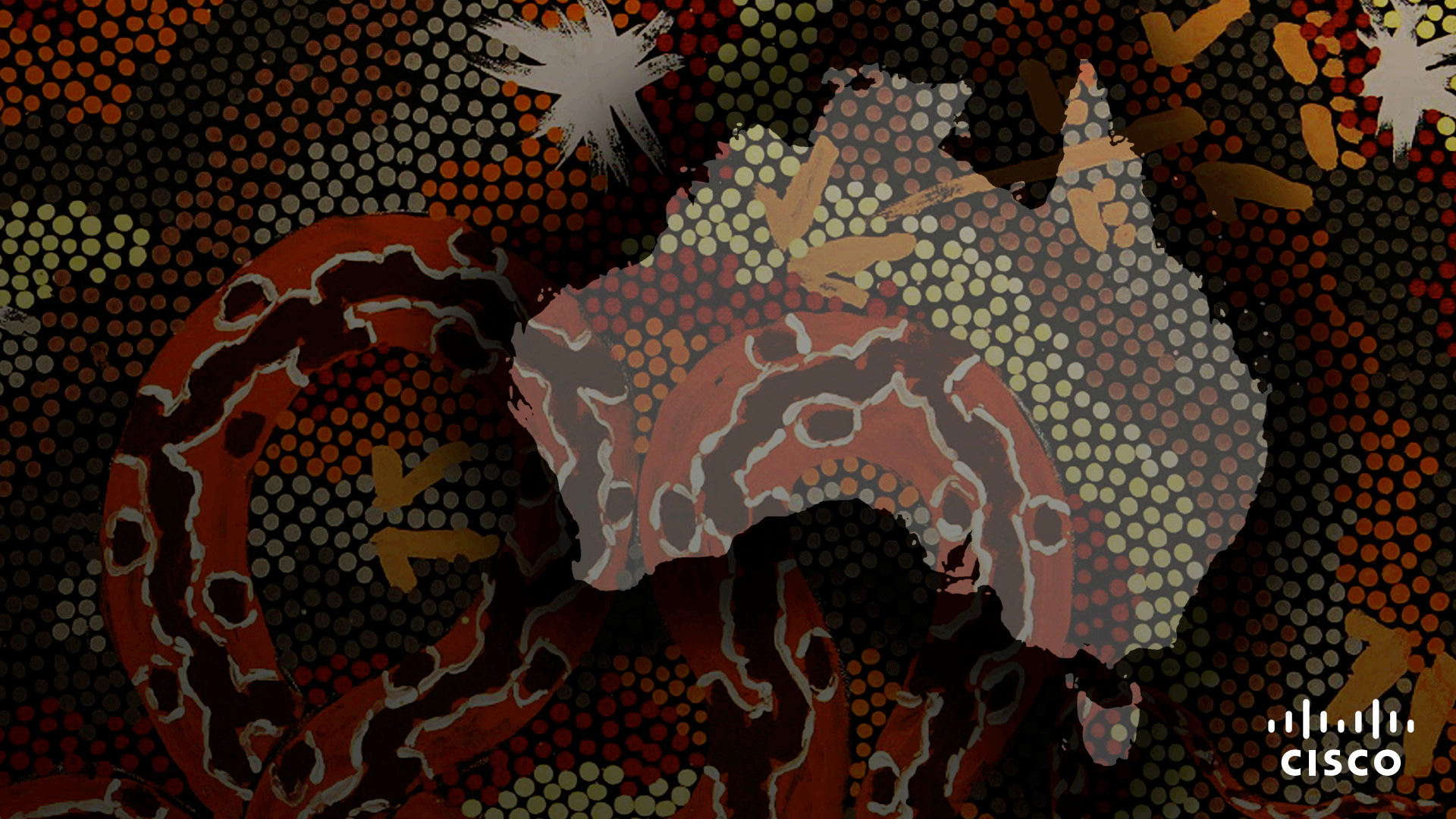
Quinn Snyder | Technical Advocate, Learning and Certifications

@qsnyder

CISCOU-1814

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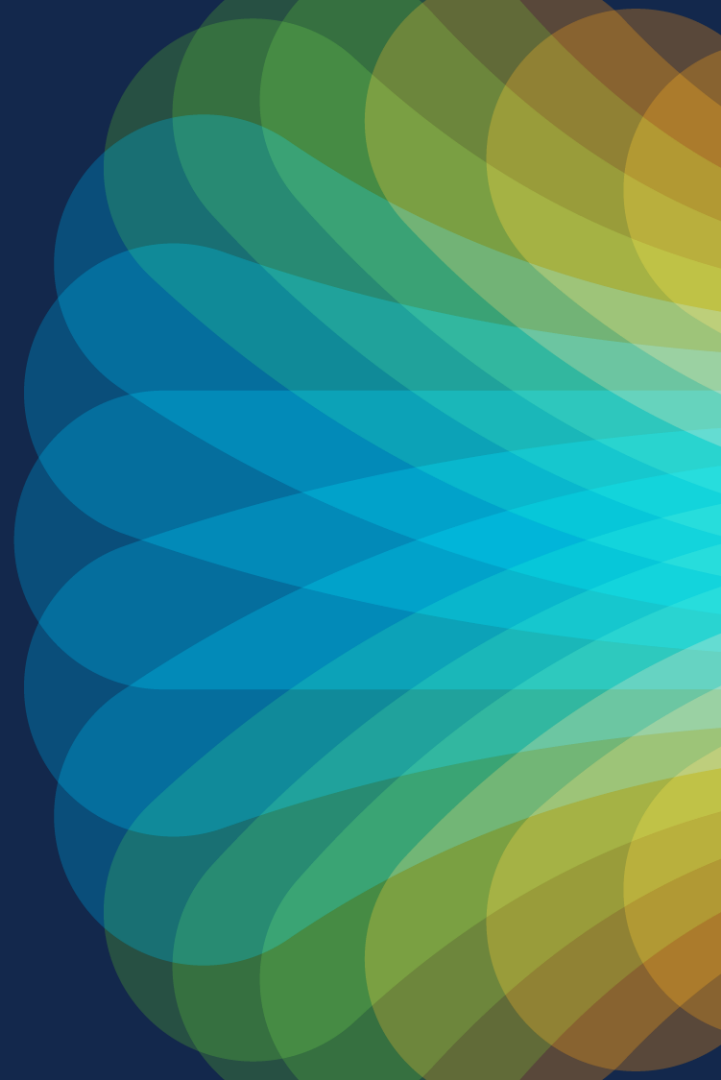
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Agenda

- This Agenda
- Exam Topics
- Cloud Connectivity
- Mouse Goes “Clicky-Clicky”
- Lets Automate!
- Conclusion

Exam Topic Correlation, Background



Where in the Exam Topics?

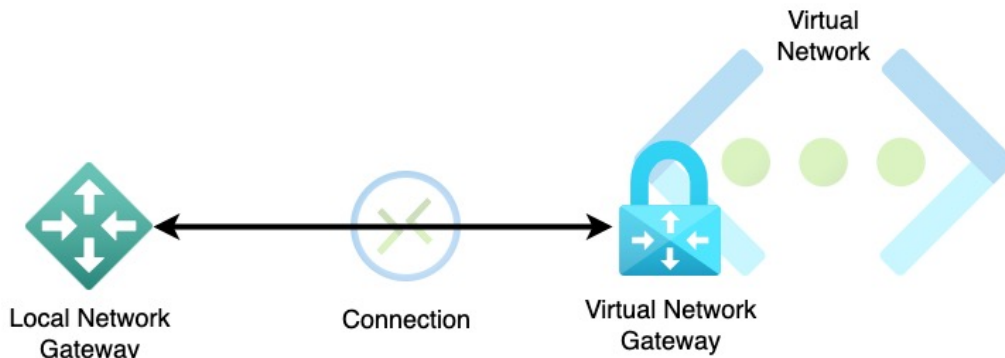
- **3.0 – IPsec Cloud Connectivity (25%)**
 - 3.1 – Configure IPsec internet-based secure cloud connectivity between an on-premises Cisco IOS XE router to a native AWS, Azure, and Google Cloud endpoint
- **5.0 – Management (20%)**
 - 5.1 – Diagnose IPsec internet-based secure cloud connectivity between an on-premises Cisco IOS XE router to a native AWS, Azure, and Google Cloud endpoint
 - 5.2 – Diagnose routing issues on Cisco IOS XE to integrate with cloud networks using BGP and OSPF, including redistribution and static routing

Don't neglect
troubleshooting!

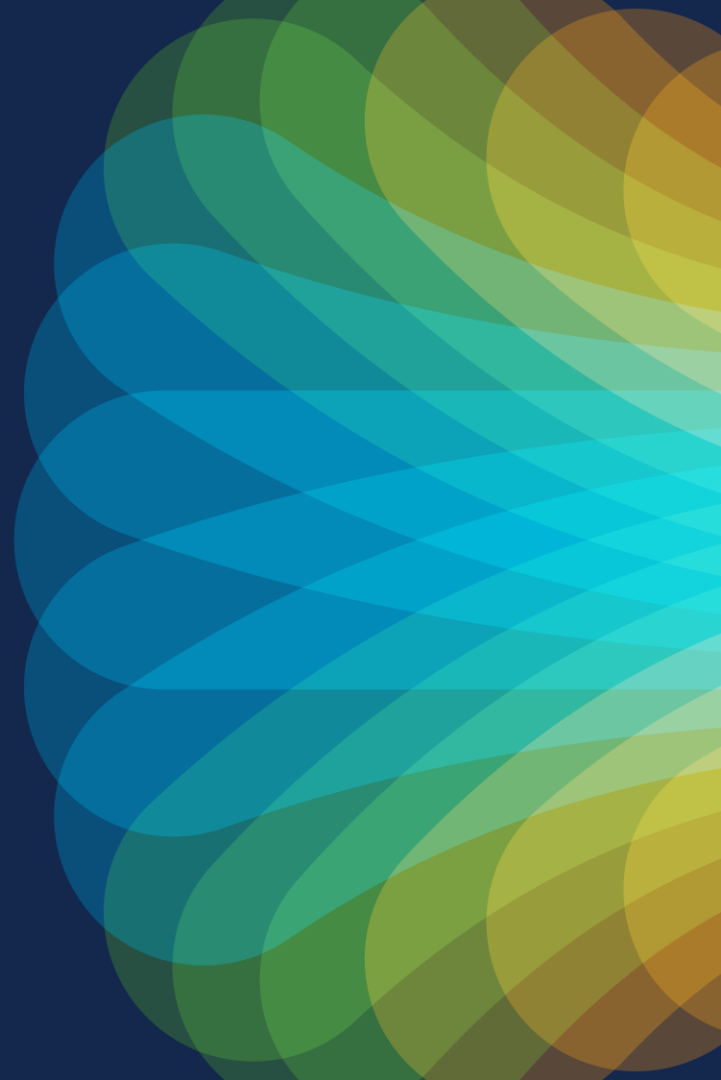
Cloud: Its About Terminology

Azure Edition

- **Virtual Network (Vnet):**
Network entity (LAN of the cloud)
- **Virtual Network Gateway:**
Hosts the VPN endpoint in the Vnet
- **Local Network Gateway:**
Virtual representation of “local” VPN endpoint
- **Connection:** Creates the binding parameters between local and remote



Tutorial

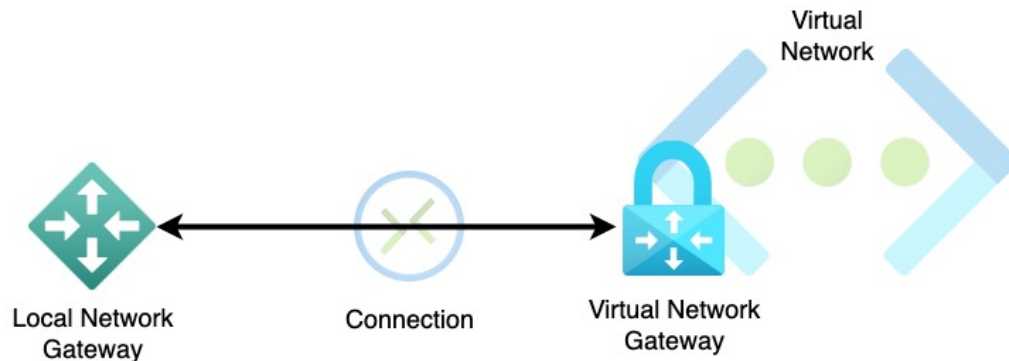
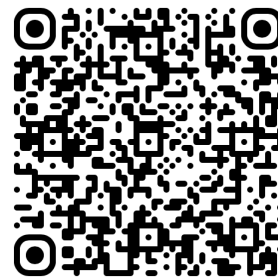


Building an Azure VPN

Steps for Success

1. Create Vnet
(includes CIDR and subnet)
2. Create Virtual Network Gateway
3. Define the Local Network Gateway
4. Connect both VNG and LNG with VPN parameters
5. Apply template
6. Success!

Cisco U. Tutorial



Building an Azure VPN: Virtual Network

The screenshot displays the Microsoft Azure portal interface. At the top, the header includes the Microsoft Azure logo, a search bar, and user information (qsnyder@cisco.com). The main content area is divided into several sections:

- Azure services:** A row of icons for various services including 'Create a resource', 'Virtual network gateways', 'Connections', 'Local network gateways', 'Virtual networks', 'Public IP addresses', 'Resource groups', 'Users', 'Microsoft Defender for...', and a 'More services' link.
- Resources:** A section with tabs for 'Recent' and 'Favorite'. It contains a table of resources:

Name	Type	Last Viewed
NetworkWatcherRG	Resource group	a week ago
LandC-Azure-SBX	Subscription	3 months ago

Below the table is a 'See all' link.

- Navigate:** A row of icons for 'Subscriptions', 'Resource groups', 'All resources', and 'Dashboard'.
- Tools:** A row of icons for 'Microsoft Learn', 'Azure Monitor', 'Microsoft Defender for Cloud', and 'Cost Management'.
- Useful links:** A row of links for 'Documentation', 'Azure Services', and 'Recent Azure Updates'.
- Azure mobile app:** A row of buttons for 'Download on the App Store' and 'GET IT ON Google Play'.

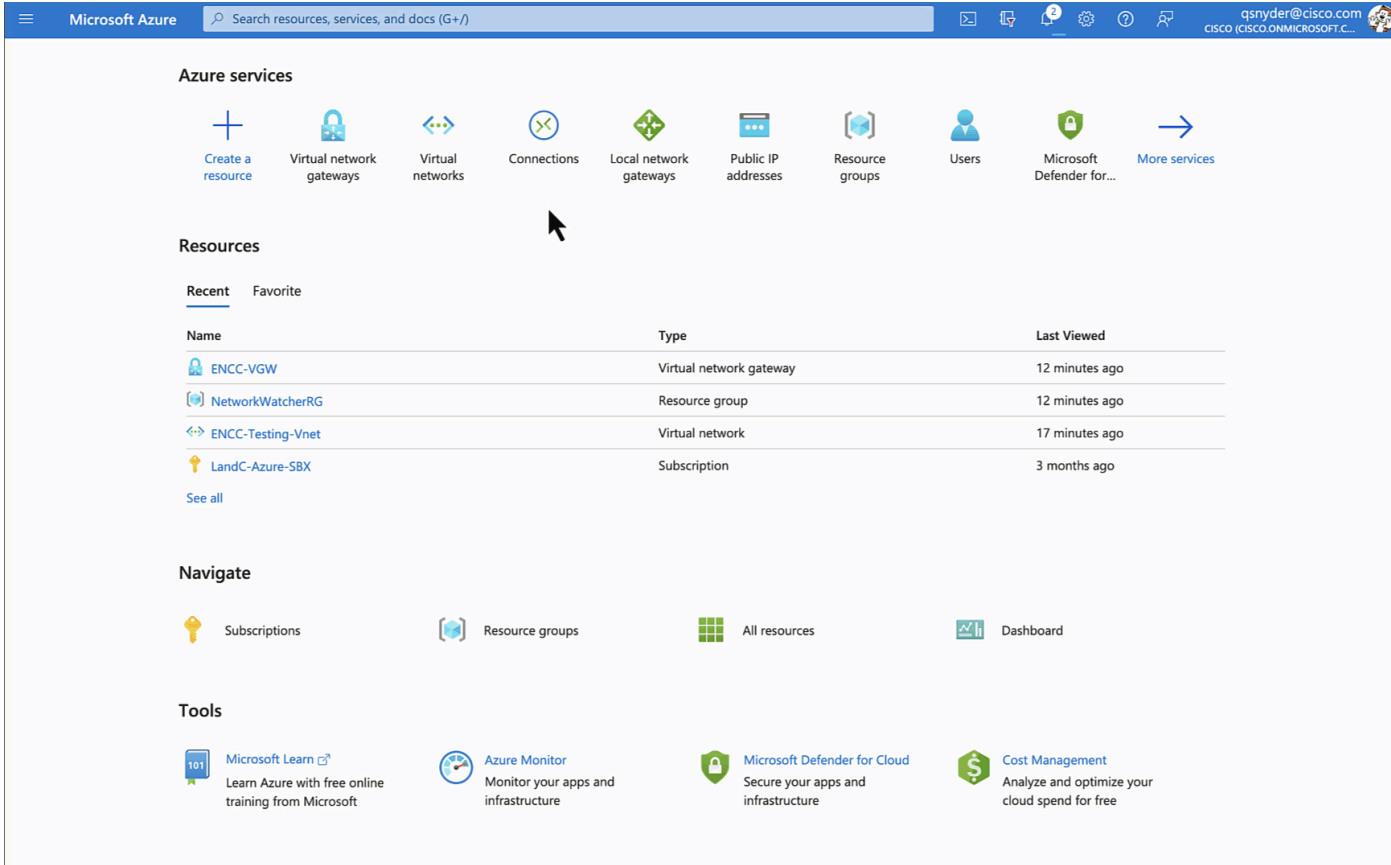
Building an Azure VPN: Virtual Network Gateway

The screenshot displays the Microsoft Azure portal interface. At the top, the header includes the Microsoft Azure logo, a search bar, and user information (qsnyder@cisco.com). Below the header, the 'Azure services' section features icons for 'Create a resource', 'Virtual networks', 'Virtual network gateways', 'Connections', 'Local network gateways', 'Public IP addresses', 'Resource groups', 'Users', 'Microsoft Defender for...', and a 'More services' link. The 'Resources' section has tabs for 'Recent' and 'Favorite', followed by a table of recent resources.

Name	Type	Last Viewed
ENCC-Testing-Vnet	Virtual network	a few seconds ago
NetworkWatcherRG	Resource group	a few seconds ago
LandC-Azure-SBX	Subscription	3 months ago

Below the table is a 'See all' link. The 'Navigate' section contains icons for 'Subscriptions', 'Resource groups', 'All resources', and 'Dashboard'. The 'Tools' section includes links to 'Microsoft Learn', 'Azure Monitor', 'Microsoft Defender for Cloud', and 'Cost Management'. The 'Useful links' and 'Azure mobile app' sections are partially visible at the bottom.

Building an Azure VPN: Local Network Gateway



The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with the Microsoft Azure logo, a search bar, and user information (qsnyder@cisco.com). Below the navigation bar, the 'Azure services' section is visible, featuring a grid of service icons. The 'Local network gateways' icon, which is a green diamond with a white 'X' inside, is highlighted by a mouse cursor. Other icons in the grid include 'Create a resource', 'Virtual network gateways', 'Virtual networks', 'Connections', 'Public IP addresses', 'Resource groups', 'Users', and 'Microsoft Defender for...'. Below the 'Azure services' section, the 'Resources' section is visible, showing a table of recent resources. The table has columns for 'Name', 'Type', and 'Last Viewed'. The resources listed are 'ENCC-VGW' (Virtual network gateway), 'NetworkWatcherRG' (Resource group), 'ENCC-Testing-Vnet' (Virtual network), and 'LandC-Azure-SBX' (Subscription). Below the 'Resources' section, the 'Navigate' section is visible, showing icons for 'Subscriptions', 'Resource groups', 'All resources', and 'Dashboard'. At the bottom, the 'Tools' section is visible, showing icons for 'Microsoft Learn', 'Azure Monitor', 'Microsoft Defender for Cloud', and 'Cost Management'.

Azure services

- Create a resource
- Virtual network gateways
- Virtual networks
- Connections
- Local network gateways
- Public IP addresses
- Resource groups
- Users
- Microsoft Defender for...
- More services

Resources

Recent Favorite

Name	Type	Last Viewed
ENCC-VGW	Virtual network gateway	12 minutes ago
NetworkWatcherRG	Resource group	12 minutes ago
ENCC-Testing-Vnet	Virtual network	17 minutes ago
LandC-Azure-SBX	Subscription	3 months ago

[See all](#)

Navigate

- Subscriptions
- Resource groups
- All resources
- Dashboard

Tools

- [Microsoft Learn](#)
Learn Azure with free online training from Microsoft
- [Azure Monitor](#)
Monitor your apps and infrastructure
- [Microsoft Defender for Cloud](#)
Secure your apps and infrastructure
- [Cost Management](#)
Analyze and optimize your cloud spend for free

Building an Azure VPN: Connection

The screenshot displays the Microsoft Azure portal interface. At the top, there's a navigation bar with the Microsoft Azure logo, a search bar, and user information (qsnyder@cisco.com). Below the navigation bar, the main content area is divided into several sections:

- Azure services:** A row of icons for various services: Create a resource, Local network gateways, Virtual network gateways, Virtual networks, Connections, Public IP addresses, Resource groups, Users, Microsoft Defender for..., and More services.
- Resources:** A section with tabs for Recent and Favorite. It contains a table of resources:

Name	Type	Last Viewed
ENCC-VPN-LGW	Local network gateway	23 minutes ago
NetworkWatcherRG	Resource group	23 minutes ago
ENCC-VGW	Virtual network gateway	40 minutes ago
ENCC-Testing-Vnet	Virtual network	45 minutes ago
LandC-Azure-SBX	Subscription	3 months ago

Below the table is a "See all" link.

- Navigate:** A row of icons for navigation: Subscriptions, Resource groups, All resources, and Dashboard.
- Tools:** A row of icons for tools: Microsoft Learn (Learn Azure with free online training from Microsoft), Azure Monitor (Monitor your apps and infrastructure), Microsoft Defender for Cloud (Secure your apps and infrastructure), and Cost Management (Analyze and optimize your cloud spend for free).

Building an Azure VPN: Finding Information

Microsoft Azure Search resources, services, and docs (G+)

qsnyder@cisco.com

Azure services

- Create a resource
- Virtual network gateways
- Connections
- Local network gateways
- Virtual networks
- Public IP addresses
- Resource groups
- Users
- Microsoft Defender for...
- More services

Resources

Recent Favorite

Name	Type	Last Viewed
ENCC-VGW	Virtual network gateway	a few seconds ago
ENCC-VPN-Connection	Connection	14 minutes ago
NetworkWatcherRG	Resource group	15 minutes ago
ENCC-VPN-LGW	Local network gateway	48 minutes ago
ENCC-Testing-Vnet	Virtual network	an hour ago
LandC-Azure-SBX	Subscription	3 months ago

[See all](#)

Navigate

- Subscriptions
- Resource groups
- All resources
- Dashboard

Tools

- [Microsoft Learn](#)
Learn Azure with free online training from Microsoft
- [Azure Monitor](#)
Monitor your apps and infrastructure
- [Microsoft Defender for Cloud](#)
Secure your apps and infrastructure
- [Cost Management](#)
Analyze and optimize your cloud spend for free

<https://portal.azure.com/#create/hub>

Building an Azure VPN: Success!

Home > Virtual network gateways > ENCC-VGW

ENCC-VGW
Virtual network gateway

Search

Refresh → Move Delete

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Configuration

Connections

Point-to-site configuration

NAT Rules

Properties

Locks

Monitoring

Logs

Alerts

Metrics

BGP peers

Automation

Tasks (preview)

Export template

Health check

Advanced tr

Show data for last

Total tunnel ingress

Tunnel Ingress Bytes (Sum)

511 B

Home > Virtual network gateways > ENCC-VGW

ENCC-VGW | BGP peers

Virtual network gateway

Search

Download BGP peers

Download learned routes

Refresh

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Configuration

Connections

Point-to-site configuration

NAT Rules

Properties

Locks

Monitoring

Showing only top 50 BGP peers in the grid, click Download BGP peers above to see all.

BGP peers

Peer address	Local address	Asn	Status	Connected duration	Routes received	Messages sent	M
192.168.150.1	10.0.1.254	65000	Connected	00:01:02.6663957	2	4	6

Showing only top 50 BGP learned routes in the grid, click Download learned routes above to see all.

Learned Routes

Network	Next hop	Local address	Weight	Source peer	Origin	AS path
10.0.0.0/16	-	10.0.1.254	32768	10.0.1.254	Network	-
192.168.150.0/30	-	10.0.1.254	32768	10.0.1.254	Network	-
192.168.150.1/32	-	10.0.1.254	32768	10.0.1.254	Network	-
192.168.128.0/24	192.168.150.1	10.0.1.254	32768	192.168.150.1	EBgp	65000
192.168.150.0/30	192.168.150.1	10.0.1.254	32768	192.168.150.1	EBgp	65000

Tunnel Ingress Bytes (Sum)

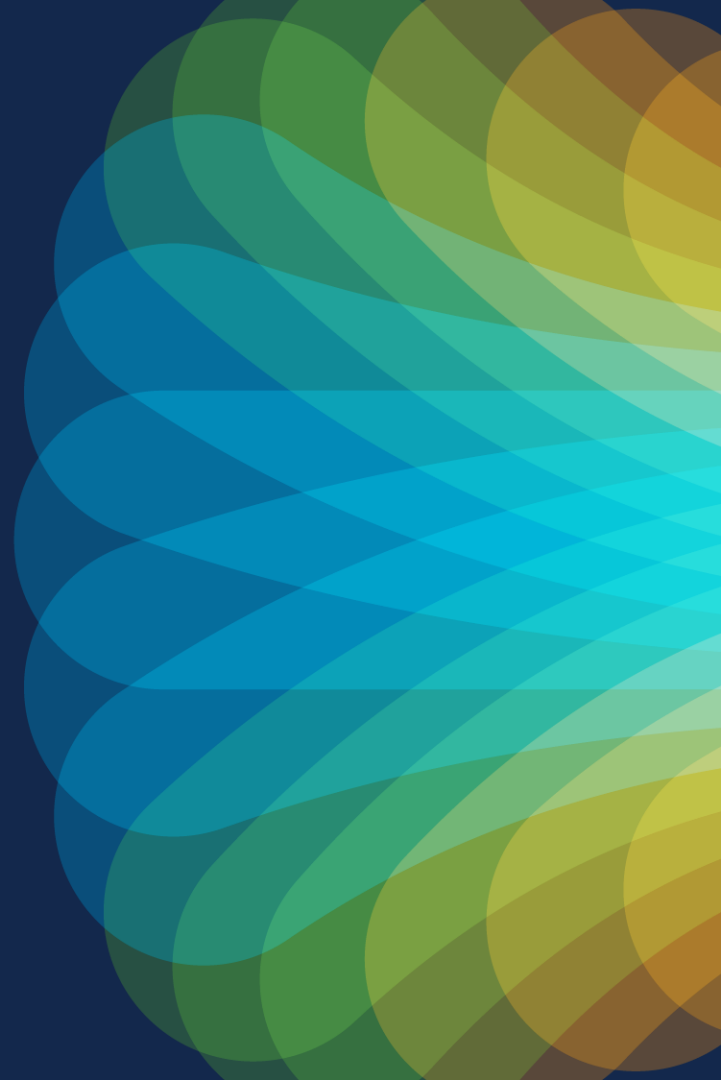
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So, Where's the Troubleshooting?

- First step: configuration template applied successfully
- Second step: Find ways to “break” the configuration and review CLI output from both router *and* cloud provider
 - Sounds like a problem for automation
 - What declarative, cloud-centric IaC tool could we use here?

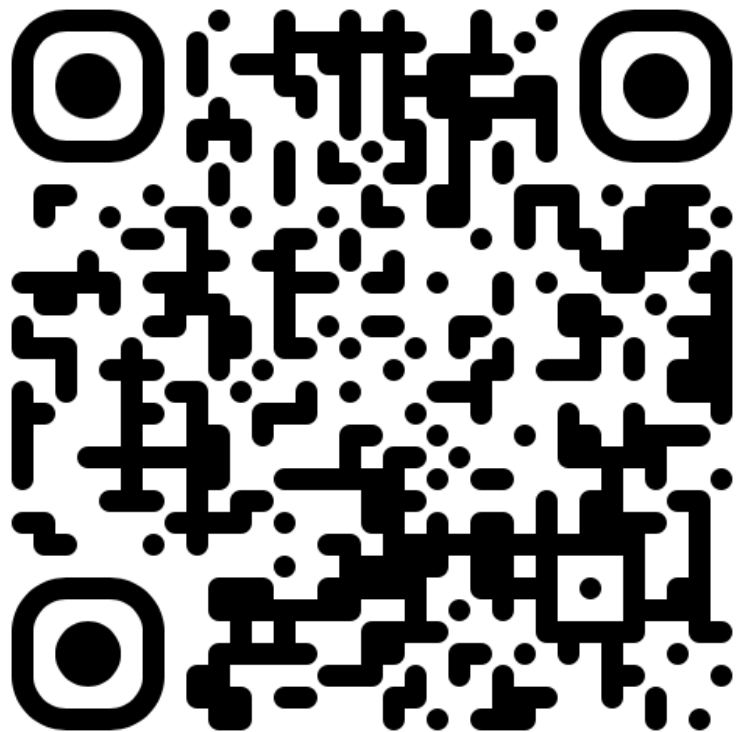
laC Demo

Bringing It All Together



In conclusion...

- <https://github.com/qsnyder/ciscou-1814>
 - QR code is nextdoor
- Contains sample Terraform, configs
- PDF of presentation
- Includes README with cross-links to other software as appropriate



Session Surveys

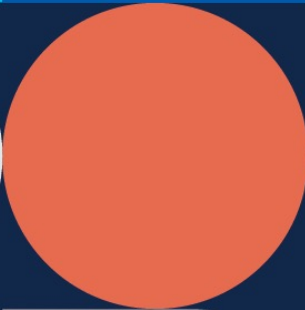
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The bridge to possible

Thank you

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