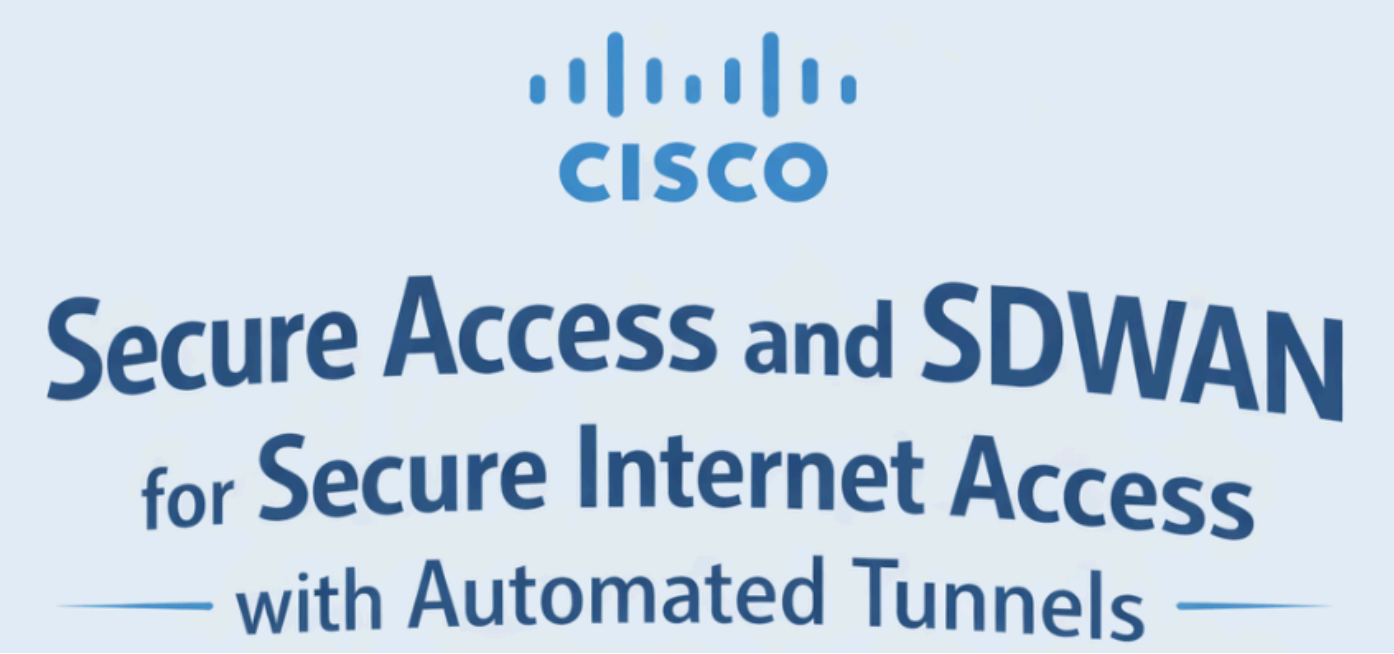
Configure Secure Access with SD-WAN Automated Tunnels for Secure Internet Access

Contents

Introduction

This document describes how to configure Secure Access with SD-WAN Automated Tunnels for Secure Internet Access.



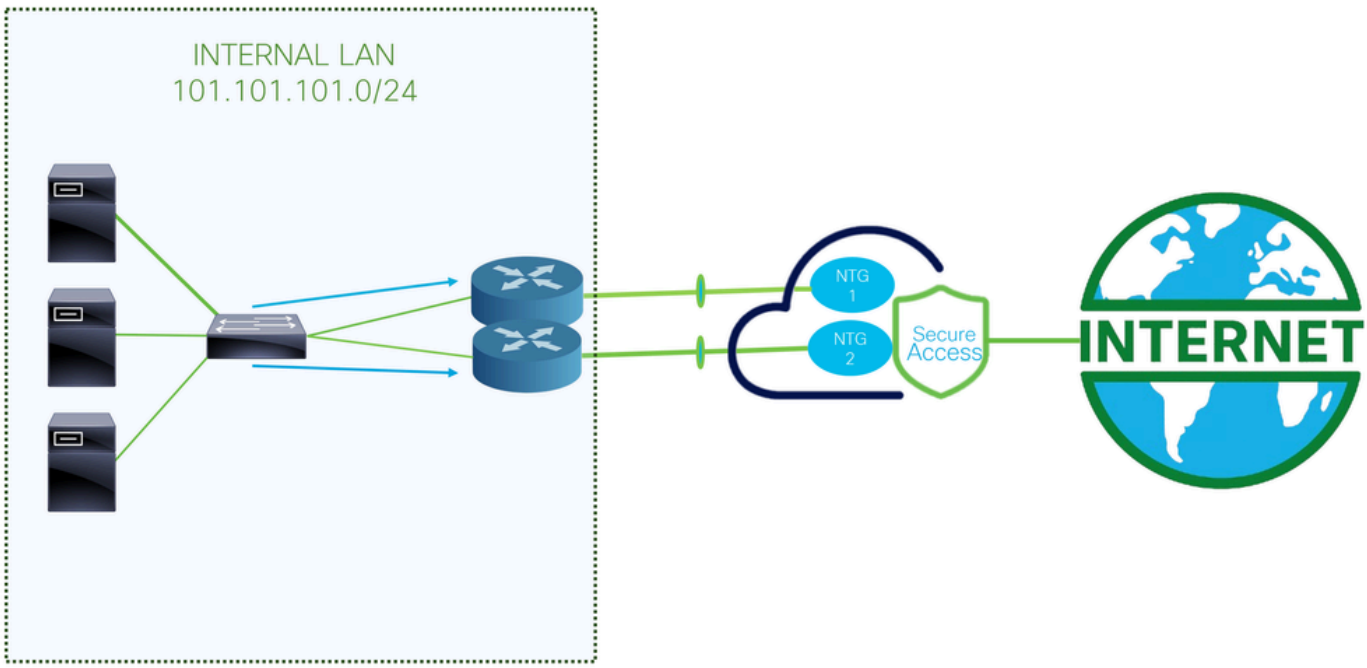
Background Information

As organizations increasingly adopt cloud-based applications and support distributed workforces, network architectures must evolve to provide secure, reliable, and scalable access to resources. Secure Access Service Edge (SASE) is a framework that converges networking and security into a single cloud-delivered service, combining SD-WAN capabilities with advanced security functions such as Secure Web Gateway (SWG), Cloud Access Security Broker (CASB), DNS-layer security, Zero Trust Network Access (ZTNA) or integrated VPN for secure remote access.

Integrating Cisco Secure Access with SD-WAN through automated tunnels enables organizations to route internet traffic securely and efficiently. SD-WAN provides intelligent path selection and optimized connectivity across distributed locations, while Cisco Secure Access ensures that all traffic is inspected and protected according to corporate security policies before reaching the internet.

By automating tunnel configuration between SD-WAN devices and Secure Access, organizations can simplify deployment, improve scalability, and ensure consistent security enforcement for users-no matter where they are located. This integration is a key component of a modern SASE architecture, enabling secure internet access for branch offices, remote sites, and mobile users.

Network Diagram



This is the architecture used for this configuration example. As you can see, there are two edge routers:

If you choose to deploy the policies to two different devices, an NTG is configured for each router, and NAT is enabled on the Secure Access side. This allows both routers to send traffic from the same source through the tunnels. Normally, this is not permitted; however, enabling the NAT option for these tunnels allows two edge routers to send traffic originating from the same source address.

Prerequisites

Requirements

- Secure Access Knowledge
- Cisco Catalyst SD-WAN Manager Release 20.15.1 and Cisco IOS XE Catalyst SD-WAN Release 17.15.1 or later
- Intermediate knowledge of routing and switching
- ECMP Knowledge
- VPN Knowledge

Components Used

- Secure Access Tenant
- Catalyst SD-WAN Manager Release 20.18.1 and Cisco IOS XE Catalyst SD-WAN Release 17.18.1
- Catalyst SD-WAN Manager

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Configure

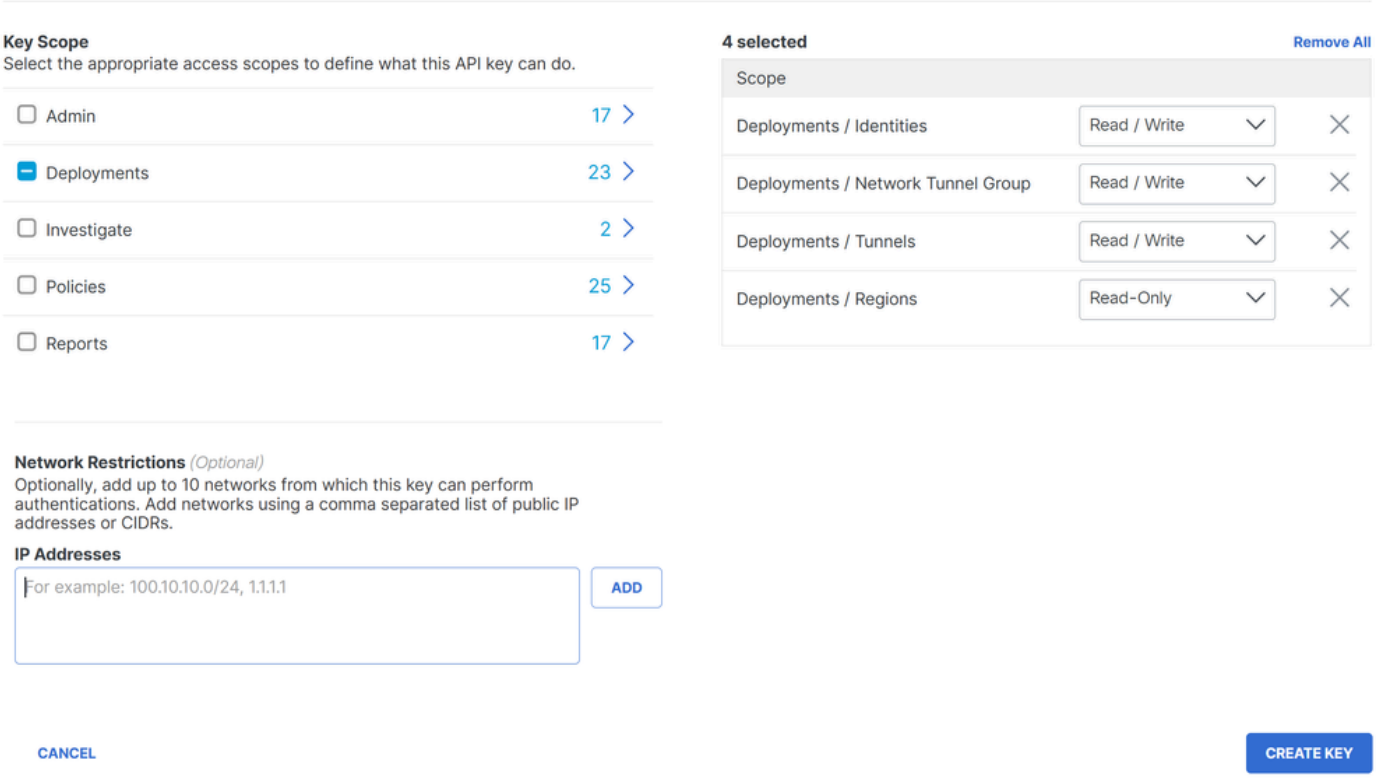
Secure Access Configuration

API Creation

In order to create the automated tunnels with Secure Access check the next steps:

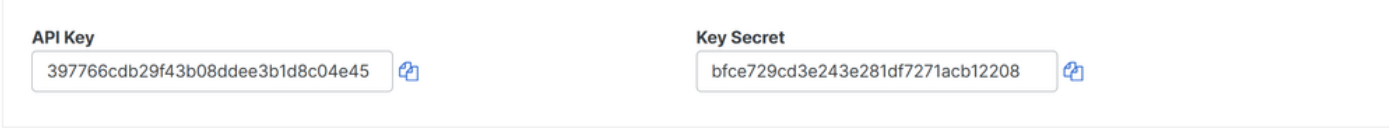
Navigate to [Secure Access Dashboard].

- Click on Admin > API Keys
- Click on Add
- Choose the next options:
  - Deployments / Network Tunnel Group: Read/Writte
  - Deployments / Tunnels: Read/Writte
  - Deployments / Regions: Read-Only
  - Deployments / Identities: Read-Writte
  - Expiry Date: Never Expire



Note: Optionally, add up to 10 networks from which this key can perform authentications. Add networks using a comma separated list of public IP addresses or CIDRs.

- Click CREATE KEY to finalize the creation of the API Key and Key Secret.



Caution: Copy them before you click ACCEPT AND CLOSE; otherwise, you need to create them again and delete the ones that were not copied.

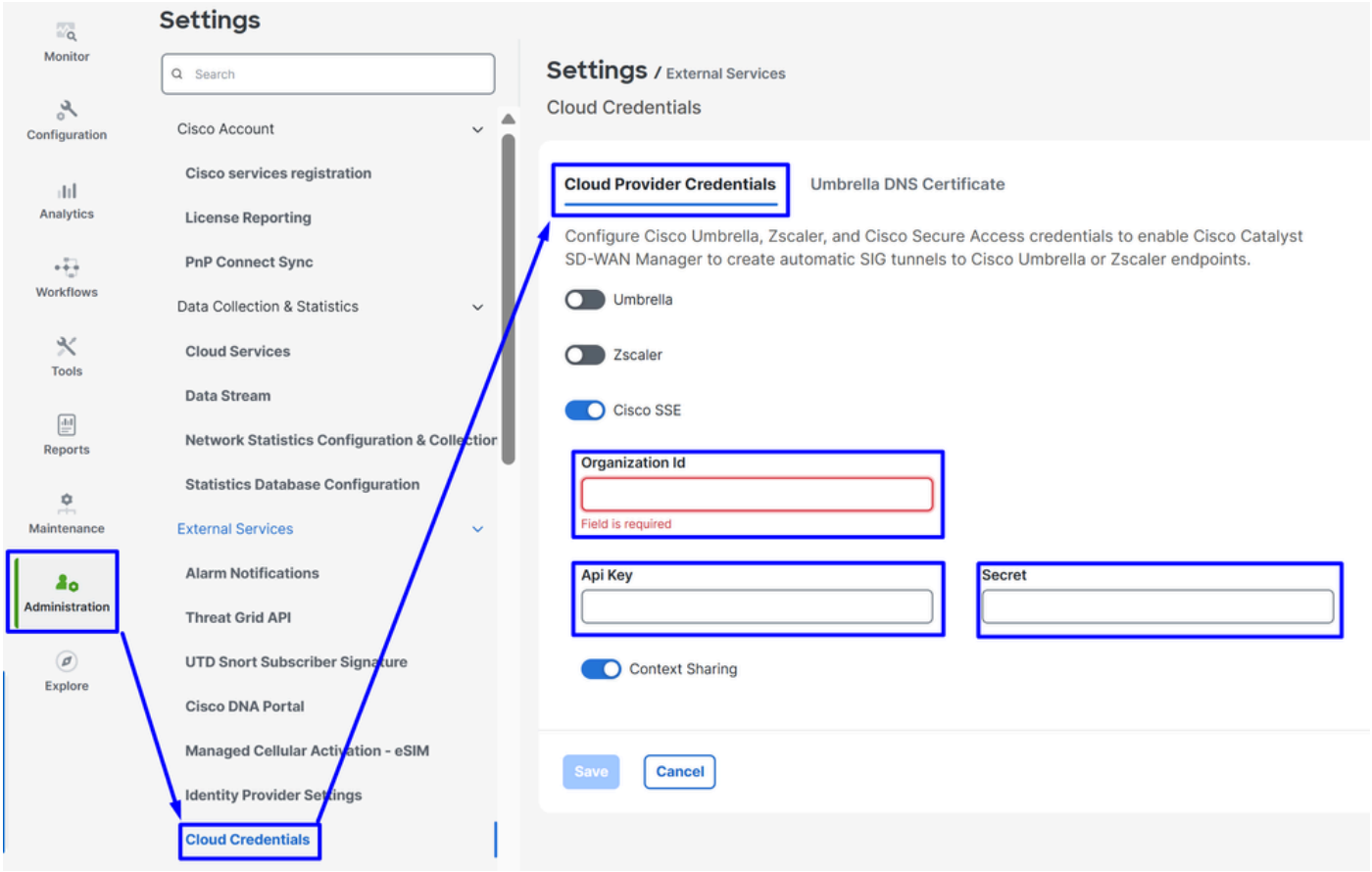
Then to finalize click ACCEPT AND CLOSE.

SD-WAN Configuration

API Integration

Navigate to Catalyst SD-WAN Manager:

- Click on **Administration** >Settings > Cloud Credentials
- Then click on Cloud Provider Credentials and enable Cisco SSEand fill the API and Organtiazation Settings



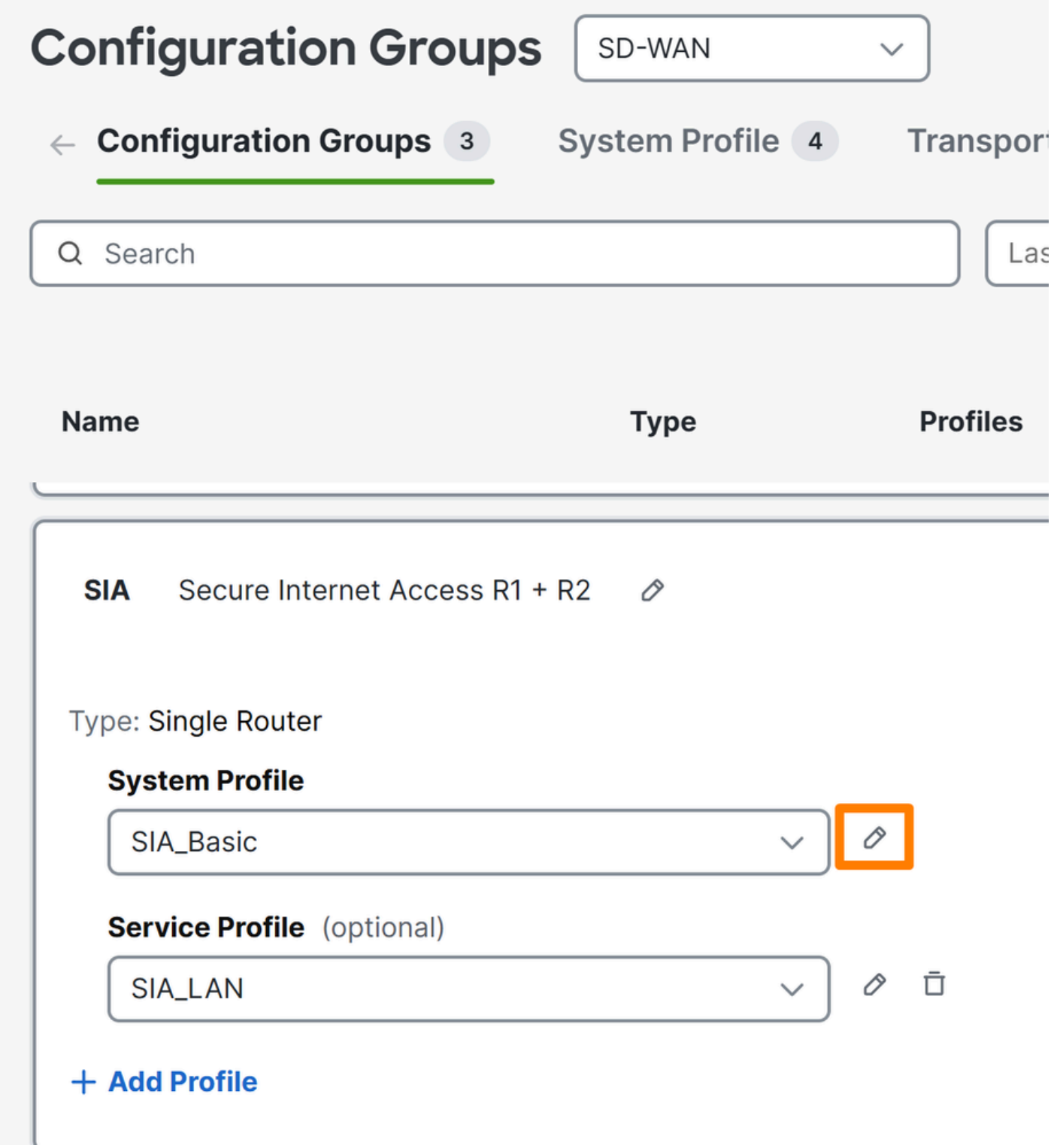
- Organization ID: You can take that from the URL of you SSE Dashboard https://dashboard.sse.cisco.com/org/xxxxx
- Api Key: Copy it from the step Secure Access Configuration
- Secret: Copy it from the step Secure Access Configuration

Then after that click on the Save button.

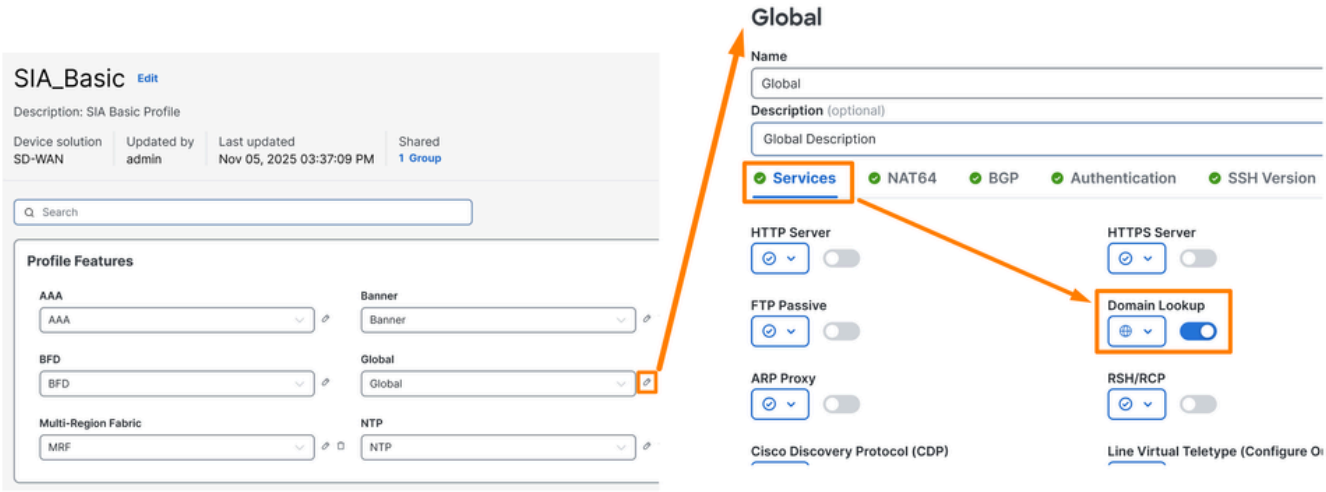
Note: Before you proceed with the next steps, you need to be sure that the SD-WAN Manager and the Catalyst SD-WAN Edges have DNS resolution and internet access.

To check if the DNS-Lookup is enabled please navigate to:

- Click on ***Configuration*** > ***Configuration Groups***
- Click on the profile of your Edge Devices and edit the ***System Profile***



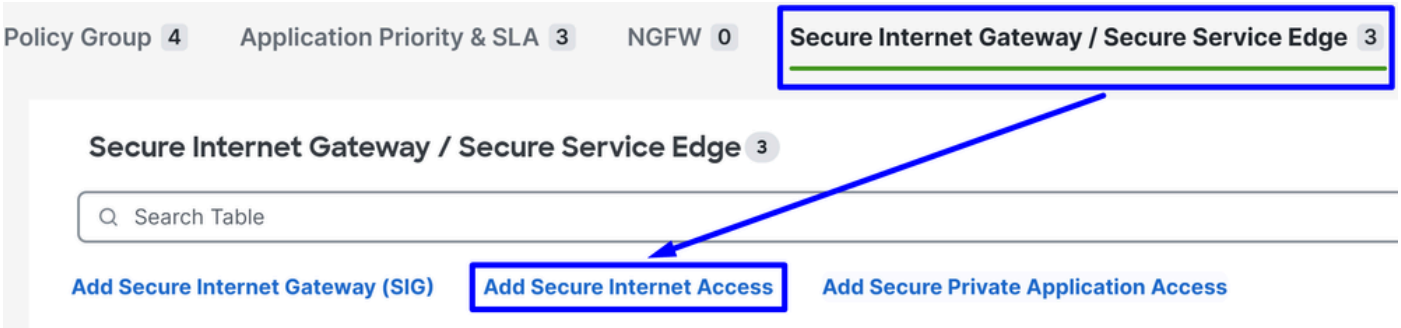
- Then Edit the ***Global*** option and be sure the option ***Domain Resolution*** is enabled



Configure Policy Group

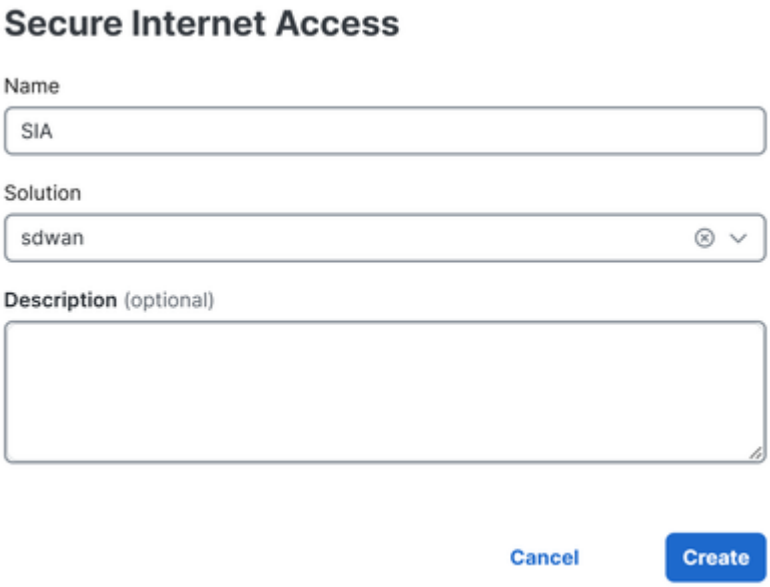
Navigate to ***Configuration > Policy Groups***:

- Click on Secure Internet Gateway / Secure Service Edge > *Add Secure Internet Access*

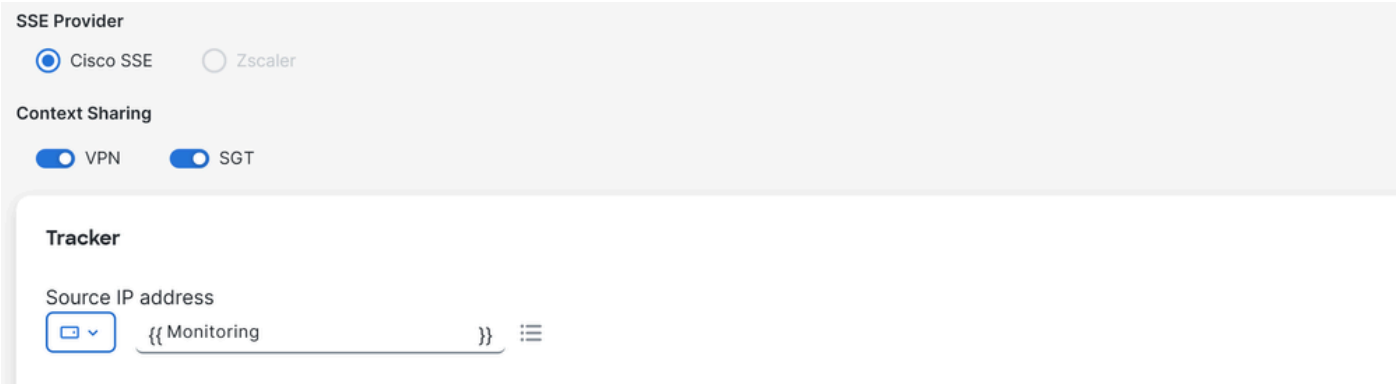


Note: In releases lower than 20.18 this option is called Add Secure Service Edge (SSE)

- Configure a name, solution and click on Create

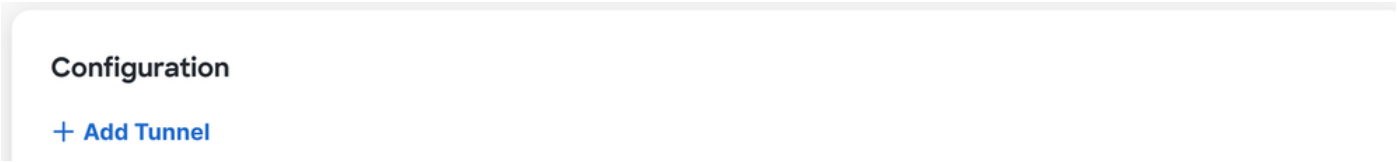


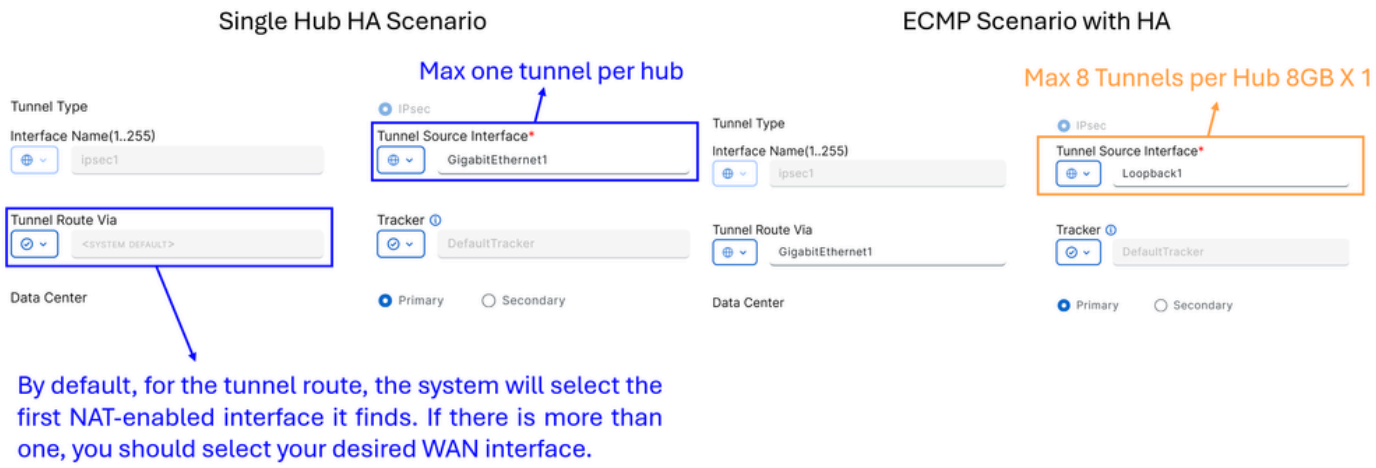
The next configurations allow you to create the tunnels after you deploy the configuration in your Catalyst SD-WAN Edges:



- SSE Provider: SSE
- Context Sharing: Choose VPN or/and SGT depends of your needs
- Tracker
    - **Source IP Address**: Choose Device Specific (This permit you to modify it per device and identify the use case for it in the deployment stage)

Under the Configuration step you set up the tunnels:





- **Single Hub HA Scenario**: In this scenario, you can configure high availability using one NTG as active and another as passive, with a maximum throughput of 1Gbps per NTG
- ECMP Scenario with HA: In this scenario, you can configure up to 8 tunnels per hub, supporting a total of up to 16 tunnels per NTG. This setup allows for higher throughput across the tunnels

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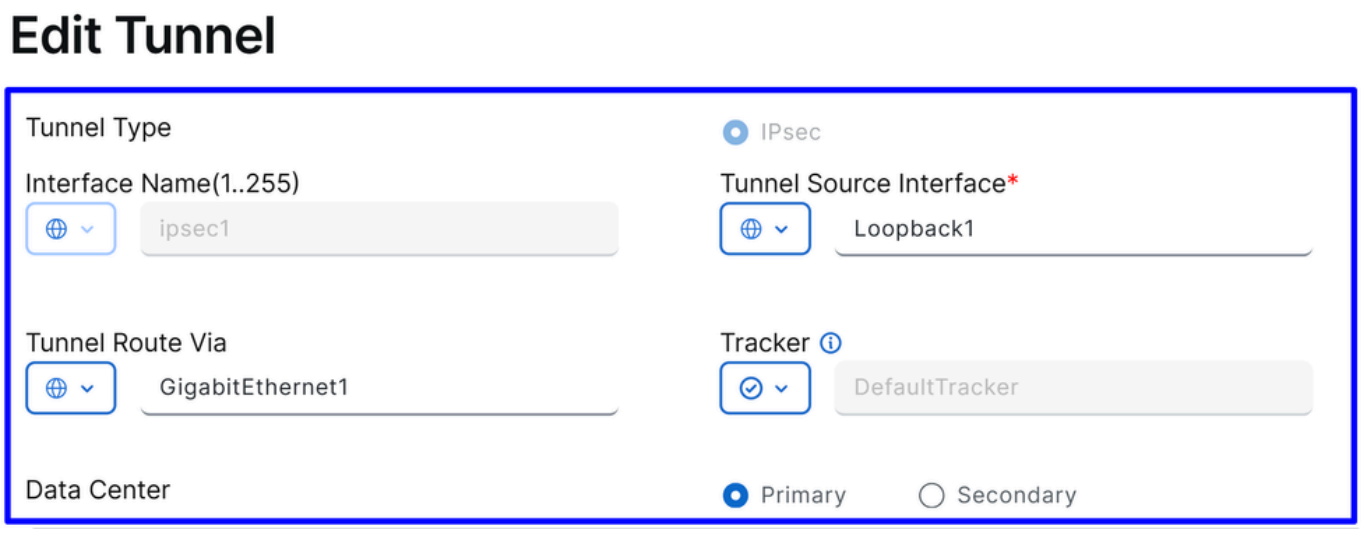
Note: If your network interfaces have a throughput greater than 1Gbps and you require scalability, you must use loopback interfaces. Otherwise, you can use standard interfaces on your device. This is to enable ECMP from Secure Access side.

Warning: If you want to configure loopback interfaces for an ECMP scenario, you must first set up the loopback interfaces in Configuration Groups > Transport & Management Profile, under the policy that you use in your router.

- Click onAdd Tunnel

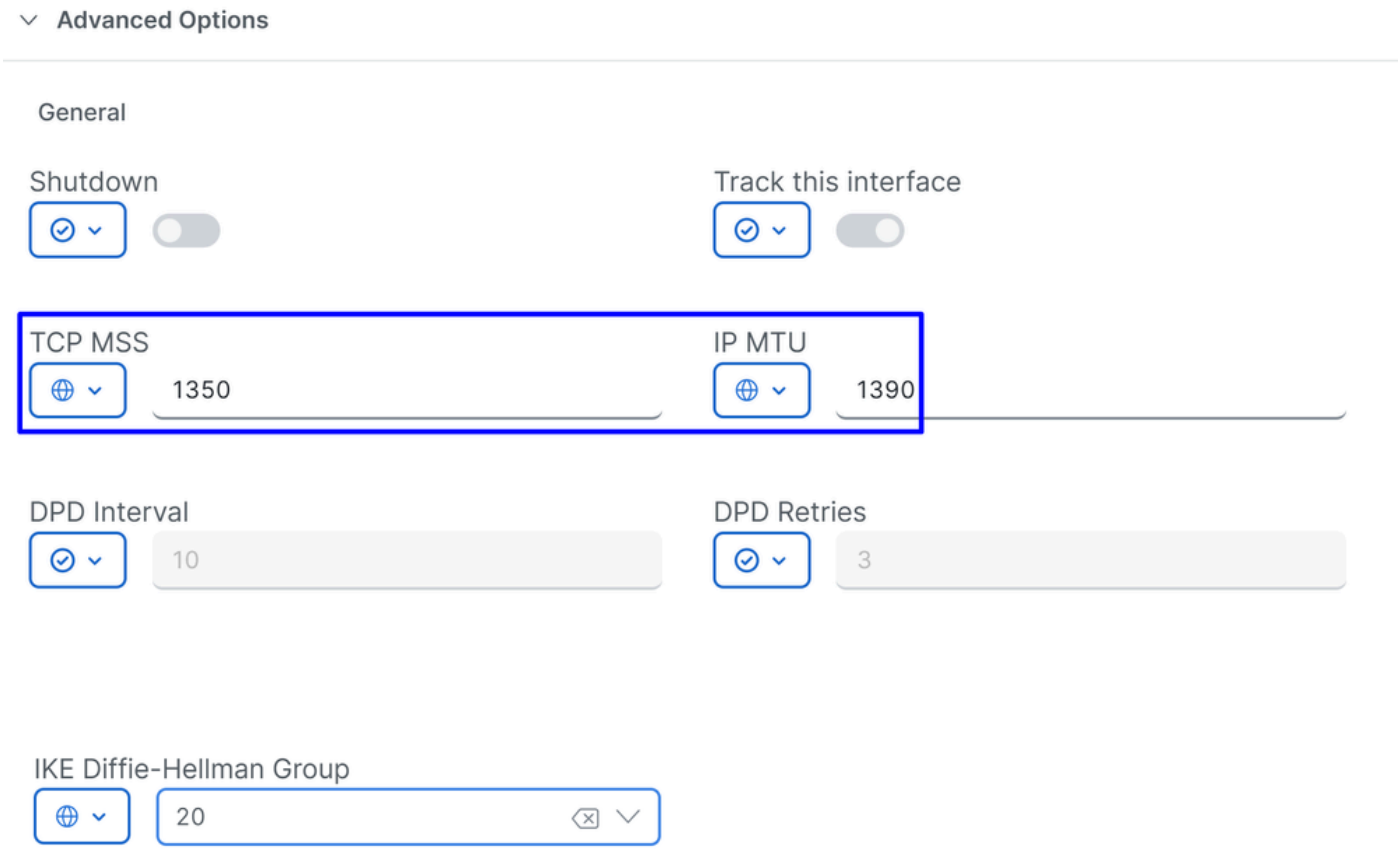


- Interface Name: ipsec1, ipsec2, ipsec3 and so on
- Tunnel Source

Interface: Choose Loopback Interfaces or specific one from where you stablish the tunnel

- **Tunnel Route Via**: If you choose Loopback, you need to select the physical interface from which you want to route the traffic. If you do not select Loopback, this option appeared grayed out, and use the first NAT enabled interface the system founds. If there is more than one, you must select your desired WAN interface
- **Data Center**: This means to which Hub in Secure Access you stablish the connection

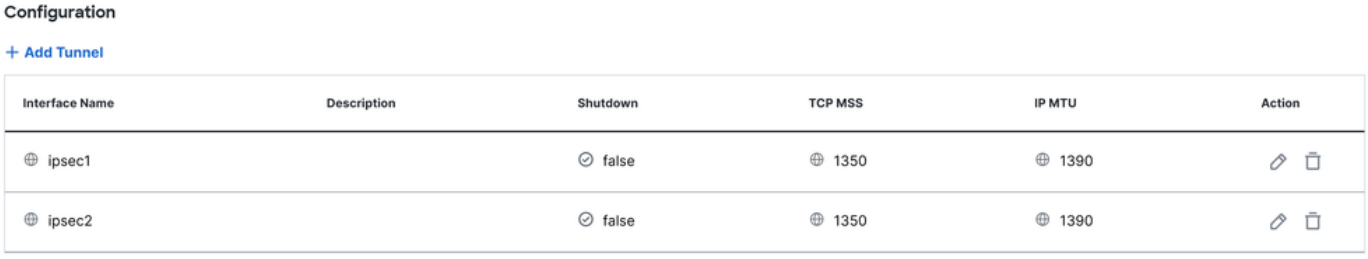
The next part of the tunnel configuration you configure the tunnels with the best practices provided by Cisco.



- TCP MSS: 1350
- IP MTU: 1390
- IKE Diffie-Hellman Group: 20

After that you must configure the Secondary Tunnel pointing to the Secondary Datacenter.

SINGLE HUB HA SCENARIO



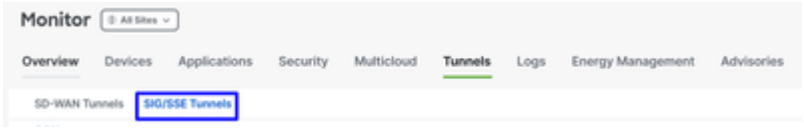
This is the final result when you use the normal scenario deployment.

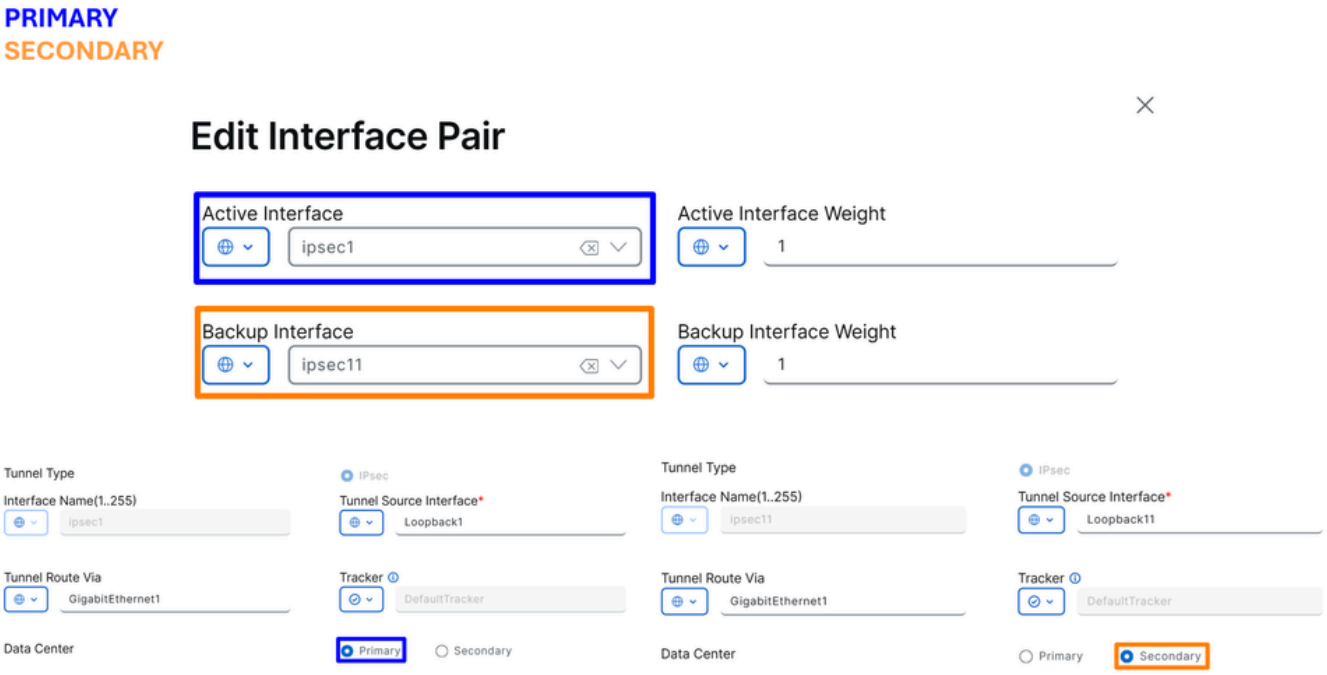
ECMP SCENARIO WITH HA

Interface Name	Description	Shutdown	TCP MSS	IP MTU
ipsec1		false	1350	1390
ipsec2		false	1350	1390
ipsec3	PRIMARY HUB	false	1350	1390
ipsec4		false	1350	1390
ipsec5		false	1350	1390
ipsec11		false	1350	1390
ipsec12		false	1350	1390
ipsec13	SECONDARY HUB	false	1350	1390
ipsec14		false	1350	1390
ipsec15		false	1350	1390

Then, you need to configure High Availability in the Secure Internet Policy.

Click on Add Interface Pair:



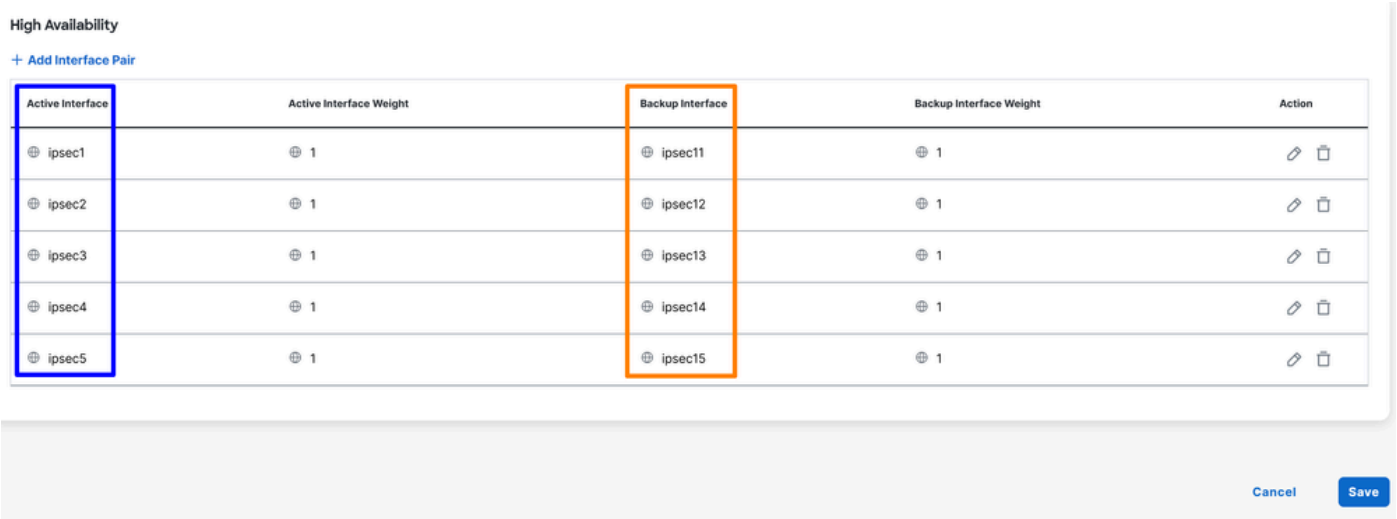


In this step, you need to configure the primary and secondary tunnel for each tunnel pair you are setting up. This means that each tunnel have its own backup. Remember, these tunnels were created as Primary and Secondary for this exact purpose.
"Active interface" refers to the Primary tunnel, while "Backup interface" refers to the Secondary tunnel:

- Active Interface: Primary
- Backup Interface: Secondary

Warning: If this step is skipped, the tunnels do not come up, and no connection is established from the routers to Secure Access.

After High Availability is configured for the tunnels, the setup is displayed as shown in the image below. In the lab example used for this guide, five tunnels are shown in HA. The number of tunnels can be adjusted as needed.



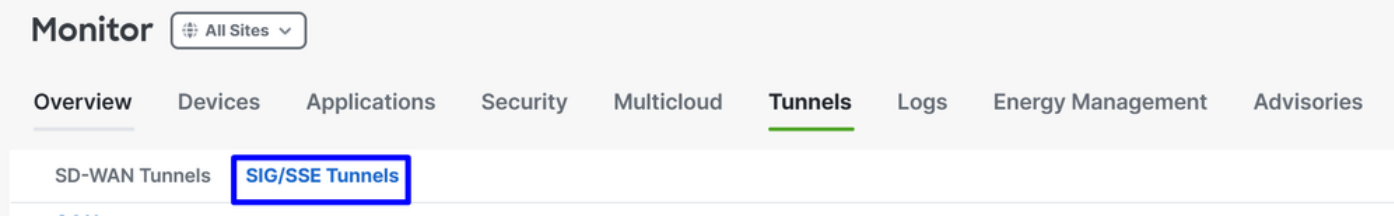
Note: A maximum of 8 tunnel pairs (16 tunnels: 8 primary and 8 secondary) can be configured in SD-WAN Catalyst vManage. Cisco Secure Access supports up to 10 tunnel pairs.

- Click Save

After this point, if everything is correctly configured, the tunnels appear as UP in the SD-WAN Manager and Secure Access.

To verify in SD-WAN, check he next steps:

- Click on Monitor > Tunnels
- Then Click onSIG/SSE Tunnels

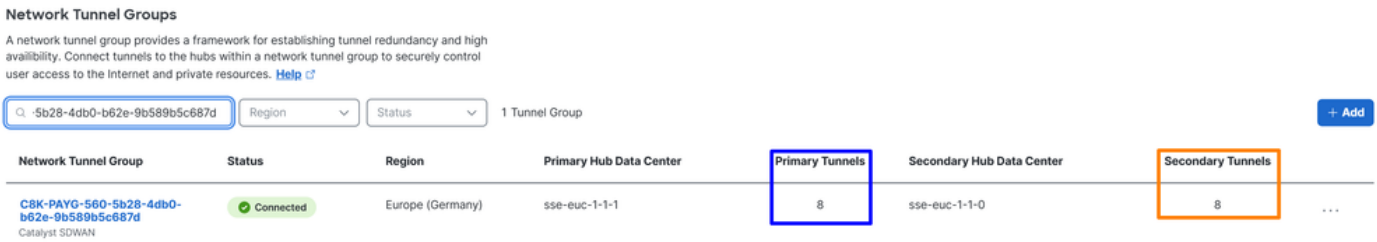


And you are able to see the tunnels stablished to Cisco Secure Access UP or not.

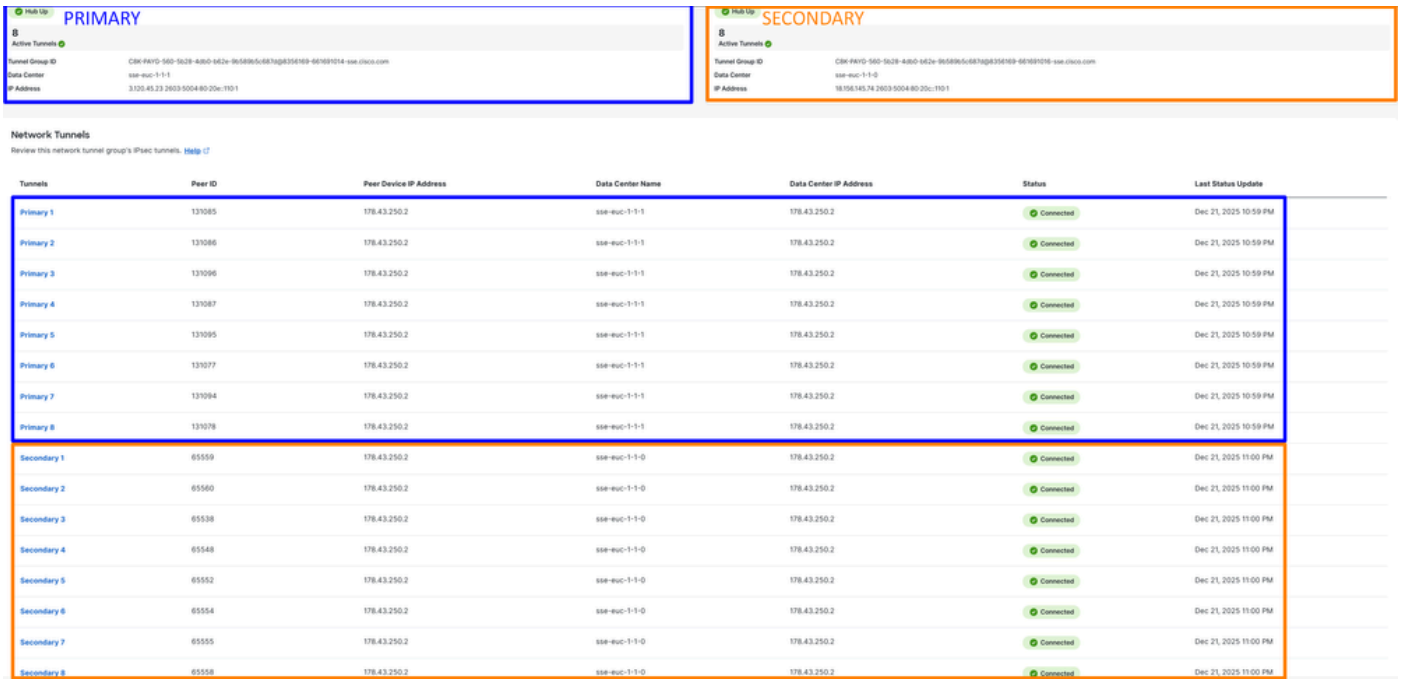
Network Tunnel Group	Tunnel Name	Host Name	Site Name	Tunnel Group ID	Transport Type	Tunnel Type	HA Pair	Provider	Destination Data Center	Tunnel Status(Local)	Tunnel Status(Remote)
		R101-1	SITE_101								
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000001	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000002	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000003	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000004	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000005	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000006	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000007	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000008	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	active	Cisco Secure Access	3.120.45.23	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000011	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000012	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000013	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000014	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000015	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000016	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000017	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up
C8K-PAYG-560-5b28-4db0-b62e-9b589b5c687d	Tunnel16000018	R101-1	SITE_101	661691015	IPSEC	SSE-Public access	backup	Cisco Secure Access	18.156.145.74	Up	Up

To verify in Secure Access, check the next steps:

- Click on Connect > Network Connections



In a detailed view, click the name of the tunnel:



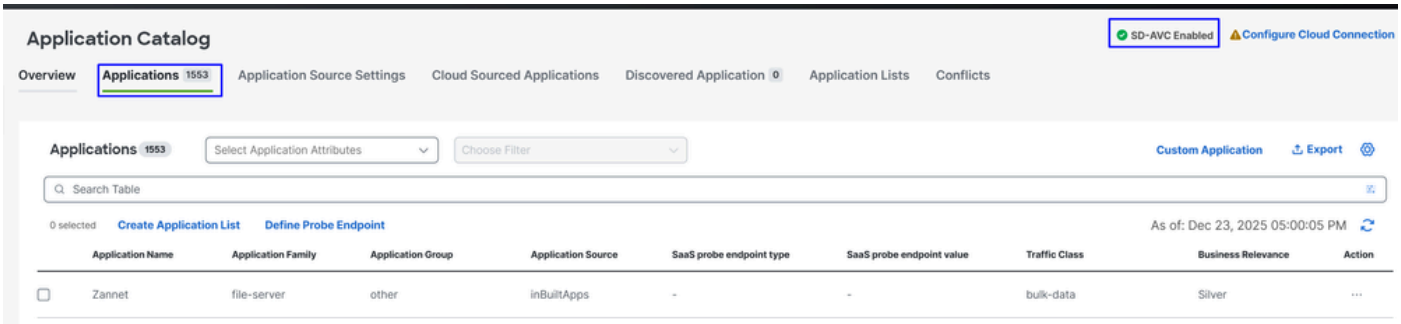
Afther this, you can move to the step, Create your Custom Bypass FQDN or APP in SD-WAN

Create your Custom Bypass FQDN or APP in SD-WAN (OPTIONAL)

There are special use cases where you need to create Application Bypass and **FQDN** or **IP** that you can apply to your routing policies:

Navigate to SD-WAN Manager portal:

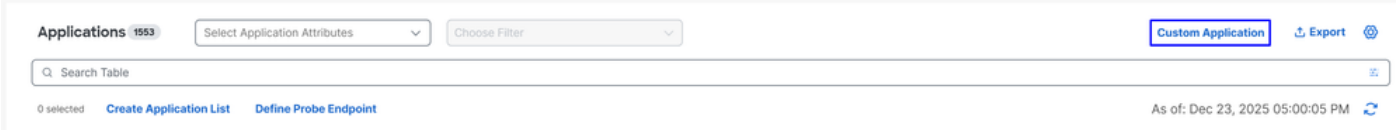
- Click on Configuration > Application Catalog > Applications



Tip: If running a version lower than 20.15, custom applications can be created under Policy Lists

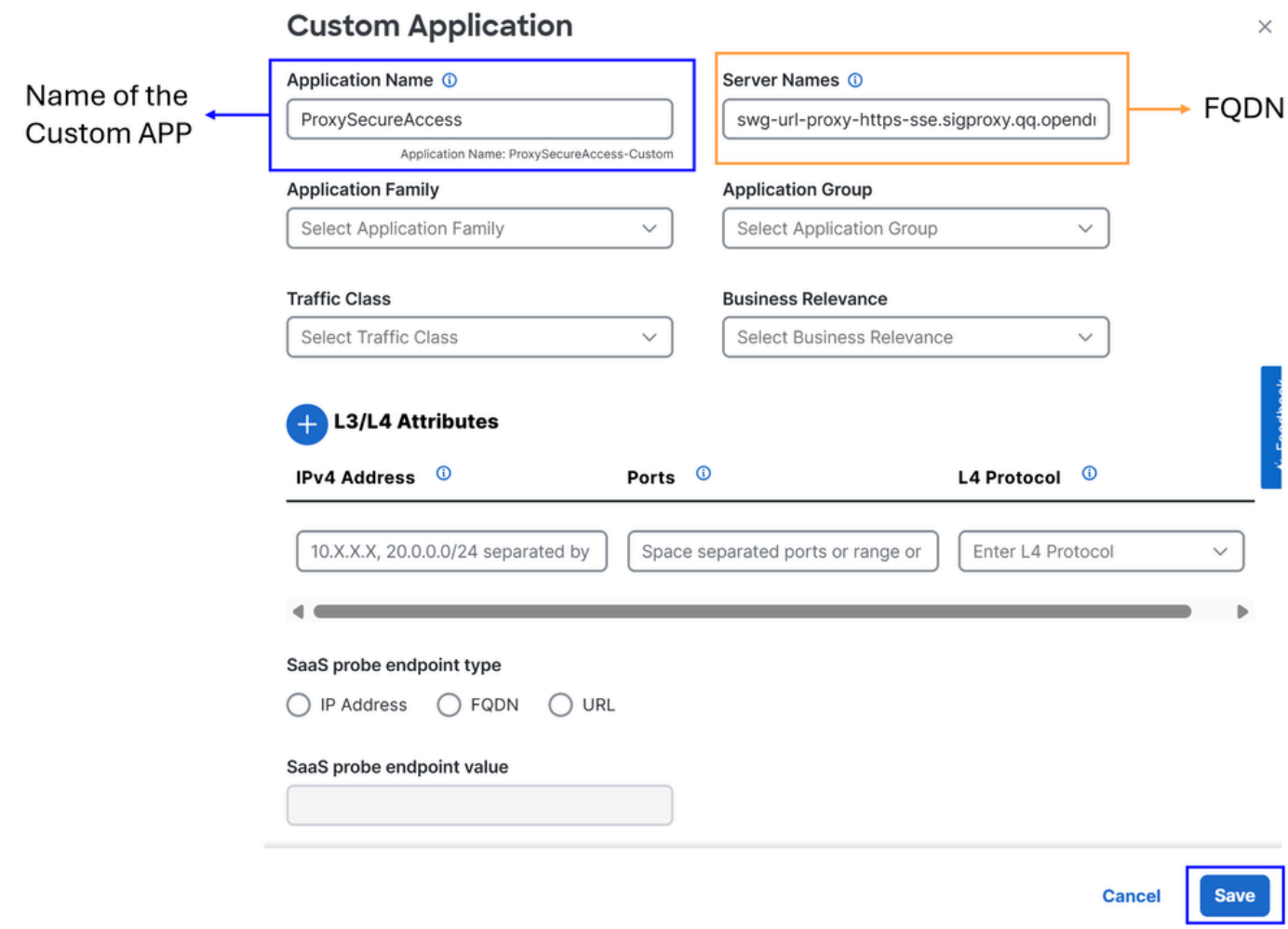
Note: In order to have access to the Application Catalog you must enable SD-AVC.

- Click on Custom Application



At this stage, a basic exclusion is configured using the Secure Client – Umbrella Module SWG FQDN:

ProxySecureAccess

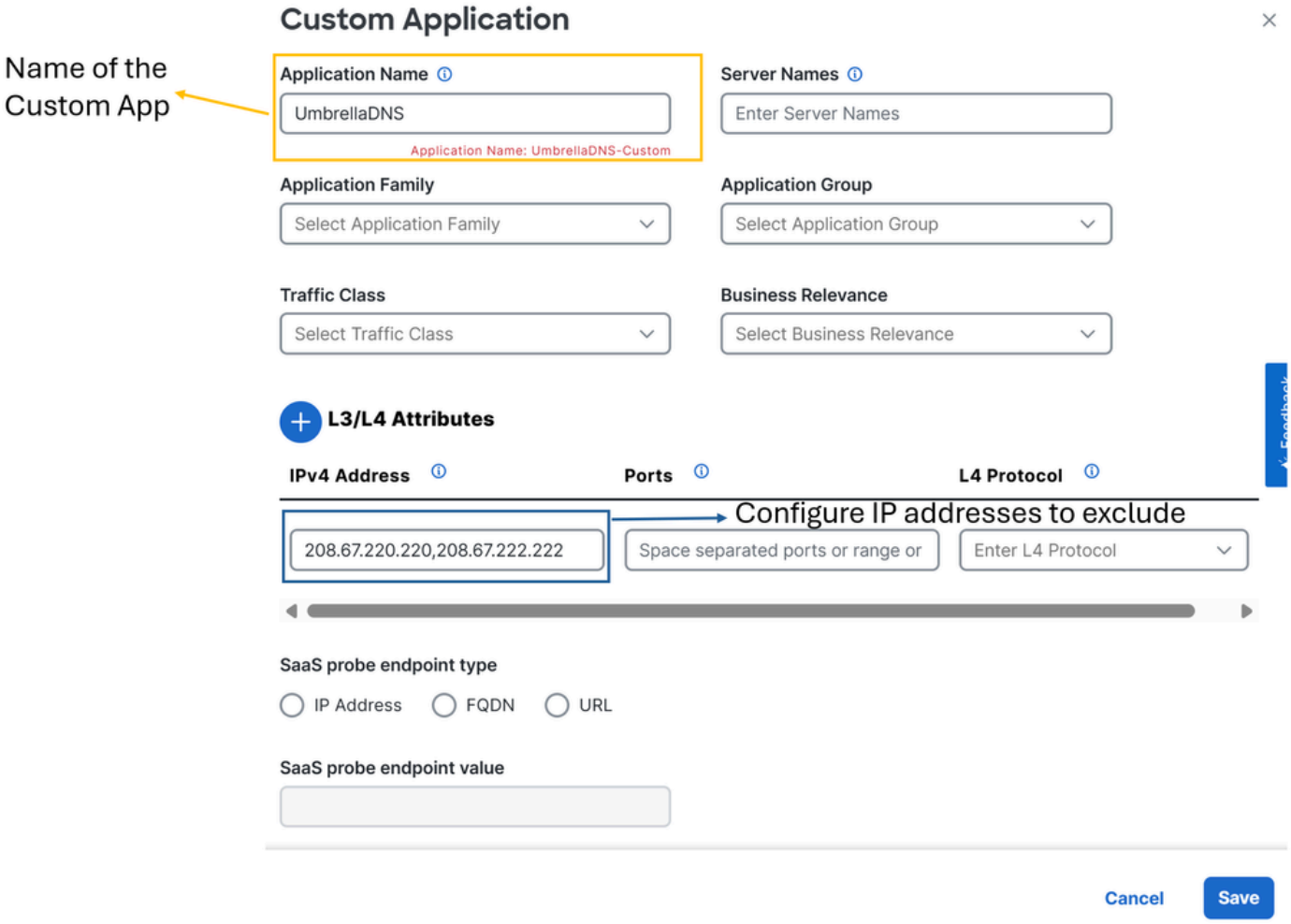


- Server Name: Use the FQDN that you would like to bypass (In this example FQDN of SWG are configured)
  - swg-url-proxy-https-sse.sigproxy.qq.opendns.com
  - swg-url-proxy-https-ORGID.sseproxy.qq.opendns.com
- Click on Save

Note: Change ORGID with your SSE organization number.

Next, a basic exclusion is created; in this case, the Umbrella DNS servers:

UmbrellaDNS



Now you can proceed with the configurations of the routing policies.

Routing your Traffic

In this step, you need to route internet traffic through the tunnels to protect it via Cisco Secure Access. In this case, you use a flexible routing policy that allows us to bypass certain traffic-helping to prevent sending unwanted traffic through Secure Access or to avoid potential bad practices.
First, let it define the two routing methods that can be used:

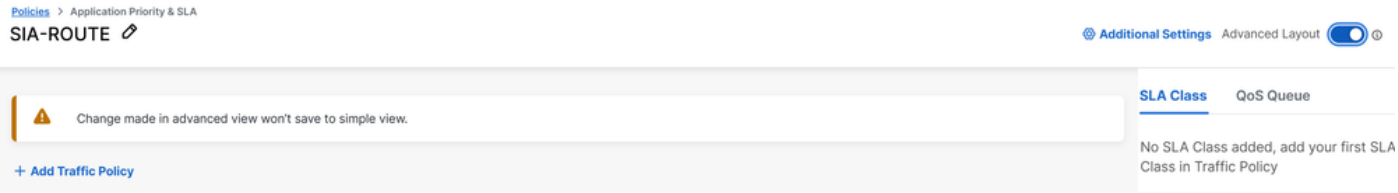
- Configuration > Configuration Groups > Service Profile > Service Route: This method provides routing to Secure Access, but lacks flexibility.
- **Configuration** > Policy Groups > Application Priority & SLA: This method offers various routing options within SD-WAN and, most importantly, allows you to bypass specific traffic so it is not sent through Secure Access.

For flexibility and alignment with best practices, this configuration is used, Application Priority & SLA:

- Click on **Configuration** > Policy Groups > Application Priority & SLA
- Then click on Application Priority & SLA Policy

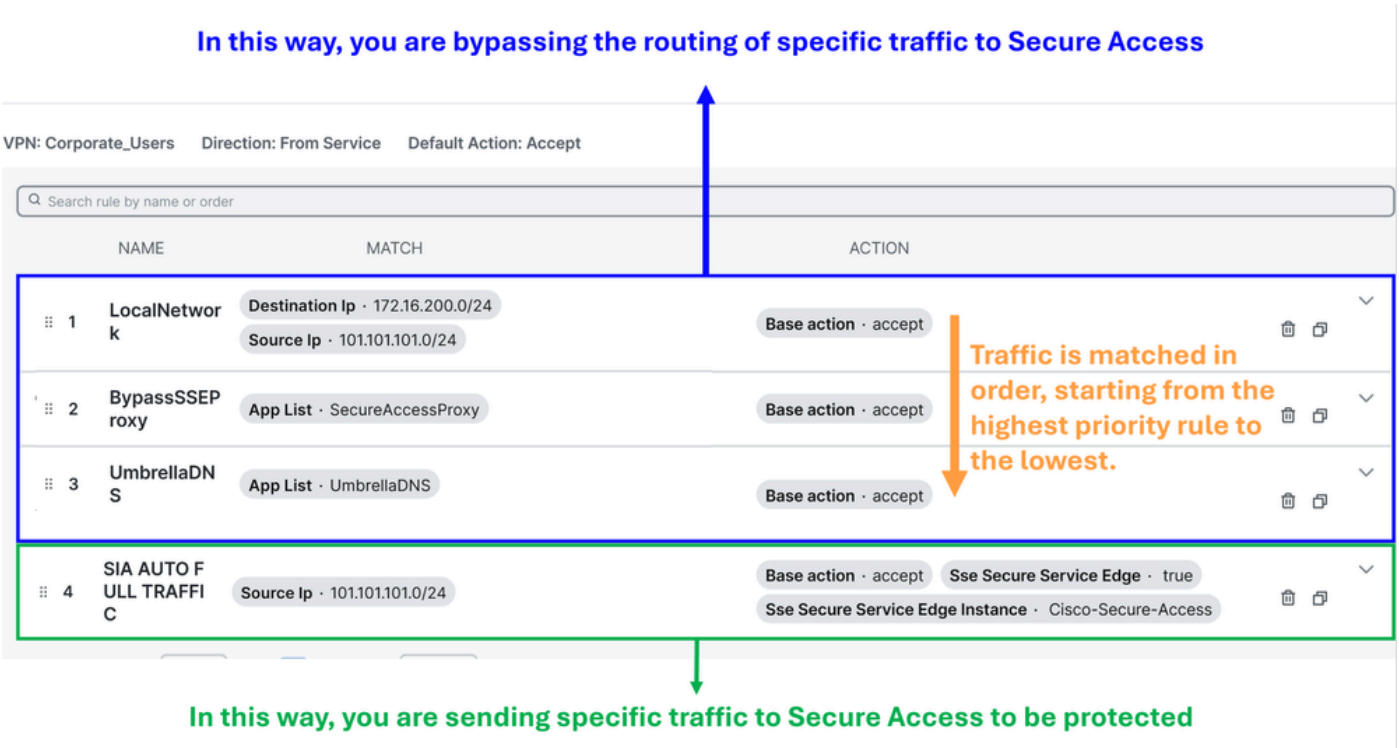
- Configure a Policy Name and click Create

- Enable Advanced Layout
- Click on + Add Traffic Policy



- Policy Name: Name that adjust this to the purpose of this Traffic Policy List
- VPN(s): Choose the Service VPN of user from where you route the traffic
- **Direction**: From Service
- Default action: Accept

After that you are able to start the creation of the Traffic Policy:



1. Local Network Policy (Optional): Source 101.101.101.0/24, Destination 172.16.200.0/24. This route prevents intra-network traffic from being sent to Cisco Secure Access. Typically, customers do not do this, as internal routing is usually handled by the distribution router in SD-WAN deployments. This configuration ensures that internal traffic between these subnets is not routed to Secure Access, depending on whether your scenario requires it (Optional, depends of your network enviroment)
2. **BypassSSEProxy (Optional)**: This policy prevents internal computers with the Cisco Umbrella module in

Secure Client and SWG enabled from sending proxy traffic back to the cloud. Routing proxy traffic to the cloud again is not considered best practice.

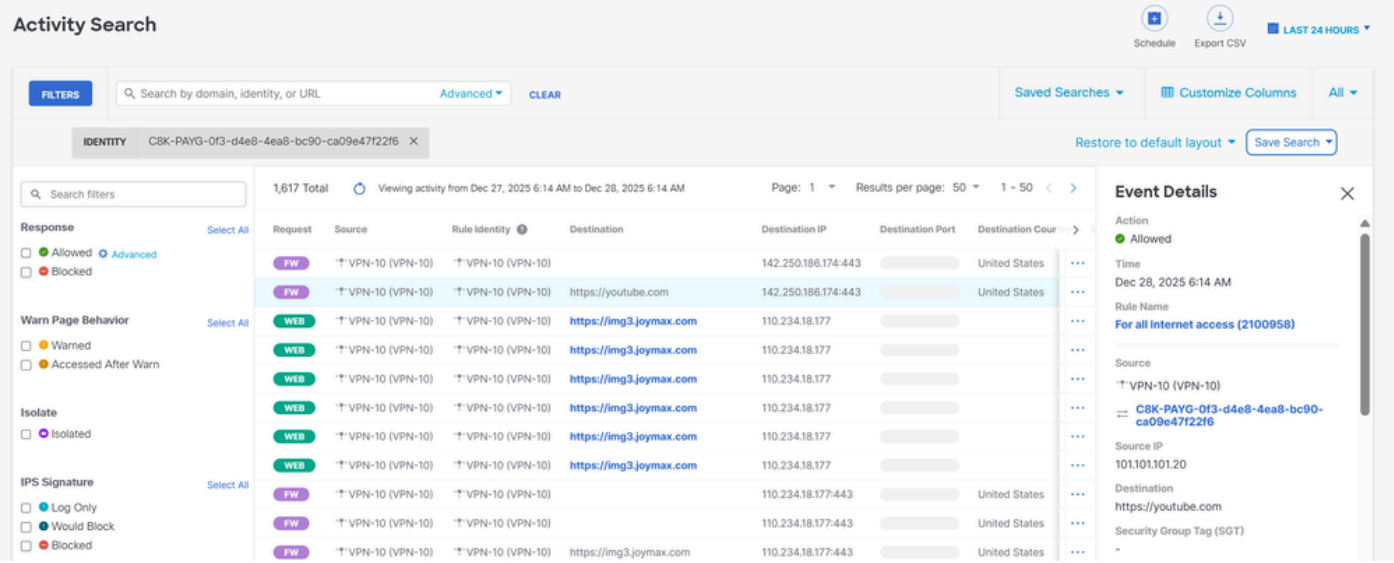
3. UmbrellaDNS (Best Practice): This policy prevents DNS queries destined for the internet from being sent through the tunnel. Sending DNS queries to Umbrella resolvers (208.67.222.222,208.67.220.220) via the tunnel is not recommended.
4. SIA AUTO FULL TRAFFIC: This policy routes all traffic from the source 101.101.101.0/24 to the internet through the SSE tunnels you previously created, ensuring this traffic is protected in the cloud.

Verify

in order to verify if the traffic is flooding already through Cisco Secure Access, navigate to Events or Activity Search or Network-Wide Path Insights and filter by your tunnel identity:

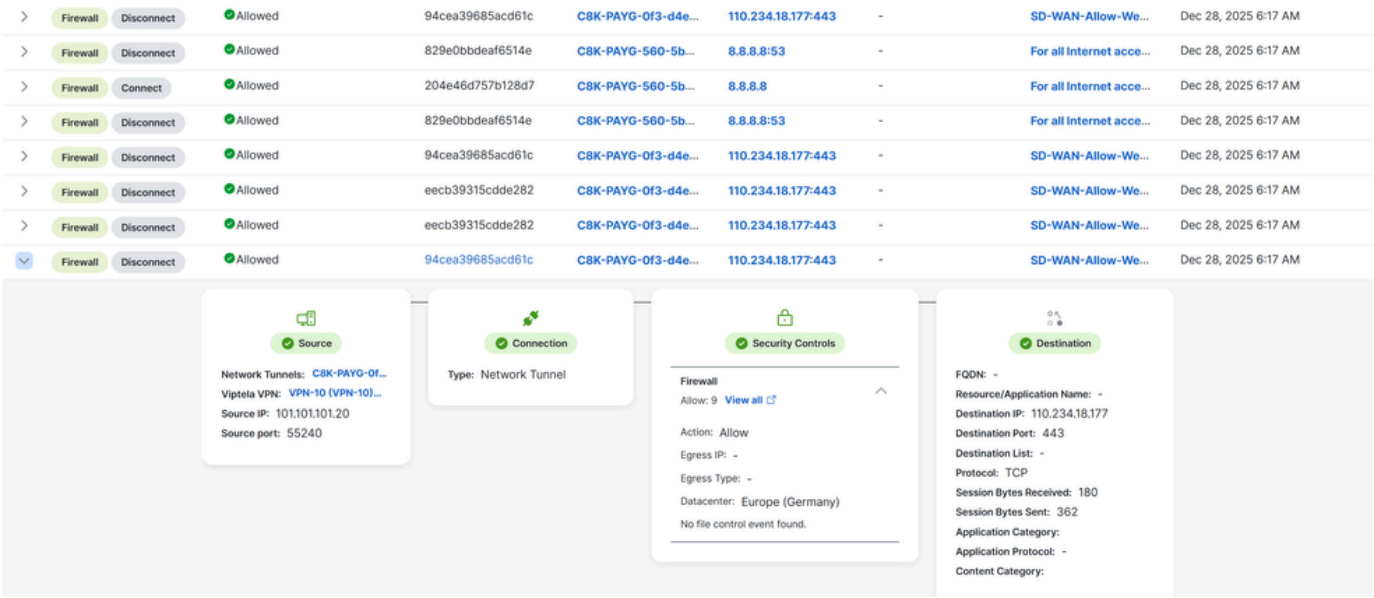
Secure Access - Activity Search

Navigate to Monitor > Activity Search:



Secure Access - Events

Navigate to Monitor > Events:

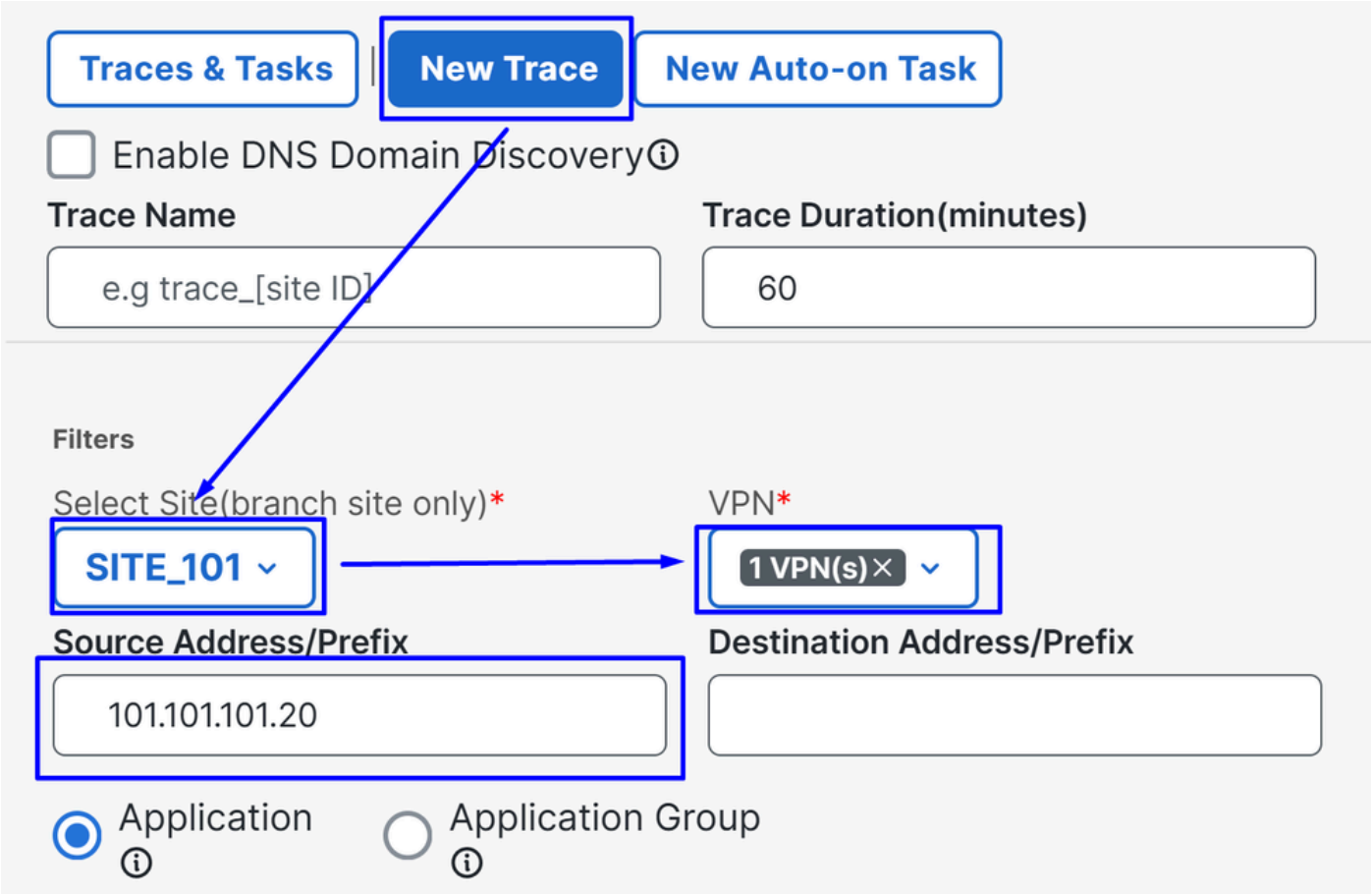


Note: Be sure you have your default policy with logging enabled, by default is disabled.

Catalyst SD-WAN Manager - Network-Wide Path Insights

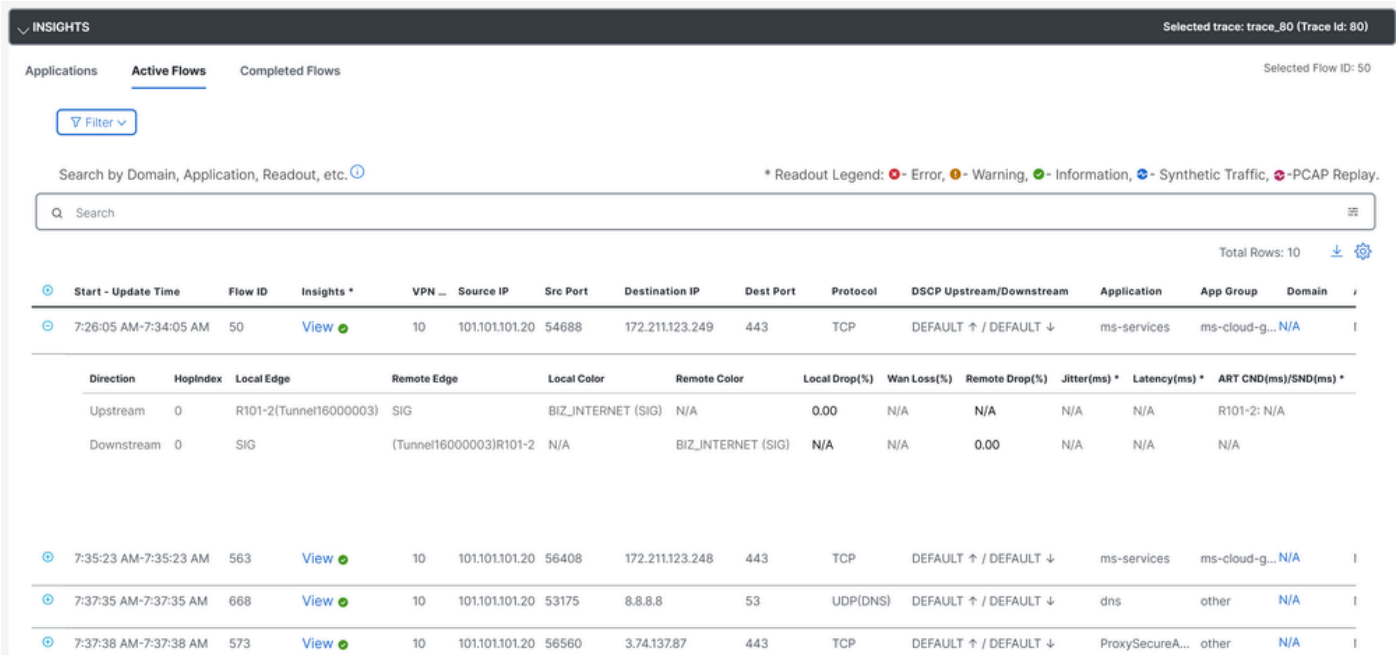
Navigate to Catalyst SD-WAN Manager:

- Click on Tools > Network-Wide Path Insights
- Click on New Trace



- Site: Choose the site from where your traffic is eggressing
- VPN: Choose the VPN ID of your subnet from where your traffic is eggressing
- Source: Put the IP or let it on blanck to filter all the traffic filtered by the **Site** and VPN choosen

Then in Insights you are able to see the traffic flooding through the tunnels and the type of traffic going to Secure Access:



Related Information

- Cisco Technical Support & Downloads
- Cisco Secure Access Help Center
- Cisco SASE Design Guide
- Cisco Catalyst SD-WAN Security Configuration Guide, Cisco IOS XE Catalyst SD-WAN Release 17.x
- Cisco SASE Solution: Cisco Catalyst SD-WAN integrated with Cisco Secure Access At-a-Glance