Direct Peering
- enables connection beteween business network and Google's edge network .
- Provides direct path from on-prem network to Google Services, including Google Cloud products that is exposed thru Public IP.
- Direct peering exists outside of Google Cloud. Product such as google Workspace is not accessible.
- Available at any of 100 locations in 33 countries. See supported peering site.

Carrier Peering
- Access to Google applications, such as Google Workspace, by using SP that connect your infra to Google
- Big disadvantage of CP, it doesn't produce any custom routes in VPC network. To send traffic thru CP by using Cloud VPN tunnel,.

Partner Interconnect
- Go thru Service Providers
- Cheaper than DI
- Max 50Gbps / connection

Dedicated Interconnect
- directly connect your on-prem networks into GCP network thru fiber connection
- typical hw requirement are such   10G circuits, single mode fiber, 10GBASE-LR (1310 nm) or 100G, single mode fiber, 100GBASE-LR4 (which is 10km max distance).
- Can use other circuit if distance is further away, IPv4 link local addressing, LACP even use single circuit, EBGP-4 with multi-hop and 802.1q VLANs. as of 201903, up to 80gb/s

Comparison between Dedicated InterConnect and Partner InterConnect

| Dedicated InterConnect	Partner InterConnect
Direct connection to Google	Connectivity thru supported SP
Traffic flows directly, not thru public internet	Traffic flows thru SP, not thru public internet
10-Gbps to 200-Gbps, with flexible VLAN attachment from 50 MBps to 50 Gbps	50 Mbps to 50Gbps
Requires routing equipment in colocation facility (check peeringdb.com)	Use any supported SP
Can configure BGP on-prem with Cloud Router	Can configure BGP on-prem with Cloud Router
cannot use Cloud VPN, but can use own VPN solution	cannot use Cloud VPN, but can use own VPN solution
Offers end-to-end SLA	Offers SLA for connection between Google and SP. But between SP and on-prem, contact SP
Pricing: extremely pricey	Pricing: based on VLAN attachments capacity and egress traffic

More Comparison - Direct Peering, Carrier Peering and InterConnect

Direct Peering	Carrier Peering	InterConnect
Can be used by GC - example access VMs thru Cloud VPN, but does not require it	can be used by Google Cloud, but does not require it	Requires Google Cloud
Give direct access to Google Workspace and Google APIs for the full suite of GC products	Give direct access to Google Workspace	Access to Google Cloud products
	Access to Google Cloud products uses public IP	Access to Google APIs and products using PGA
Has no setup or maintenance costs	Has service provider costs	Has maintenance costs
Does not use any Google Cloud (Cloud Router, Cloud DNS)	Does not use any Google Cloud (Cloud Router, Cloud DNS)	Do use Google Cloud resources (InterConnection, VLAN attachments, Cloud Routers and so on
Contact Google to customize route	Contact Google to customize route	Can customize route with Cloud Router
Routes to on-prem network do not appear in any VPC network of your GC project	Routes to on-prem network do not appear in any VPC network of your GC project	Routes to on-prem network are learned by CR

Objectives
1. Setup a Dedicated Interconnect
2. Setup a Partner Interconnect

1. Setup a Dedicated Interconnect
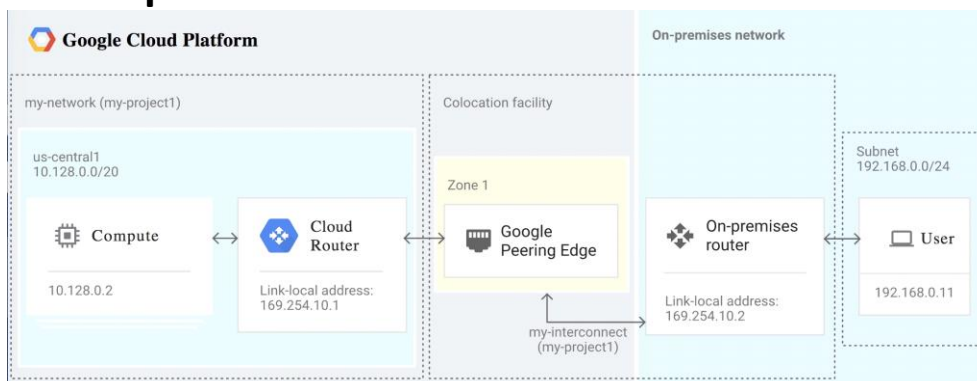
Launch GCP
Goto Interconnect

Pasted Graphic.tiff ¬

Select a VLAN attachment

LABELS

Labels help organize your resources (e.g., cost_center:sales or env:prod).

ⓘ No VLAN attachments selected.

Hybrid Connectivity
Interconnect

Interconnect lets you establish high bandwidth, low latency connections between your Google Cloud VPC networks and your on-premises infrastructure.
Get started to figure out the interconnect option that's right for you.
Learn more

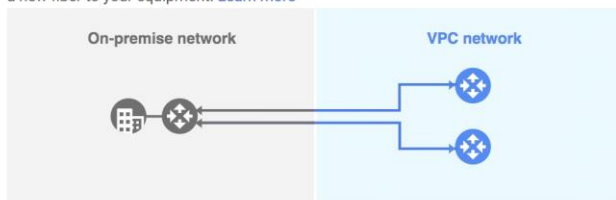Get started

Click Get started
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Choose an interconnect type that fits your networking needs:

Interconnect type

● Dedicated Interconnect
Connect your on-premises network to your Google Cloud VPC network by connecting a new fiber to your equipment. Learn more

On-premise network   VPC network

○ Partner Interconnect
Connect your on-premises network to your Google Cloud VPC network through a connection from a supported service provider. Learn more or check supported service providers

On-premise network   Service provider   VPC network
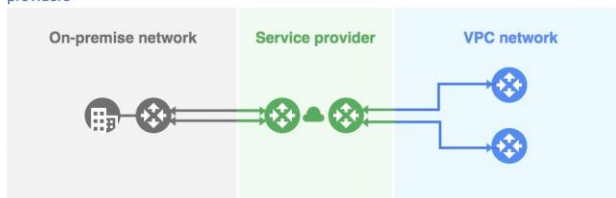
Continue   Cancel

Select Dedicated Interconnect
Click Continue
1__#$!@%!#__Pasted Graphic.tiff ¬
Select Order new Dedicated Interconnect
Click Continue
1__#$!@%!#__Pasted Graphic 1.tiff ¬

Specify a name to the connection
Enter a description
Click Choose colocation facility by clicking Select next to the location.
NOTE: List of Google POP Point of Presence all over the world
NOTE: Malaysia has 2 POP as of 201903 one in Cyberjaya and another one in Menara AIMS , Changkat Raja Chulan KL
NOTE: Look for them in peeringdb.com   CX2 / my01 and aims kuala lumpur

Under Capacity select the speed
NOTE: As of 201903, KL has speed between 10GB/s to 80GB/s (which uses 10GB/s x 8 links) or 200GB/s (2x 100Gb/s)

Click Next
On Redundancy
1__#$!@%!#__Pasted Graphic 2.tiff ¬

You may add second interconnect for a heifty price or skip the step by unticking Create redundant interconnect and then clicking Next

Under Contact information page, enter your company name and email address to receive informationa about LOA-CFA, circuit turnup and configuration
Click Next

Under Review your order
Pasted Graphic 3.tiff ¬
Click Place order
On pops up, click SUBMIT to confirm the order

Under Confirmation page
Pasted Graphic 4.tiff ¬

Add VLAN attachment
NOTE: Must do this after Dedication connection is approved by GCP
NOTE: VLAN attachment is a virtual point-to-point tunnel between your on-prem network and single region in a VPC network
Back to Interconnect page
Click VLAN attachments
Click Add VLAN attachment
Click Dedicated Interconnect then click Continue
Pasted Graphic 5.tiff ¬

Choose an Interconnect

To create a VLAN attachment, first choose which Dedicated Interconnect it will attach to

◉ In this project
◯ In another project

Interconnect

[▾]

Select a project, then an Interconnect
Click Continue
Pasted Graphic 6.tiff ¬
Click + Add VLAN attachment
Pasted Graphic 7.tiff ¬
Specify a name a description for the attachment,
Select a Cloud Router to exchange BGP routes with on-prem routers
Click Show VLAN ID, BGP IPs, capacity
Pasted Graphic 8.tiff ¬
NOTE: You may let Google pick up a random VLAN ID or specify manually
Pasted Graphic 10.tiff ¬
Under Allocate BGP IP address
NOTE: Again you can let google automatically allocate one IP or manually enter a local link ip to your router
Under capacity select from 50MB/s to 10GB/s
Click Done
Click Create
NOTE: If all information entered correctly you can click Next to the summary page

2. Setup a Partner Interconnect

From GCP, goto Interconnect
Click Physical connections tab
Click Set up connection
From interconnect type, select Partner Interconnect , then click Continue
Pasted Graphic 11.tiff ¬
Click Find a service provider, then look for a service provider
NOTE: IF you already have a service provider click on the first button

Under Add VLAN attachments page,
There are three options here under redundancy
i. Create a redundant pair of VLAN attachments (recommended)
Pasted Graphic 12.tiff ¬

ii. Add a redundant VLAN to an existing VLAN

Pasted Graphic 13.tiff ¬

iii. Create a single VLAN (non redundancy)
Pasted Graphic 14.tiff ¬
Then click Next
Under Connect to your VPC networks
Pasted Graphic 16.tiff ¬
You may enable Pre-active VLAN attachments option
- activate this only if your provider will managing BGP for you. This requires SP to able to configure layer 3 connectivity too. See document about supported SP for Partner Interconnect

NOTE: Pairing keys are used only for Partner Interconnect. It allow SP to identify particular VLAN without anyone sharing potentially sensitive info about their VPC network . . Key is one-time use and can't be modified.   If you need one, delete VLAN and then recreate the VLAN and then new key will generate automatically

Click OK