

InControl Setup Guide for Managing FusionHub & AWS Transit Gateway Connections

December 2021

Overview

FusionHub on AWS allows you to establish SpeedFusion connections between AWS VPC and on-premise Peplink devices. AWS Transit Gateway Connect and Peering Connection integration allows your on-premises networks in different worldwide locations to connect through AWS Cloud and be able to access other services on AWS.

This guide contains:

- Provisioning Transit Gateway / Connect / Peering Connect, VPC route table by InControl
- Provisioning AWS Global Network by InControl
- Provisioning GRE and BGP settings to Peplink FusionHub

Prerequisite

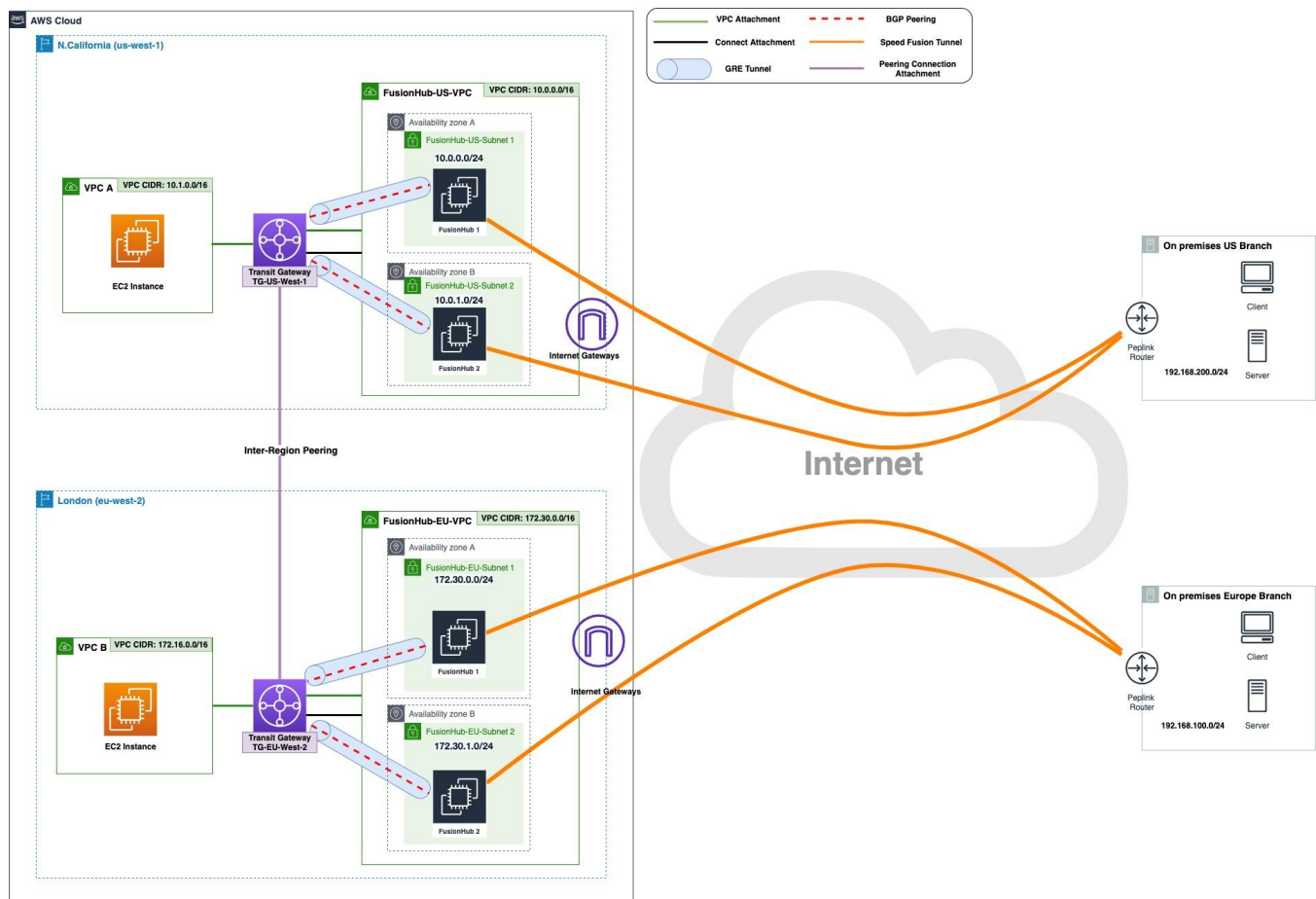
Users who would like to deploy FusionHub on AWS with AWS Transit Gateway Connect should require some basic technical knowledge/know-how in the areas listed below:

- Understand the operation of SpeedFusion/PepVPN on Balance/MAX and FusionHub;
- Understand how to use InControl 2
(<https://www.peplink.com/software/network-management-solution-incontrol-2/>);
- Understand the FusionHub license model. (Software license for FusionHub is free for 1 SpeedFusion/PepVPN Peer. It is necessary to purchase a license from our eStore if more than one SpeedFusion/PepVPN peer is required.);
- Understand the concept and know how to operate Amazon AWS Marketplace, EC2, VPC, and Transit Gateway;
- Understand the requirements for FusionHub on AWS and which requirements will incur changes by AWS according to the different types of instances and regions.

Sample Deployment Diagram

In this example, we connected the US Branch (192.168.200.0/24) and EU branch (192.168.100.0/24) with SpeedFusion through FusionHub on different AWS Regions. The edge device (Peplink router) at the branch will establish a SpeedFusion tunnel to the FusionHub devices (DC & DR) at the local AWS region. Both AWS regions are connected via AWS Transit Gateway Inter-Region Peering Connection.

As a result, the US Branch (192.168.200.0/24) and EU Branch (192.168.100.0/24) can communicate over SpeedFusion and the AWS Transit Gateway Inter-Region Peering Connection.



Setting Up FusionHub devices on AWS

To deploy FusionHub on AWS, it is necessary to:

- Create a VPC, Subnet, and Internet Gateway on AWS;
- Deploy the FusionHub devices to the defined AWS VPC.

Create AWS VPC and Subnets

The following tables are the regions, names, CIDR, and IP addresses which will be used for creating VPC, Subnets, Internet Gateway, and FusionHub devices.

VPC

Region	VPC Name	VPC IPv4 CIDR
us-west-1 (N. California)	FusionHub-US-VPC	10.0.0.0/16
eu-west-2 (London)	FusionHub-EU-VPC	172.30.0.0/16

VPC Subnet and FusionHub IP

Subnet Name	VPC name	Region/ Availability Zone	Subnet IPv4 CIDR	FusionHub Private IP
FusionHub-US-Subnet-1	FusionHub-US-VPC	us-west-1a	10.0.0.0/24	10.0.0.10
FusionHub-US-Subnet-2	FusionHub-US-VPC	us-west-1c	10.0.1.0/24	10.0.1.10
FusionHub-EU-Subnet-1	FusionHub-EU-VPC	eu-west-2a	172.30.0.0/24	172.30.0.10
FusionHub-EU-Subnet-2	FusionHub-EU-VPC	eu-west-2b	172.30.1.0/24	172.30.1.10

Region: us-east-1 (N. California)

Create the VPC

VPC Name: FusionHub-US-VPC

IPv4 CIDR: 10.0.0.0/16

Your VPCs (1/1) [Info](#)

Filter VPCs

search: FusionHub X Clear filters

<input checked="" type="checkbox"/>	Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	IPv6 pool
<input checked="" type="checkbox"/>	FusionHub-US-VPC	vpc-0a16a163df3705b6a	Available	10.0.0.0/16	-	-

Create two Subnets

Subnet name: FusionHub-US-Subnet-1

Availability Zone: us-west-1a

IPv4 CIDR: 10.0.0.0/24

Subnet name: FusionHub-US-Subnet-2

Availability Zone: us-west-1c

IPv4 CIDR: 10.0.1.0/24

Subnets (2) [Info](#)

Filter subnets

search: FusionHub X Clear filters

<input type="checkbox"/>	Name	Subnet ID	State	VPC	IPv4 CIDR	Availabl...	Availability Zone
<input type="checkbox"/>	FusionHub-US-Sub...	subnet-0475becc792caf65	Available	vpc-0a16a163df3705b6a FusionHub-US-VPC	10.0.0.0/24	251	us-west-1a
<input type="checkbox"/>	FusionHub-US-Sub...	subnet-01e0d77c528bfb52a	Available	vpc-0a16a163df3705b6a FusionHub-US-VPC	10.0.1.0/24	251	us-west-1c

Create the Internet Gateways

Create an Internet Gateway and attach them to FusionHub-US-VPC.

Internet gateways (1/1) [Info](#)

Filter internet gateways

search: FusionHub X Clear filters

<input checked="" type="checkbox"/>	Name	Internet gateway ID	State	VPC ID	Owner
<input checked="" type="checkbox"/>	FusionHub US Internet Gate...	igw-0120d1d461ebecc1e	Attached	vpc-0a16a163df3705b6a FusionHub-US-VPC	

Configure the Route Table

Define the default route (0.0.0.0/0) in the Route Table of FusionHub-US-VPC to route all Internet traffic to the defined Internet Gateway.

Route tables (1/1) [Info](#)

search: FusionHub X

Clear filters

☒

Name

☒

-

☐

Route table ID

☐

rtb-0a4ab2856acbb384a

☐

Explicit subnet associat...

☐

-

☐

Edge associations

☐

-

☐

Main

☐

Yes

☐

VPC

☐

vpc-0a16a163df3705b6a | Fus...

☐

Owner ID

☐

rtb-0a4ab2856acbb384a

Details

Routes

Subnet associations

Edge associations

Route propagation

Tags

Routes (2)

Both

Edit routes

< 1 > ⚙

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	igw-0120d1d461ebecc1e	Active	No

Create FusionHub on AWS VPC

This step is to create two separate FusionHub IPs on VPC Subnet **FusionHub-US-Subnet-1** and **FusionHub-US-Subnet-2** respectively, and to specify the Primary IP instead of using Auto-assign. For the detailed steps, please refer to (<https://forum.peplink.com/t/deploying-peplink-fusionhub-at-aws-marketplace>).

1st FusionHub IP is 10.0.0.10, on FusionHub-US-Subnet-1.

2nd FusionHub IP is 10.0.1.10, on FusionHub-US-Subnet-2.

Step 3: Configure Instance Details
Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances: 1 [Launch into Auto Scaling Group](#)

Purchasing option: ☐ Request Spot instances

Network: vpc-0a16a163df3705b6a | FusionHub-US-VPC [Create new VPC](#)

Subnet: subnet-0475beec792caf65 | FusionHub-US-Subnet [Create new subnet](#)
251 IP Addresses available

Auto-assign Public IP: Use subnet setting (Disable)

Placement group: ☐ Add instance to placement group

Capacity Reservation: Open

Domain join directory: No directory [Create new directory](#)

IAM role: None [Create new IAM role](#)

CPU options: ☐ Specify CPU options

Shutdown behavior: Stop

Stop - Hibernate behavior: ☐ Enable hibernation as an additional stop behavior

Enable termination protection: ☐ Protect against accidental termination

Monitoring: ☐ Enable CloudWatch detailed monitoring
[Additional charges apply.](#)

EBS-optimized instance: ☒ Launch as EBS-optimized instance

Tenancy: Shared - Run a shared hardware instance
[Additional charges will apply for dedicated tenancy.](#)

Credit specification: ☐ Unlimited
[Additional charges may apply](#)

File systems: [Add file system](#) [Create new file system](#)

Network interfaces

Device	Network Interface	Subnet	Primary IP	Secondary IP	IPv6 IPs	IPv4 Prefixes	IPv6 Prefixes
eth0	New network interface	subnet-0475beec792caf65	10.0.0.10	Add IP	The selected subnet does not support IPv6 because it does not have an IPv6 CIDR.	None	The selected subnet does not support IPv6 because it does not have an IPv6 CIDR.

[Add Device](#)

Advanced Details

Next, associate the Elastic IPs to the FusionHub devices.

Instances (2) Info									
<input type="text" value="Filter instances"/> 1									
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Availability Zone	Public IPv4 ...	Elastic IP	IPv6 IPs
<input type="checkbox"/>	FusionHub-US...	i-08b1c62fb6a7c1a05	Running	t3.nano	2/2 checks passed	us-west-1a	13.52.47.132	13.52.47.132	-
<input type="checkbox"/>	FusionHub-US...	i-01282fdc76aeb1a3f	Running	t3.nano	2/2 checks passed	us-west-1c	54.183.29.172	54.183.29.172	-

Enter the License Key for the FusionHub by accessing the FusionHub via <https://<elastic IP>/>.

Configure the IP Forwarding mode

Connection Settings

Connection Method

DHCP

Routing Mode

☐ NAT
 ☒ IP Forwarding

Help

This option allows you to select the routing method to be used in routing IP frames via the WAN connection. The mode can be either *NAT* (Network Address Translation) or *IP Forwarding*. *NAT* should be chosen for the routing mode in most cases.

[Close](#)

DNS Servers

☒ Apply NAT on Remote peers' outgoing Internet traffic

their outgoing Internet traffic to this unit. When this checkbox is checked, all outgoing traffic is forwarded out of this WAN. Leave this checkbox checked if you are not sure.

DNS Servers

DNS Server 1:

DNS Server 2:

Client ID (Optional)

Configure Route Isolation on Devices

Enable the PepVPN Route Isolation on the branch Peplink devices (Balance/MAX).

OSPF & RIPv2 Route Advertisement

PepVPN Route Isolation

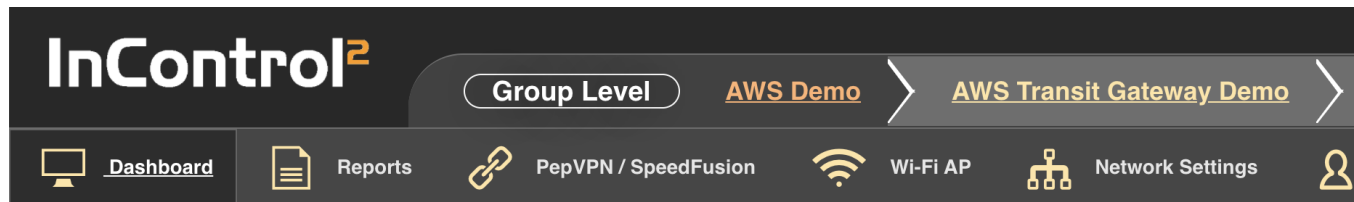
☒ Enable

Setting up AWS VPC and FusionHub in another Region

Repeat the steps above to set up FusionHub in another region (eu-west-2, London in this example).

Configure SpeedFusion via InControl

To set up SpeedFusion for the FusionHub and MAX devices, place the devices into the same InControl organization.



InControl²

Group Level AWS Demo > AWS Transit Gateway Demo >

Dashboard Reports PepVPN / SpeedFusion Wi-Fi AP Network Settings User

AWS Transit Gateway Demo ☆

Online	Offline
6 device(s)	0 device(s)

Device List

6 device(s)

Status	Device Name	Tags	Wi-Fi Config	Product
	☆ FusionHub-EU-01		-	FusionHub
	☆ FusionHub-EU-02		-	FusionHub
	☆ FusionHub-US-01		-	FusionHub
	☆ FusionHub-US-02		-	FusionHub
	☆ MAX_TST_EU		Device managed	MAX Transit LTEA
	☆ MBX_US		Device managed	MAX HD4 MBX

Configure the SpeedFusion Profiles via PepVPN/SpeedFusion Configuration at the **Organization level** as shown below:

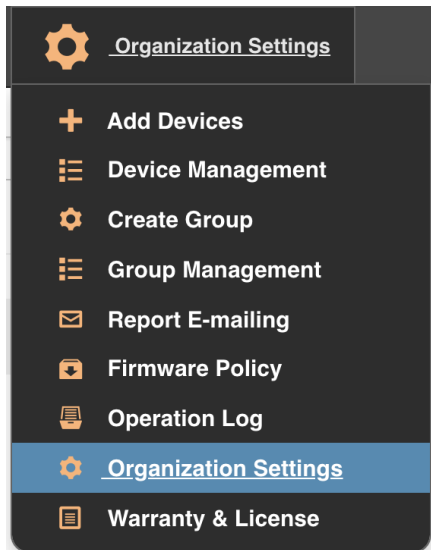
Enabled	Name	Topology	NAT	Description
<input checked="" type="checkbox"/>	SpeedFusion-EU	Star	No	Hub: FusionHub-EU-01 End Points: MAX TST EU
<input checked="" type="checkbox"/>	SpeedFusion-EU-DR	Star	No	Hub: FusionHub-EU-02 End Points: MAX TST EU
<input checked="" type="checkbox"/>	SpeedFusion-US	Star	No	Hub: FusionHub-US-01 End Points: MBX US
<input checked="" type="checkbox"/>	SpeedFusion-US-DR	Star	No	Hub: FusionHub-US-02 End Points: MBX US

SpeedFusion Profiles for DR purposes are required to set the path cost to 20 or higher.

Set Up Transit Gateway Connections via InControl

Adding AWS Access Key and Secret Access Key

In InControl, go to Organization Settings and add the AWS Access Key ID, Secret Access Key, and Account ID. With these credentials, InControl will be able to set up the Transit Gateway and related configurations on the specific AWS Account ID.



AWS Transit Gateway Integration Settings

AWS Access Key ID

AWS Secret Access Key

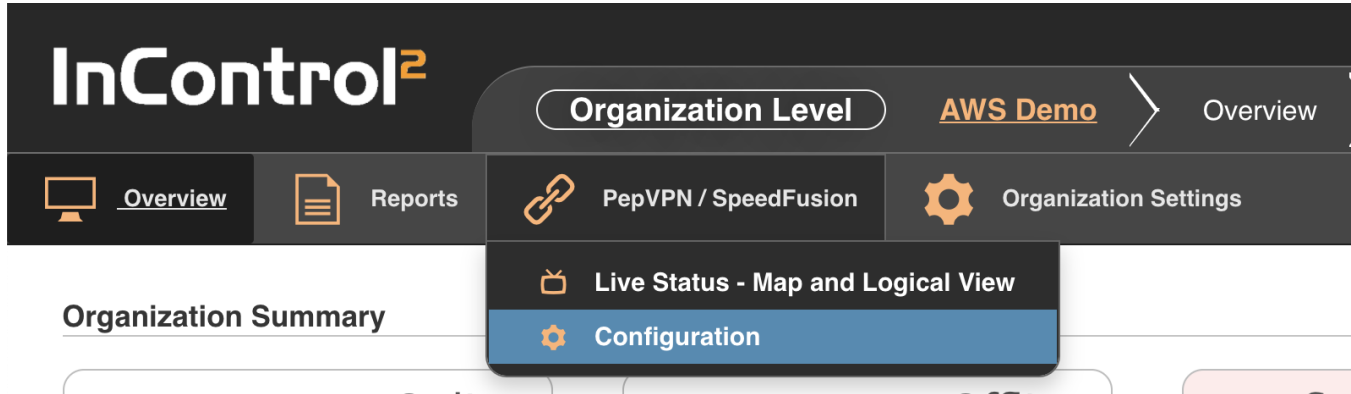
Account ID

We recommend using the following AWS IAM Policy for the AWS Access Key:

```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "VisualEditor0",
      "Effect": "Allow",
      "Action": [
        "ec2:Describe*",
        "ec2:DeleteTags",
        "networkmanager:*",
        "ec2:CreateRoute",
        "ec2:CreateTags",
        "sts:GetAccessKeyInfo",
        "ec2:Get*",
        "ec2:*TransitGateway*"
      ],
      "Resource": "*"
    },
    {
      "Sid": "VisualEditor1",
      "Effect": "Deny",
      "Action": [
        "ec2:DeleteTransitGatewayRouteTable",
        "ec2:DeleteTransitGatewayPeeringAttachment",
        "ec2:DeleteTransitGatewayPrefixListReference",
        "ec2:DeleteTransitGatewayVpcAttachment",
        "ec2:DeleteTransitGatewayConnect",
        "ec2:DeleteTransitGateway",
        "ec2:DeleteTransitGatewayMulticastDomain"
      ],
      "Resource": "*"
    }
  ]
}
```

FusionHub to AWS Transit Gateway Connections

Under Organization Level, go to PepVPN / SpeedFusion, Configuration.



Click “Add” to create an AWS Transit Gateway and add the Peer Connections from FusionHub to the Transit Gateway.

FusionHub to AWS Transit Gateway Connections

FusionHubs	Region

Add

Note: all of the above Transit Gateways will connect to each other.

Create a new Transit Gateway (named US Transit Gateway) and add Connect Peer from FusionHub-US-01 to Transit Gateway.

Connect a FusionHub to an AWS Transit Gateway

FusionHub

FusionHub-US-01

AWS Region

us-west-1

EC2 Instance

FusionHub-US-01

VPC

FusionHub-US-VPC

Transit Gateway

Create New...

Name

US Transit Gateway

Description

Optional

Multicast Support

☐

Auto Accept Cross-Account Shared Attachments

☐

Transit Gateway CIDR Block

192.0.2.0/24

Note: You can specify a size /24 CIDR block or larger (for example, /23 or /22). You can associate any public or private IP address range, except for addresses in the 169.254.0.0/16 range, and ranges that overlap with the addresses for your entire private global network.

OK

Cancel

Add Connect Peer from FusionHub-US-02 to the same Transit Gateway (US Transit Gateway) in the us-west-01 region that was created in the previous step.

Connect a FusionHub to an AWS Transit Gateway

FusionHub

FusionHub-US-02

x

▼

AWS Region

us-west-1

x

▼

EC2 Instance

FusionHub-US-02

VPC

FusionHub-US-VPC

Transit Gateway

US Transit Gateway

▼

OK

Cancel

Repeat the steps above to create the Transit Gateway Connections for the eu-west-2 region. The table should match the example below.

FusionHub to AWS Transit Gateway Connections

FusionHubs	Region	VPC	Transit Gateway
FusionHub-EU-01	eu-west-2	FusionHub-EU-VPC	TGW EU
FusionHub-EU-02	eu-west-2	FusionHub-EU-VPC	TGW EU
FusionHub-US-01	us-west-1	FusionHub-US-VPC	TGW US
FusionHub-US-02	us-west-1	FusionHub-US-VPC	TGW US

Define Devices' Sites

Please select the site for the following devices:

Device Name	Site
MBX_US	Select Here ▼
MAX_TST_EU	Select Here ▼

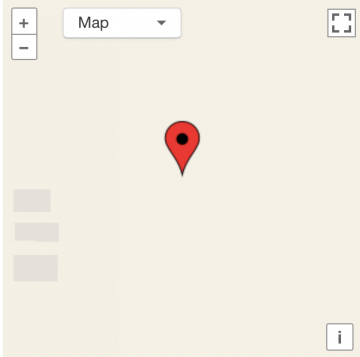
OK Cancel

New a Site

Name:

Description:

Address:



Location:

Save Cancel

Global Network: [Manage Device Sites](#)

Associate the newly defined site with the MAX/Balance (branch Peplink device).

Please select the site for the following devices:

Device Name	Site
MAX_TST_EU	<input type="text" value="EU Office"/> ▼
MBX_US	<input type="text" value="US Office"/> ▼

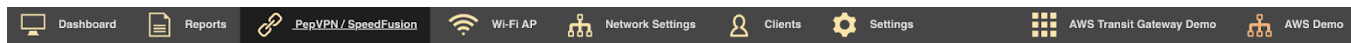
Save

Cancel
















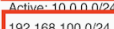







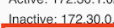








Verify the Configuration

InControl


Under the InControl Organization (AWS Demo), at the Group (AWS Transit Gateway Demo) level, select the PepVPN / SpeedFusion Live Status - Tabular View of InControl. The US Branch Peplink devices have obtained the route of the EU Branch's 192.168.100.0/24 subnet while the EU Branch devices have also successfully obtained the route of the US Branch's 192.168.200.0/24 subnet.





PepVPN / SpeedFusion Live Status - Tabular View


Device A				Device B		
	Name	WAN	IP / Subnet Address(es)	Name	WAN	IP / Subnet Address(es)
	 FusionHub-US-02 > Primary Tunnel (1167- )		Active: 192.168.200.0/24		 MBX_US > Primary Tunnel (2936- )	Active: 10.0.1.0/24 Inactive: 10.0.0.0/16, 172.30.0.0/16, 
	 FusionHub-US-01 > Primary Tunnel (1181- )		Active: 192.168.200.0/24		 MBX_US > Primary Tunnel (2936- )	Active: 10.0.0.0/24, 10.0.0.0/16, 172.30.0.0/16, 
	 FusionHub-EU-02 > Primary Tunnel (1133- )		Active: 192.168.100.0/24		 MAX_TST_EU > Primary Tunnel (2938- )	Active: 172.30.1.0/24 Inactive: 172.30.0.0/16, 10.0.0.0/16, 
	 FusionHub-EU-01 > Primary Tunnel (1177- )		Active: 192.168.100.0/24		 MAX_TST_EU > Primary Tunnel (2938- )	Active: 172.30.0.0/24, 172.30.0.0/16, 10.0.0.0/16, 


Verify the connectivity by using the Ping command. The command can ping from the EU Branch to the US Branch's device.



[Settings](#)


 Remote Web Admin


 Web CLI


 Firmware Management

 **Device Tools**

 Device Details

 Reports

 PepVPN / SpeedFusion

 Wi-Fi AP

Command

Ping

Connection

PepVPN

Destination(s)

192.168.200.1

Packet Size

56

No. of Times

5

Start

Stop

Results

```

Profile: conn_to_FusionHub-EU-01
Remote Peer: FusionHub-EU-01 (FHEU-1)

PING 192.168.200.1 (192.168.200.1) 56(84) bytes of data.
64 bytes from 192.168.200.1: icmp_req=1 ttl=59 time=501 ms
64 bytes from 192.168.200.1: icmp_req=2 ttl=59 time=501 ms
64 bytes from 192.168.200.1: icmp_req=3 ttl=59 time=501 ms
64 bytes from 192.168.200.1: icmp_req=4 ttl=59 time=501 ms
64 bytes from 192.168.200.1: icmp_req=5 ttl=59 time=501 ms

--- 192.168.200.1 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4000ms
rtt min/avg/max/mdev = 501.005/501.265/501.616/0.672 ms
          
```

AWS Console

Once InControl has added the Transit Gateway, Attachments, Connect Peers, and the BGP Route table, they can also be verified via AWS Web Console.

US Transit Gateway

Transit gateways (1/1) Info				
<input type="text" value="Filter transit gateways"/>				
<input checked="" type="checkbox"/>	Name ▾	Transit gateway ID ▾	Owner ID ▾	State
<input checked="" type="checkbox"/>	US Transit Gateway	tgw-05e02450fc157ad02		✔ Available

US Transit Gateway Attachments

Transit gateway attachments (3) Info				
<input type="text" value="Filter transit gateway attachments"/>				
<div> <div>State: pending ✕</div> <div>State: available ✕</div> <div>Clear filters</div> </div>				
<input type="checkbox"/>	Name ▾	Transit gateway attachment ID ▾	Resource type ▾	State
<input type="checkbox"/>	[InControl] Between...	tgw-attach-00bbc4be3d649cd05	Peering	✔ Available
<input type="checkbox"/>	[InControl] For Fusi...	tgw-attach-07e17299b0de2448d	VPC	✔ Available
<input type="checkbox"/>	[InControl] For US T...	tgw-attach-039b50b1fd704df5b	Connect	✔ Available

US Transit Gateway Connect Peers / BGP Status

Connect peers				
	Name ▾	Connect peer ID ▾	Connect attachment ID ▾	State ▾
<input type="radio"/>	–	tgw-connect-peer-0503c17c76817fca6	tgw-attach-039b50b1fd704df5b	✔ Available
<input type="radio"/>	–	tgw-connect-peer-061cd0d43545f576b	tgw-attach-039b50b1fd704df5b	✔ Available

Transit gateway BGP 1 Status	Transit gateway BGP 2 address	Transit gateway BGP 2 Status
Up	169.254.30.251	Up
Up	169.254.30.235	Up

US Transit Gateway Route Table

Routes (4)							Refresh	Actions	Create s
Filter routes									
<input type="checkbox"/>	CIDR	Attachment ID	Resource ID	Resource type	Route type	Route state			
<input type="checkbox"/>	10.0.0.0/16	tgw-attach-07e17299b0de2448d	vpc-0a16a163df3705b6a	VPC	Propagated	Active			
<input type="checkbox"/>	172.30.0.0/16	tgw-attach-00bbc4be3d649cd05	tgw-0110207895b64d3d3	Peering	Static	Active			
<input type="checkbox"/>	192.168.100.0/24	tgw-attach-00bbc4be3d649cd05	tgw-0110207895b64d3d3	Peering	Static	Active			
<input type="checkbox"/>	192.168.200.0/24	tgw-attach-039b50b1fd704df5b	tgw-connect-peer-061cd0d...	Connect	Propagated	Active			

EU Transit Gateway

Transit gateways (1) Info

Filter transit gateways				
<input type="checkbox"/>	Name	Transit gateway ID	Owner ID	State
<input type="checkbox"/>	EU Transit Gateway	tgw-0110207895b64d3d3	780995285927	Available

EU Transit Gateway Attachments

Transit gateway attachments (3) Info

Filter transit gateway attachments						Refresh	Actions
State: pending X State: available X Clear filters							
<input type="checkbox"/>	Name	Transit gateway attachment ID	Transit gateway ID	Resource type	State		
<input type="checkbox"/>	-	tgw-attach-00bbc4be3d649cd05	tgw-0110207895b64d3d3	Peering	Available		
<input type="checkbox"/>	[InControl] For Fusi...	tgw-attach-09e75e5d47e3ccdb2	tgw-0110207895b64d3d3	VPC	Available		
<input type="checkbox"/>	[InControl] For EU T...	tgw-attach-0b0d226480361ba3b	tgw-0110207895b64d3d3	Connect	Available		

EU Transit Gateway Connect Peers / BGP Status

Connect peers				
	Name ▾	Connect peer ID ▾	Connect attachment ID ▾	State
<input type="radio"/>	–	tgw-connect-peer-0b3aaf3e05f8b6e30	tgw-attach-0b0d226480361ba3b	✔ Available
<input type="radio"/>	–	tgw-connect-peer-0d67f821169a7cc9d	tgw-attach-0b0d226480361ba3b	✔ Available




Transit gateway BGP 1 Status ▾	Transit gateway BGP 2 address ▾	Transit gateway BGP 2 Status ▾
Up	169.254.30.203	Up
Up	169.254.30.211	Up

Global Networks - Overview

Network Manager > Global networks > Peplink SpeedFusion global network - FguVcX

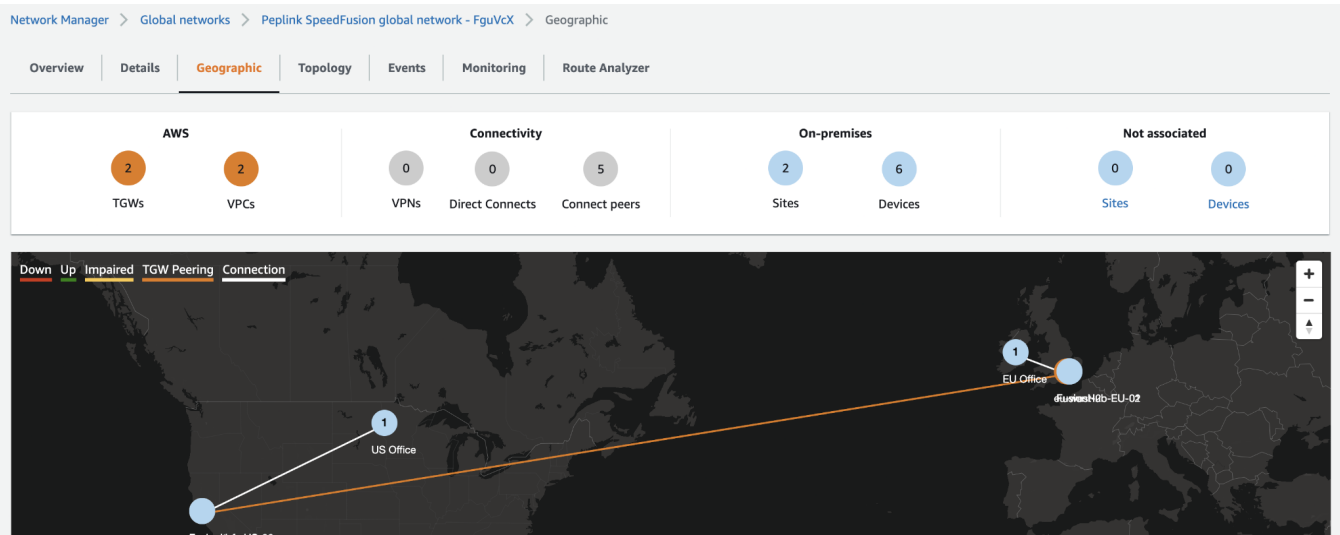
Overview | Details | Geographic | Topology | Events | Monitoring | Route Analyzer

Peplink SpeedFusion global network - FguVcX Inventory
 Network resources that are part of your global network.

 2 Transit Gateways	 2 Sites	 6 Devices
--	---	---

Global Networks - Geographic

This tab shows that the on-premises sites and devices are connected through the local AWS Region via SpeedFusion, and that the two AWS Regions are connected by Transit Gateway Inter-Region Peering Connection.



Global Networks - Topology

This displays the logical relationship of the network between the US and Europe, along with the on-premises networks with Peplink devices.

Peplink SpeedFusion global network - FgwVcX topology

This view represents the logical relationship of your global network.



Show: ☒ Site ☒ Device ☒ Customer Gateway

