Zscaler & Azure Traffic Forwarding Deployment Guide

January 2022

Version 1.2

Zscaler Business Development – Solutions Architecture Team

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Table of Contents

Terms and Acronyms

Acronym	*Definition*
WVD	Windows Virtual Desktop
CA	Central Authority (Zscaler)
CSV	Comma-Separated Values
DPD	Dead Peer Detection *(RFC 3706)*
GRE	Generic Routing Encapsulation *(RFC2890)*
IKE	Internet Key Exchange *(RFC2409)*
IPsec	Internet Protocol Security *(RFC2411)*
VPN	Virtual Private Network
PAC	Proxy Auto-Configuration
PFS	Perfect Forward Secrecy
PSK	Pre-Share Key
SSL	Secure Socket Layer *(RFC6101)*
XFF	X-Forwarded-For *(RFC7239)*
ZIA	Zscaler Internet Access (Zscaler)
ZEN	Zscaler Enforcement Node (Zscaler)
ZPA	Zscaler Private Access (Zscaler)
ZCC	Zscaler Client Connector (Zscaler)

About This Document

Zscaler Overview

Zscaler (Nasdaq: ZS), enables the world's leading organizations to securely transform their networks and applications for a mobile and cloud-first world. Its flagship Zscaler Internet Access (ZIA) and Zscaler Private Access (ZPA) services create fast, secure connections between users and applications, regardless of device, location, or network. Zscaler delivers its services 100% in the cloud and offers the simplicity, enhanced security, and improved user experience that traditional appliances or hybrid solutions can't match. Used in more than 185 countries, Zscaler operates a massive, global cloud security platform that protects thousands of enterprises and government agencies from cyberattacks and data loss. For more information on Zscaler, visit www.zscaler.com or follow Zscaler on Twitter @zscaler.

Zscaler Resources

The following table contains links to Zscaler resources based on general topic areas.

Name	***Definition***
ZIA Help Portal	Help articles for ZIA.
ZPA Help Portal	Help articles for ZPA
ZIA Best Practices for Traffic Forwarding	Help article on traffic forwarding best practices.
ZIA – PAC Files	Help articles for PAC, Forwarding PAC, Application Profile PAC.
ZIA – Installing SSL Certificate on IE-11	Help articles for installing SSL Certificate.
ZIA – Configuring VPN Credentials	Help articles for configuring VPN.
ZIA – Configuring a Location	Help articles configuring a location.
ZIA – Configuring an IPsec Tunnel	Help articles for configuring IPsec tunnels.
ZCC - Help	Help articles for Zscaler Client Connector.
ZCC - Bypasses for Tunnel-2 App PAC and Forward PAC	Help articles for ZCC tunnel and PAC bypasses.
ZCC - Configuring Zscaler App Profiles	Help articles for ZCC profiles.
ZCC- Configuring Zscaler Forwarding Profiles	Help articles for forwarding profiles.
ZCC - Customizing Zscaler App with Install Options (MSI)	Help articles for ZCC installs.
ZCC - Customizing Zscaler App with Install Options (EXE)	Help articles for ZCC installs.
Submit a Zscaler Support Ticket	Zscaler support portal for submitting requests and issues.

Microsoft Azure (Azure)

Microsoft Azure, part of Microsoft.com (Nasdaq:MSFT), Microsoft Azure, commonly referred to as Azure, is a cloud computing service created by Microsoft for building, testing, deploying, and managing applications and services through Microsoft-managed data centers. For more information on Azure, visit azure.microsoft.com or follow them on Twitter@microsoft.

Microsoft Resources

The following table contains links to Microsoft Azure resources based on general topic areas.

Name	*Definition*
Azure Trial License	Link to obtain Azure trial license.
Azure Documentation	Azure help documentation.
Windows Virtual Desktop Environment	Setup procedures for Windows Virtual Desktop Environment.
Azure Virtual Network	Help articles for Azure Virtual Network.
Azure Active Directory	Help articles for Azure Active Directory.
Azure Virtual Network Gateway	Tutorial: Create a Site-to-Site connection in the Azure portal.
Azure VPN High Availability	Highly Available cross-premises and VNet-to-VNet connectivity.
Azure Route Tables	Virtual network traffic routing.
Getting Started with WVD	Help article on getting started with Windows Virtual Desktop.

Audience

This guide is for network administrators, endpoint / IT administrators, and security analysts responsible for deploying, monitoring, and managing enterprise security systems. For additional product and company resources, refer to *About This Document*.

Software Revisions

This document was authored using Zscaler Internet Access v6.0 and Zscaler Client Connector version 2.1.2.105 for the Windows 10 Dedicated Desktop, and PAC file Windows 10 Shared desktop.

Request for Comments

- **For Prospects / Customers:** We value reader opinions and experiences. Contact us at partner-doc-support@zscaler.com to offer feedback or corrections for this guide.

For Zscaler Employees**:** contact z-bd-sa@zscaler.com to reach the team that validated and authored the integrations in this document.

Understanding Zscaler and Azure WVD

The following sections detail how Zscaler Internet Access (ZIA) and Zscaler Private Access (ZPA) operate and interact with Microsoft Azure WVD.

Product Overview

Figure 1 shows a high-level overview of Zscaler Internet Access (ZIA) and Zscaler Private Access (ZPA) in a Microsoft WVD environment.

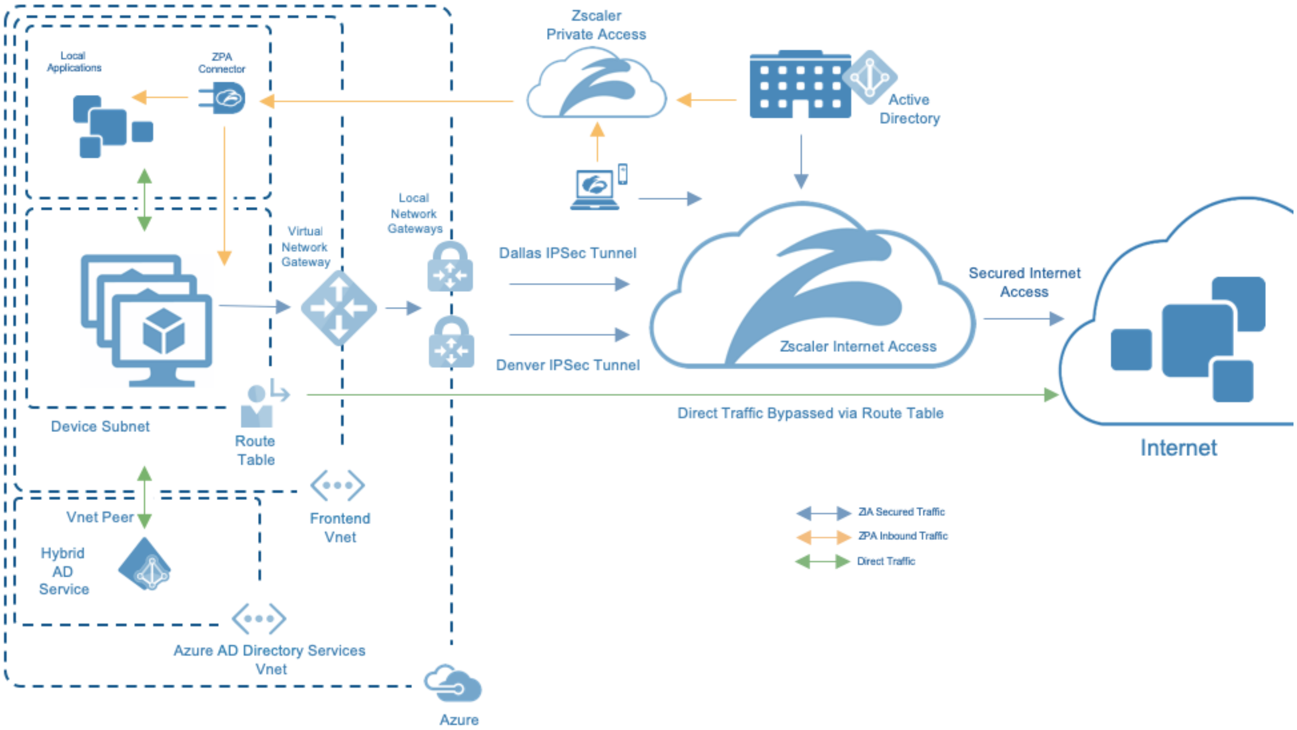


***Figure 1.** Zscaler Internet Access, Zscaler Private Access in a Microsoft WVD Environment*

You can integrate Azure and Zscaler in multiple ways. You can forward Internet traffic from Azure to Zscaler Internet Access (ZIA) by using the Zscaler Client Connector (ZCC) on a dedicated private WVD Instance, by using a Browser PAC File, or by forwarding traffic over an IPsec Tunnel (as shown in Figure 1). The IPsec tunnel can be created using various industry standard network and/or native Microsoft components.

You can connect customer traffic destined for internal private resources seamlessly and securely over ZPA by placing a ZPA Application Connector inside the Azure environment. Zscaler Private Access initiated from inside Azure destined to External private resources is currently limited to using the Zscaler Client Connector on a Dedicated Private WVD Instance.

This Deployment Guide covers all of the available traffic forwarding methods. IPsec Tunnels are created using the Azure Virtual Network Gateway, and the Zscaler Client Connector is deployed on a WVD private instance to both Zscaler Internet Access and Zscaler Private Access.

Zscaler Internet Access (ZIA) Overview

Zscaler Internet Access (ZIA) is a secure Internet and web gateway delivered as a service from the cloud. Think of it as a secure Internet onramp—all you do is make Zscaler your next hop to the Internet through one of the following methods:

- Use a tunnel from a network device like an Azure Virtual Gateway or a Cisco CSR for general forwarding from Azure to Zscaler Internet Access (ZIA)..

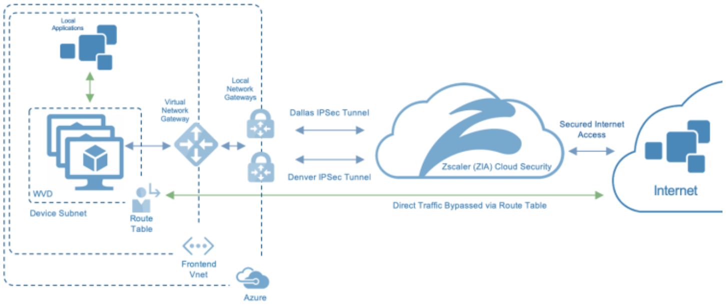


Figure 2. *IPsec Tunnel to Zscaler Internet Access*

- Use Zscaler Client Connector, PAC File, or Tunnel for Microsoft Azure WVD Personal (Dedicated Workstation) Instance. .

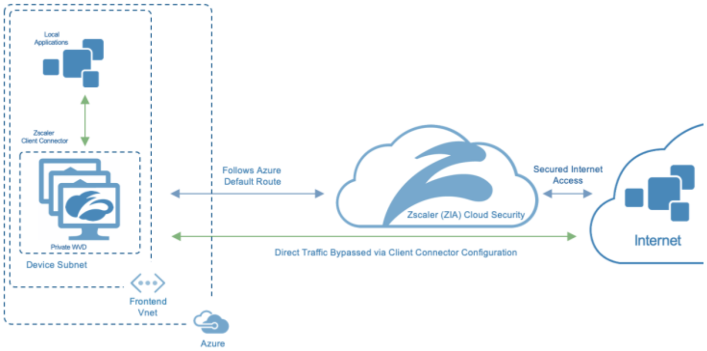


Figure 3. *Zscaler Client Connector on a WVD Private Instance*

- Use a PAC file or Tunnel from a network device for Microsoft Azure WVD Pooled (Shared) Instance. .

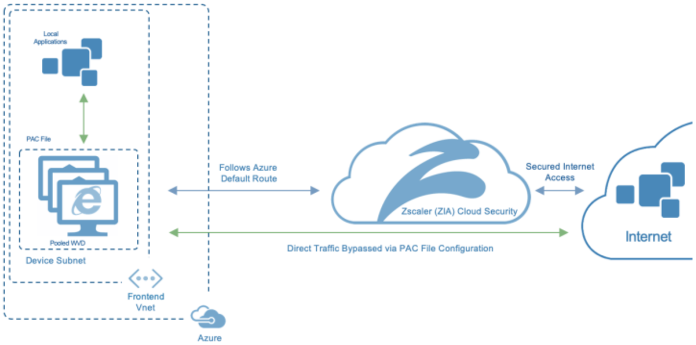

Local Applications
PAC File
Pooled WVD
Device Subnet
Follows Azure Default Route
Zscaler (ZIA) Cloud Security
Secured Internet Access
Internet
Direct Traffic Bypassed via PAC File Configuration
Frontend Vnet
Azure

Figure 4. *Browser PAC File*

- Forward traffic via our lightweight Zscaler Client Connector or PAC file for mobile or remote employees.

No matter where users connect—a coffee shop in Milan, a hotel in Hong Kong, or a WVD instance in Azure in South Korea—they get identical protection. ZIA sits between your users and the Internet, inspecting every byte of traffic inline across multiple security techniques (even SSL-encrypted traffic).

You get full protection from web and Internet threats. With a cloud platform that supports Cloud Firewall, IPS, Sandboxing, DLP, CASB, and Browser Isolation you can start with the services you need today and activate others as your needs grow. For more information, see the resources in *Zscaler Resources*.

Zscaler Private Access (ZPA) Overview

The Zscaler Private Access (ZPA) service enables organizations to provide access to internal applications and services while ensuring the security of their networks. ZPA is an easier to deploy, more cost-effective, and more secure alternative to VPNs. Unlike VPNs, which require users to connect to your network to access your enterprise applications, ZPA allows you to give users policy-based secure access only to the internal apps they need to get their work done. With ZPA, application access does not require network access.

ZPA provides a simple, secure, and effective way to access internal applications. Access is based on policies created by the IT admin within the ZPA Admin Portal and hosted within the Zscaler cloud. On each user device, a piece of software called Zscaler Client Connector is installed. The Zscaler Client Connector ensures the user's device posture and extends a secure micro-tunnel out to the Zscaler cloud when a user attempts to access an internal application.

ZPA is a separate cloud service from Zscaler Internet Access but is applicable for Dedicated Instance WVD environments for connectivity back to client's internal applications. It is also applicable for external or remote clients, connecting into applications hosted in Azure eliminating the need for a jump box. For this guide, ZPA access is used to RDP to the WVD instance for administrative purposes, and the Internet bound traffic is sent through an IPsec tunnel to Zscaler Internet Access providing a Dark Internet, Zero-Trust secured Internet experience.

- To access Internal Azure Applications, install a ZPA Application Connector in your Azure environment. ZPA provides Dark Internet, Zero-Trust access using controlled Natural Access for the best possible user experience.

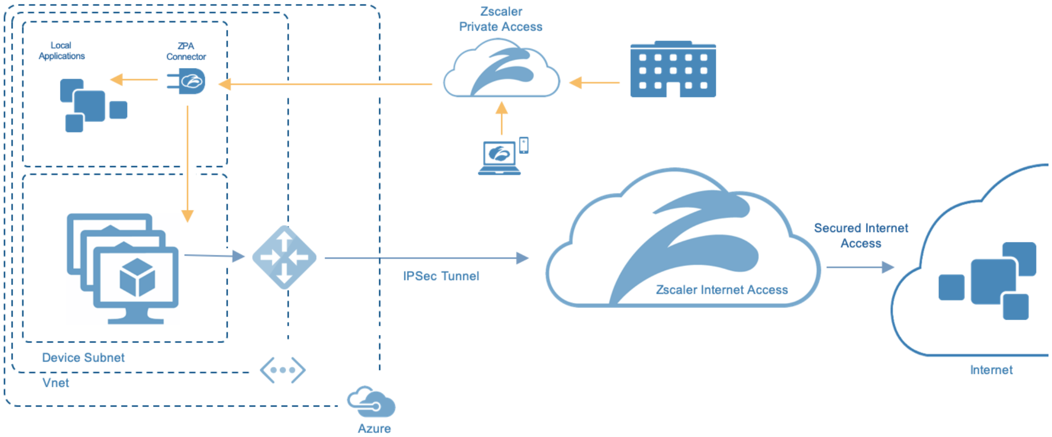


Figure 5. *ZPA Access to Internal Azure Applications*

- For access from the Azure WVD environment to the customers external private resources using ZPA, run the Zscaler Client Connector on a Private WVD instance.

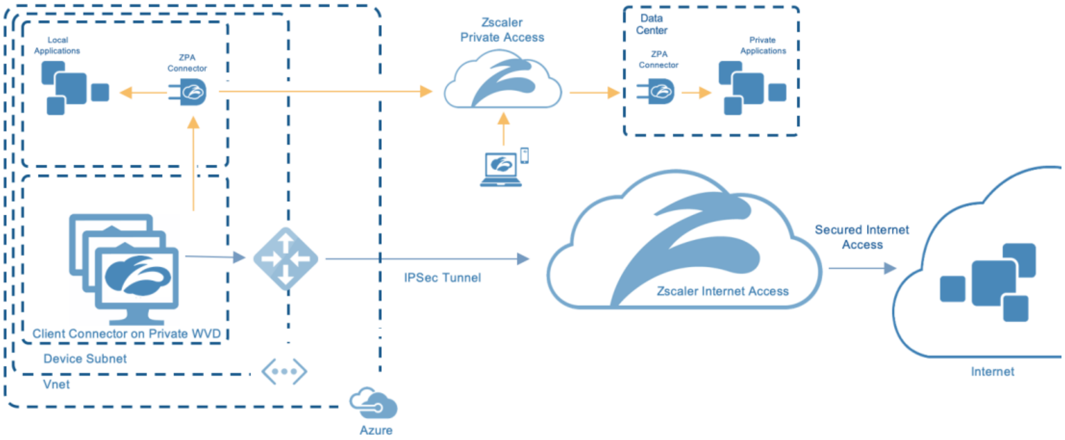


Figure 6. *ZPA Access from a Private WVD host running the Zscaler Client Connector*

ZPA provides the clients environment Zero Trust, Always-on, VPN-like connectivity over a dark Internet. This creates a user experience with secure, simple, low latency connectivity via the same ZIA client for secure internet browsing. For more information, see the resources in *Zscaler Resources*.

Azure Windows Virtual Desktop (WVD) Overview

Microsoft WVD is a desktop and app virtualization service that run on Azure. You can use Azure WVD to provision Windows 10 pools of resources in just a few minutes and quickly scale to provide thousands of desktops to workers across the globe. You can pay either monthly or hourly, just for the WVD instances you launch, which helps you save money when compared to traditional desktops and on-premises VDI solutions. WVD helps you eliminate the complexity in managing hardware inventory, OS versions and patches, and Virtual Desktop Infrastructure (VDI), which helps simplify your desktop delivery strategy. With Microsoft WVD, your users get a fast, responsive desktop of their choice that they can access anywhere, anytime, from any supported device. For more information, see the resources listed under *Zscaler Resources*.

Azure WVD Installation

The scope of this document is not to walk through the step-by-step procedures to install WVD in Azure, but to provide the Zscaler installation procedures for a WVD Personal, or Pooled environment and the options and requirements for each. Microsoft videos were followed to build and create the WVD pools for testing. The tested installation required a working Hybrid Azure AD instance to domain join the WVD VMs, a Resource Group, Storage Account, Virtual Network, Network Security Group. The installation requires some basic Power Shell Scripting to create the WVD Tenant and bind the Azure subscription to the Tenant. Creation of the Tenant requires Global Admin Privileges for Azure and Local Administrator privileges on the workstation used to create the WVD Tenant.

Windows Virtual Desktop Installation Video

https://www.youtube.com/watch?v=DrkQFSVD9Ik

Creating a WVD Host Pool

A WVD Host Pool in Azure is a resource Pool of VM's that can be configured as personal stand-alone VM's with their own operating system that can be assigned to an individual user, or a Pool of Shared VM resources sharing an operating system. The Zscaler Client Connector runs on a Personal Windows 10 Enterprise and all Client Connector forwarding using TLS or DTLS to ZIA, ZPA, and ZDX is supported.

There are several technical and security benefits provided by using a Personal Windows-10 Workstation and the Zscaler Client Connector. The Zscaler Client Connector allows for Zscaler Private Access (ZPA) Connectivity allowing access to all private applications. The Client Connector also enhances connectivity for Zscaler Internet Access (ZIA), and provides all TCP and UDP ports to be forwarded to the Zscaler Enforcement Node which can provide Traditional and Application Firewall protection using the Zscaler Cloud Firewall.

The addition of the Zscaler Digital Experience (ZDX) on the Client Connector also gives you complete end-to-end traffic visibility, from the Zscaler Client to any SaaS Application in the Cloud using application monitors sent by the Client Connector to your most critical applications.

After creating a Personal Pool, you need to define the criteria for the pool which includes the location where the VM's exist. This selected location should be as geographically central to your organization's population as possible for a single pool, or as close as possible if you create multiple pools for your different locations. You also need to select Windows-10 Enterprise for Zscaler Client Connector support. Today only single session is support for the Zscaler Client Connector. Multisession is not supported.

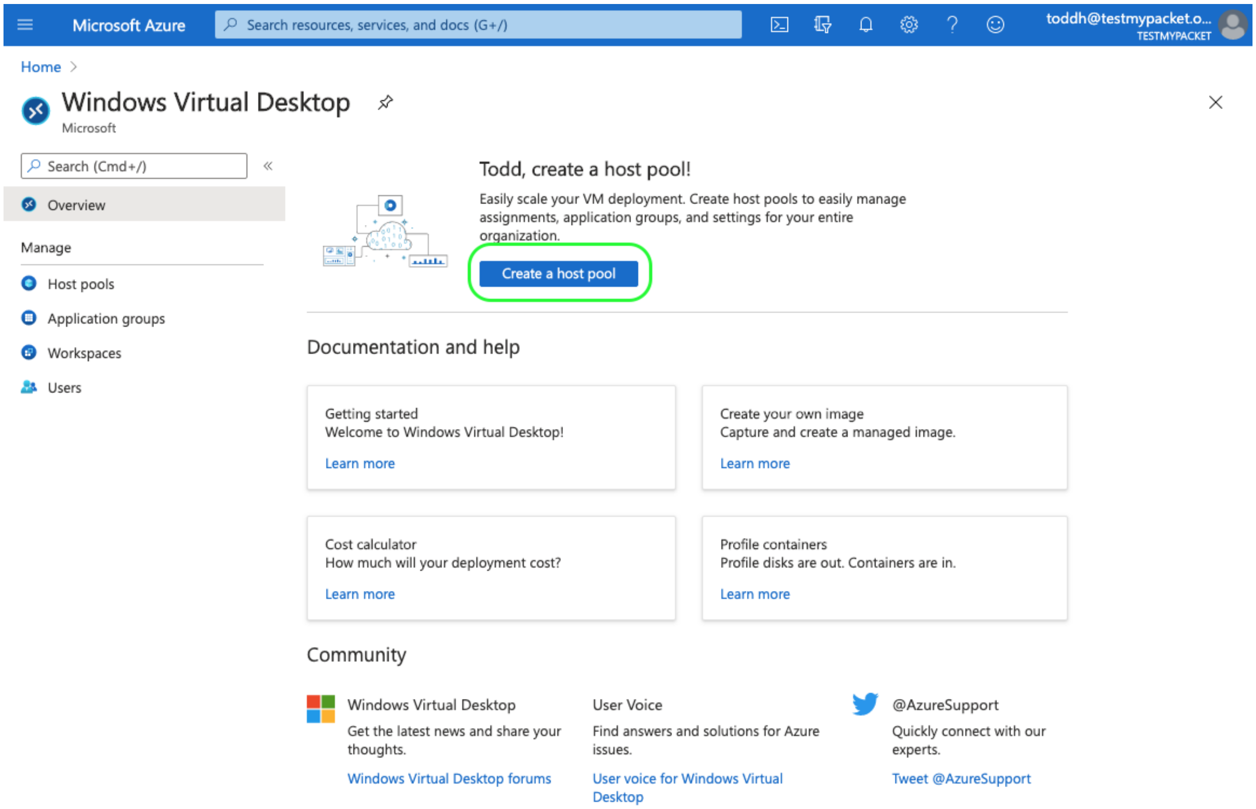
The administrator account is a global administrator account or a service principle that domain joins the VM to the Azure AD Domain. This is a requirement for Reverse Connect to work for the WVD environment.

Reverse Connect is one of the core differences between a typical Remote Desktop Service and Microsoft WVD. It allows an Azure authenticated user to connect to an Azure domain joined VM through a Remote Desktop Gateway in Azure using a Browser or the RD Client which uses HTML5 over TCP port 443. For more information, see **Getting Started with WVD**.

The VM's were configured without a Public IP Address and you must use Reverse Connect to use the VM as a WVD Resource. However, ZPA can be used to connect to internal Azure resources that do not have an external IP address, which eliminates the need to have a jump box for support or configuration. This provides a zero-trust dark internet solution for administrators to attach to resources or applications.

Installing Windows Virtual Desktop

After the WVD Tenant has been created and assigned to the Azure license, the first step is to create a host pool. **Search for Windows Virtual Desktop** and select the service to install. Select **Create a host pool** to start the installation wizard. There are two types of host pools for a WVD environment. They are Pooled or Personal.



Todd, create a host pool!

Easily scale your VM deployment. Create host pools to easily manage assignments, application groups, and settings for your entire organization.

Documentation and help

Getting started
Welcome to Windows Virtual Desktop!
Learn more

Create your own image
Capture and create a managed image.
Learn more

Cost calculator
How much will your deployment cost?
Learn more

Profile containers
Profile disks are out. Containers are in.
Learn more

Community

Windows Virtual Desktop
Get the latest news and share your thoughts.
Windows Virtual Desktop forums

User Voice
Find answers and solutions for Azure issues.
User voice for Windows Virtual Desktop

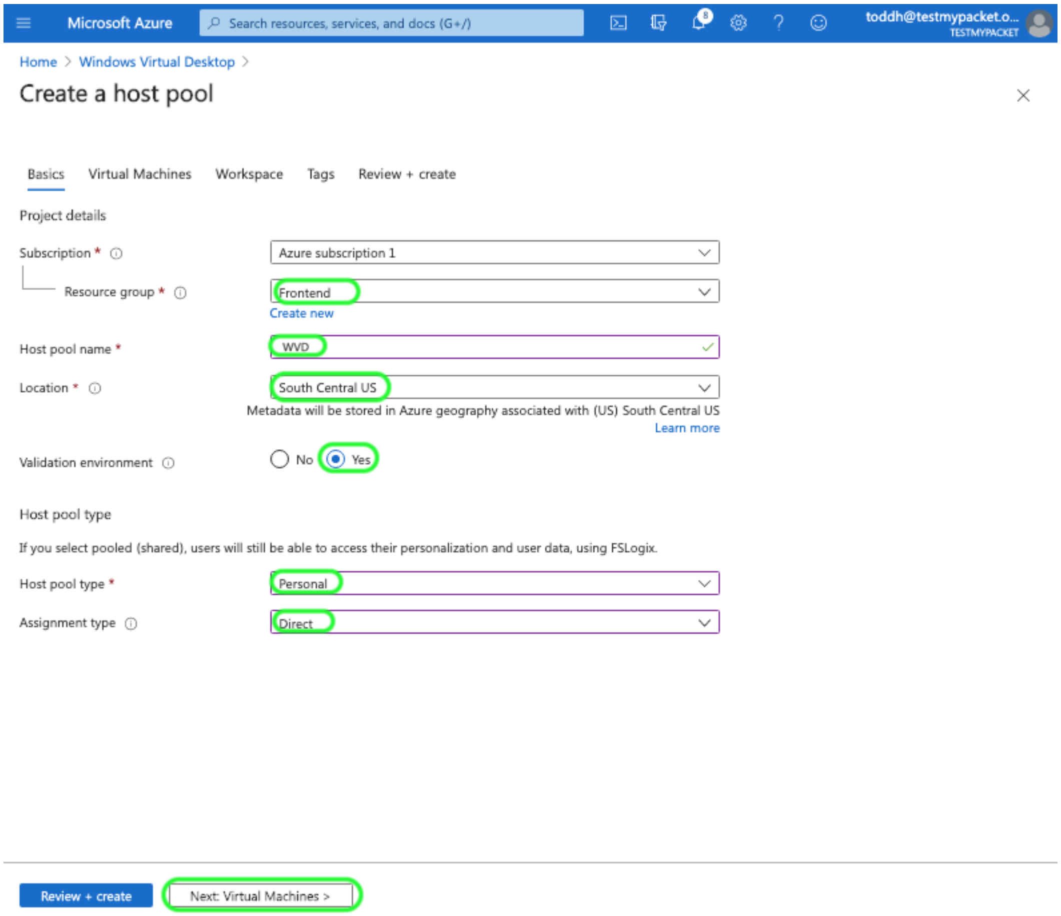
@AzureSupport
Quickly connect with our experts.
Tweet @AzureSupport

Figure 7. *Create a Windows Virtual Desktop Host pool*

Creating a Personal (Dedicated) Host Pool

To select and create the Pool type for the host pool, select either **Pooled** (which for Zscaler connectivity requires a PAC file for traffic forwarding, or **Personal** (which creates a stand-alone workstation that can load the Zscaler Client Connector).

This example uses a Personal host pool. Use **Select a Host** type of **Personal**.



Create a host pool

Project details

Subscription * : Azure subscription 1

Resource group * : Frontend (Create new)

Host pool name * : WVD

Location * : South Central US

Metadata will be stored in Azure geography associated with (US) South Central US. Learn more

Validation environment: ○ No ● Yes

Host pool type

If you select pooled (shared), users will still be able to access their personalization and user data, using FSLogix.

Host pool type * : Personal

Assignment type: Direct

Figure 8. Select Host Pool Type

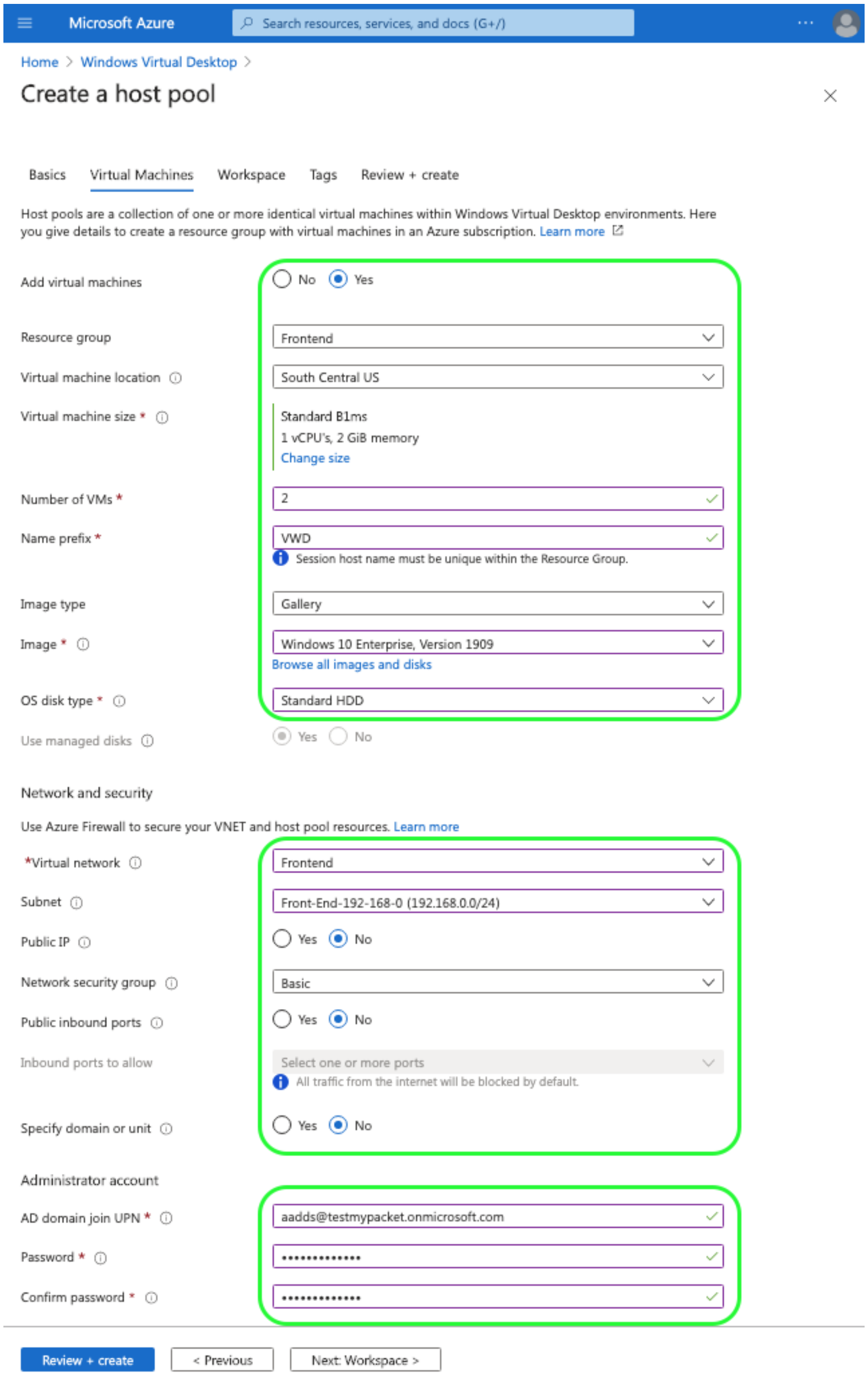
To configure the Virtual Machine, Enter the **VM** and **Network** specifics for the **Pool** and then enter the credentials of an Azure administrator that can attach the VM to a domain.

NOTE

The installation fails if the VM cannot attach to the domain.

Select **Next Virtual Machines** to continue.

Select **Yes** to register the Desktop App Group and Create a new Workspace name. This is the workspace the client sees when attaching from the RD client or a browser. Then select **Review + create** to create the host pool. The installation can take around 30 minutes.


Microsoft Azure
Search resources, services, and docs (G+/)
Home > Windows Virtual Desktop >

Create a host pool

Basics | Virtual Machines | Workspace | Tags | Review + create

Host pools are a collection of one or more identical virtual machines within Windows Virtual Desktop environments. Here you give details to create a resource group with virtual machines in an Azure subscription. Learn more

Add virtual machines: ○ No ● Yes

Resource group: Frontend

Virtual machine location: South Central US

Virtual machine size *: Standard B1ms
1 vCPU's, 2 GiB memory
Change size

Number of VMs *: 2

Name prefix *: VWD

Session host name must be unique within the Resource Group.

Image type: Gallery

Image *: Windows 10 Enterprise, Version 1909

Browse all images and disks

OS disk type *: Standard HDD

Use managed disks: ● Yes ○ No

Network and security

Use Azure Firewall to secure your VNET and host pool resources. Learn more

*Virtual network: Frontend

Subnet: Front-End-192-168-0 (192.168.0.0/24)

Public IP: ○ Yes ● No

Network security group: Basic

Public inbound ports: ○ Yes ● No

Inbound ports to allow: Select one or more ports

All traffic from the internet will be blocked by default.

Specify domain or unit: ○ Yes ● No

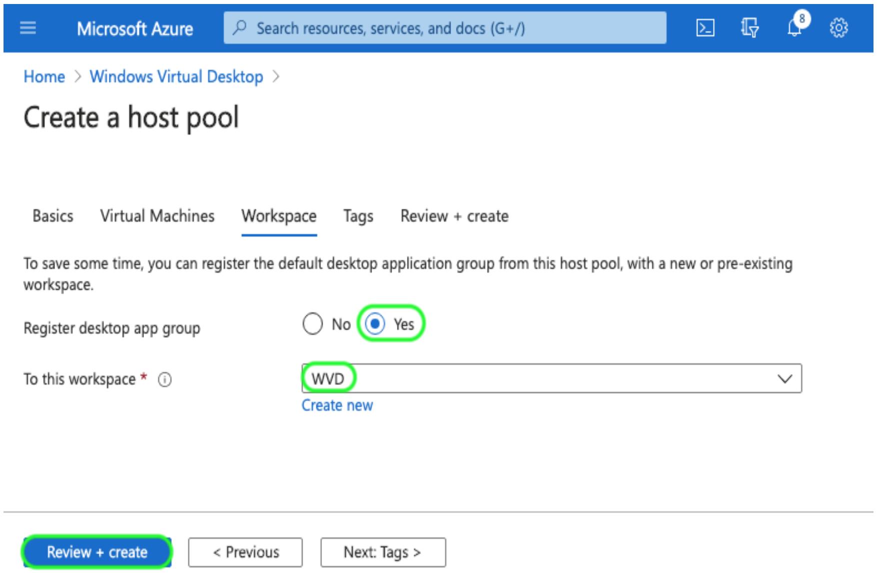
Administrator account

AD domain join UPN *: aadds@testmypacket.onmicrosoft.com

Password *: •••••••••••••

Confirm password *: •••••••••••••

Figure 9. *Configuration of the host pool*



To save some time, you can register the default desktop application group from this host pool, with a new or pre-existing workspace.

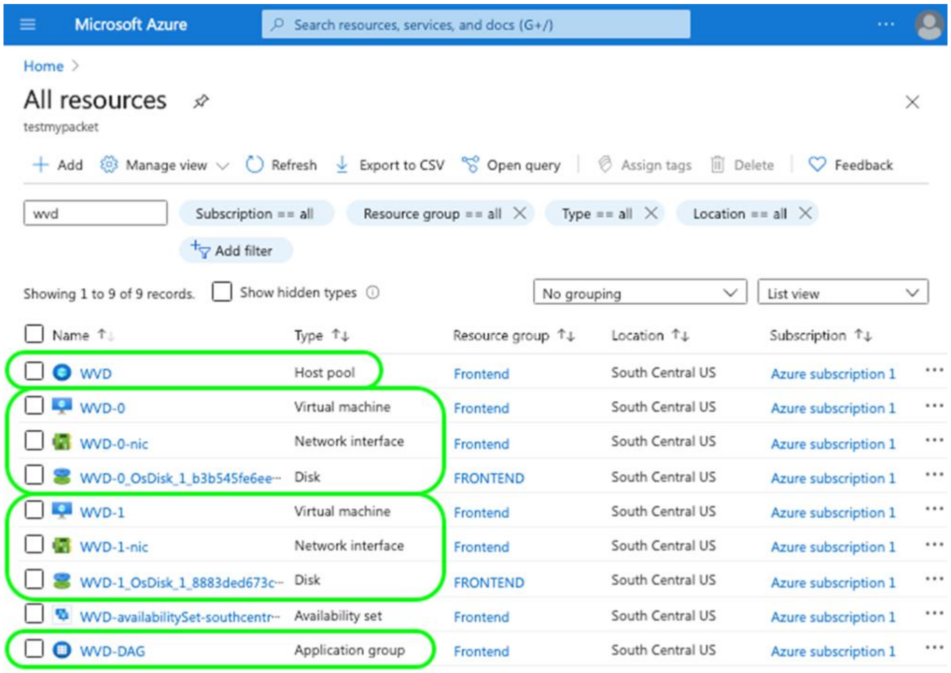
Register desktop app group ○ No ● Yes

To this workspace * WVD

__Figure 10.__ Configuration of the host pool

Here are the configured host pool and all the created resources from the installation processes. The highlighted devices are the **Host Pool**, the **Desktop Application Group (DAG)**, and the **Dedicated Personal Virtual Machines**. We need to assign the users to the Virtual Machine. This is done in two steps:

1. Assigning the user in the Desktop Application Group
2. Assigning the machine to the user is the Session Host Pool under the Host Pool.



wvd | Subscription == all | Resource group == all | Type == all | Location == all

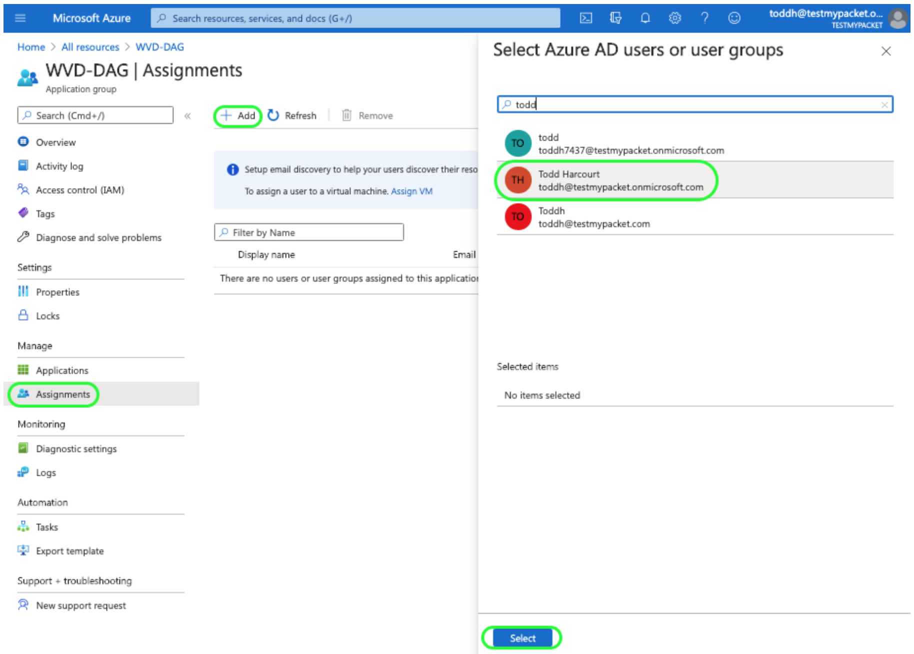
Showing 1 to 9 of 9 records. □ Show hidden types

No grouping | List view

Name	Type	Resource group	Location	Subscription
WVD	Host pool	Frontend	South Central US	Azure subscription 1
WVD-0	Virtual machine	Frontend	South Central US	Azure subscription 1
WVD-0-nic	Network interface	Frontend	South Central US	Azure subscription 1
WVD-0_OsDisk_1_b3b545fe6ee···	Disk	FRONTEND	South Central US	Azure subscription 1
WVD-1	Virtual machine	Frontend	South Central US	Azure subscription 1
WVD-1-nic	Network interface	Frontend	South Central US	Azure subscription 1
WVD-1_OsDisk_1_8883ded673c···	Disk	FRONTEND	South Central US	Azure subscription 1
WVD-availabilitySet-southcentr···	Availability set	Frontend	South Central US	Azure subscription 1
WVD-DAG	Application group	Frontend	South Central US	Azure subscription 1

__Figure 11.__ The Created WVD Host Pool

To start, Select the **Application Group** to bring up the configuration parameters. Select **Assignments** and then **Add** to bring up the Azure AD User selection menu. Select the user/s to assign to the dedicated VMs and then click **Select** to give the user access to the WVD VM resources.



Setup email discovery to help your users discover their reso

To assign a user to a virtual machine. Assign VM

There are no users or user groups assigned to this applicatio

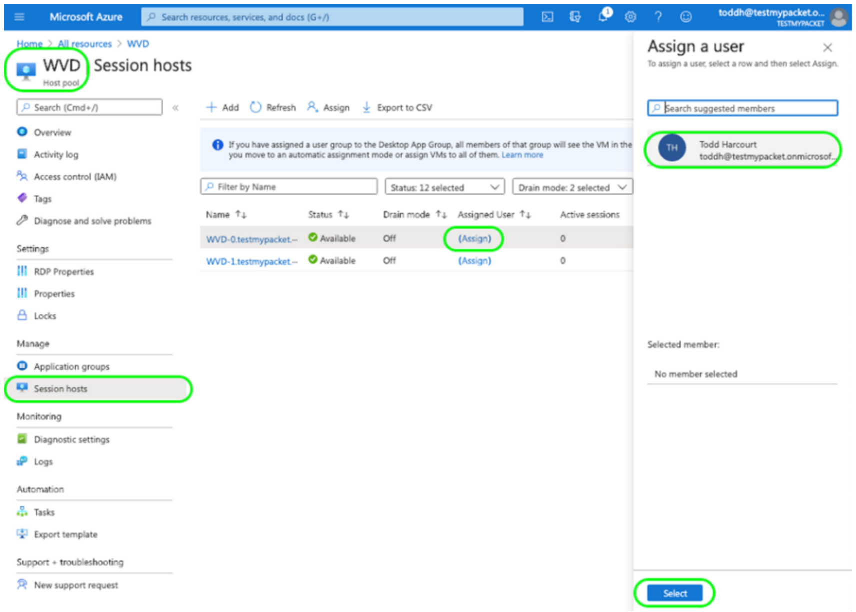
TO	todd toddh7437@testmypacket.onmicrosoft.com
TH	Todd Harcourt toddh@testmypacket.onmicrosoft.com
TO	Toddh toddh@testmypacket.com

No items selected

Figure 12. *The Created Virtual Machine*

Select **All Resource,** and then select the **WVD Host Pool, Session hosts** and **Assign** to bring up the VMs and then select **(Assign)**. Select the user that is assigned to the VM and click **Select**.

We are finished with the VM configuration and if everything completed successfully our users should be able to connect to the VM through the remote desktop application or a browser by using reverse connect.



If you have assigned a user group to the Desktop App Group, all members of that group will see the VM in the you move to an automatic assignment mode or assign VMs to all of them. Learn more

Name	Status	Drain mode	Assigned User	Active sessions
WVD-0.testmypacket.--	Available	Off	(Assign)	0
WVD-1.testmypacket.--	Available	Off	(Assign)	0

To assign a user, select a row and then select Assign.

TH Todd Harcourt toddh@testmypacket.onmicrosof...

Selected member:

No member selected

Figure 13. *The Created Virtual Machine*

Let's test our VM using Reverse Connect. Bring up a browser and go to the following URL.

https://rdweb.wvd.microsoft.com/webclient

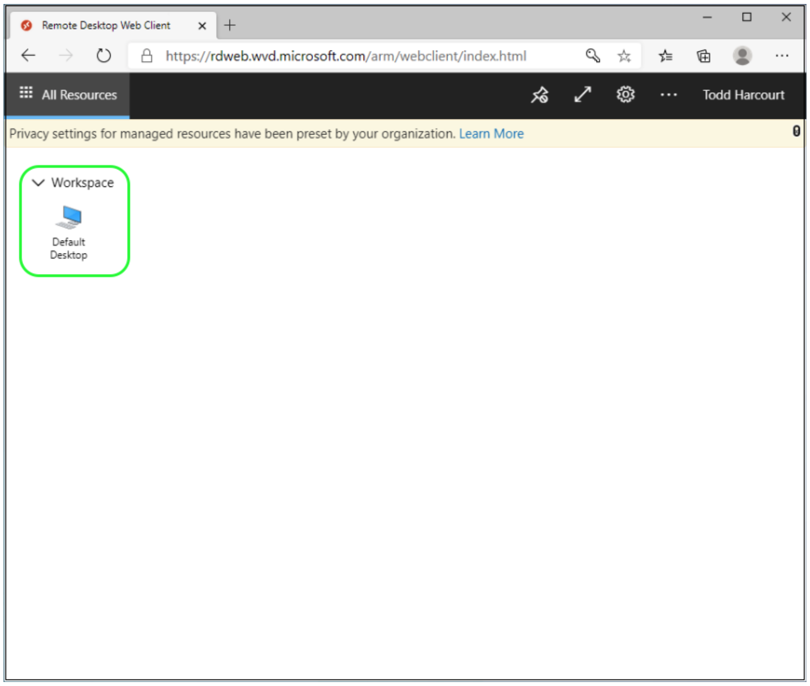

Remote Desktop Web Client
https://rdweb.wvd.microsoft.com/arm/webclient/index.html
All Resources
Todd Harcourt
Privacy settings for managed resources have been preset by your organization. Learn More
Workspace
Default Desktop

Figure 14. *Browser Access to the Workspace*

This brings up the workspace we created. Double-click on the Default Desktop icon and enter the Azure domain user credentials. This opens Windows-10 VM in our browser.

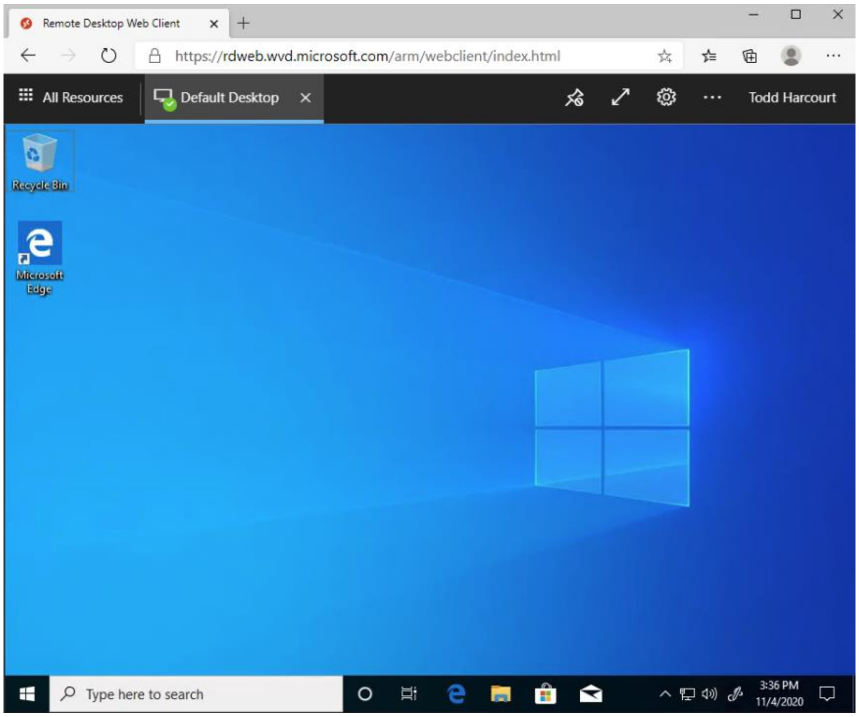


Figure 15. *The Windows-10 Workstation ready to Install the Zscaler Client Connector or PA*

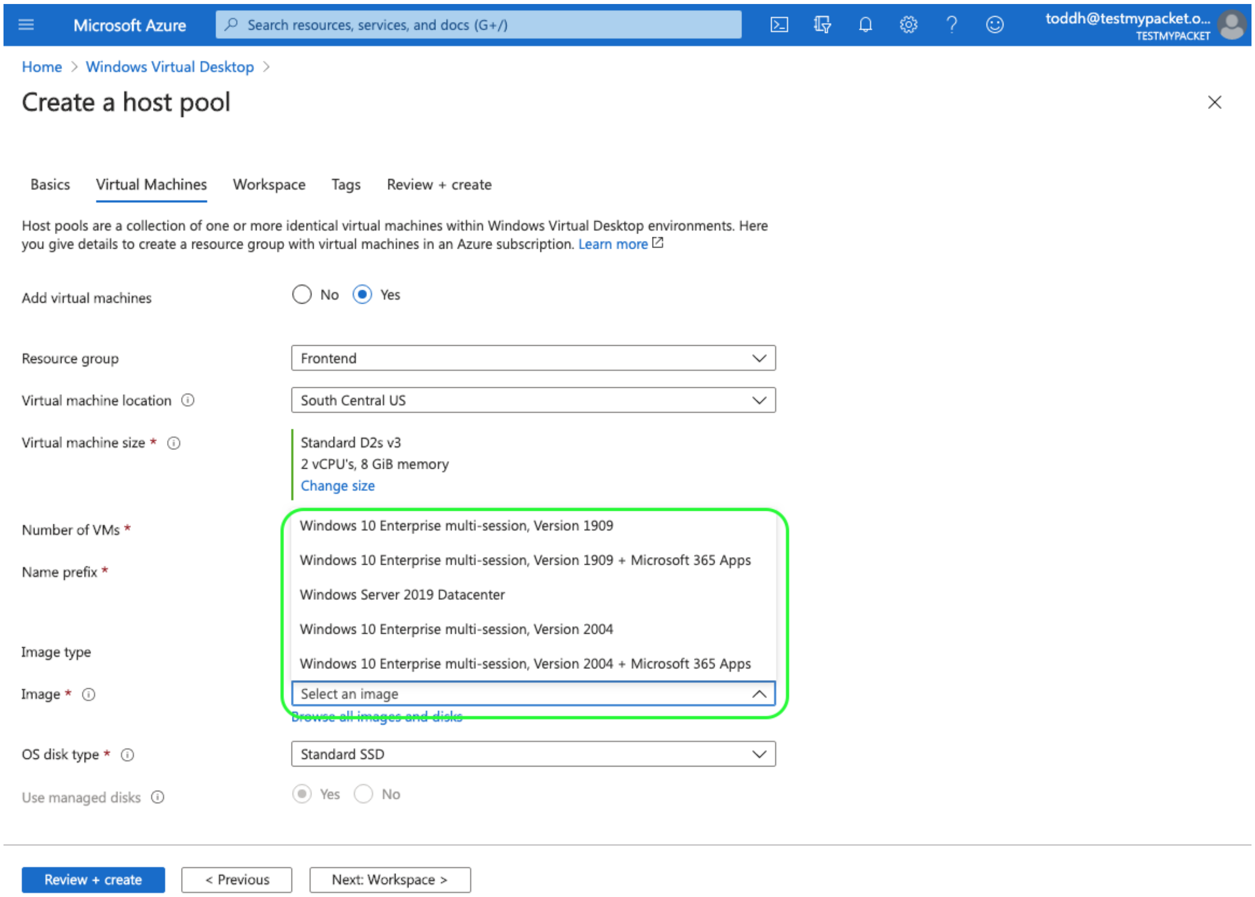
Our VM is ready to install traffic forwarding to Zscaler for network and end point security. We will walk through the methods of configuring forwarding depending on the type of VM. If the VM is a pooled device using multi-threaded Windows-10 OS, we will install a PAC file using the example in the appendix with the appropriate bypasses.

If the VM is a Private VM, the Zscaler Client Connector will be used, although PAC file is an option for every browser if the Zscaler Client Connector is not an option for some reason.

We will also configure a tunnel to ZIA for Internet bound traffic using a virtual network gateway.

Creating a Pooled (Shared) Host Pool

A pooled device is a shared virtual machine where each device will have multiple users that use the same resources, but to the user it feels like a personal dedicated Windows workstation. This has financial advantages by pooling resources and provide some operational simplification of management.



Create a host pool

Host pools are a collection of one or more identical virtual machines within Windows Virtual Desktop environments. Here you give details to create a resource group with virtual machines in an Azure subscription. Learn more

Add virtual machines ○ No ● Yes

Resource group: Frontend

Virtual machine location: South Central US

Virtual machine size *: Standard D2s v3, 2 vCPU's, 8 GiB memory, Change size

Number of VMs *

Name prefix *

Image type

Image *: Select an image

- Windows 10 Enterprise multi-session, Version 1909
- Windows 10 Enterprise multi-session, Version 1909 + Microsoft 365 Apps
- Windows Server 2019 Datacenter
- Windows 10 Enterprise multi-session, Version 2004
- Windows 10 Enterprise multi-session, Version 2004 + Microsoft 365 Apps

Browse all images and disks

OS disk type *: Standard SSD

Use managed disks ● Yes ○ No

Figure 16. *Selecting an Image for Pooled (Shared) VM Pool Type*

A pooled host environment also has ramifications for Zscaler. **The Zscaler Client Connector is not supported on pooled machines**. Connectivity to Zscaler is then provided by other means, such as a PAC file for browsers on the pooled system, a Virtual Zscaler Edge Connector, or a tunnel from a firewall or network device running in the Azure environment. VM's of this type run a Windows-10 Multi-Session OS, which is not supported by the Zscaler Client Connector today.

Zscaler Traffic Forwarding Options

The following processes install the Zscaler Client Connector for the Private WVD VM, or a PAC file using a Dedicated Proxy Port for the Pooled VM. For either the Zscaler Client Connector or a PAC file, bypasses need to be added to direct traffic away from being sent to Zscaler with the goal to keep control traffic local to the Azure environment. This could also include the clients own internal domain.

Setting up Zscaler Client Connector

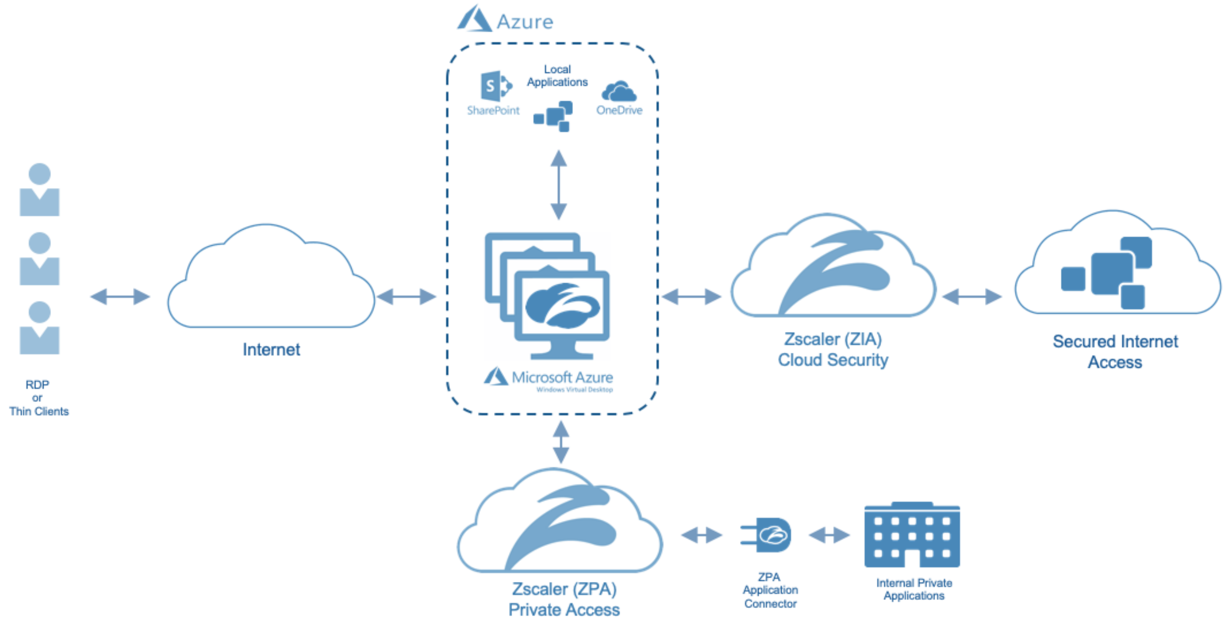


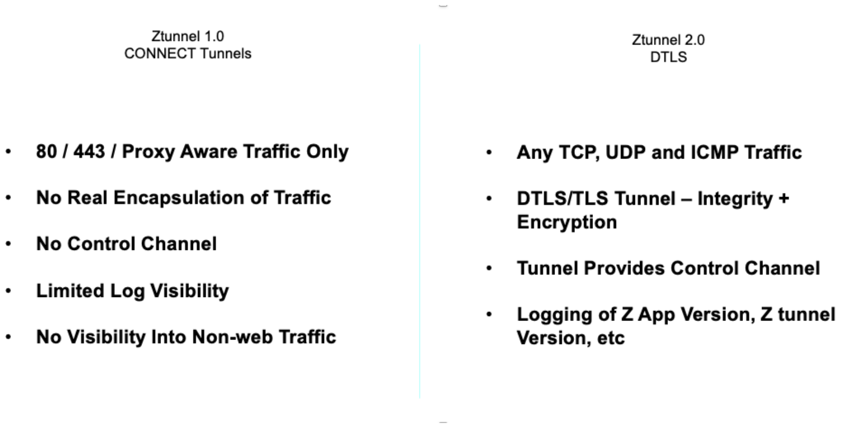
Figure 17. *Traffic Flow with Zscaler Client Connector using ZIA and ZPA*

The Zscaler Client Connector is a common endpoint agent for both ZIA and ZPA services. Users can get all of the benefits of the Zscaler Internet security using ZIA, as well as granular, policy-based access to internal resources from a single end-point client using ZPA.

The Zscaler Client Connector has two different modes of operation for forwarding traffic to Zscaler Internet Access. These modes are referred to as Tunnel-1 and Tunnel-2. Tunnel-1 mode only forwards HTTP and HTTPS traffic to ZIA and all other traffic is sent direct to the destination. Whereas, Tunnel-2 mode forwards all TCP, UDP, and ICMP traffic. Using Tunnel-2 and Zscaler Cloud Firewall enables complete traffic coverage and security for Zscaler cloud services, but requires a bit more setup detail compared to Tunnel-1. Selection of Tunnel-1 or Tunnel-2 depends on where you enable Firewall services. If you have Zscaler Cloud Firewall, or want to use the Standard L4 Firewall, configure Tunnel-2 mode.

Zscaler Client Connector traffic forwarded to ZIA is evaluated and inspected according to your organization's security and access policies. By using the Client Connector and Tunnel-2 mode, all user traffic is secured and enforced from the Azure WVD instance out to Internet destinations.

ZPA is a Zscaler cloud service that enables your users to securely access internal enterprise applications in traditional private data centers, or IaaS cloud providers. ZPA establishes a secure transport for accessing your enterprise apps by forwarding all TCP and UDP traffic destined for the application over a TLS connection regardless of the tunnel mode of ZIA. Using ZPA requires the Zscaler Client Connector, and is an advantage to using a Private WVD instance. ZPA provides authenticated, zero trust Access over unadvertized Internet connectivity.



Ztunnel 1.0
CONNECT Tunnels

- **80 / 443 / Proxy Aware Traffic Only**
- **No Real Encapsulation of Traffic**
- **No Control Channel**
- **Limited Log Visibility**
- **No Visibility Into Non-web Traffic**

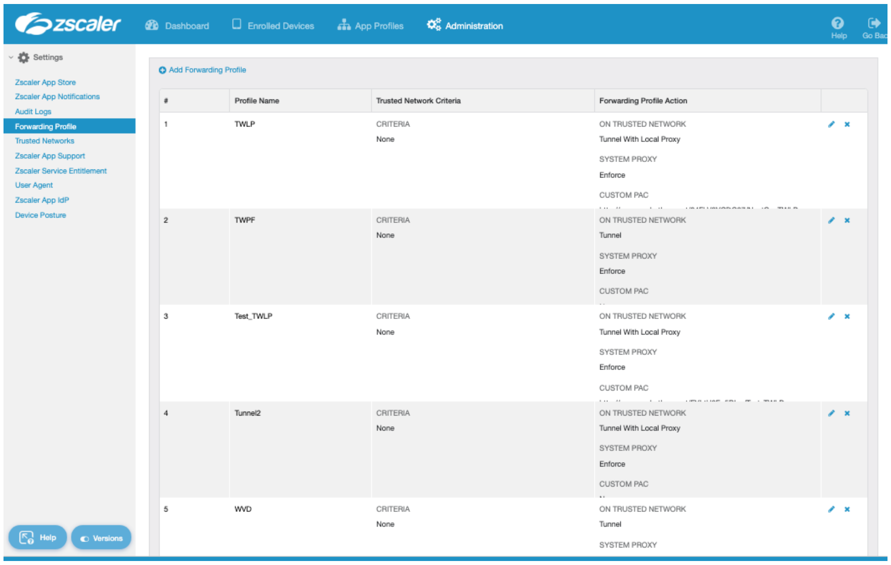
Ztunnel 2.0
DTLS

- **Any TCP, UDP and ICMP Traffic**
- **DTLS/TLS Tunnel – Integrity + Encryption**
- **Tunnel Provides Control Channel**
- **Logging of Z App Version, Z tunnel Version, etc**

Figure 18. *Comparison of Tunnel-1 and Tunnel-2 modes*

After you've selected a tunnel mode, configure the Zscaler Client Connector to bypass the appropriate local traffic. This is done with configuration PAC files. For Tunnel-1 , add an App Profile PAC to bypass traffic. For Tunnel-2, configure and add a Forwarding Profile PAC. Configure the PAC files in the ZIA Admin Portal, under Hosted PAC Files using the examples and then create forwarding profile for WVD. For more information, see the PAC file examples in *Appendix B: PAC Examples*.

Use the default forwarding profile for Tunnel-1. To create a Forwarding Profile for Tunnel-2 mode, open the Zscaler Client Connector and select **Administration** / **Forwarding Profile** and **Add Forwarding Profile**. This brings up the **Edit Forwarding Profile** window.

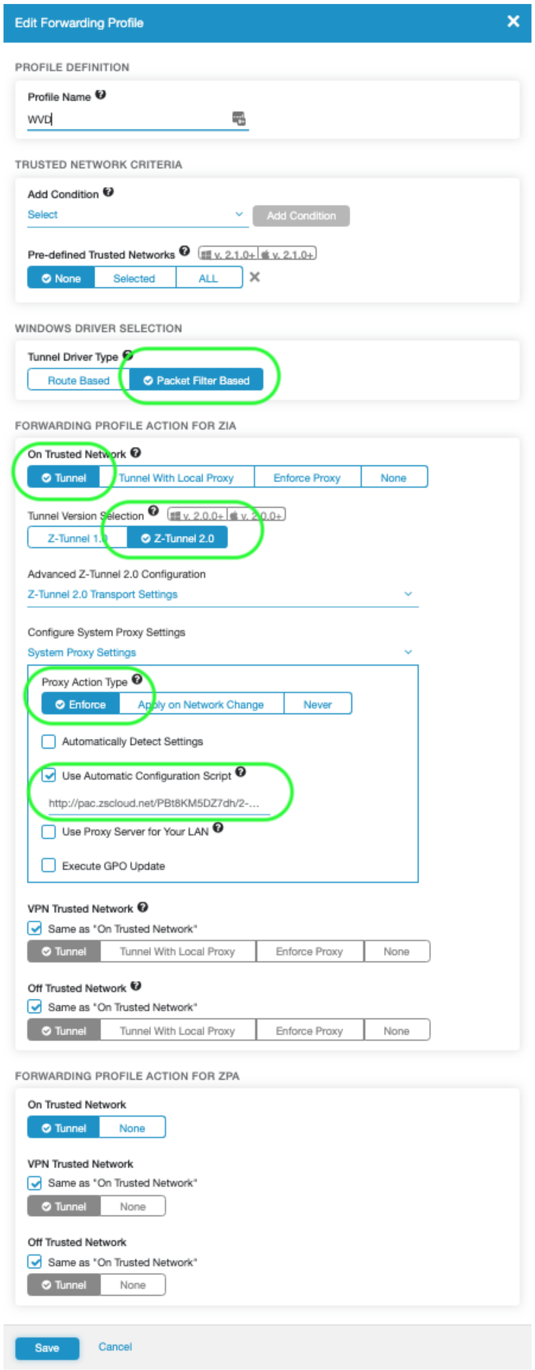


Add Forwarding Profile

#	Profile Name	Trusted Network Criteria	Forwarding Profile Action
1	TWLP	CRITERIA None	ON TRUSTED NETWORK Tunnel With Local Proxy SYSTEM PROXY Enforce CUSTOM PAC
2	TWPF	CRITERIA None	ON TRUSTED NETWORK Tunnel SYSTEM PROXY Enforce CUSTOM PAC
3	Test_TWLP	CRITERIA None	ON TRUSTED NETWORK Tunnel With Local Proxy SYSTEM PROXY Enforce CUSTOM PAC
4	Tunnel2	CRITERIA None	ON TRUSTED NETWORK Tunnel With Local Proxy SYSTEM PROXY Enforce CUSTOM PAC
5	WVD	CRITERIA None	ON TRUSTED NETWORK Tunnel SYSTEM PROXY

Figure 19. *Create a Forwarding Profile*

To create a Tunnel-2 Forwarding Profile, Enter the **Profile Name** and select the settings shown above. Under the **Z-Tunnel 2.0** > **Configure System Proxy Settings** > **Enforce** > **Use Automatic Configuration Script**, and you will need to add the location of the Forward Profile PAC file location we just created on the ZIA Admin Portal. Save the profile.



Edit Forwarding Profile ✕

PROFILE DEFINITION

Profile Name: WVD

TRUSTED NETWORK CRITERIA

Add Condition: Select [Add Condition]

Pre-defined Trusted Networks (v. 2.1.0+ | v. 2.1.0+): [✓ None] Selected ALL ✕

WINDOWS DRIVER SELECTION

Tunnel Driver Type: Route Based [✓ Packet Filter Based]

FORWARDING PROFILE ACTION FOR ZIA

On Trusted Network: [✓ Tunnel] Tunnel With Local Proxy Enforce Proxy None

Tunnel Version Selection (v. 2.0.0+ | v. 2.0.0+): Z-Tunnel 1.0 [✓ Z-Tunnel 2.0]

Advanced Z-Tunnel 2.0 Configuration: Z-Tunnel 2.0 Transport Settings

Configure System Proxy Settings: System Proxy Settings

Proxy Action Type: [✓ Enforce] Apply on Network Change Never

☐ Automatically Detect Settings

☑ Use Automatic Configuration Script

http://pac.zscloud.net/PBt8KM5DZ7dh/2-...

☐ Use Proxy Server for Your LAN

☐ Execute GPO Update

VPN Trusted Network

☑ Same as "On Trusted Network"

[✓ Tunnel] Tunnel With Local Proxy Enforce Proxy None

Off Trusted Network

☑ Same as "On Trusted Network"

[✓ Tunnel] Tunnel With Local Proxy Enforce Proxy None

FORWARDING PROFILE ACTION FOR ZPA

On Trusted Network: [✓ Tunnel] None

VPN Trusted Network

☑ Same as "On Trusted Network"

[✓ Tunnel] None

Off Trusted Network

☑ Same as "On Trusted Network"

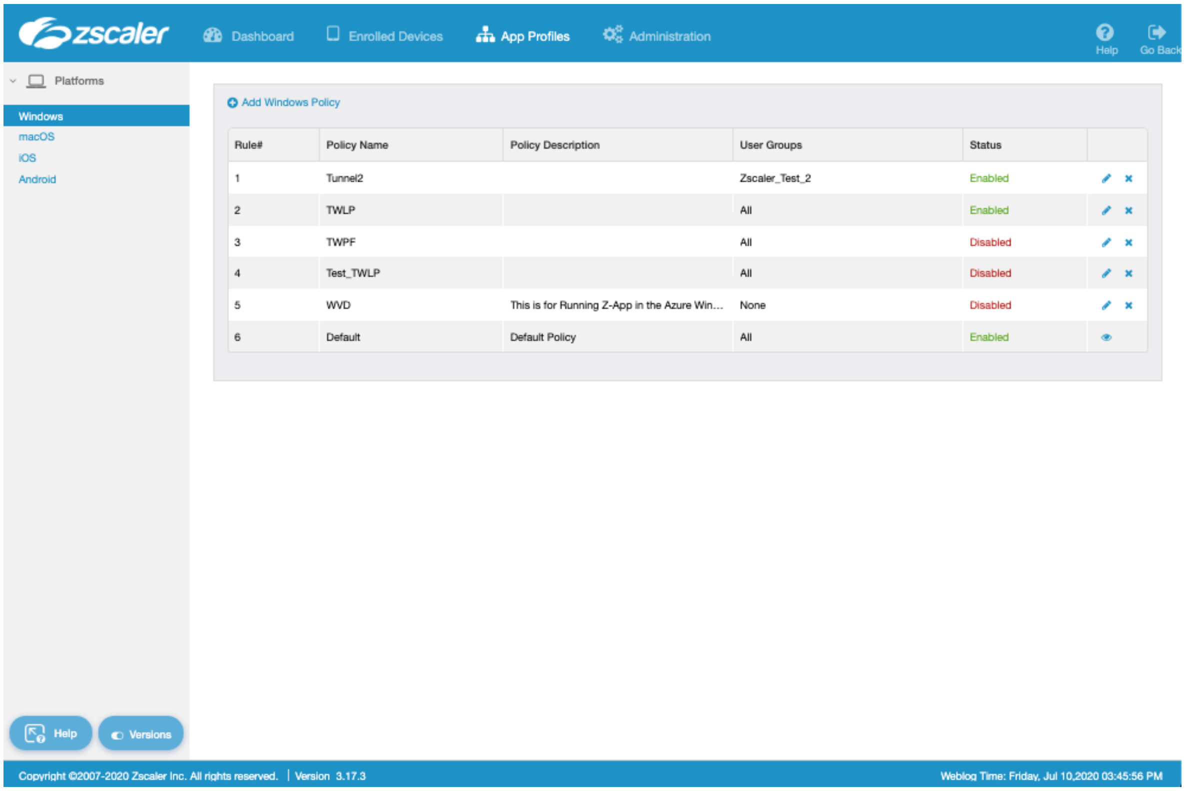
[✓ Tunnel] None

Save Cancel

Figure 20. *Create a Forwarding Profile for Tunnel 2.0*

Next create the Application Profile for the Zscaler Client Connector to assign to the WVD devices. To add the Application profile, select **App Profile** > **Windows** > **Add Windows Policy**.

This brings up the **Windows Policy Screen**.



Rule#	Policy Name	Policy Description	User Groups	Status	
1	Tunnel2		Zscaler_Test_2	Enabled	✎ ✕
2	TWLP		All	Enabled	✎ ✕
3	TWPF		All	Disabled	✎ ✕
4	Test_TWLP		All	Disabled	✎ ✕
5	WVD	This is for Running Z-App in the Azure Win...	None	Disabled	✎ ✕
6	Default	Default Policy	All	Enabled	👁

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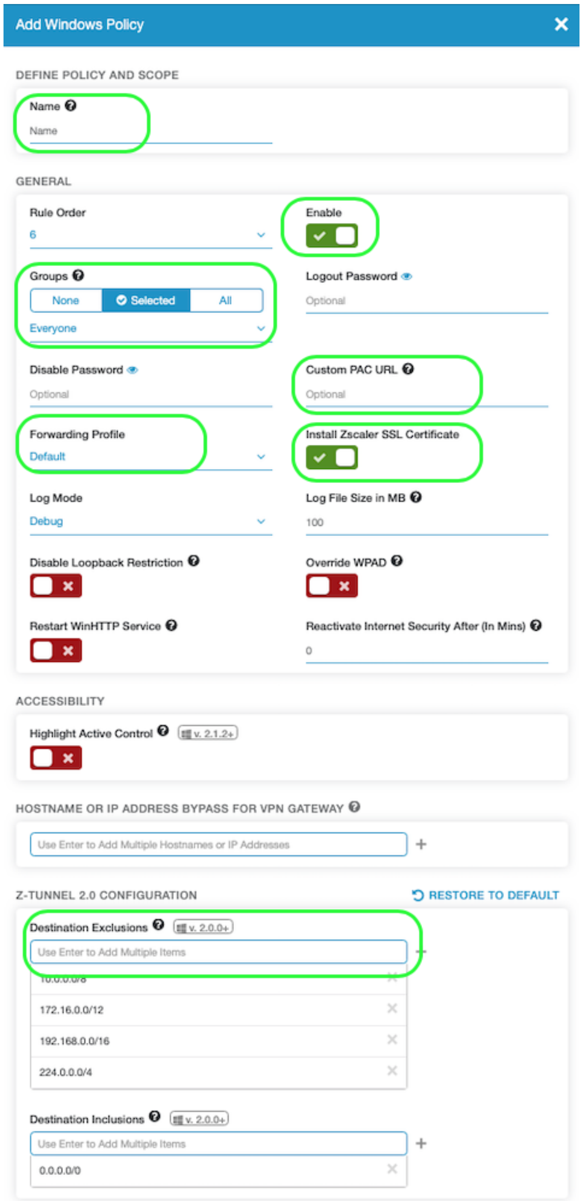
Weblog Time: Friday, Jul 10,2020 03:45:56 PM

Figure 21. *Create an Application Profile*

To create the App Profile for a Tunnel-1 configuration give the profile a **Name**, enable the profile, select the Groups it applies to (typically an AD Group), enter the **Custom PAC URL** (This is the App PAC we created), and enable **Install Zscaler SSL Certificate**.

For Tunnel-2 there are two additional steps. Select the **Forwarding Profile** we just created, and under **Destination Exclusions** enter the public IP address of the Thin Client or remote device that connects to the VM.



Add Windows Policy ✕

DEFINE POLICY AND SCOPE

Name: Name

GENERAL

Rule Order: 6

Enable: ✓

Groups: None | ● Selected | All

Everyone

Logout Password: Optional

Disable Password: Optional

Custom PAC URL: Optional

Forwarding Profile: Default

Install Zscaler SSL Certificate: ✓

Log Mode: Debug

Log File Size in MB: 100

Disable Loopback Restriction: ✕

Override WPAD: ✕

Restart WinHTTP Service: ✕

Reactivate Internet Security After (In Mins): 0

ACCESSIBILITY

Highlight Active Control (v. 2.1.2+): ✕

HOSTNAME OR IP ADDRESS BYPASS FOR VPN GATEWAY

Use Enter to Add Multiple Hostnames or IP Addresses +

Z-TUNNEL 2.0 CONFIGURATION

RESTORE TO DEFAULT

Destination Exclusions (v. 2.0.0+)

Use Enter to Add Multiple Items +

10.0.0.0/8

172.16.0.0/12

192.168.0.0/16

224.0.0.0/4

Destination Inclusions (v. 2.0.0+)

Use Enter to Add Multiple Items +

0.0.0.0/0

Figure 22. *Create an Application Profile*

NOTE

This step is not required if you are deploying Zscaler Client Connector version 3.0 or later.

We should be ready to launch Zscaler Client Connect on the VM after it has been deployed with the appropriate installation switching specifying the Zscaler Cloud, and the Customer Domain, and any other installation switches preferred. See the Client Connector installation instructions link in *Zscaler Resources*.

PAC Files

Proxy Auto-Configuration (PAC) files are used to support explicit proxy deployments in which client browsers are explicitly configured to send traffic to Zscaler. PAC files can be used for HTTP and HTTP traffic.

A PAC file is a text file that instructs a browser to forward traffic to a proxy server, instead of directly to the destination server. It contains JavaScript that specifies the proxy server and, optionally, additional parameters that specify when and under what circumstances a browser forwards traffic to the proxy server.

For example, a PAC file can specify on what days of the week or what hours of the day traffic is sent to a proxy, or for which domains and URLs traffic is not sent to a proxy. Zscaler uses Macros for proxy selection. The macros used in these examples are PROXY ${COUNTRY_GATEWAY_FX} in the APP and Browser PAC, and PROXY ${ZAPP_TUNNEL2_BYPASS}"; for the Forwarding PAC.

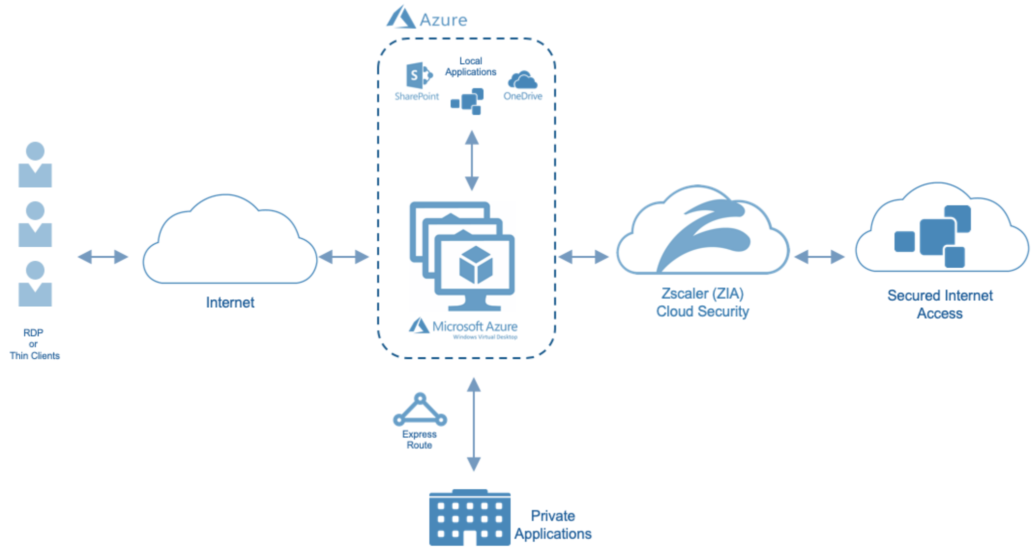


Figure 23. *Traffic Flow using Proxy Auto-Config (PAC File)*

All major browsers support PAC files. Browsers simply require the address of the PAC file so they can fetch the file from the specified address and execute the JavaScript in the file. PAC files can be hosted on VDI, an internal web server, or a server outside the corporate network. For the Zscaler macros to work the PAC must be hosted on Zscaler.

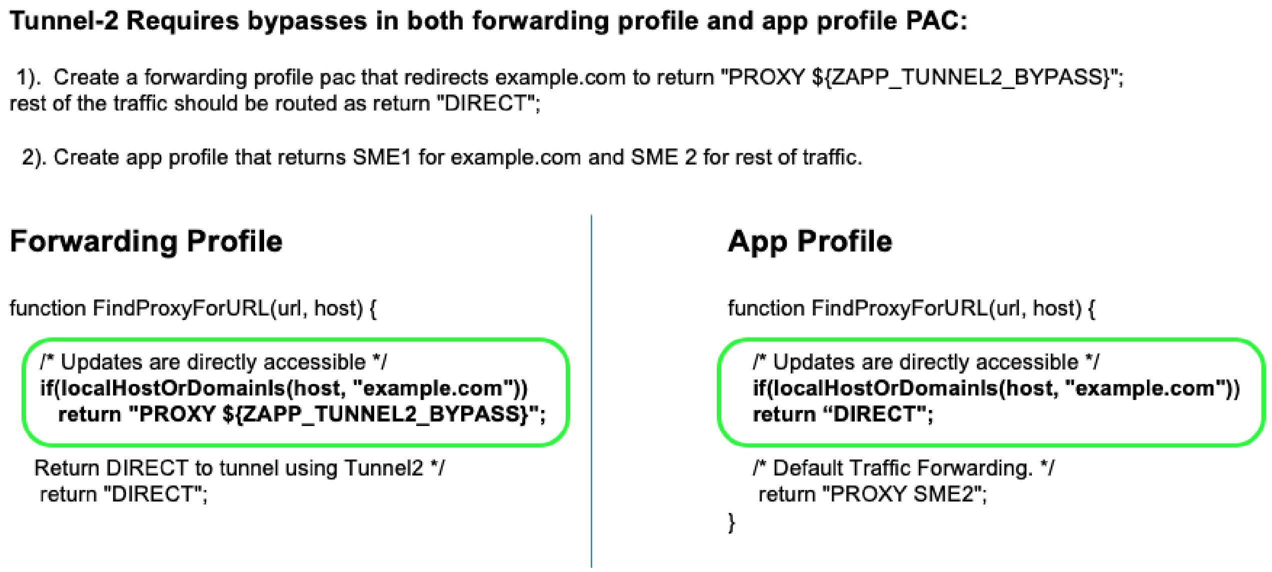
The Zscaler service hosts a default PAC file that uses geo-location technology to forward traffic to the nearest Zscaler Enforcement Node (ZEN). You can also upload custom PAC files to the Zscaler service.

There are three PAC files used in the various deployments referenced in this document and each have differences in the configuration. For the Zscaler Client Connector think of the PAC file as a configuration file. It is not ever changing and unmanageable as the reputation of normal browser PAC file use. The primary use case for using the PAC file is to define what IP addresses, URLs, and domains should "Bypass" the Zscaler proxy. Bypasses allow for traffic to stay local or go direct to the defined resources. In the case of WVD, all control traffic and anything that is a local trusted resource should stay local to Azure and not forwarded to ZIA and back. However, any resource that is publicly resolvable can be forwarded to ZIA for security.

For the Pool or Shared VM, you should install a traditional browser PAC file in the browser settings. Depending on the Zscaler connectivity, you may need to use a dedicated proxy port provided by Zscaler and assigned to a specific customer. A dedicated proxy port allows Zscaler to identify any traffic that is received on that unique port and eliminates the initial authentication pop-up and along with Integrated Windows Authentication allows for transparent authentication and a better user experience. If traffic is received over a tunnel, a dedicated proxy port is not needed.

For Tunnel-1 mode on the Zscaler Client Connector, install an **Application PAC file** in the **App Profile** under the **Custom PAC URL**.

For Tunnel-2 mode on the Zscaler Client Connector, install the application PAC file in the **App Profile** under the **Custom PAC URL** and a **Forwarding Profile PAC** containing the same bypasses in the **APP PAC**. See the example below for the required syntax for each file.



Tunnel-2 Requires bypasses in both forwarding profile and app profile PAC:

1). Create a forwarding profile pac that redirects example.com to return "PROXY ${ZAPP_TUNNEL2_BYPASS}"; rest of the traffic should be routed as return "DIRECT";

2). Create app profile that returns SME1 for example.com and SME 2 for rest of traffic.

Forwarding Profile

```
function FindProxyForURL(url, host) {
  /* Updates are directly accessible */
  if(localHostOrDomainIs(host, "example.com"))
    return "PROXY ${ZAPP_TUNNEL2_BYPASS}";
  Return DIRECT to tunnel using Tunnel2 */
  return "DIRECT";
```

App Profile

```
function FindProxyForURL(url, host) {
   /* Updates are directly accessible */
   if(localHostOrDomainIs(host, "example.com"))
   return “DIRECT";
   /* Default Traffic Forwarding. */
    return "PROXY SME2";
}
```

Figure 24. *Tunnel-2 PAC File Symbiosis*

For more information and example PAC files including the Browser PAC, the App PAC, and the Forwarding PAC, the resources in *Zscaler Resources*.

Site-to-Site VPN – IPsec Tunnels

Overview

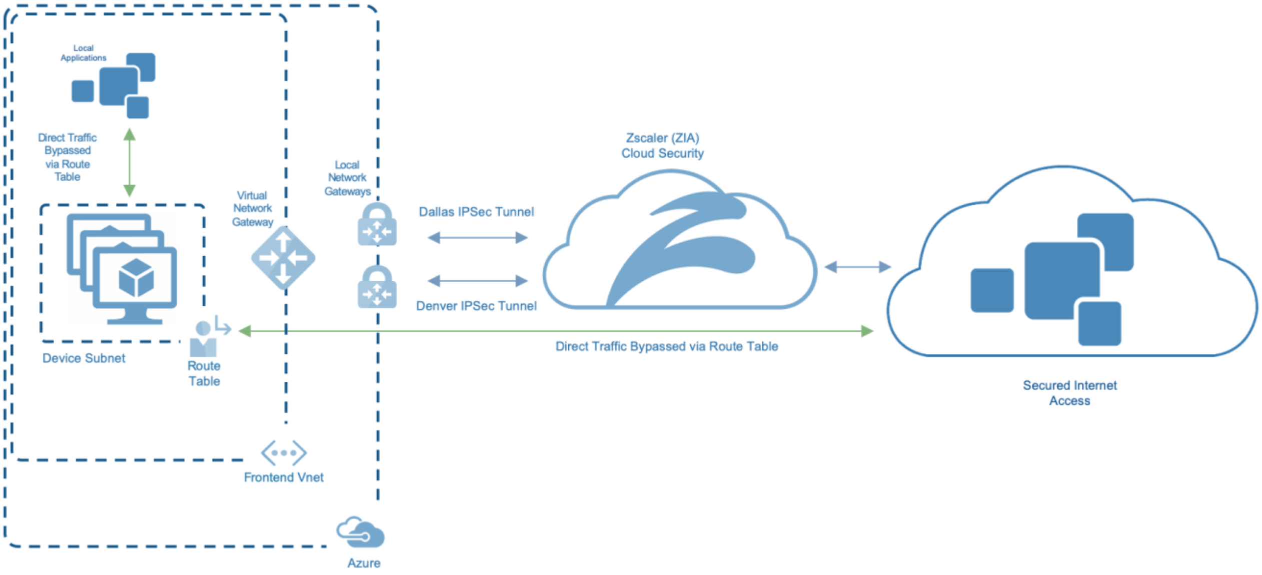


Figure 25. *Active-Standby Gateway Redundancy Active-Active Tunnels*

This section shows you how to use the Azure and the ZIA Admin Portals to create site-to-site VPN gateway connections from Azure to Zscaler that route and secure your Internet bound traffic using Zscaler Internet Security.

A site-to-site VPN gateway connection is used to connect your Azure virtual network over an IPsec/IKEv2 VPN tunnel to the Zscaler cloud. All Internet bound traffic is then directed through the tunnel using a default route. This configuration uses the Microsoft Virtual Network Gateway, a Local Network Gateway and VPN connection per Zscaler location. A route table is used to direct traffic down the tunnel and to bypass local and unique traffic that must bypass the Zscaler cloud. The native Microsoft features also provide redundancy in case of a failure of one of the components.

Azure VPN Gateway Redundancy

Every Azure VPN gateway consists of two instances in an active-standby configuration. For any planned maintenance or unplanned disruption that happens to the active instance, the standby instance would take over (failover) automatically and resume the site-to-site VPN connections. The switch over causes a brief interruption. For planned maintenance, the connectivity should be restored within 10 to 15 seconds. For unplanned issues, the connection recovery is be longer: about one to one and a half minutes in the worst case.

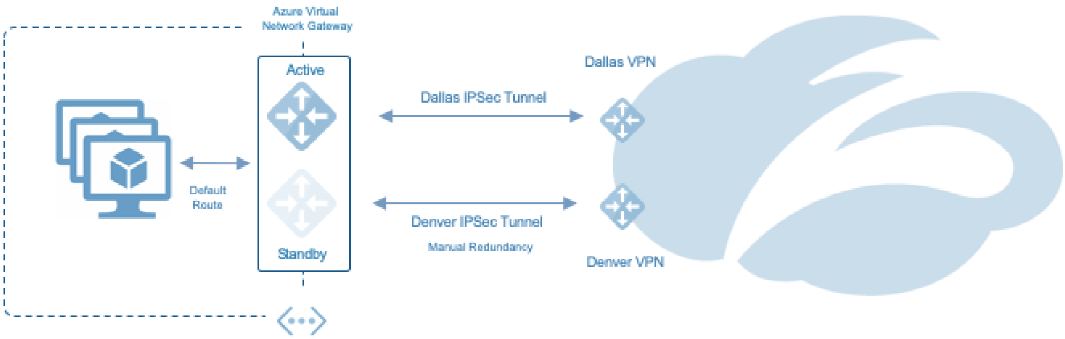
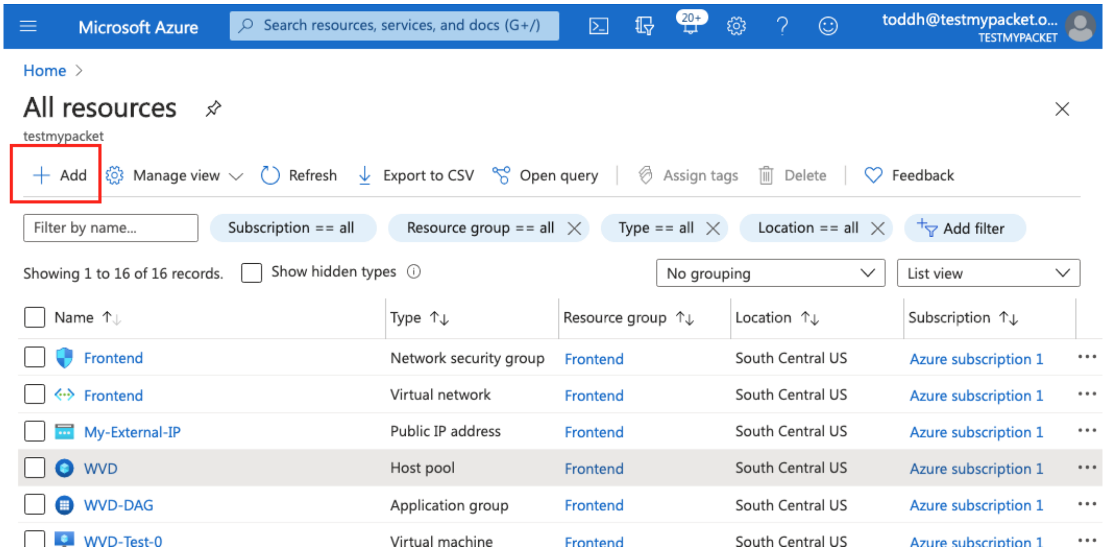


Figure 26. *Active-Standby Gateway Redundancy Active-Active Tunnels*

Both the Azure and Zscaler clouds are highly redundant, and the secondary Tunnel is only provided as an example for manual redundancy in case of compliance requirements. The routes would be switched on the Local Gateways to use the secondary Tunnel. Currently there is no state or health check to remove the routes in case of a tunnel failure event.

Creating an Azure VPN Gateway

To create a VPN Gateway to attach to Zscaler locations, you must add it as a resource. Select all resources and then select **Add** to start the process of adding a new resource.



Showing 1 to 16 of 16 records.

Name	Type	Resource group	Location	Subscription
Frontend	Network security group	Frontend	South Central US	Azure subscription 1
Frontend	Virtual network	Frontend	South Central US	Azure subscription 1
My-External-IP	Public IP address	Frontend	South Central US	Azure subscription 1
WVD	Host pool	Frontend	South Central US	Azure subscription 1
WVD-DAG	Application group	Frontend	South Central US	Azure subscription 1
WVD-Test-0	Virtual machine	Frontend	South Central US	Azure subscription 1

Figure 27. *Create a VPN Gateway*

Installing the Virtual Network Gateway Application

After selecting **dd,** type **Virtual Network Gateway** in the search field and hit return**.** This displays the VPN application.

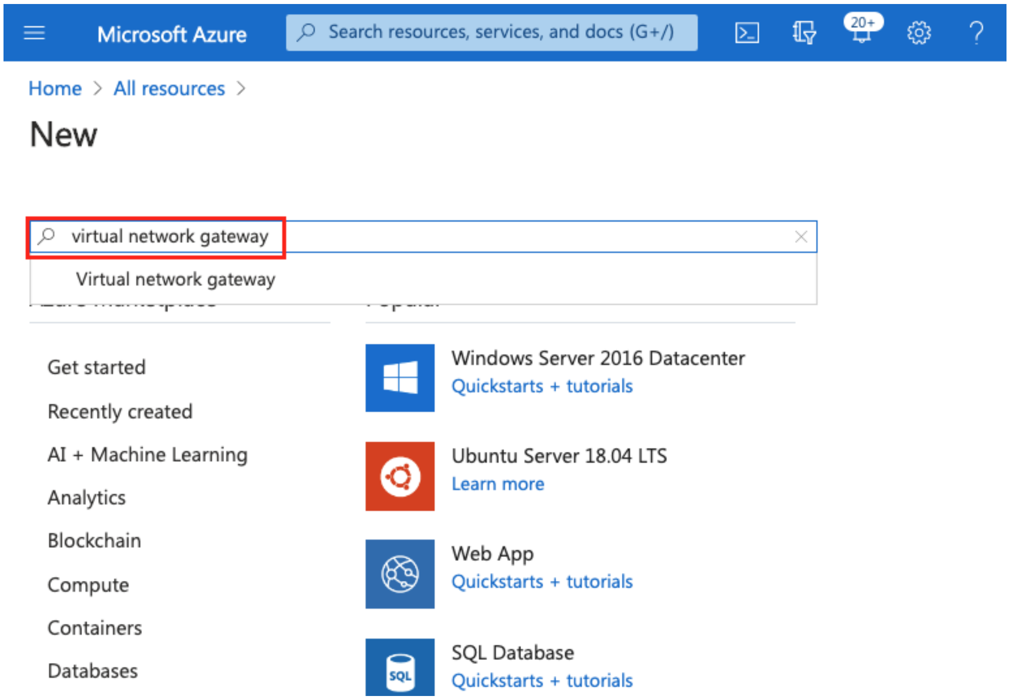
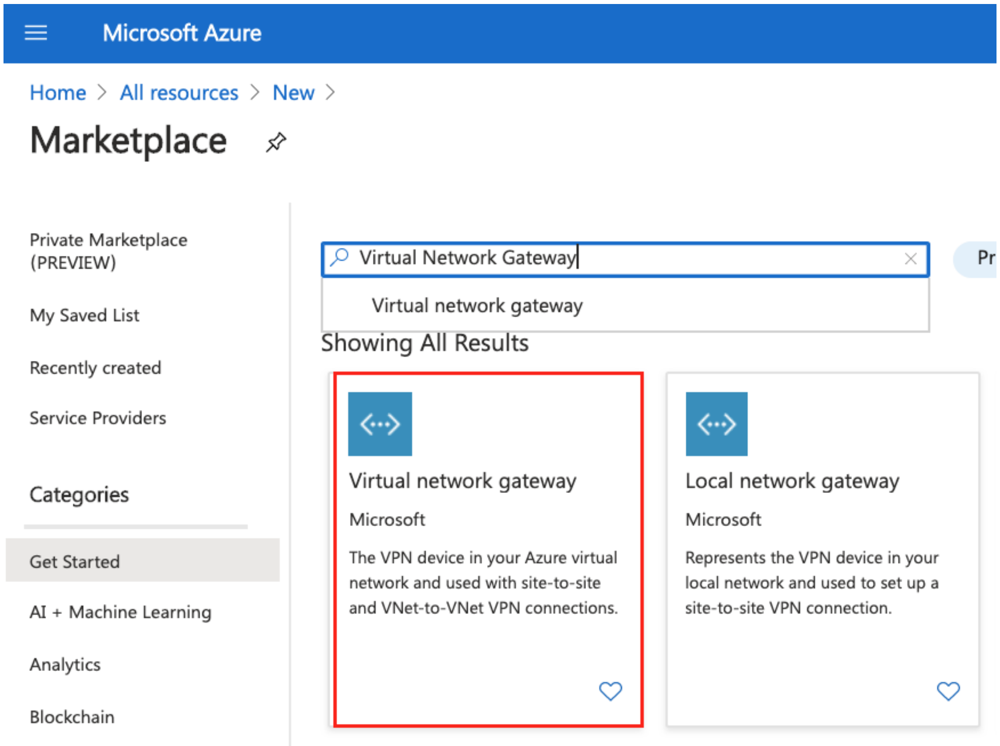


Figure 28. *Search for the Resource*

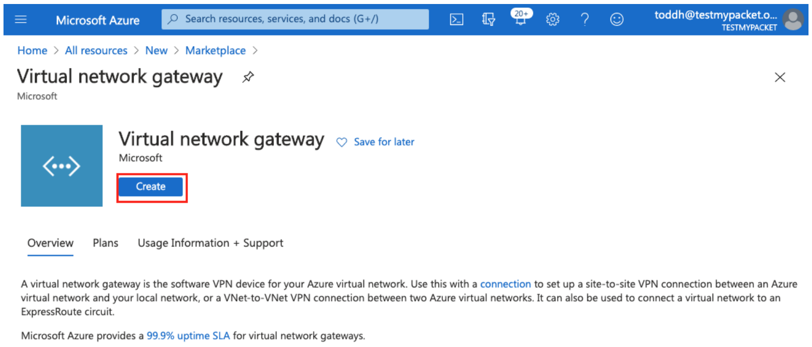


The VPN device in your Azure virtual network and used with site-to-site and VNet-to-VNet VPN connections.

Represents the VPN device in your local network and used to set up a site-to-site VPN connection.

Figure 29. *Virtual Network Gateway*

Select the **Virtual network gateway** to get started with the configuration and then select **Create** to start the Installation Wizard for the Gateway.


Microsoft Azure
Search resources, services, and docs (G+/)
20+
toddh@testmypacket.o...
TESTMYPACKET
Home > All resources > New > Marketplace >

Virtual network gateway

Microsoft

Virtual network gateway

Microsoft

Save for later
Create
Overview
Plans
Usage Information + Support

A virtual network gateway is the software VPN device for your Azure virtual network. Use this with a connection to set up a site-to-site VPN connection between an Azure virtual network and your local network, or a VNet-to-VNet VPN connection between two Azure virtual networks. It can also be used to connect a virtual network to an ExpressRoute circuit.

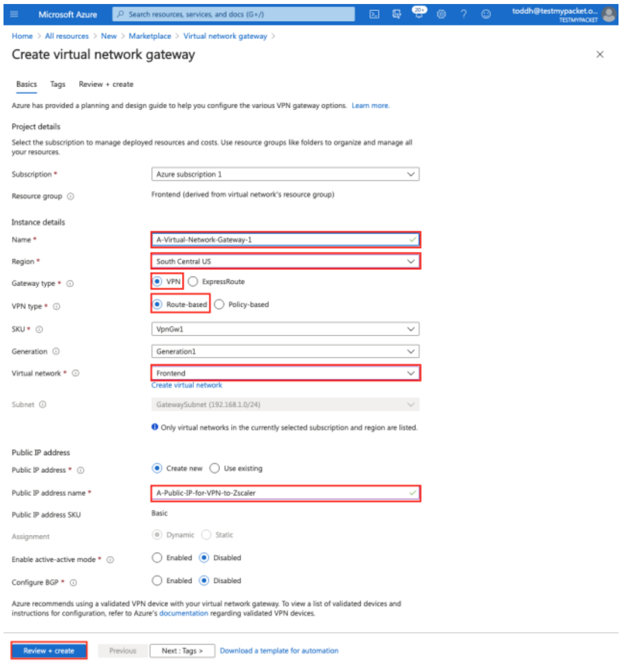
Microsoft Azure provides a 99.9% uptime SLA for virtual network gateways.

Figure 30. *Create the Virtual network gateway*

Configuring the Virtual Network Gateway Application

To create the Virtual Network Gateway, fill in the required information. Give the gateway a name that is easily identified as the VPN Gateway. For this configuration, a Prefix of “A-“ was used for all resources associated with this installation. That keeps everything together when you look at the resources created. Select the **Region** for the gateway creation. The region selected should be the location of the Virtual Network (Vnet). Select:

- A **Gateway type** of **VPN**
- A **VPN type** of **Route-based**
- The **Virtual Network** where the gateway is created, and traffic served
- Name the **External Public IP** associated with this gateway


Microsoft Azure
Search resources, services, and docs (G+/)
20+
toddh@testmypacket.o...
TESTMYPACKET
Home > All resources > New > Marketplace > Virtual network gateway >

Create virtual network gateway

Basics
Tags
Review + create

Azure has provided a planning and design guide to help you configure the various VPN gateway options. Learn more.

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Azure subscription 1

Resource group : Frontend (derived from virtual network's resource group)

Instance details

Name * : A-Virtual-Network-Gateway-1

Region * : South Central US

Gateway type * : ● VPN ○ ExpressRoute

VPN type * : ● Route-based ○ Policy-based

SKU * : VpnGw1

Generation : Generation1

Virtual network * : Frontend

Create virtual network

Subnet : GatewaySubnet (192.168.1.0/24)

Only virtual networks in the currently selected subscription and region are listed.

Public IP address

Public IP address * : ● Create new ○ Use existing

Public IP address name * : A-Public-IP-for-VPN-to-Zscaler

Public IP address SKU : Basic

Assignment : ● Dynamic ○ Static

Enable active-active mode * : ○ Enabled ● Disabled

Configure BGP * : ○ Enabled ● Disabled

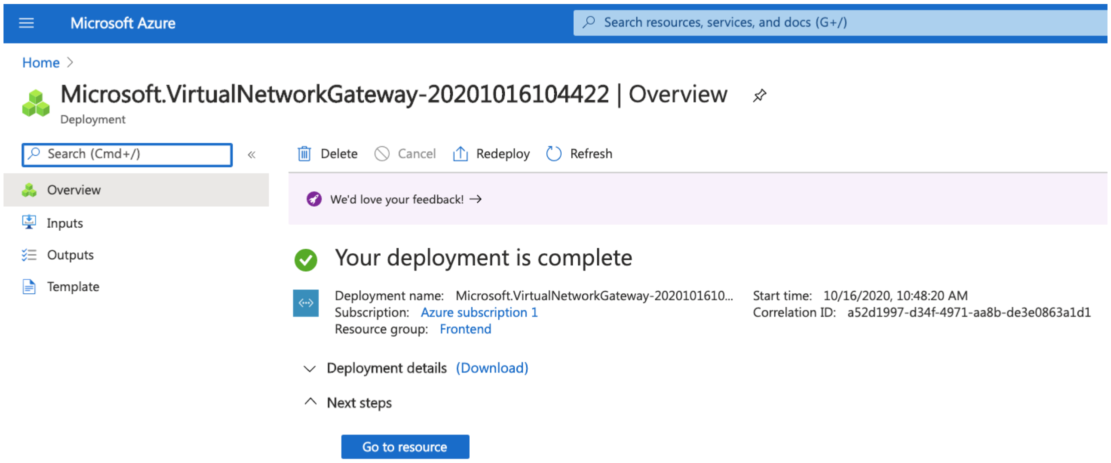
Azure recommends using a validated VPN device with your virtual network gateway. To view a list of validated devices and instructions for configuration, refer to Azure's documentation regarding validated VPN devices.

Figure 31. *Create an Application Profile*

This IP address is used as part of the VPN credentials and defined as a location in the ZIA Admin Portal. **Review and Create** the gateway.

Gateway Deployment

Deployment of the gateway can take up to 45 minutes to complete. When the gateway is created, a message saying the deployment is complete appears. You can then select the **Go to resource** button or select the gateway from the **All resources** page. The procedures below always start from **All resources** to use it as a constant.



Microsoft.VirtualNetworkGateway-20201016104422 | Overview

Deployment

Your deployment is complete

Deployment name: Microsoft.VirtualNetworkGateway-2020101610...
Subscription: Azure subscription 1
Resource group: Frontend

Start time: 10/16/2020, 10:48:20 AM
Correlation ID: a52d1997-d34f-4971-aa8b-de3e0863a1d1

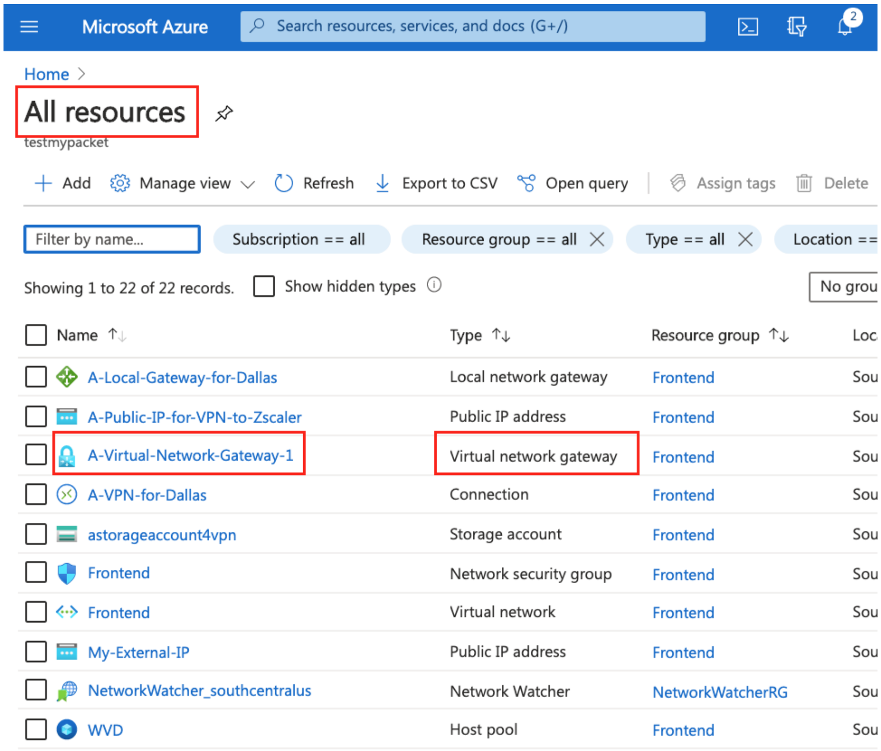
Deployment details (Download)

Next steps

Figure 32. *Deployment of the VPN Gateway*

Configuring the Virtual Network Gateway

From the **All resources** page select the newly created **Virtual network gateway**. This brings up the gateway details and allows you to create the additional components.



All resources

testmypacket

Showing 1 to 22 of 22 records. □ Show hidden types

□	Name	Type	Resource group	Loc
□	A-Local-Gateway-for-Dallas	Local network gateway	Frontend	Sou
□	A-Public-IP-for-VPN-to-Zscaler	Public IP address	Frontend	Sou
□	A-Virtual-Network-Gateway-1	Virtual network gateway	Frontend	Sou
□	A-VPN-for-Dallas	Connection	Frontend	Sou
□	astorageaccount4vpn	Storage account	Frontend	Sou
□	Frontend	Network security group	Frontend	Sou
□	Frontend	Virtual network	Frontend	Sou
□	My-External-IP	Public IP address	Frontend	Sou
□	NetworkWatcher_southcentralus	Network Watcher	NetworkWatcherRG	Sou
□	WVD	Host pool	Frontend	Sou

Figure 33. *All Resources*

Adding Connections to the Gateway

To create a VPN connection to Zscaler, you need to create one for each location you are going to connect to. In our example we created a connection to Dallas and to Denver for redundancy (See Figure 35). Select **Connection** and then **Add**. This brings up the **Connection Wizard**.

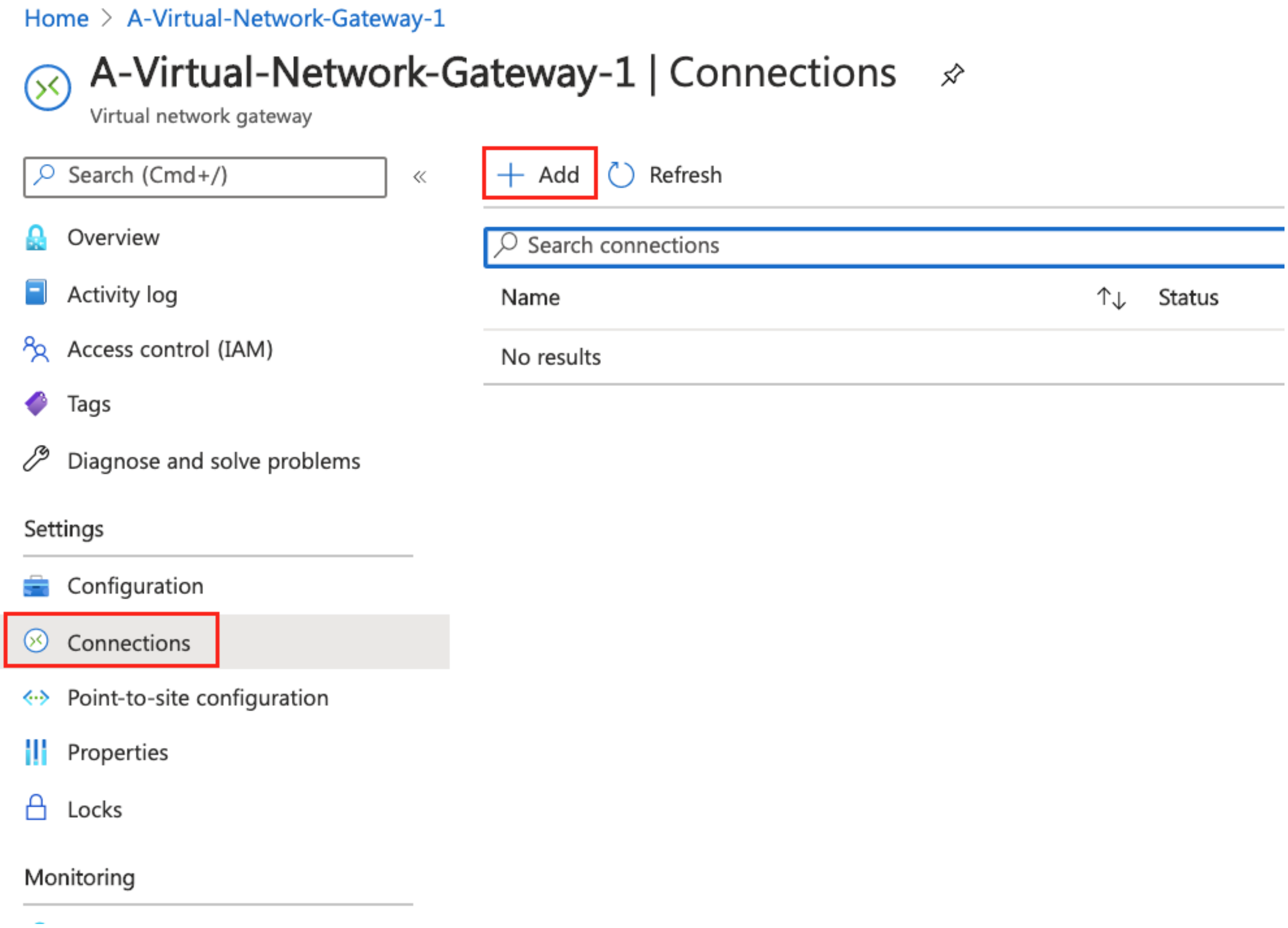
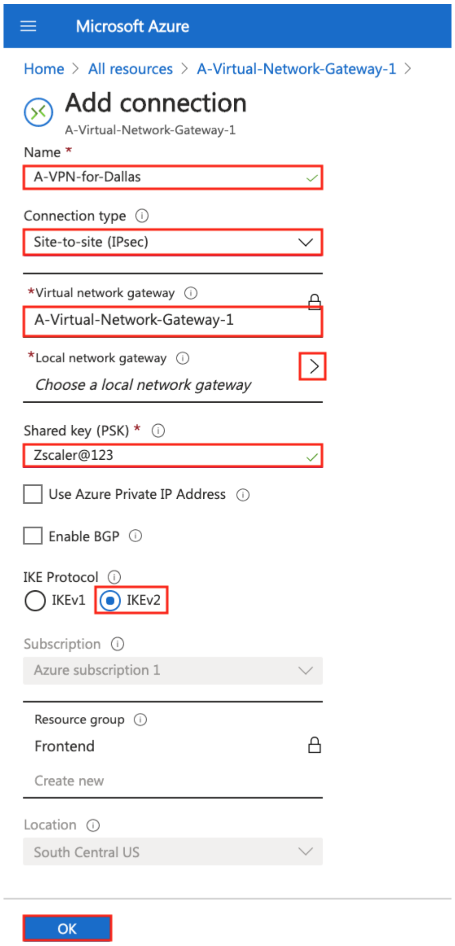


Figure 34. *Creating Connections*

Configuring the Virtual Network Gateway

In the **Add Connection** wizard enter a **Name** that identifies the connection, then select a **Connection type** of **Site-to-site (IPsec)**. The virtual network gateway should be pre-populated with the gateway we just created. Enter the **Shared key (PSK)** that is used by the Zscaler setup as part of the VPN credentials. Then select **IKEv2**. Next select the **arrow (>)** next to the **Local network gateway** to start the wizard to create the local gateway that represents the Zscaler VPN.



Microsoft Azure

Home > All resources > A-Virtual-Network-Gateway-1 >

Add connection

A-Virtual-Network-Gateway-1

Name *: A-VPN-for-Dallas

Connection type: Site-to-site (IPsec)

*Virtual network gateway: A-Virtual-Network-Gateway-1

*Local network gateway: Choose a local network gateway

Shared key (PSK) *: Zscaler@123

□ Use Azure Private IP Address

□ Enable BGP

IKE Protocol: ○ IKEv1 ● IKEv2

Subscription: Azure subscription 1

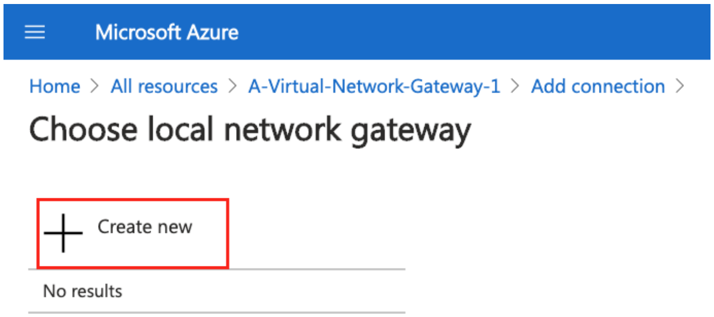
Resource group: Frontend

Create new

Location: South Central US

OK

Figure 35. *Create a VPN Connection*



Microsoft Azure

Home > All resources > A-Virtual-Network-Gateway-1 > Add connection >

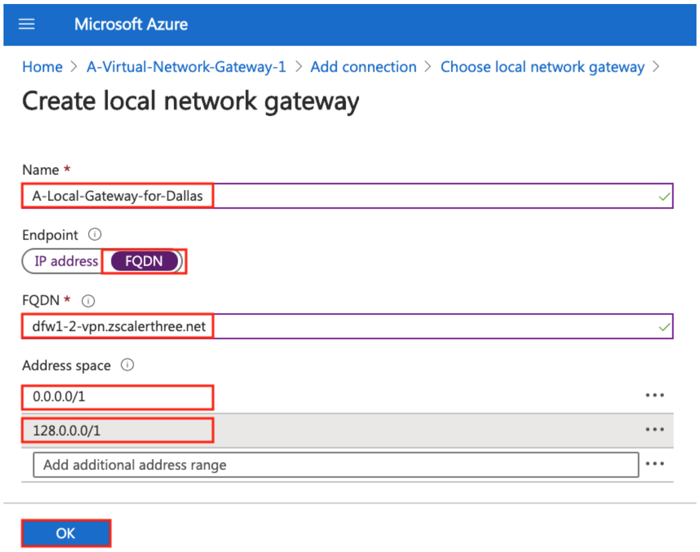
Choose local network gateway

+ Create new

No results

Figure 36. *Add a Local network gateway*

After the wizard has launched select **Create new** to create a new local gateway. Give the gateway an intuitive **Name** that identifies it as a VPN to a Zscaler location, then select an **Endpoint** of **FQDN**. The fully qualified domain name (FQDN) is selected from the Zscaler list of VPN hostnames for your cloud. (Zscaler Three Cloud is used for this example, but your cloud could be any of the Zscaler clouds.)


Microsoft Azure
Home > A-Virtual-Network-Gateway-1 > Add connection > Choose local network gateway >

Create local network gateway

Name * A-Local-Gateway-for-Dallas

Endpoint: ○ IP address ● FQDN

FQDN * dfw1-2-vpn.zscalerthree.net

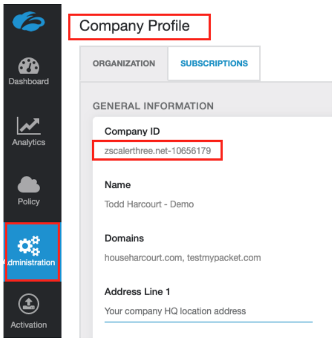
Address space
0.0.0.0/1
128.0.0.0/1
Add additional address range

Figure 37. *Create a Local network gateway*

See the following page to identify your Zscaler cloud and the VPN Host to populate as the FQDN.

Identify the FQDN for the VPN

To identify your Zscaler cloud, select **Administration**, and then **Company profile** from the Zscaler UI. Your cloud is identified as the prefix of your company ID.



Company Profile

GENERAL INFORMATION

Company ID
zscalerthree.net-10656179

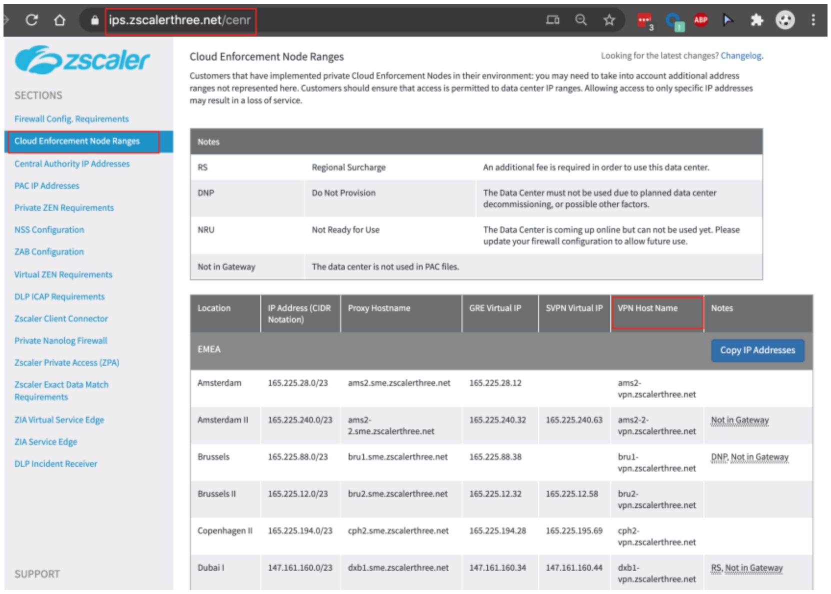
Name
Todd Harcourt - Demo

Domains
househarcourt.com, testmypacket.com

Address Line 1
Your company HQ location address

Figure 38. *Your Zscaler Cloud*

Go to URL https://ips.(yourzscalercloud).net/cenr and select the **VPN Host Name** for the **Location** you want the VPN tunnel to terminate at. In our example, we use dfw1-2-vpn.zscalerthree.net, which is the Zscaler Dallas location. Enter the name as the FQDN in the Azure Gateway setup.



ips.zscalerthree.net/cenr

SECTIONS

- Firewall Config. Requirements
- Cloud Enforcement Node Ranges
- Central Authority IP Addresses
- PAC IP Addresses
- Private ZEN Requirements
- NSS Configuration
- ZAB Configuration
- Virtual ZEN Requirements
- DLP ICAP Requirements
- Zscaler Client Connector
- Private Nanolog Firewall
- Zscaler Private Access (ZPA)
- Zscaler Exact Data Match Requirements
- ZIA Virtual Service Edge
- ZIA Service Edge
- DLP Incident Receiver

SUPPORT

Cloud Enforcement Node Ranges

Looking for the latest changes? Changelog.

Customers that have implemented private Cloud Enforcement Nodes in their environment: you may need to take into account additional address ranges not represented here. Customers should ensure that access is permitted to data center IP ranges. Allowing access to only specific IP addresses may result in a loss of service.

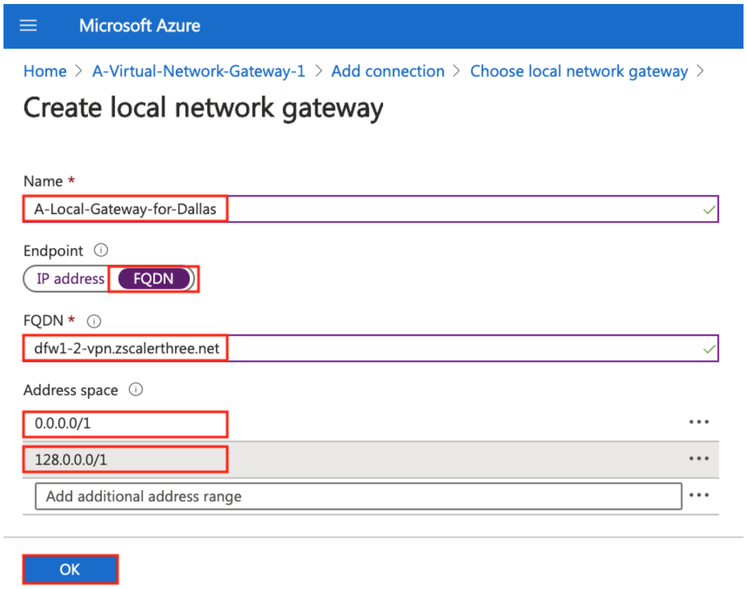
Notes		
RS	Regional Surcharge	An additional fee is required in order to use this data center.
DNP	Do Not Provision	The Data Center must not be used due to planned data center decommissioning, or possible other factors.
NRU	Not Ready for Use	The Data Center is coming up online but can not be used yet. Please update your firewall configuration to allow future use.
Not in Gateway	The data center is not used in PAC files.	

Location	IP Address (CIDR Notation)	Proxy Hostname	GRE Virtual IP	SVPN Virtual IP	VPN Host Name	Notes
EMEA						Copy IP Addresses
Amsterdam	165.225.28.0/23	ams2.sme.zscalerthree.net	165.225.28.12		ams2-vpn.zscalerthree.net	
Amsterdam II	165.225.240.0/23	ams2-2.sme.zscalerthree.net	165.225.240.32	165.225.240.63	ams2-2-vpn.zscalerthree.net	Not in Gateway
Brussels	165.225.88.0/23	bru1.sme.zscalerthree.net	165.225.88.38		bru1-vpn.zscalerthree.net	DNP, Not in Gateway
Brussels II	165.225.12.0/23	bru2.sme.zscalerthree.net	165.225.12.32	165.225.12.58	bru2-vpn.zscalerthree.net	
Copenhagen II	165.225.194.0/23	cph2.sme.zscalerthree.net	165.225.194.28	165.225.195.69	cph2-vpn.zscalerthree.net	
Dubai I	147.161.160.0/23	dxb1.sme.zscalerthree.net	147.161.160.34	147.161.160.44	dxb1-vpn.zscalerthree.net	RS, Not in Gateway

Figure 39. *Identify the FQDN*

Finish the Local Gateway Setup

After identifying the name of the VPN host, enter it in the **FQDN field**. Enter the **Address space** for which the local gateway provides access. Address space entries are the destination IP addresses. In this case it is the Internet or all IP addresses in CIDR block format.



Microsoft Azure

Home > A-Virtual-Network-Gateway-1 > Add connection > Choose local network gateway >

Create local network gateway

Name *

A-Local-Gateway-for-Dallas

Endpoint

IP address [✓ FQDN]

FQDN *

dfw1-2-vpn.zscalerthree.net

Address space

0.0.0.0/1

128.0.0.0/1

Add additional address range

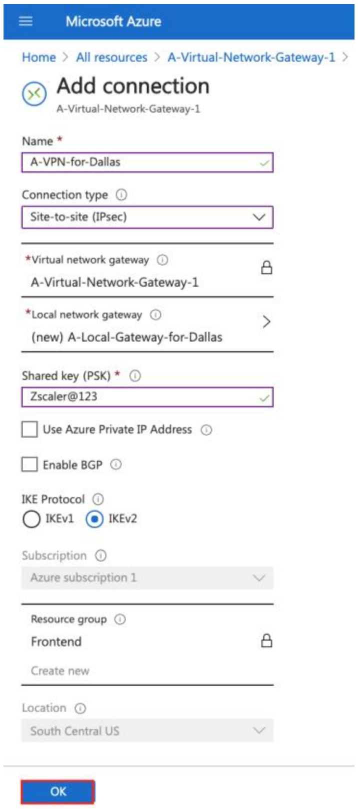
OK

Figure 40. *Create a Local network gateway*

You can't enter 0.0.0.0/0, but you can break it up intotwo entries of **0.0.0.0/1 and 128.0.0.0/1** as the address space. Then select **OK** to finish the local gateway configuration.

Finish the Virtual Network Gateway Setup

After the creation of the local gateway, we are placed back into the **Virtual network gateway** wizard, which is now finished. Select **OK** to finish the configuration.



Add connection
A-Virtual-Network-Gateway-1

Name * A-VPN-for-Dallas

Connection type: Site-to-site (IPsec)

*Virtual network gateway: A-Virtual-Network-Gateway-1

*Local network gateway: (new) A-Local-Gateway-for-Dallas

Shared key (PSK) *: Zscaler@123

□ Use Azure Private IP Address

□ Enable BGP

IKE Protocol: ○ IKEv1 ● IKEv2

Subscription: Azure subscription 1

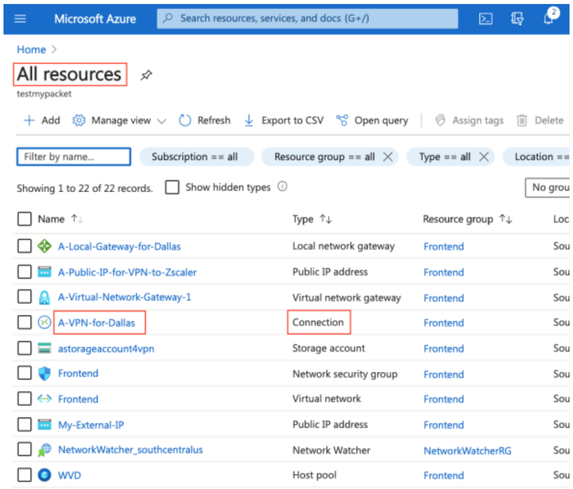
Resource group: Frontend
Create new

Location: South Central US

Figure 41. *Create a Connection*

Configure the IPsec Parameters

Next, set the IPsec configuration parameters on the connection. Select **All resources**, and then select the **Connection** that was just created.



All resources
testmypacket

Filter by name... | Subscription == all | Resource group == all | Type == all | Location ==

Showing 1 to 22 of 22 records. □ Show hidden types

Name	Type	Resource group	Loc
A-Local-Gateway-for-Dallas	Local network gateway	Frontend	Sou
A-Public-IP-for-VPN-to-Zscaler	Public IP address	Frontend	Sou
A-Virtual-Network-Gateway-1	Virtual network gateway	Frontend	Sou
A-VPN-for-Dallas	Connection	Frontend	Sou
astorageaccount4vpn	Storage account	Frontend	Sou
Frontend	Network security group	Frontend	Sou
Frontend	Virtual network	Frontend	Sou
My-External-IP	Public IP address	Frontend	Sou
NetworkWatcher_southcentralus	Network Watcher	NetworkWatcherRG	Sou
WVD	Host pool	Frontend	Sou

Figure 42. *Select the Connection*

This opens the **Connection** screen. Select **Configuration** to bring up the configuration screen.

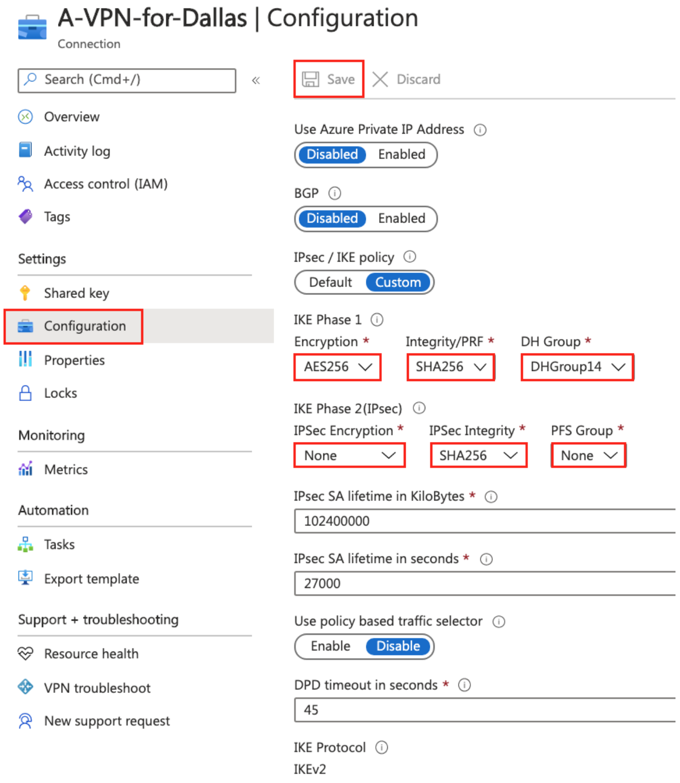
Under **IPsec / IKE policy** select **Custom**. This opens the IPsec parameters. For **IKE Phase 1** set:

- **Encryption** to **AES256**
- **Integrity/PRF** to **SHA256**
- **DH Group** to **DHGroup14**

For **IKE Phase2 (IPsec)** set:

- **IPsec Encryption** to **none (Null Encryption)**
- **Integrity** to **SHA256**
- **PFS Group** to **none**

Then select **Save**.



Use Azure Private IP Address: [✓ Disabled] Enabled

BGP: [✓ Disabled] Enabled

IPsec / IKE policy: Default [✓ Custom]

IKE Phase 1

Encryption *: AES256

Integrity/PRF *: SHA256

DH Group *: DHGroup14

IKE Phase 2(IPsec)

IPSec Encryption *: None

IPSec Integrity *: SHA256

PFS Group *: None

IPsec SA lifetime in KiloBytes *: 102400000

IPsec SA lifetime in seconds *: 27000

Use policy based traffic selector: Enable [✓ Disable]

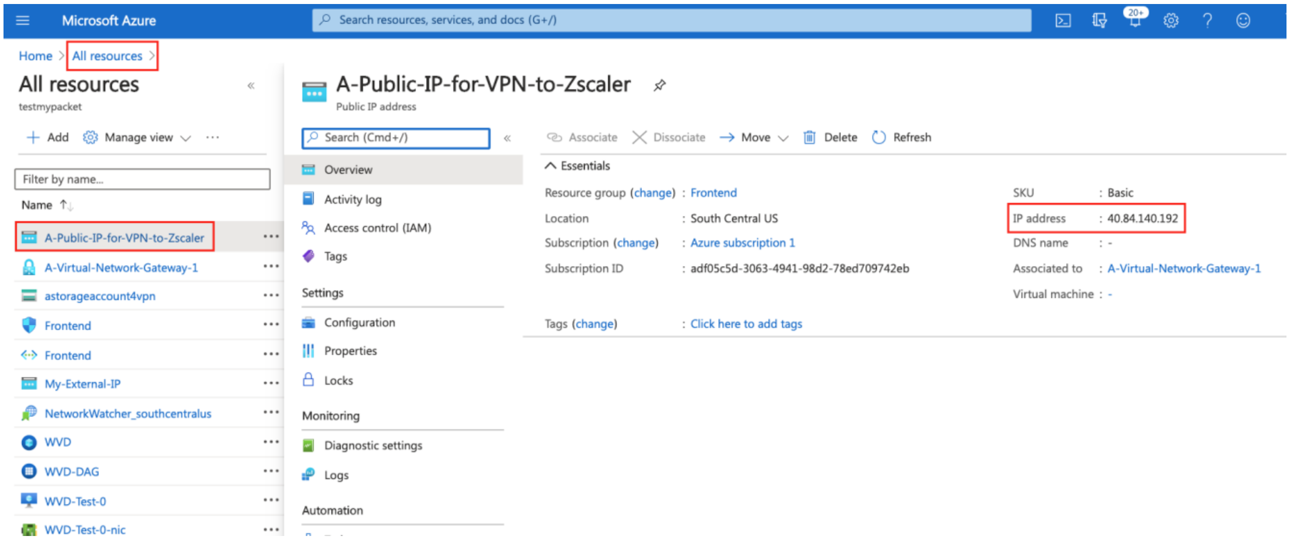
DPD timeout in seconds *: 45

IKE Protocol: IKEv2

Figure 43. *Customizing IPsec*

Identify the Public IP Address

You must identify the public IP address used to connect to Zscaler to create the VPN credentials and the location identifying the inbound traffic. Select **All resources** and then select the **Public IP Address object** created on Page 38. The IP address is located on the right side of the parameter screen. Copy the **address** and move to the next section to open a support ticket with Zscaler to have the address added as an identified IP address.



Resource group (change) : Frontend
Location : South Central US
Subscription (change) : Azure subscription 1
Subscription ID : adf05c5d-3063-4941-98d2-78ed709742eb
Tags (change) : Click here to add tags
SKU : Basic
IP address : 40.84.140.192
DNS name : -
Associated to : A-Virtual-Network-Gateway-1
Virtual machine : -

Figure 44. *Identify the External IP Address*

Configuring Zscaler

Submit a Zscaler Ticket to Add the IP Address to your Zscaler Account

Zscaler support must provision the IP address saved from the last step needs as an identified IP address bound to the Zscaler account. From the ZIA Admin Portal select the **question mark (?)** at the bottom left of the portal screen. Then select **Submit a Ticket**. This opens the **Submit a Case** page.

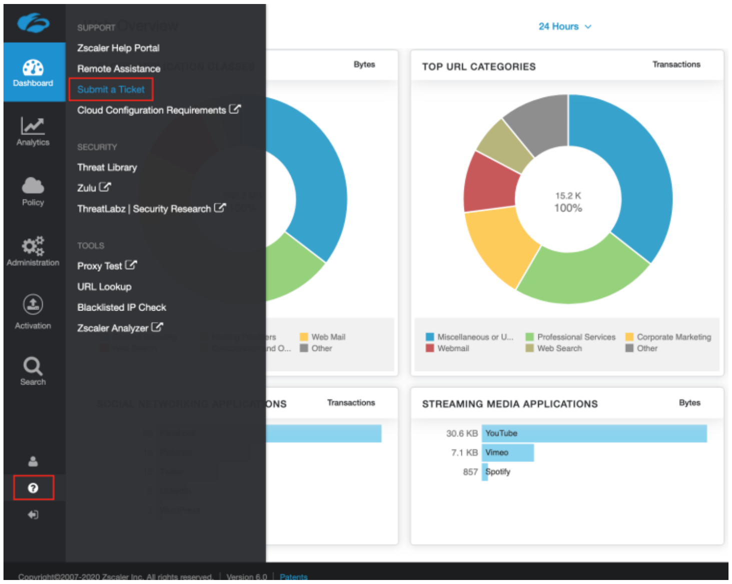
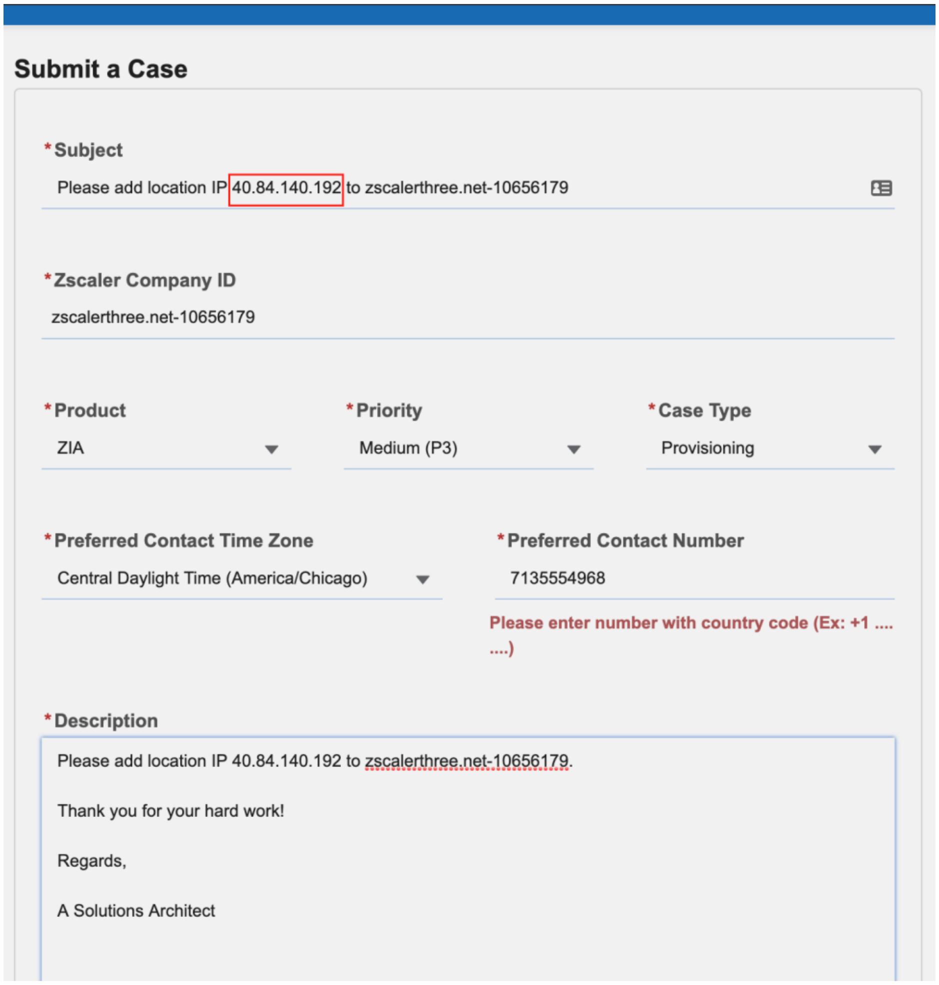


Figure 45. *Submit a Provisioning Ticket*

Fill in the fields to have the IP address added to the Zscaler tenant and select **Submit.**



Submit a Case

*Subject
Please add location IP 40.84.140.192 to zscalerthree.net-10656179

*Zscaler Company ID
zscalerthree.net-10656179

*Product
ZIA

*Priority
Medium (P3)

*Case Type
Provisioning

*Preferred Contact Time Zone
Central Daylight Time (America/Chicago)

*Preferred Contact Number
7135554968

Please enter number with country code (Ex: +1 ....)

*Description

Please add location IP 40.84.140.192 to zscalerthree.net-10656179.

Thank you for your hard work!

Regards,

A Solutions Architect

Figure 46. *Submit a Case*

Create VPN Credentials

After you get confirmation that the IP has been added successfully, create the **VPN Credentials** and the **Location**. Select **Administration** and then select **VPN Credentials**.

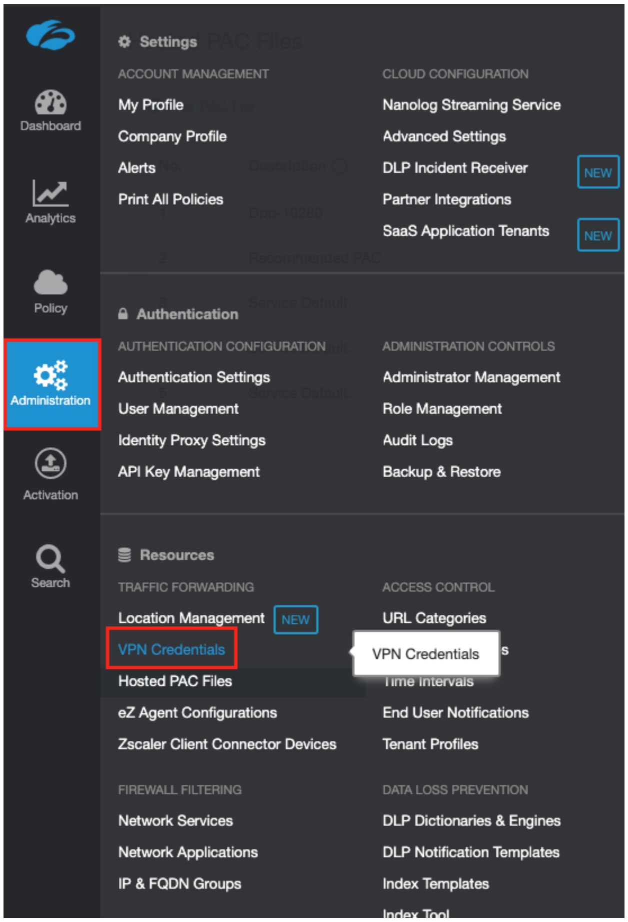


Figure 47. Create VPN Credentials

Select **Administration** and **Add VPN Credentials**, which opens the **Add VPN Credential** screen.

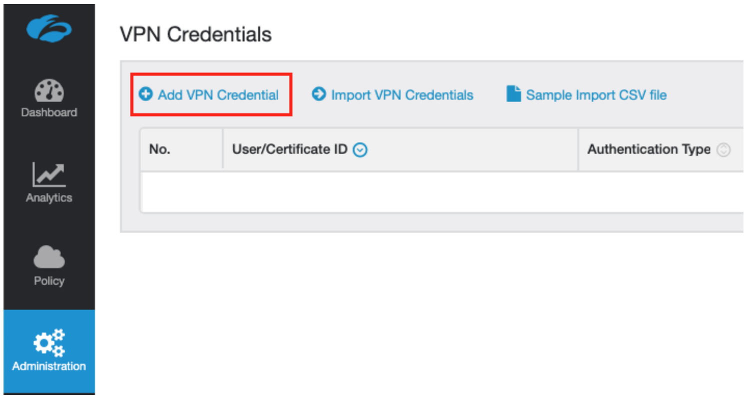
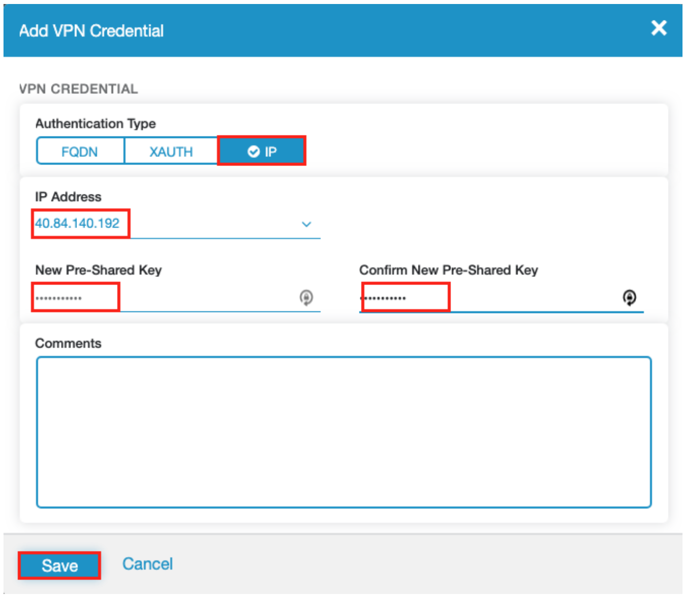


Figure 48. Add VPN Credentials

Select **IP** and then select the **IP address** just added from the pull-down menu. To complete the configuration, enter the **Shared Key (PSK)** created in

Configuring the Virtual Network Gateway, then select **Save**.



Add VPN Credential

VPN CREDENTIAL

Authentication Type: FQDN / XAUTH / ✓ IP

IP Address: 40.84.140.192

New Pre-Shared Key: ••••••••••

Confirm New Pre-Shared Key: ••••••••••

Comments

Figure 49. *Create VPN Credentials*

Adding a Zscaler Location

You must create a location needs to terminate the IPsec VPN connection. To create a location, select **Administration** and then select **Location Management.**

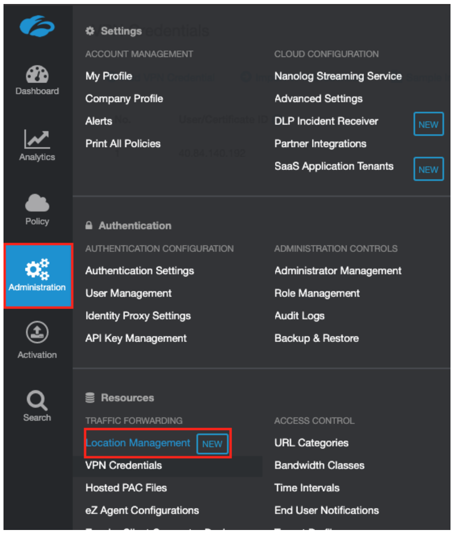
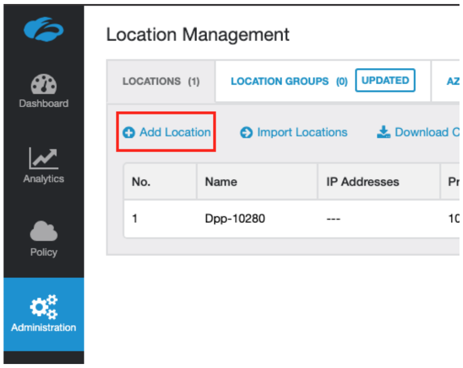


Figure 50. *Select Location Management*

Then select **Add Location**. This opens the **Add Location** screen.



No.	Name	IP Addresses	Pr
1	Dpp-10280	---	10

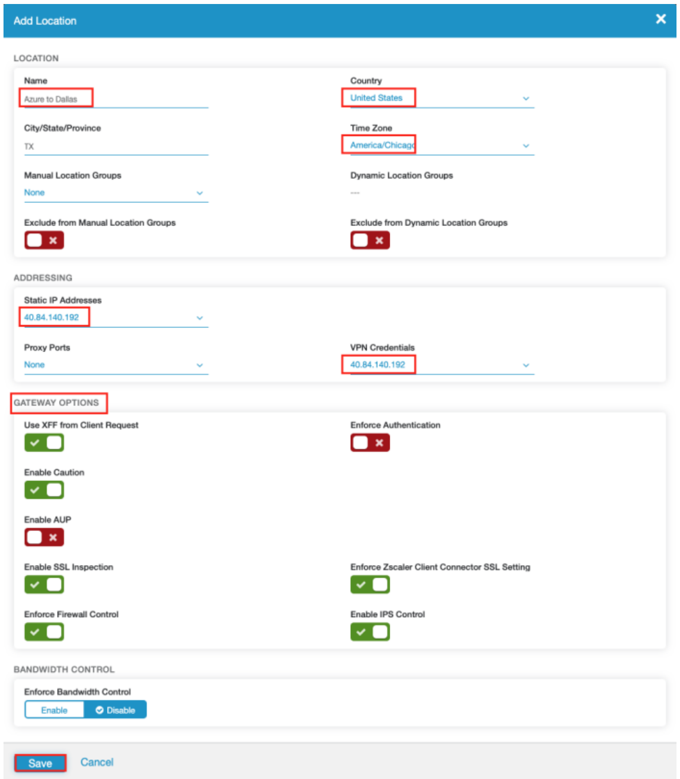
Figure 51. *Add a Location*

Location Parameters

In the **Add Location** screen enter an intuitive **Name** for the VPN tunnel, then enter the **Country, City/State/Province,** and **Time-Zone** information.

Select the **Azure Public IP address** from the **Static IP Address** pull down menu and the **VPN Credentials** created in the previous step.

Finally select the **Gateway Options** to enforce on the VPN connections and **Save** the configuration.


Add Location

LOCATION

Name: Azure to Dallas
Country: United States
City/State/Province: TX
Time Zone: America/Chicago
Manual Location Groups: None
Dynamic Location Groups: ---
Exclude from Manual Location Groups: ✗
Exclude from Dynamic Location Groups: ✗

ADDRESSING

Static IP Addresses: 40.84.140.192
Proxy Ports: None
VPN Credentials: 40.84.140.192

GATEWAY OPTIONS

Use XFF from Client Request: ✓
Enforce Authentication: ✗
Enable Caution: ✓
Enable AUP: ✗
Enable SSL Inspection: ✓
Enforce Zscaler Client Connector SSL Setting: ✓
Enforce Firewall Control: ✓
Enable IPS Control: ✓

BANDWIDTH CONTROL

Enforce Bandwidth Control: Enable [✓ Disable]

Figure 52. *Create a Location*

Check the Status of the VPN Connection

To check the status of the VPN connection with tunnel insights select **Analytics** and **Tunnel Insights** from the ZIA Admin Portal user interface. This brings up the Insights selection screen.

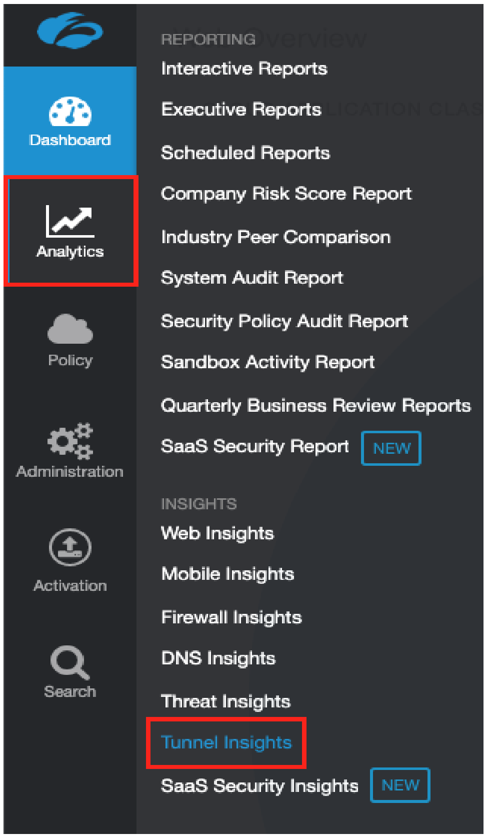
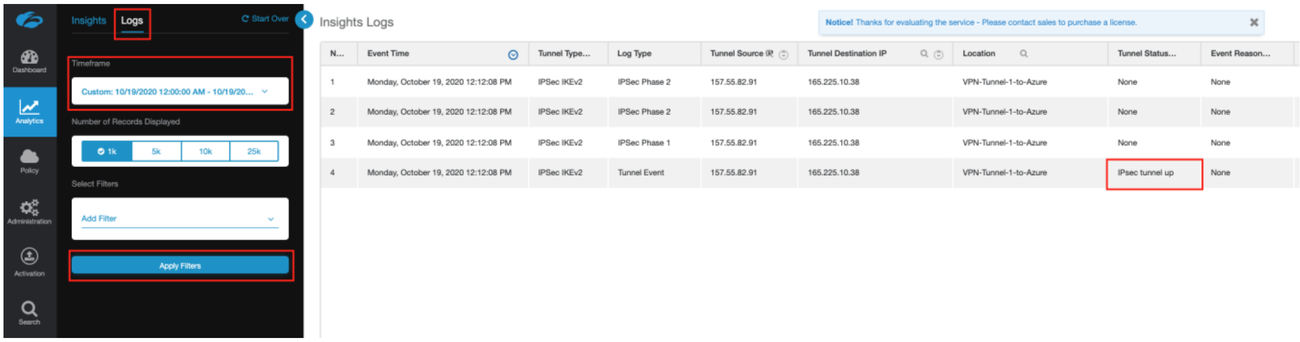


Figure 53. *Tunnel Insights*

Identify the Public IP Address

To check the VPN tunnel status, filter the logs to find the **Tunnel Status**. Depending on your installation you may need to provide additional filters to narrow down the logs. For this example, this is the first tunnel, so we just need to select **Logs** at the top of the filter selections and then select a **Timeframe** to display. In this example, you can see our IPsec Tunnel is now up. If no logs are displayed, or the logs show an error, revisit all of the configuration steps (or open a support ticket with Zscaler).



Timeframe
Custom: 10/19/2020 12:00:00 AM - 10/19/20...

Number of Records Displayed
1k 5k 10k 25k

Select Filters

Insights Logs

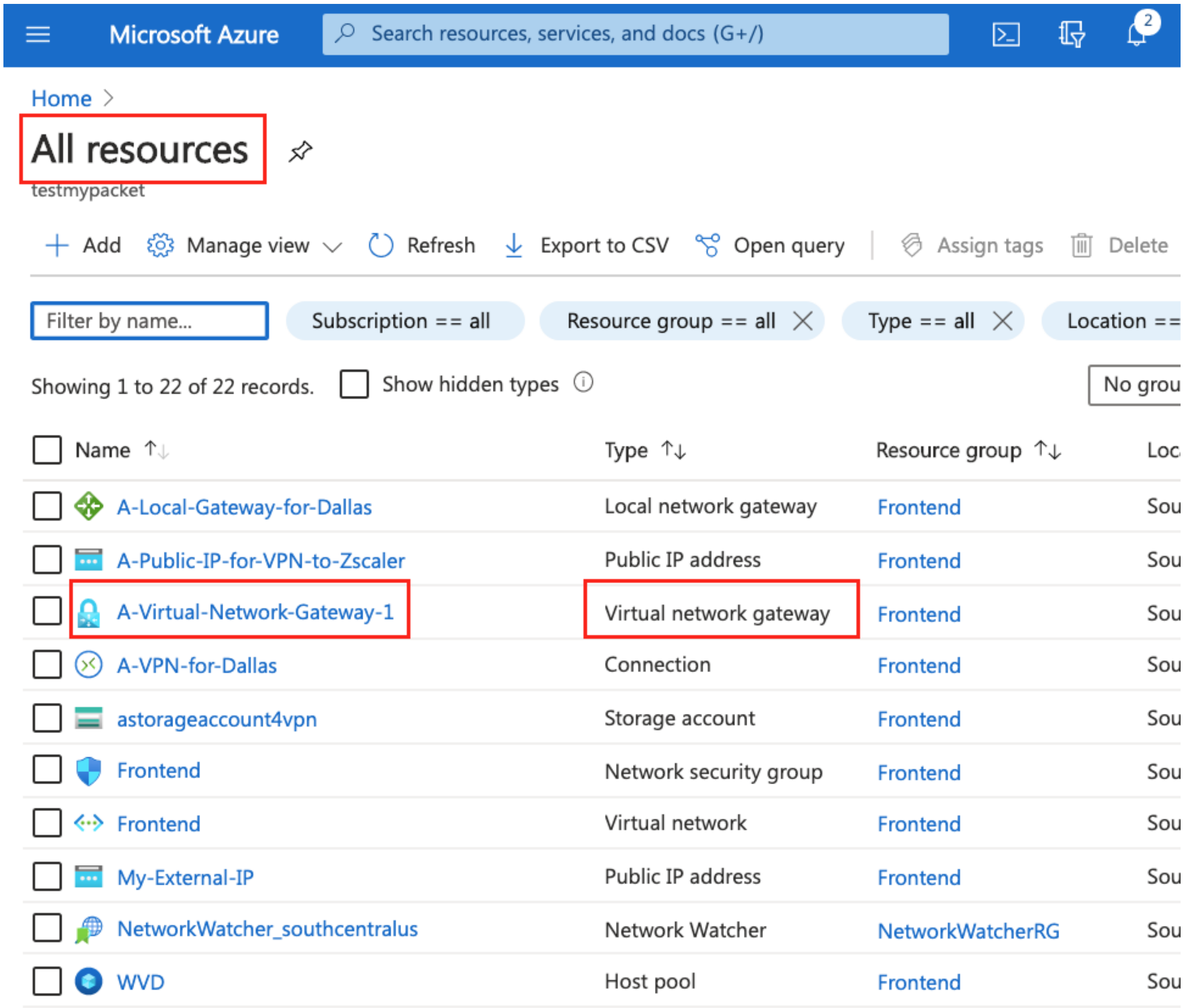
Notice! Thanks for evaluating the service - Please contact sales to purchase a license.

N...	Event Time	Tunnel Type...	Log Type	Tunnel Source IP	Tunnel Destination IP	Location	Tunnel Status...	Event Reason...
1	Monday, October 19, 2020 12:12:08 PM	IPSec IKEv2	IPSec Phase 2	157.55.82.91	165.225.10.38	VPN-Tunnel-1-to-Azure	None	None
2	Monday, October 19, 2020 12:12:08 PM	IPSec IKEv2	IPSec Phase 2	157.55.82.91	165.225.10.38	VPN-Tunnel-1-to-Azure	None	None
3	Monday, October 19, 2020 12:12:08 PM	IPSec IKEv2	IPSec Phase 1	157.55.82.91	165.225.10.38	VPN-Tunnel-1-to-Azure	None	None
4	Monday, October 19, 2020 12:12:08 PM	IPSec IKEv2	Tunnel Event	157.55.82.91	165.225.10.38	VPN-Tunnel-1-to-Azure	IPsec tunnel up	None

Figure 54. *Tunnel Insights*

Create a Redundant VPN Connection for Manual Fail-over

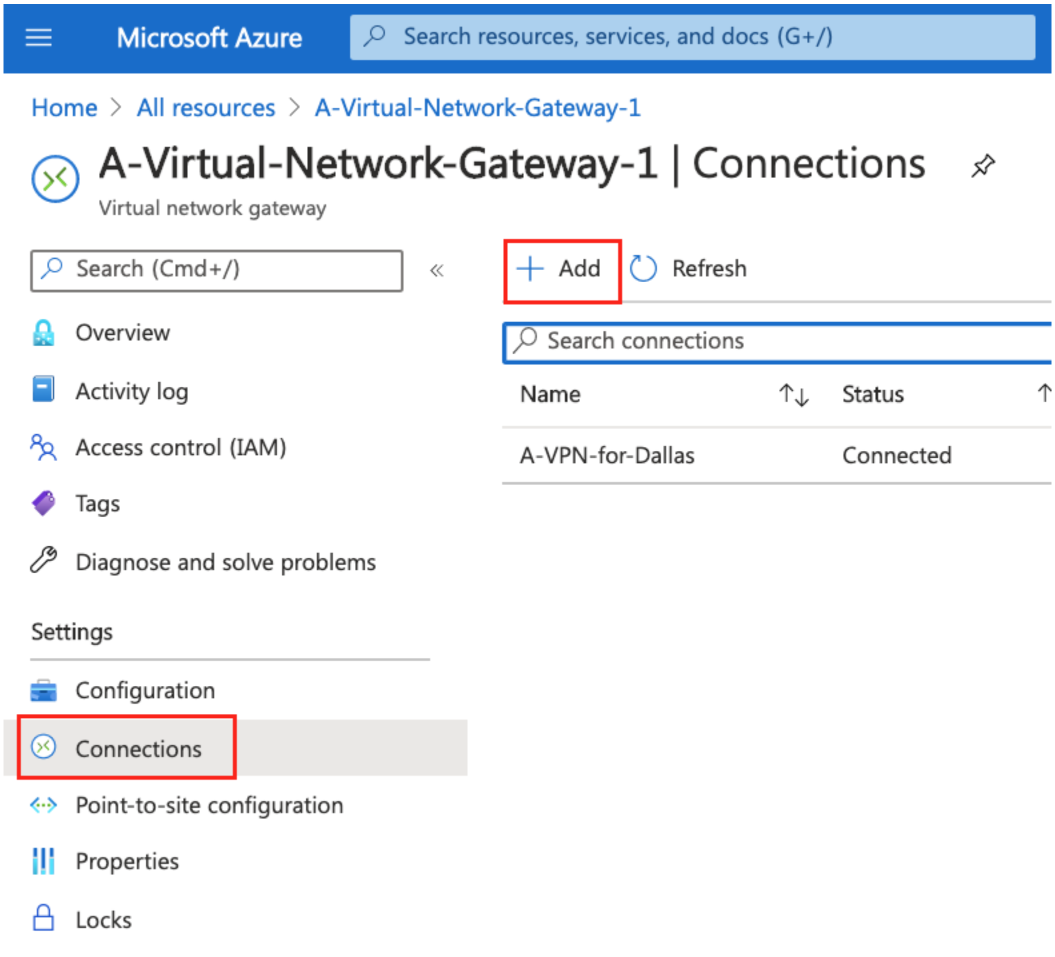
To create a redundant connection, repeat the steps to create a connection bound to the Virtual Network Gateway. From **All resources**, select the **Virtual network gateway**.



□ Name ↑↓	Type ↑↓	Resource group ↑↓	Loc
□ A-Local-Gateway-for-Dallas	Local network gateway	Frontend	Sou
□ A-Public-IP-for-VPN-to-Zscaler	Public IP address	Frontend	Sou
□ A-Virtual-Network-Gateway-1	Virtual network gateway	Frontend	Sou
□ A-VPN-for-Dallas	Connection	Frontend	Sou
□ astorageaccount4vpn	Storage account	Frontend	Sou
□ Frontend	Network security group	Frontend	Sou
□ Frontend	Virtual network	Frontend	Sou
□ My-External-IP	Public IP address	Frontend	Sou
□ NetworkWatcher_southcentralus	Network Watcher	NetworkWatcherRG	Sou
□ WVD	Host pool	Frontend	Sou

Figure 55. *The Virtual Network Gateway*

Select **Connections** and then **Add**. This brings up the **Add Connection** screen.


Microsoft Azure
Search resources, services, and docs (G+/)
Home > All resources > A-Virtual-Network-Gateway-1
A-Virtual-Network-Gateway-1 | Connections
Virtual network gateway
Search (Cmd+/)
Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems
Settings
Configuration
Connections
Point-to-site configuration
Properties
Locks
Add
Refresh
Search connections

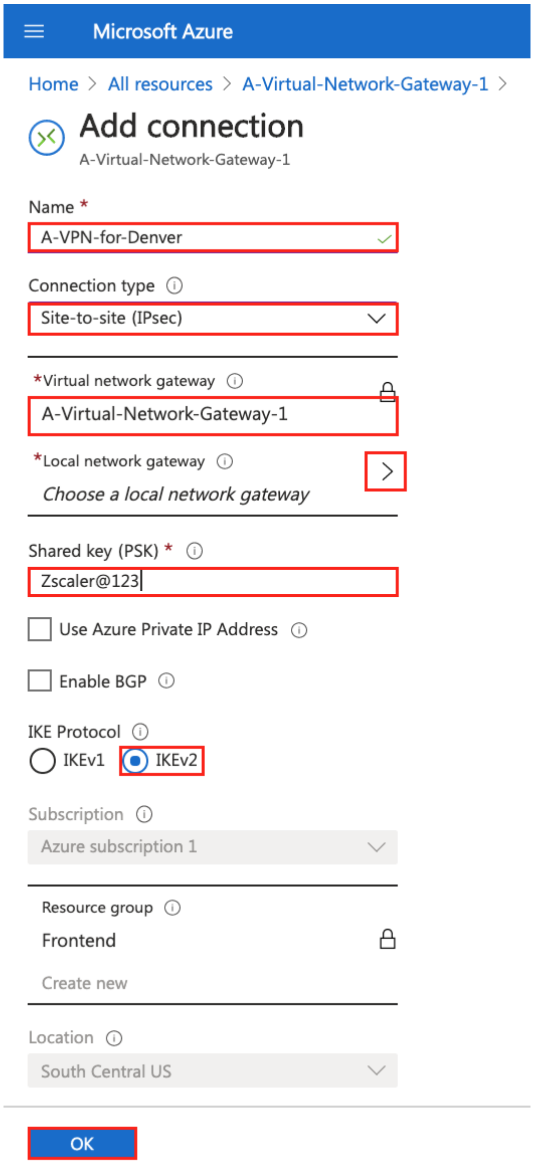
Name	Status
A-VPN-for-Dallas	Connected

Figure 56. *Add a Connection*

In the **Add Connection** wizard give the connection a **Name** that identifies the connection, then select a **Connection type** of **Site-to-site (IPsec)**. The virtual network gateway should be pre-populated with the gateway we just created.

Enter your **Shared key (PSK)** that is used as part of the VPN credentials configured on the Zscaler setup. Then select **IKEv2**.

Next, select the **arrow (>)** next to the **Local network gateway** to start the wizard to create the Local Gateway that represents the Zscaler VPN.



Microsoft Azure

Home > All resources > A-Virtual-Network-Gateway-1 >

Add connection

A-Virtual-Network-Gateway-1

Name * A-VPN-for-Denver

Connection type: Site-to-site (IPsec)

*Virtual network gateway: A-Virtual-Network-Gateway-1

*Local network gateway: Choose a local network gateway

Shared key (PSK) *: Zscaler@123

□ Use Azure Private IP Address

□ Enable BGP

IKE Protocol: ○ IKEv1 ● IKEv2

Subscription: Azure subscription 1

Resource group: Frontend

Create new

Location: South Central US

Figure 57. *Configure the Connection*

In the wizard, select **Create new** to create a new local gateway. Give the gateway an intuitive **Name** identifying it as a VPN to a Zscaler location, then select an **Endpoint of FQDN**. The fully qualified domain name (FQDN) is selected from the Zscaler list of VPN hostnames for your cloud. Repeat the steps in Identify the FQDN for the VPN to identify the FQDN from https://ips.(yourzscalercloud).net/cenr.

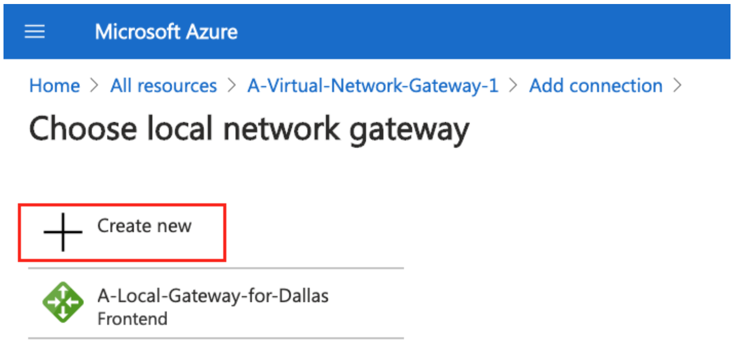
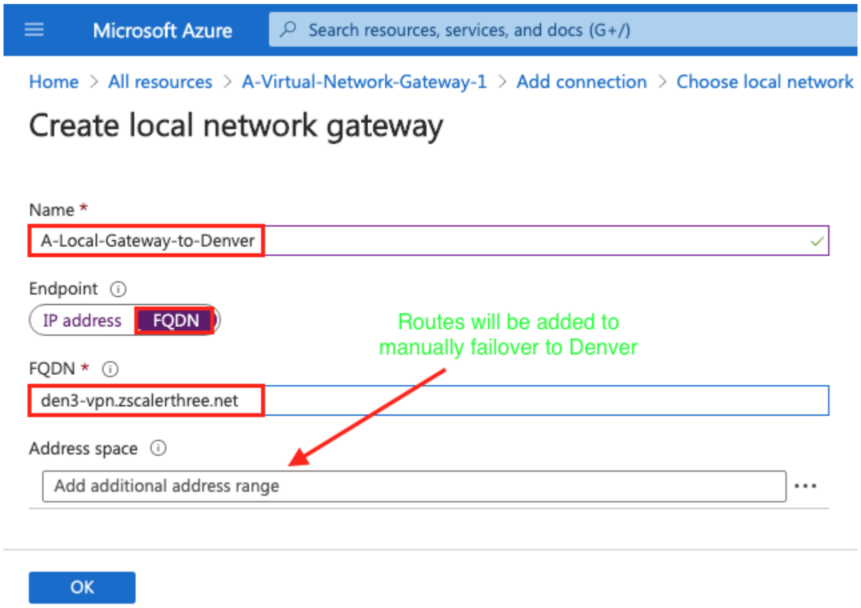

Microsoft Azure
Home > All resources > A-Virtual-Network-Gateway-1 > Add connection >
Choose local network gateway
Create new
A-Local-Gateway-for-Dallas
Frontend

Figure 58. *Create a Local Gateway*


Microsoft Azure
Search resources, services, and docs (G+/)
Home > All resources > A-Virtual-Network-Gateway-1 > Add connection > Choose local network
Create local network gateway
Routes will be added to manually failover to Denver
OK

Name * A-Local-Gateway-to-Denver

Endpoint: IP address / FQDN (selected: FQDN)

FQDN * den3-vpn.zscalerthree.net

Address space: Add additional address range

Figure 59. *Configure the Local Gateway*

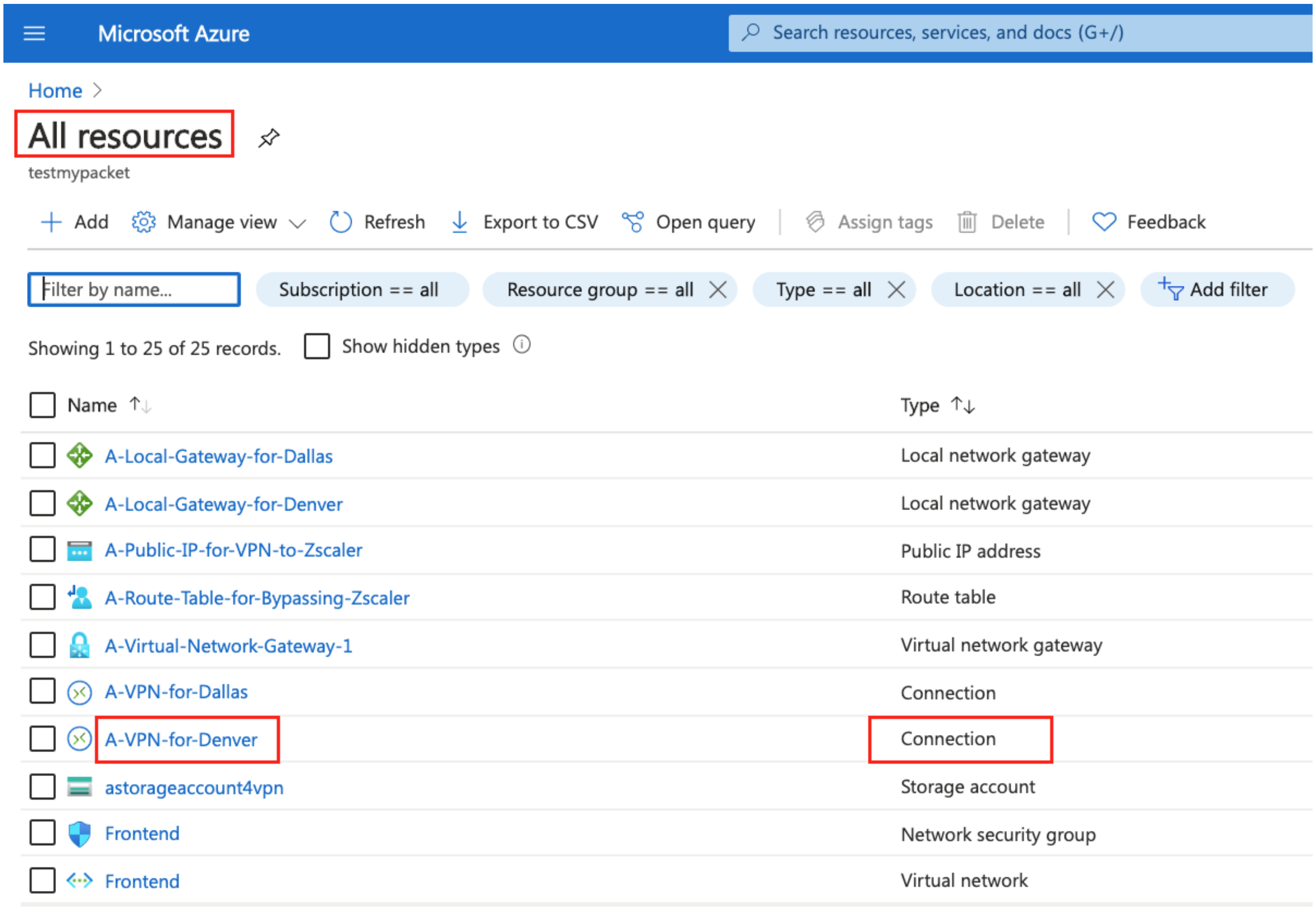
After you are back into the **Virtual Network Gateway** wizard, select **OK** to finish the configuration.

NOTE

Routes are manually added to the Address space and removed from the other local network gateway to force redundancy in case of a catastrophic failure.

Set the IPsec VPN Parameters

You not need to set the IPsec configuration parameters on the connection. Select **All resources** and then select the **Connection** you just created.



All resources

testmypacket

Showing 1 to 25 of 25 records.

Name	Type
A-Local-Gateway-for-Dallas	Local network gateway
A-Local-Gateway-for-Denver	Local network gateway
A-Public-IP-for-VPN-to-Zscaler	Public IP address
A-Route-Table-for-Bypassing-Zscaler	Route table
A-Virtual-Network-Gateway-1	Virtual network gateway
A-VPN-for-Dallas	Connection
A-VPN-for-Denver	Connection
astorageaccount4vpn	Storage account
Frontend	Network security group
Frontend	Virtual network

Figure 60. *Select the Connection*

This opens the **Connection** screen. Select **Configuration** to bring up the configuration screen. Under **IPsec / IKE** policy select **Custom** to reveal the IPsec parameters.

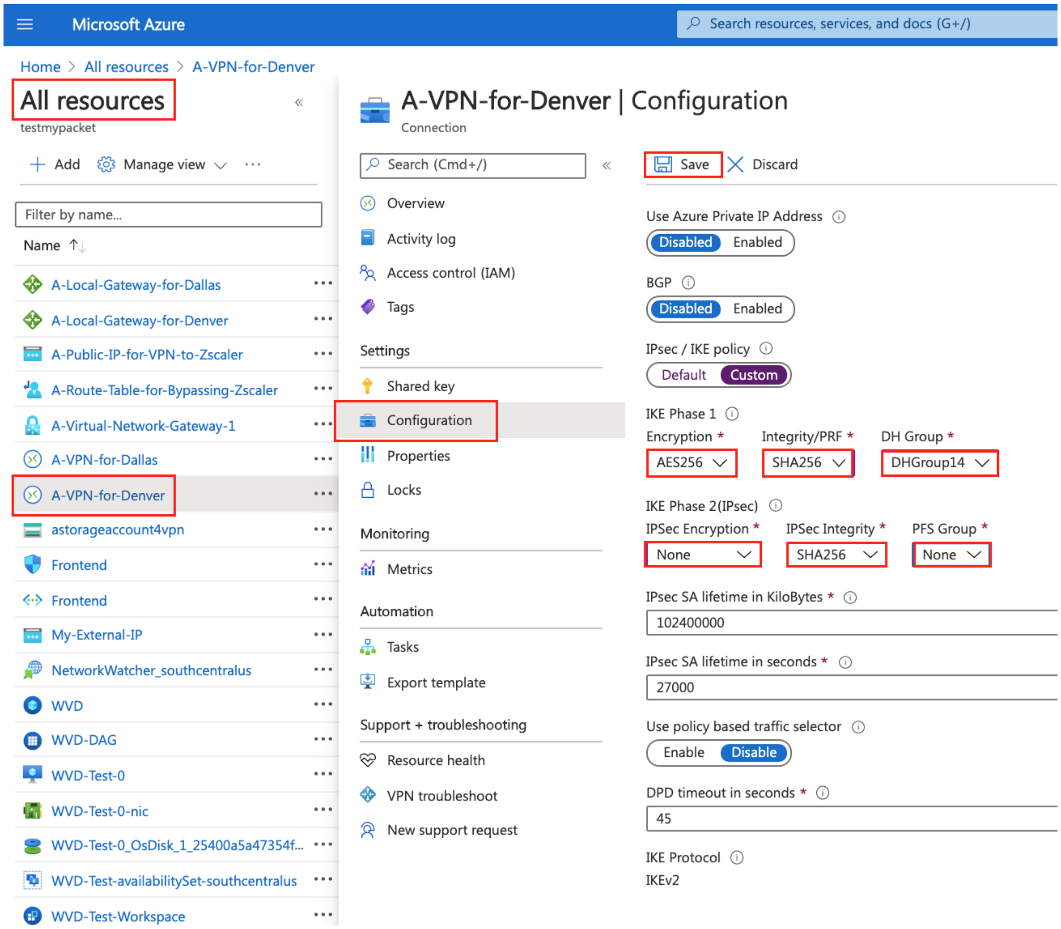
For **IKE Phase 1** set:

- **Encryption** to **AES256**
- **Integrity/PRF** to **SHA256**
- **DH Group** to **DHGroup14**.

For **IKE Phase2 (IPsec)** set:

- **IPsec Encryption** to **none (Null Encryption)**
- **IPsec Integrity** to **SHA256**
- **PFS Group** to **none**

Then select **Save**.



A-VPN-for-Denver | Configuration
Connection

Use Azure Private IP Address: Disabled

BGP: Disabled

IPsec / IKE policy: Custom

IKE Phase 1
Encryption *: AES256
Integrity/PRF *: SHA256
DH Group *: DHGroup14

IKE Phase 2(IPsec)
IPSec Encryption *: None
IPSec Integrity *: SHA256
PFS Group *: None

IPsec SA lifetime in KiloBytes *: 102400000

IPsec SA lifetime in seconds *: 27000

Use policy based traffic selector: Disable

DPD timeout in seconds *: 45

IKE Protocol: IKEv2

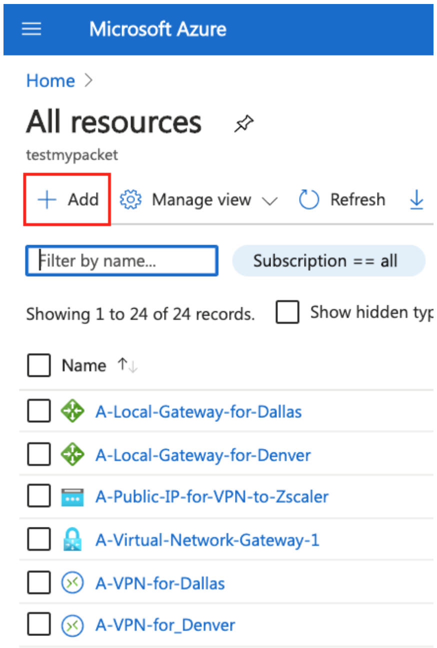
Figure 61. Configure IPsec Parameters

We have finished the configuration of the redundant VPN connection. The final step is to create a Route Table. Move to the next section to complete our installation.

Create a Route Table

You need to create a route table and assign it to our subnets sending traffic to Zscaler to control the flow of traffic in Azure. Since the default action is to forward traffic to Zscaler, the route table is used to send local traffic locally and control any Internet traffic that needs to bypass Zscaler.

To create a route table from all resources select **Add.**



□ A-Local-Gateway-for-Dallas
□ A-Local-Gateway-for-Denver
□ A-Public-IP-for-VPN-to-Zscaler
□ A-Virtual-Network-Gateway-1
□ A-VPN-for-Dallas
□ A-VPN-for_Denver

Figure 62. *Add a Resource*

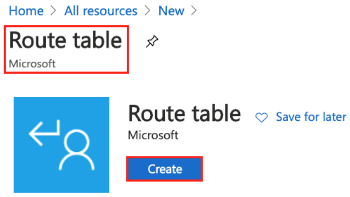
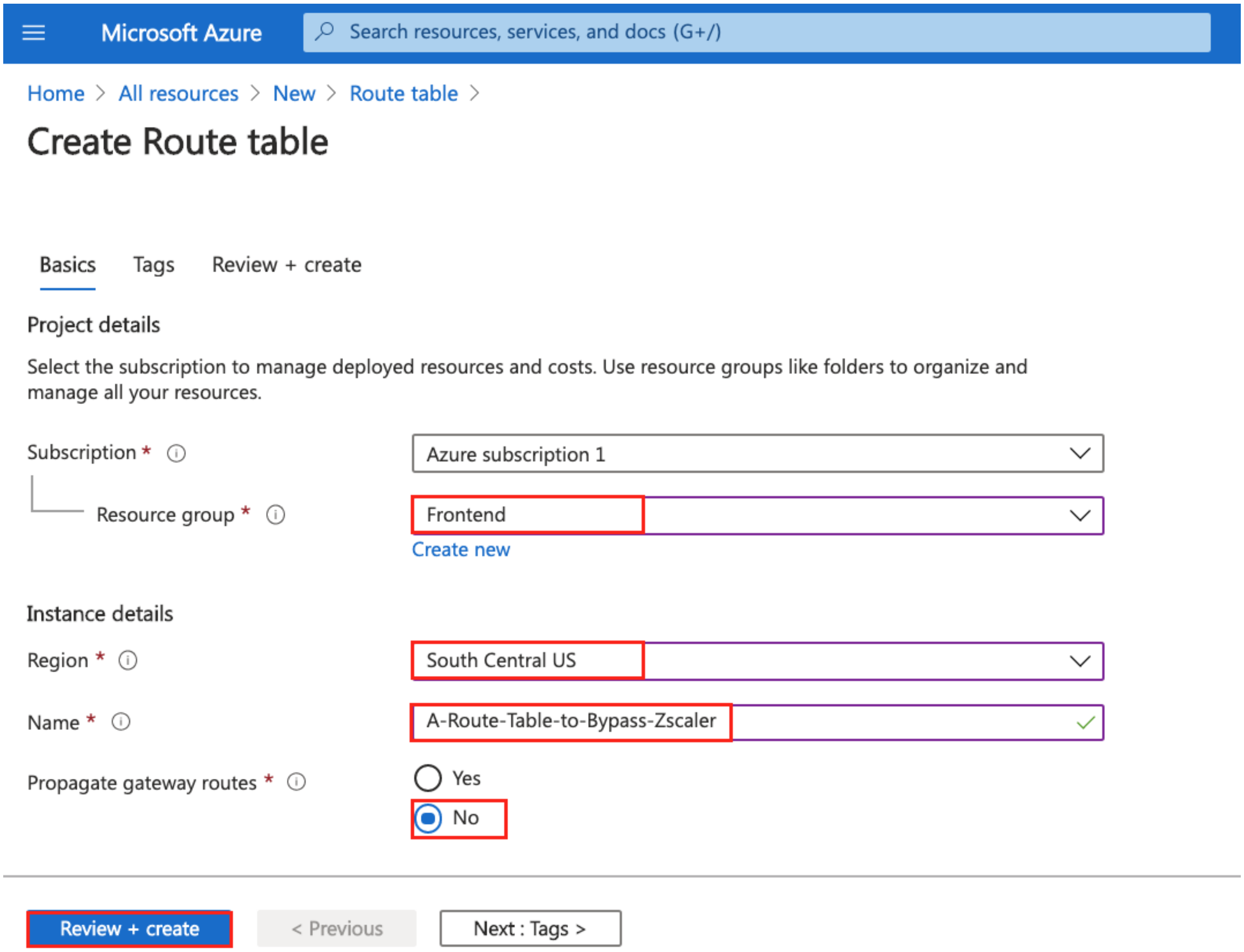


Figure 63. *Create an Application Profile*

You must configure the route table's basic features. Select:

- The **Resource group** containing the subnets that need to have traffic directed away from Zscaler
- The **Region** for the route table and give the resource an **Intuitive name**
- Select **No** to **Propagate gateway routes** because we want to control the routes that are applied to the subnet



Microsoft Azure
Search resources, services, and docs (G+/)
Home > All resources > New > Route table >

Create Route table

Basics
Tags
Review + create

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : Azure subscription 1

Resource group * : Frontend

Create new

Instance details

Region * : South Central US

Name * : A-Route-Table-to-Bypass-Zscaler ✓

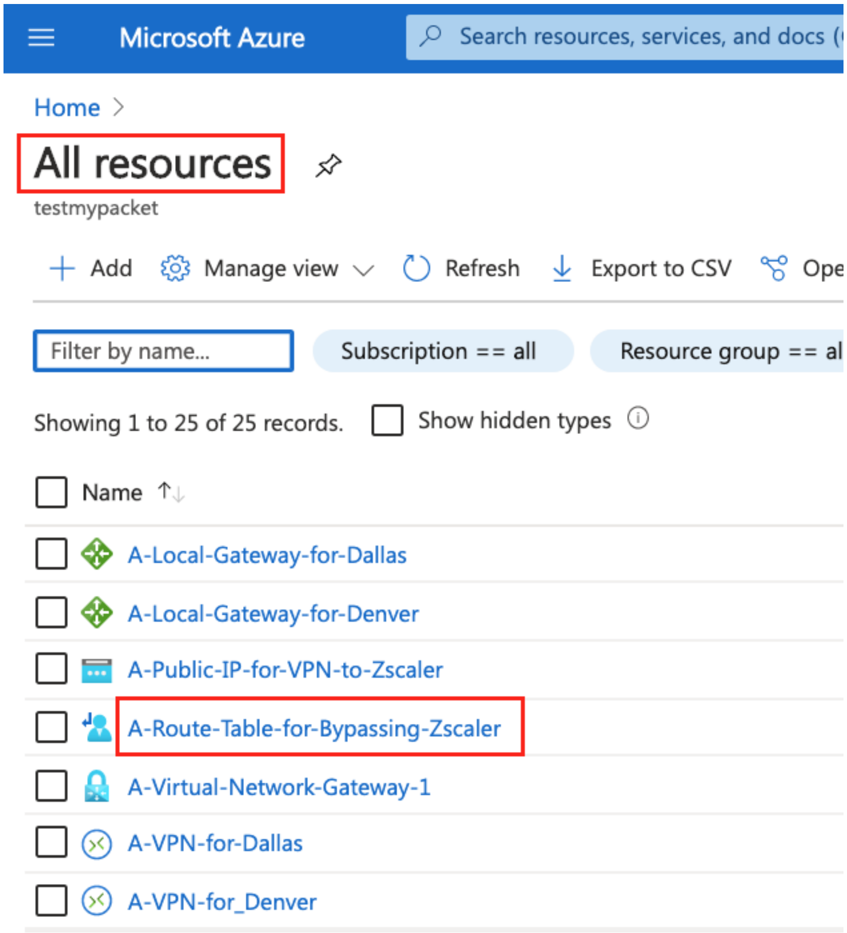
Propagate gateway routes * : ○ Yes ● No

Review + create
< Previous
Next : Tags >

Figure 64. *Create an Application Profile*

Configure the Route Table

To configure the details of the route table, from **All resources** select the **Route Table** that was just created. This brings up the Route Table configuration Screen.

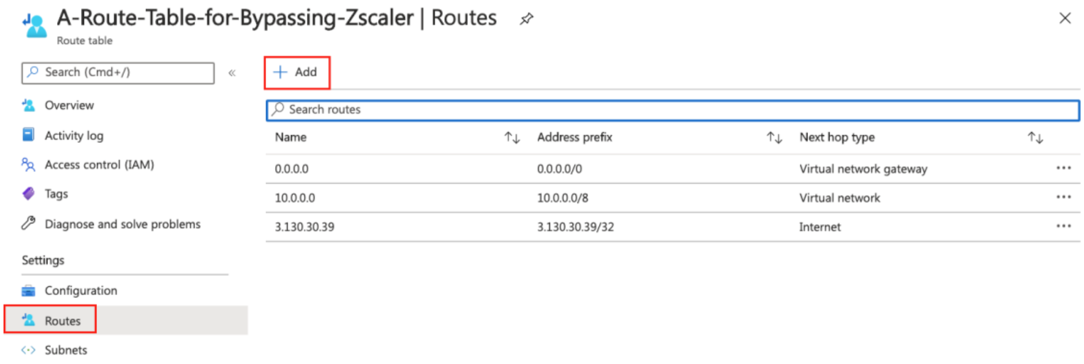


- □ A-Local-Gateway-for-Dallas
- □ A-Local-Gateway-for-Denver
- □ A-Public-IP-for-VPN-to-Zscaler
- □ A-Route-Table-for-Bypassing-Zscaler
- □ A-Virtual-Network-Gateway-1
- □ A-VPN-for-Dallas
- □ A-VPN-for_Denver

Figure 65. Select the Route Table to Edit

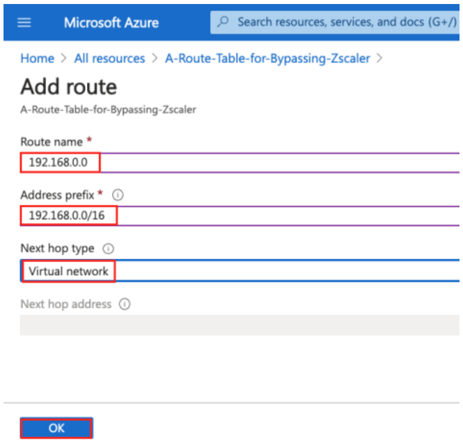
To create the needed bypass routes, select **Routes** on the left and then select **Add** to bring up the **Add route** screen.

Adding Routes



Name	Address prefix	Next hop type
0.0.0.0	0.0.0.0/0	Virtual network gateway
10.0.0.0	10.0.0.0/8	Virtual network
3.130.30.39	3.130.30.39/32	Internet

Figure 66. Add Routes



Microsoft Azure
Search resources, services, and docs (G+/)
Home > All resources > A-Route-Table-for-Bypassing-Zscaler >
OK

Add route

A-Route-Table-for-Bypassing-Zscaler

Route name *: 192.168.0.0

Address prefix *: 192.168.0.0/16

Next hop type: Virtual network

Next hop address

Figure 67. *Creating a Bypass route*

NOTE

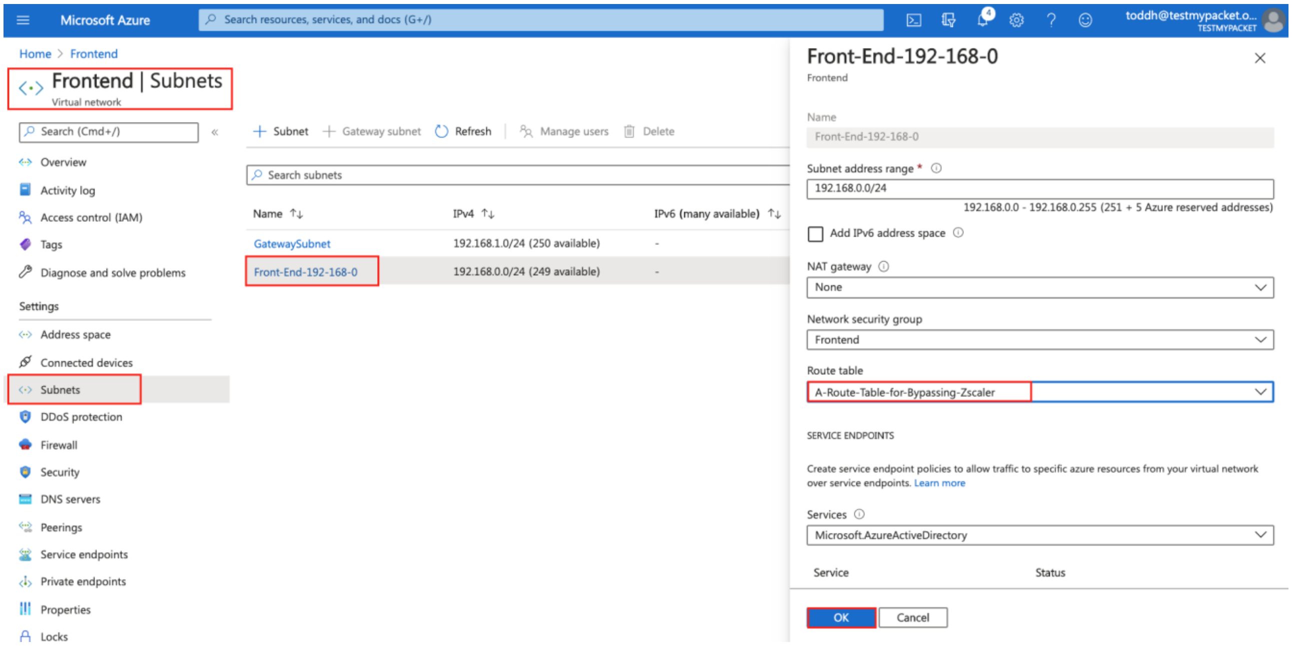
Any local traffic that needs to stay local or bypass Zscaler out to the Internet needs a route with a next hop type of Virtual Network or Internet.

In the above example, the 192.168.0.0/16 network would be kept local. We also need to add the **default route of 0.0.0.0/0 with a next hop of Virtual Network Gateway** (Zscaler).

In the above example, 3.130.30.39 goes directly to the Internet site and bypass Zscaler. Microsoft is releasing a new feature for bypassing routes based on a tag. This simulates FQDN bypasses. Currently route bypasses are destination-IP-based. To perform FQDN bypasses you need to install a component like the Microsoft firewall. That need is currently out of the scope of this document.

Applying the Route Table

The route table needs to be applied to the subnet that contains our devices that talk to the Internet. From **All resources** select the **Vnet** that contains our resources and select **Subnets**. Then select the **Subnet/s** that contain the devices that talk to Internet resources, and then apply the route table that was just created.



Frontend | Subnets
Virtual network

Name	IPv4	IPv6 (many available)
GatewaySubnet	192.168.1.0/24 (250 available)	-
Front-End-192-168-0	192.168.0.0/24 (249 available)	-

Front-End-192-168-0
Frontend

Name: Front-End-192-168-0

Subnet address range *: 192.168.0.0/24
192.168.0.0 - 192.168.0.255 (251 + 5 Azure reserved addresses)

□ Add IPv6 address space

NAT gateway: None

Network security group: Frontend

Route table: A-Route-Table-for-Bypassing-Zscaler

SERVICE ENDPOINTS

Create service endpoint policies to allow traffic to specific azure resources from your virtual network over service endpoints. Learn more

Services: Microsoft.AzureActiveDirectory

Service	Status

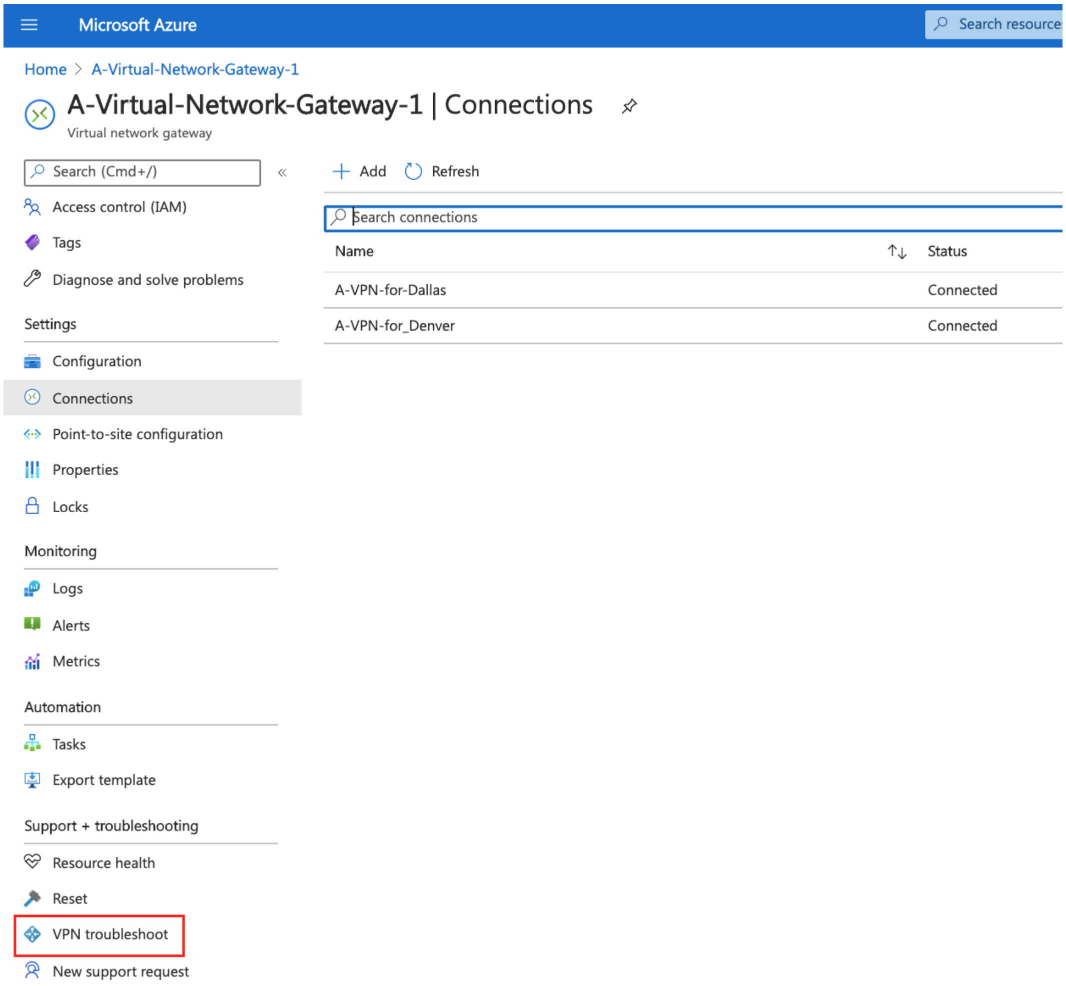
Figure 68. *Apply the Route Table to a Subnet*

Our configuration is now completed.

Appendix A: Troubleshooting

VPN Troubleshooting

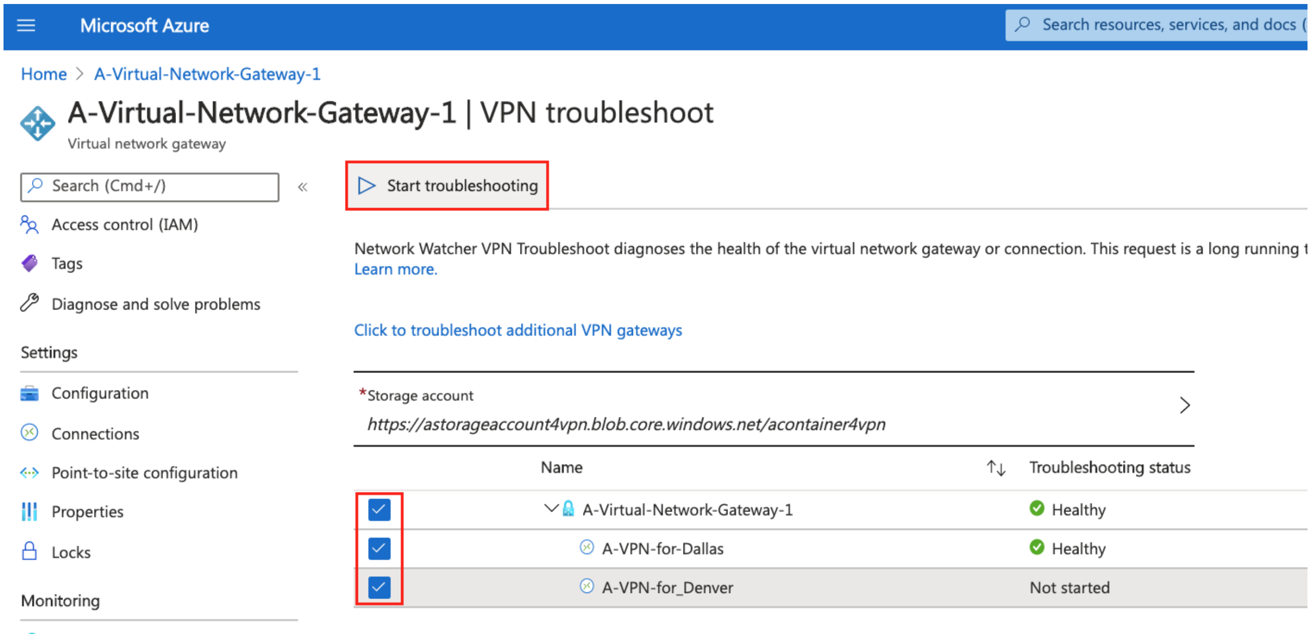
There are a couple of tools to help troubleshoot the VPN connections. From Zscaler you can use Tunnel Insights (described in Check the Status of the VPN Connection) to check if our tunnel was initiated. You can also use the native VPN troubleshooting tool in Azure (located in the Virtual Network Gateway resource). To use this tool, you must create both Storage and a Container resources. You are prompted to **Select** the resource or **Create** the resource as you initiate troubleshooting.



Name	Status
A-VPN-for-Dallas	Connected
A-VPN-for_Denver	Connected

Figure 69. *VPN Troubleshooting*

To start troubleshooting, select the storage and container, then select the **Gateway** and the **Connection** to test. Then select **Start troubleshooting**.



Microsoft Azure
Search resources, services, and docs (
Home > A-Virtual-Network-Gateway-1
Search (Cmd+/)
Access control (IAM)
Tags
Diagnose and solve problems
Settings
Configuration
Connections
Point-to-site configuration
Properties
Locks
Monitoring
Start troubleshooting
Click to troubleshoot additional VPN gateways

A-Virtual-Network-Gateway-1 | VPN troubleshoot

Virtual network gateway

Network Watcher VPN Troubleshoot diagnoses the health of the virtual network gateway or connection. This request is a long running t

Learn more.

*Storage account

https://astorageaccount4vpn.blob.core.windows.net/acontainer4vpn

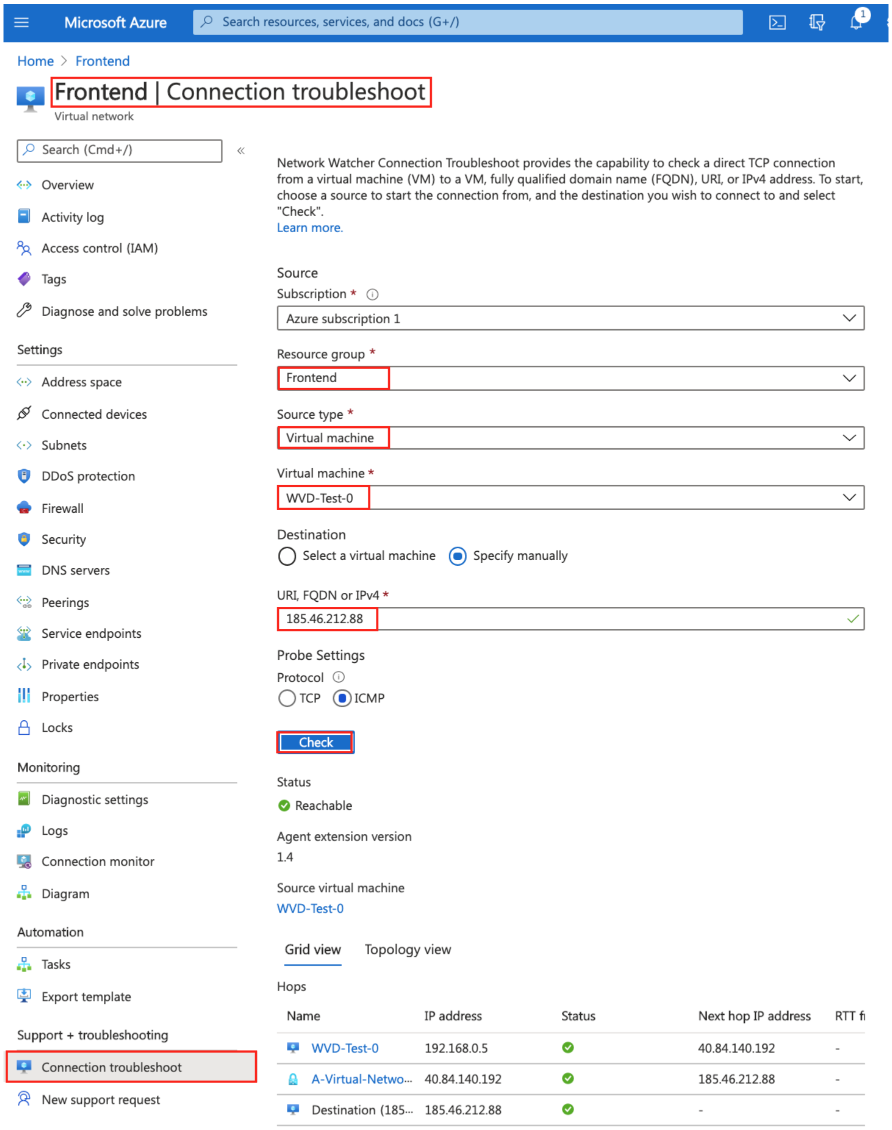
	Name	Troubleshooting status
☑	A-Virtual-Network-Gateway-1	✓ Healthy
☑	A-VPN-for-Dallas	✓ Healthy
☑	A-VPN-for_Denver	Not started

Figure 70. *Troubleshooting a VPN*

To get successful results, the test may need to be run twice. The connection has to be healthy before the gateway shows healthy, but the gateway test has to be run first. Essentially you need to run the test twice for everything to show healthy.

Troubleshooting from the VNET

From the Vnet you can issue an ICMP or TCP query to see if destinations are reachable. By issuing an ICMP probe to a Zscaler global IP, you can validate destinations are reachable from the Vnet.



Frontend | Connection troubleshoot

Virtual network

Network Watcher Connection Troubleshoot provides the capability to check a direct TCP connection from a virtual machine (VM) to a VM, fully qualified domain name (FQDN), URI, or IPv4 address. To start, choose a source to start the connection from, and the destination you wish to connect to and select "Check".
Learn more.

Source

Subscription *: Azure subscription 1

Resource group *: Frontend

Source type *: Virtual machine

Virtual machine *: WVD-Test-0

Destination

○ Select a virtual machine ● Specify manually

URI, FQDN or IPv4 *: 185.46.212.88 ✓

Probe Settings

Protocol: ○ TCP ● ICMP

Status: ✓ Reachable

Agent extension version: 1.4

Source virtual machine: WVD-Test-0

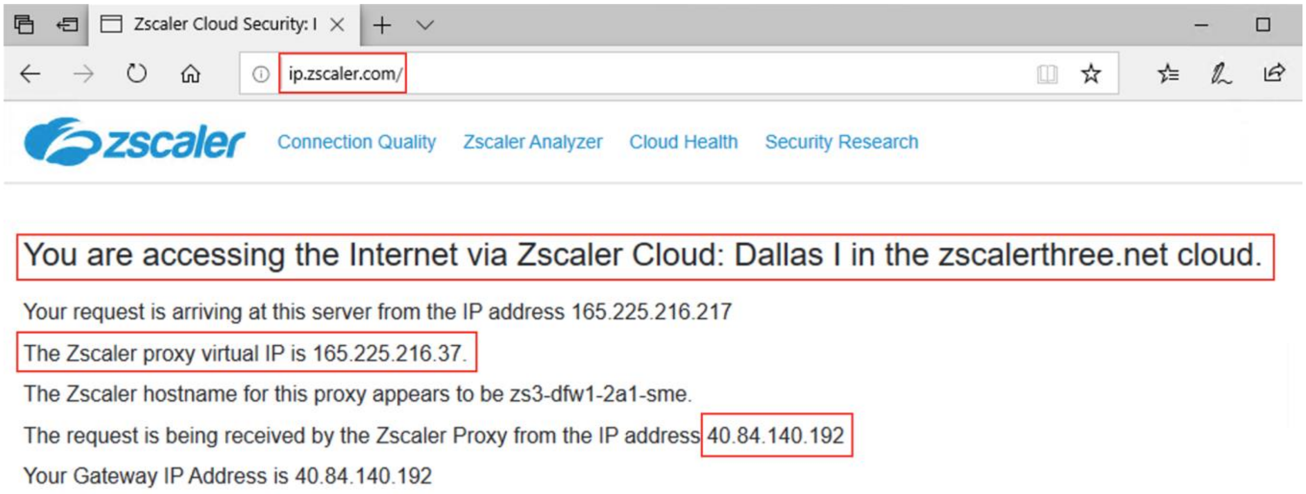
Hops

Name	IP address	Status	Next hop IP address	RTT fi
WVD-Test-0	192.168.0.5	✓	40.84.140.192	-
A-Virtual-Netwo...	40.84.140.192	✓	185.46.212.88	-
Destination (185...	185.46.212.88	✓	-	-

Figure 71. *Sending an ICMP Echo from a VM*

Verify Traffic is going through the Tunnel to Zscaler

The simplest test to see if traffic is flowing through Zscaler is to open a browser and go to ip.zscaler.com. If traffic is flowing through the tunnel through Zscaler, this page tells you traffic is received from a Zscaler location. It also tells you the traffic source public IP address. In this case, traffic is flowing from our public IP Azure in Azure to the Zscaler Dallas facility.



You are accessing the Internet via Zscaler Cloud: Dallas I in the zscalerthree.net cloud.

Your request is arriving at this server from the IP address 165.225.216.217

The Zscaler proxy virtual IP is 165.225.216.37.

The Zscaler hostname for this proxy appears to be zs3-dfw1-2a1-sme.

The request is being received by the Zscaler Proxy from the IP address 40.84.140.192

Your Gateway IP Address is 40.84.140.192

Figure 72. *ip.zscaler.com*

Appendix B: PAC Examples

APP PAC Example:

```
//////////////////////////////////////////////////////////////////////
//////////////////////

//

// Filename: App-Pac for Z-App for WVD Dedicated Machine

// Not for Shared WVD Environments

// Description: The is the Z-App App Pac File for Tunnel 2.0 and the
WVD environment

// Allowing all port to be forwarded to the Zscaler Cloud Firewall

//

//////////////////////////////////////////////////////////////////////
//////////////////////


function FindProxyForURL(url, host) {


var privateIP = /^(0|10|127|192\.168|172\.1[6789]|172\.2[0-
9]|172\.3[01]|169\.254|192\.88\.99)\.[0-9.]+$/;

var resolved_ip = dnsResolve(host);


// Don't send non-FQDN or private IP auths to us

if (isPlainHostName(host) || isInNet(resolved_ip,
"192.0.2.0","255.255.255.0") || privateIP.test(resolved_ip))

return "DIRECT";


// FTP goes directly

if (url.substring(0,4) == "ftp:")

return "DIRECT";


// Updates are directly accessible

if ((localHostOrDomainIs(host, "trust.zscaler.com")) &&
(url.substring(0,5) == "http:" || url.substring(0,6) == "https:"))

return "DIRECT";
```

```
// Example Don't send to Zscaler Internal Domains
//if (
//dnsDomainIs(host, ".name.of.customer.domain.to.bypass1.com") ||
//dnsDomainIs(host, ".name.of.customer.domain.to.bypass2.com"))
//return "DIRECT";

// Example Don't send to Zscaler Customer Internal IP Addresses
//if (
//shExpMatch(host, "8.8.8.*") ||
//shExpMatch(host, "4.4.4.*"))
//return "DIRECT";

// Azure Bypass for Authentication
if (
dnsDomainIs(url, ".microsoftonline.com") ||
dnsDomainIs(url, ".microsoftonline-p.net") ||
dnsDomainIs(url, ".azure.com"))
return "DIRECT";

// Azure and Microsoft Application Bypasses
if (
shExpMatch(url, ".microsoft.com") ||
shExpMatch(url, ".windows.net") ||
shExpMatch(url, ".sharepointonline.com") ||
shExpMatch(url, ".office.com") ||
shExpMatch(url, ".office.net") ||
shExpMatch(url, ".onmicrosoft.com") ||
shExpMatch(url, ".lync.com") ||
shExpMatch(url, ".sfbassets.com") ||
shExpMatch(url, ".trafficmanager.net") ||
shExpMatch(url, ".msecnd.net") ||
shExpMatch(url, ".aspnetcdn.com") ||
shExpMatch(url, ".azure.net") ||
shExpMatch(url, ".secure.skypeassets.com") ||
shExpMatch(url, ".tenor.com") ||
shExpMatch(url, ".microsoftstream.com") ||
shExpMatch(url, ".skype.com") ||
shExpMatch(url, ".live.com") ||
shExpMatch(url, ".skypeforbusiness.com") ||
shExpMatch(url, ".office365.com"))
return "DIRECT";

// Specific to WVD
if (
shExpMatch(url, ".wvd.microsoft.com") ||
shExpMatch(url, ".core.windows.net") ||
shExpMatch(url, "login.windows.net") ||
shExpMatch(url, ".servicebus.windows.net") ||
shExpMatch(url, ".warmpath.msftcloudes.com") ||
shExpMatch(url, ".azureedge.net") ||
shExpMatch(url, ".events.data.microsoft.com") ||
shExpMatch(url, ".msftconnecttest.com") ||
shExpMatch(url, ".microsoftonline.com") ||
shExpMatch(url, ".prod.do.dsp.mp.microsoft.com") ||
shExpMatch(url, ".sfx.ms") ||
shExpMatch(url, ".digicert.com") ||
shExpMatch(url, "aka.ms") ||
shExpMatch(url, ".aka.ms") ||
shExpMatch(url, ".prod.cms.rt.microsoft.com"))
return "DIRECT";
```

```
// Send to Zscaler Cloud

//

return "PROXY ${COUNTRY_GATEWAY_FX}:80; PROXY
${COUNTRY_SECONDARY_GATEWAY_FX}:80; DIRECT";

}
```

Forward PAC:

```
//////////////////////////////////////////////////////////////////////
//////////////////////

//

// Filename: Fwd-Pac for Z-App for WVD Dedicated Machine

// Not for Shared WVD Enviroments

// Description: The is the Z-App FWD Pac File for Tunnel 2.0 and the
WVD environment

// This provide a means for bypasses and must be added to both FWD and
APP Pac.

//

//////////////////////////////////////////////////////////////////////
//////////////////////



function FindProxyForURL(url, host) {


var privateIP = /^(0|10|127|192\.168|172\.1[6789]|172\.2[0-
9]|172\.3[01]|169\.254|192\.88\.99)\.[0-9.]+$/;

var resolved_ip = dnsResolve(host);


// Don't send non-FQDN or private IP auths to us

if (isPlainHostName(host) || isInNet(resolved_ip,
"192.0.2.0","255.255.255.0") || privateIP.test(resolved_ip))

return "PROXY ${ZAPP_TUNNEL2_BYPASS}";


// FTP goes directly
```

```
if (url.substring(0,4) == "ftp:")

return "PROXY ${ZAPP_TUNNEL2_BYPASS}";


// Updates are directly accessible

if ((localHostOrDomainIs(host, "trust.zscaler.com")) &&
(url.substring(0,5) == "http:" || url.substring(0,6) == "https:"))

return "PROXY ${ZAPP_TUNNEL2_BYPASS}";


// Example Don't send to Zscaler Internal Domains

//if (

//dnsDomainIs(host, ".name.of.customer.domain.to.bypass1.com") ||

//dnsDomainIs(host, ".name.of.customer.domain.to.bypass2.com"))

//return "PROXY ${ZAPP_TUNNEL2_BYPASS}";


// Example Don't send to Zscaler Customer Internal IP Addresses

//if (

//shExpMatch(host, "8.8.8.*") ||

//shExpMatch(host, "4.4.4.*"))

// return "PROXY ${ZAPP_TUNNEL2_BYPASS}";


// Azure Bypass for Authentication

if (

dnsDomainIs(url, ".microsoftonline.com") ||

dnsDomainIs(url, ".microsoftonline-p.net") ||

dnsDomainIs(url, ".azure.com"))

return "PROXY ${ZAPP_TUNNEL2_BYPASS}";


// Azure and Microsoft Application Bypasses

shExpMatch(url, ".microsoft.com") ||

shExpMatch(url, ".windows.net") ||

shExpMatch(url, ".sharepointonline.com") ||
shExpMatch(url, ".office.com") ||
shExpMatch(url, ".office.net") ||
shExpMatch(url, ".onmicrosoft.com") ||
shExpMatch(url, ".lync.com") ||
shExpMatch(url, ".sfbassets.com") ||
shExpMatch(url, ".trafficmanager.net") ||
shExpMatch(url, ".msecnd.net") ||
shExpMatch(url, ".aspnetcdn.com") ||
shExpMatch(url, ".azure.net") ||
shExpMatch(url, ".secure.skypeassets.com") ||
shExpMatch(url, ".tenor.com") ||
shExpMatch(url, ".microsoftstream.com") ||
shExpMatch(url, ".skype.com") ||
shExpMatch(url, ".live.com") ||
shExpMatch(url, ".skypeforbusiness.com") ||
shExpMatch(url, ".office365.com"))
return "PROXY ${ZAPP_TUNNEL2_BYPASS}";

// Specific to WVD
if (
shExpMatch(url, ".wvd.microsoft.com") ||
shExpMatch(url, ".core.windows.net") ||
shExpMatch(url, "login.windows.net") ||
shExpMatch(url, ".servicebus.windows.net") ||
shExpMatch(url, ".warmpath.msftcloudes.com") ||
shExpMatch(url, ".azureedge.net") ||
shExpMatch(url, ".events.data.microsoft.com") ||
shExpMatch(url, ".msftconnecttest.com") ||
shExpMatch(url, ".microsoftonline.com") ||
shExpMatch(url, ".prod.do.dsp.mp.microsoft.com") ||
shExpMatch(url, ".sfx.ms") ||
shExpMatch(url, ".digicert.com") ||
shExpMatch(url, "aka.ms") ||
shExpMatch(url, ".aka.ms") ||
shExpMatch(url, ".prod.cms.rt.microsoft.com"))
return "PROXY ${ZAPP_TUNNEL2_BYPASS}";

// Send to Zscaler Cloud
//
return "DIRECT";
}
```

Browser PAC:

```
//////////////////////////////////////////////////////////////////////
//////////////////////
//
// Filename: AzureWVD
// Description: PAC file for use in Azure Windows Virtual Desktop with
// Dedicated Proxy Port 10000. The Dedicated Proxy Port
// requires a Zscaler License and will be a unique port number.
//
//////////////////////////////////////////////////////////////////////
//////////////////////

function FindProxyForURL(url, host) {

var privateIP = /^(0|10|127|192\.168|172\.1[6789]|172\.2[0-
9]|172\.3[01]|169\.254|192\.88\.99)\.[0-9.]+$/;
var resolved_ip = dnsResolve(host);

// Don't send non-FQDN or private IP auths to us
if (isPlainHostName(host) || isInNet(resolved_ip,
"192.0.2.0","255.255.255.0") || privateIP.test(resolved_ip))
```

```
return "DIRECT";

// FTP goes directly
if (url.substring(0,4) == "ftp:")
return "DIRECT";

// Updates are directly accessible
if ((localHostOrDomainIs(host, "trust.zscaler.com")) &&
(url.substring(0,5) == "http:" || url.substring(0,6) == "https:"))
return "DIRECT";

// Example Don't send to Zscaler Internal Domains
//if (
//dnsDomainIs(host, ".name.of.customer.domain.to.bypass1.com") ||
//dnsDomainIs(host, ".name.of.customer.domain.to.bypass2.com"))
//return "DIRECT";

// Example Don't send to Zscaler Customer Internal IP Addresses
//if (
//shExpMatch(host, "8.8.8.*") ||
//shExpMatch(host, "4.4.4.*"))
//return "DIRECT";

// Azure Bypass for Authentication
if (
dnsDomainIs(url, ".microsoftonline.com") ||
dnsDomainIs(url, ".microsoftonline-p.net") ||
dnsDomainIs(url, ".azure.com"))
return "DIRECT";

// Azure and Microsoft Application Bypasses
```

```
if (
shExpMatch(url, ".microsoft.com")  ||
shExpMatch(url, ".windows.net")  ||
shExpMatch(url, ".sharepointonline.com")  ||
shExpMatch(url, ".office.com")  ||
shExpMatch(url, ".office.net")  ||
shExpMatch(url, ".onmicrosoft.com")  ||
shExpMatch(url, ".lync.com")  ||
shExpMatch(url, ".sfbassets.com")  ||
shExpMatch(url, ".trafficmanager.net")  ||
shExpMatch(url, ".msecnd.net")  ||
shExpMatch(url, ".aspnetcdn.com")  ||
shExpMatch(url, ".azure.net")  ||
shExpMatch(url, ".secure.skypeassets.com")  ||
shExpMatch(url, ".tenor.com")  ||
shExpMatch(url, ".microsoftstream.com")  ||
shExpMatch(url, ".skype.com")  ||
shExpMatch(url, ".live.com")  ||
shExpMatch(url, ".skypeforbusiness.com")  ||
shExpMatch(url, ".office365.com"))
return "DIRECT";

// Specific to WVD
if (
shExpMatch(url, ".wvd.microsoft.com")  ||
shExpMatch(url, ".core.windows.net")  ||
shExpMatch(url, "login.windows.net")  ||
shExpMatch(url, ".servicebus.windows.net")  ||
shExpMatch(url, ".warmpath.msftcloudes.com")  ||
shExpMatch(url, ".azureedge.net")  ||
shExpMatch(url, ".events.data.microsoft.com") ||

shExpMatch(url, ".msftconnecttest.com") ||

shExpMatch(url, ".microsoftonline.com") ||

shExpMatch(url, ".prod.do.dsp.mp.microsoft.com") ||

shExpMatch(url, ".sfx.ms") ||

shExpMatch(url, ".digicert.com") ||

shExpMatch(url, "aka.ms") ||

shExpMatch(url, ".aka.ms") ||

shExpMatch(url, ".prod.cms.rt.microsoft.com"))

return "DIRECT";


//

// Send to Zscaler Proxy

//

return "PROXY ${COUNTRY_GATEWAY_FX}:10000; PROXY
${COUNTRY_SECONDARY_GATEWAY_FX}:10000; DIRECT";

}
```

Appendix C: Requesting Zscaler Support

Gather Support Information

You might need Zscaler support for provisioning certain services, or to help troubleshoot configuration and service issues. Zscaler support is available 24/7 hours a day, year-round.

To contact Zscaler support, select **Administration** > **Settings** > and then click **Company profile**.

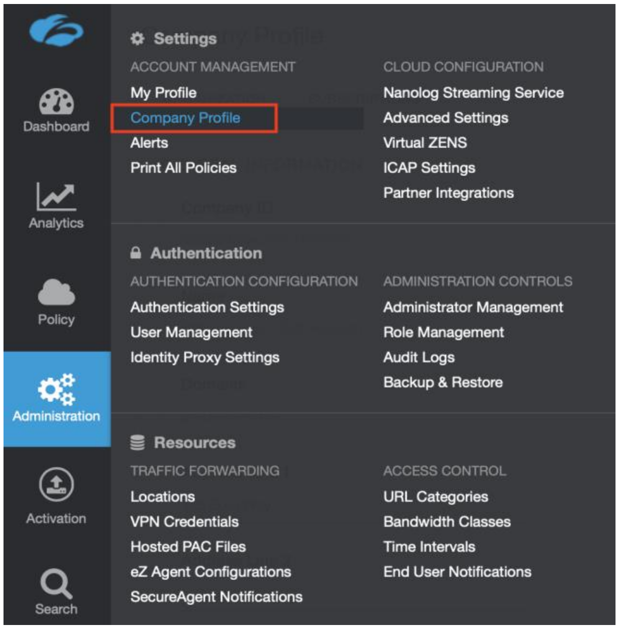
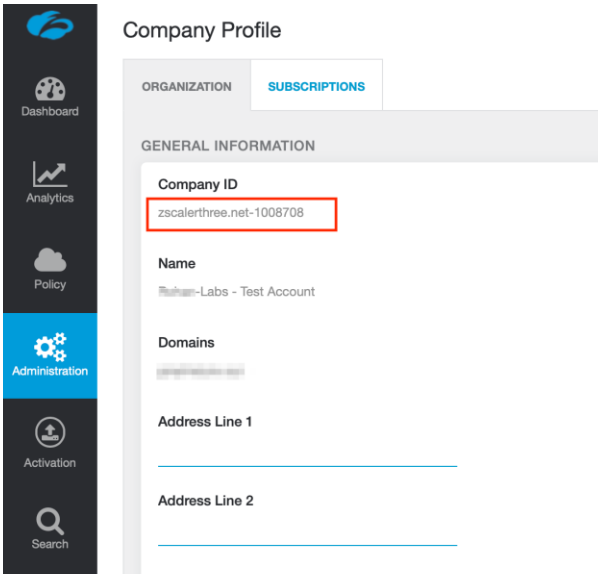


Figure 73. *Collecting details to open support case with Zscaler TAC*

Save Company ID

Copy your Company ID.



Company Profile

GENERAL INFORMATION

Company ID
zscalerthree.net-1008708

Name
[redacted]-Labs - Test Account

Domains
[redacted]

Address Line 1

Address Line 2

Figure 74. *Company ID*

Enter Support Section

With your company ID information, you can open a support ticket. Navigate to **Dashboard** > **Support** > **Submit a Ticket**.

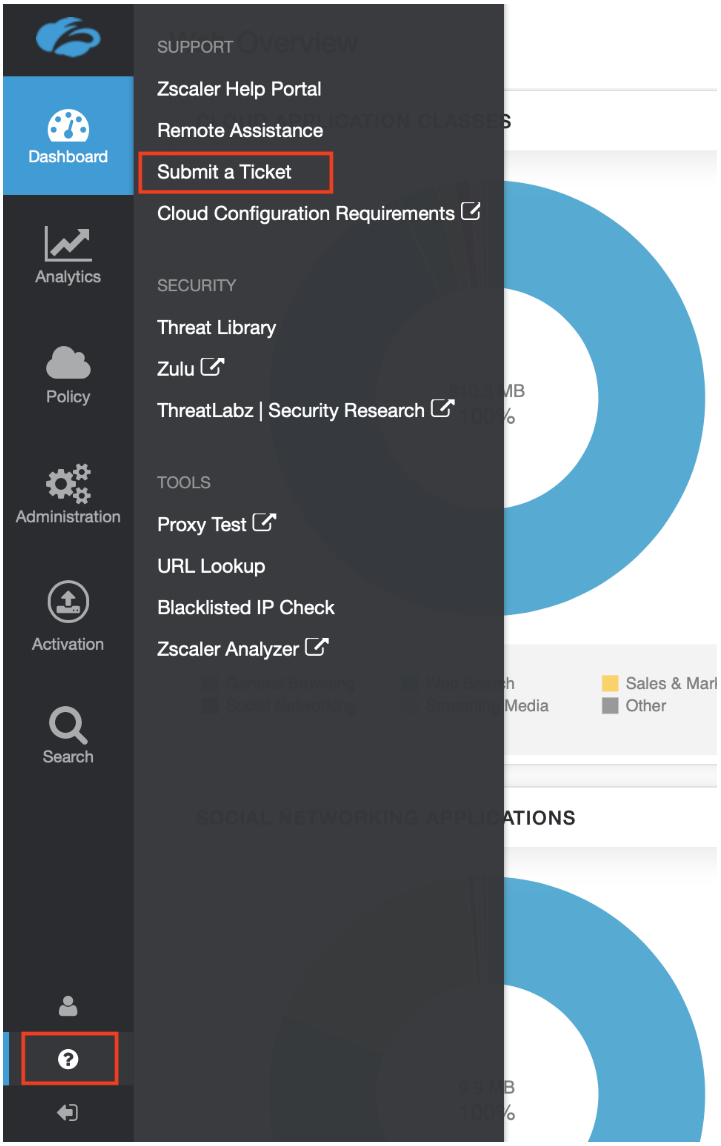


Figure 75. *Submit a ticket*