

AXON

Technical Brief

Google Cloud Interconnect CUSTOMER GUIDE



NEX T D C

where the cloud lives™

13 NEXT sales@nextdc.com www.nextdc.com

Contents

Introduction to AXON	3
Google Cloud	4
Google Cloud Guide	6
Onboarding Process	7
Technical Requirements	8
Redundant Design Requirements	10
Creating a Google Cloud Partner Interconnect via AXON	12
Steps to delete a Google Cloud Partner Interconnect via AXON	18
AXON Port Specifications	19
NEXTDC support contacts	20
Glossary	21

Introduction to AXON

In today's hyperconnected world our data, applications, clouds, locations and people live everywhere.

To operate and compete without limitation, we must integrate our siloed worlds. We need to be connected. Our people need access to whatever they need, whenever they need it, from wherever they are with complete confidence it is secure.

Connectivity with NEXTDC allows you to connect your physical and virtual worlds uniting the people, places and clouds most critical to your organisation. We help you achieve this with NEXTDC's Ethernet connectivity platform, AXON.

AXON's high-speed ethernet connections give you fast, secure on-demand access to any number of services across all our locations, allowing you to connect the clouds, carriers and data centres that underpin your hybrid cloud.

Google Cloud

Google Cloud provides low latency, highly available connections that enable you to reliably transfer data between your on-premises and Virtual Private Clouds (VPC) networks.

Traffic between your on-premises networks and your VPC doesn't have to traverse the Internet, thus taking fewer hops and reducing the potential points of failure.

By establishing a direct connection, the latency is fixed and provides your users with a consistent, reliable experience.

Your VPC network's internal (RFC 1918) addresses are directly accessible from your on-premises network. There is no need for a NAT or VPN device.

Connection capacity can be scaled to meet your requirements.

Partner Interconnect capacity ranges from 50Mbps to 10 Gbps or even greater by bonding 10Gbps services together.

Cost of egress traffic from your VPC network to your on-premise network is reduced.

Google services several geographic areas around the world:

- Asia
- Europe
- North America
- Oceania
- India

Each geographic area has different regions and within each region are different zones. Google Cloud australia-southeast1 comprises of 3 zones;

Region	Australia-Southeast1	
Location	Sydney, Australia	
Zone	Australia-Southeast1-a Australia-Southeast1-b	Australia-Southeast1-c
Features	<ul style="list-style-type: none"> ■ Available CPU platforms: <ul style="list-style-type: none"> ■ Intel Xeon E5 v4 (Broadwell) (default) ■ Intel Xeon (Skylake) ■ Up to 96 vCPU machine types when using Skylake ■ Local SSDs ■ GPUs ■ Sole-tenant nodes 	<ul style="list-style-type: none"> ■ Available CPU platforms: <ul style="list-style-type: none"> ■ Intel Xeon E5 v4 (Broadwell) (default) ■ Intel Xeon (Skylake) ■ Up to 96 vCPU machine types when using Skylake ■ Memory-optimised machine types with 160 vCPUs and 3.75TB of memory ■ Local SSDs ■ Sole-tenant nodes

Additional Region information can be found at:

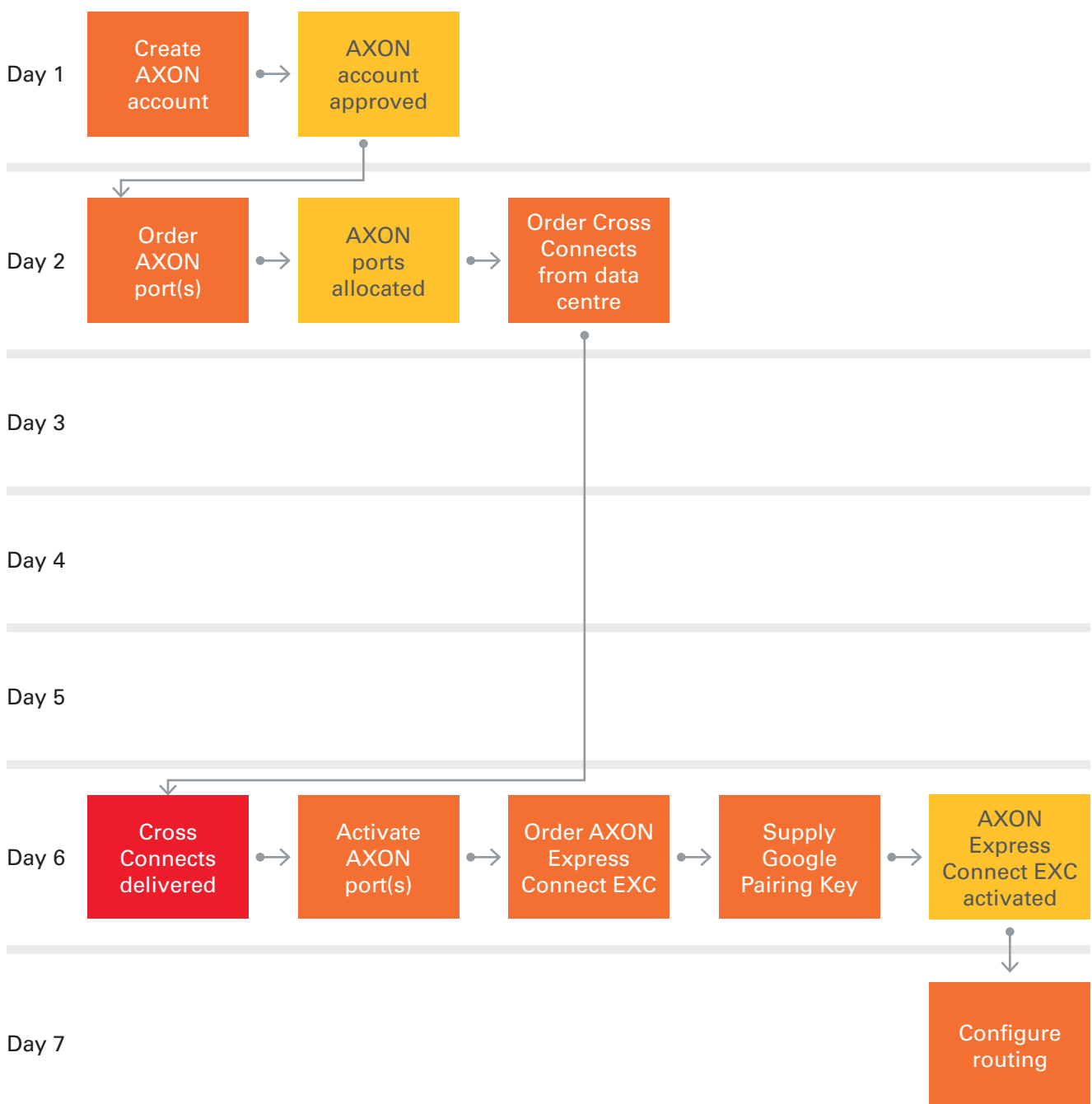
<https://cloud.google.com/compute/docs/regions-zones/>

Google Cloud Guide

Google Cloud have comprehensive setup instructions that can be reviewed here:

<https://cloud.google.com/compute/docs/how-to>

Onboarding Process

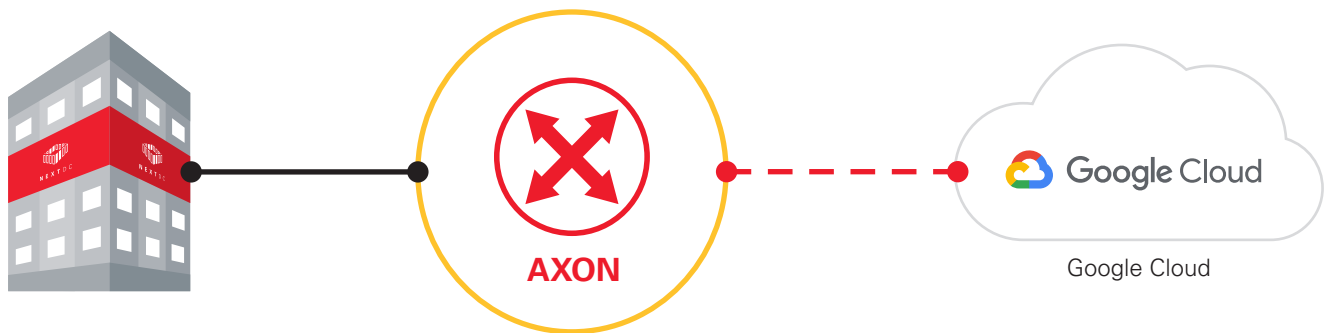


KEY	CUSTOMER	AXON	DATA CENTRE PROVIDER

Technical Requirements

Item	Qty	Comment
Single Mode Fibre (SMOF) Cross Connect (pair)	1	1 x dual core SMOF Cross Connects is required to interconnect with AXON to Google Cloud.
1 or 10 Gbps capable network switches or routers	1	<p>You can connect to AXON using either routers or switches.</p> <p>If you choose to use switches, you will need to pass Google Cloud traffic to BGP capable routers via appropriately dimensioned connectivity.</p>
1 or 10 Gbps capable network optics	1	<p>Optic options are:</p> <ul style="list-style-type: none"> ▪ 1G-LX (10KM) ▪ 10G-LRL (1KM) ▪ 10G-LR (10KM) <p>If your vendor only supplies LR optics and you are in the same data centre as the AXON POI, please order 1km (LRL) optics from AXON as they are compatible with 10km (LR) vendor optics.</p>
BGP routers	1	A BGP capable router to connect to Google Cloud.
Google Pairing Key	1	You will require a Google Pairing key. This is provided during provisioning of your Google Cloud Interconnect.

Google Cloud over AXON – minimum requirements



Key



Cross Connect



Ethernet Cross Connect (EXC)

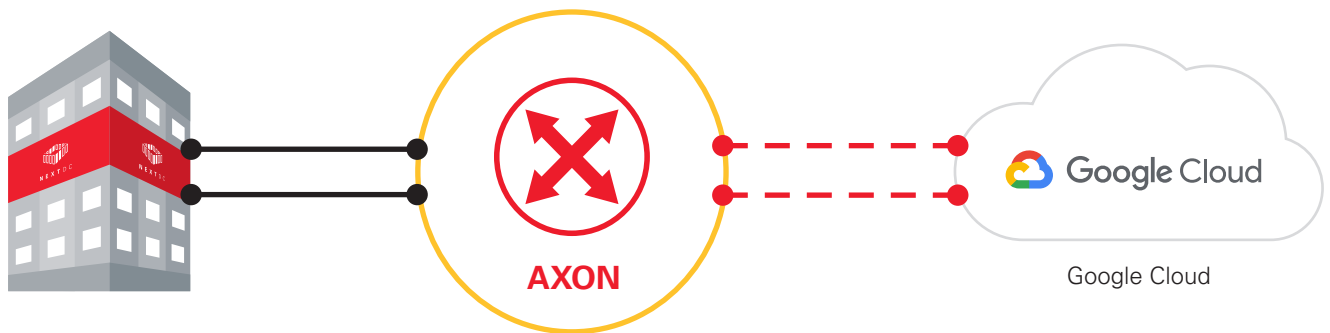


Google Cloud Interconnect

Redundant Design Requirements

Item	Qty	Comment
Single Mode Fibre (SMOF) Cross Connect (pair)	2	2 x dual core SMOF Cross Connects are required for port and switch redundancy connection to AXON. You may also consider requesting cable path diversity from your carrier and/or data centre provider.
1 or 10 Gbps capable network switches or routers	2	<p>You can connect to AXON using either routers or switches.</p> <p>If you choose to use switches, you will need to pass Google Cloud traffic to BGP capable routers via appropriately dimensioned connectivity.</p>
1 or 10 Gbps capable network optics	2	<p>Optic options are:</p> <ul style="list-style-type: none"> ▪ 1G-LX (10KM) ▪ 10G-LRL (1KM) ▪ 10G-LR (10KM) <p>If your vendor only supplies LR optics and you are in the same data centre as the AXON POI, please order 1km (LRL) optics from AXON as they are compatible with 10km (LR) vendor optics.</p>
BGP routers	2	Two BGP capable routers to connect to Google Cloud.
Google Pairing Key	2	You will require a Google Pairing key. This is provided during provisioning of your Google Cloud Interconnect.

Google Cloud over AXON – redundant requirements



Key



Cross Connect



Ethernet Cross Connect (EXC)



Google Cloud Interconnect

Creating a Google Cloud Partner Interconnect via AXON

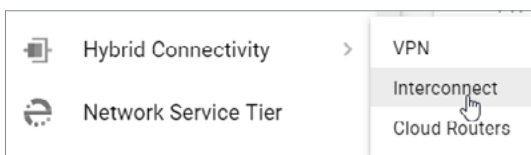
Below describes the steps and workflow required to setup a Google Partner Interconnect connection via the AXON network.

Customers can obtain all Google product documentation here: <https://cloud.google.com/interconnect/docs/how-to/partner/provisioning-overview>.

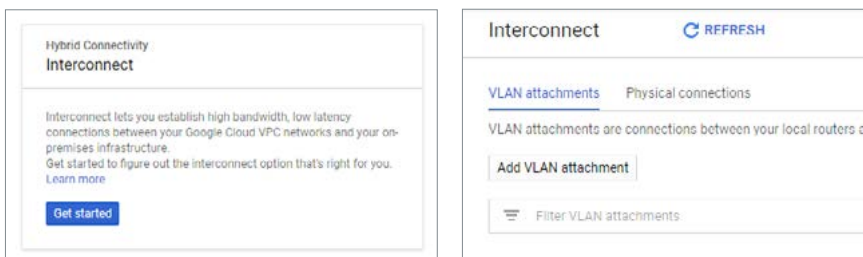
STEP 1 Login to Google Cloud Platform console <https://console.cloud.google.com>

STEP 2 Create a VLAN attachment

a. Go to Google Cloud Platform and select appropriate project. Then select “Hybrid Connectivity”-> “Interconnect” Option.



b. If this is your first Interconnect then click “Get Started.” If you have already provisioned Interconnects then click “Add VLAN attachment”



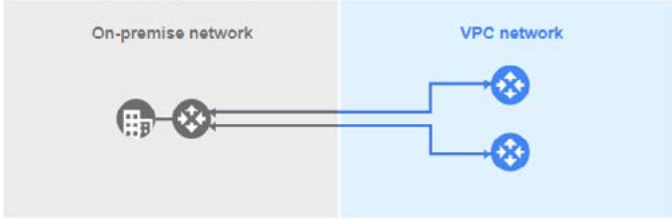
c. Then select "Partner Interconnect" option

Get started

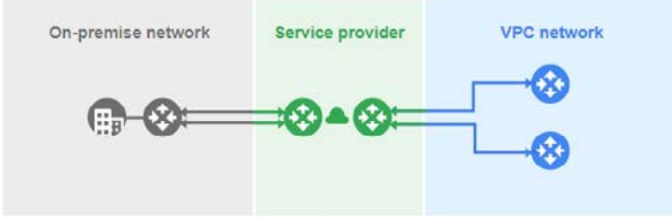
Choose an interconnect type that fits your networking needs:

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](#)



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](#)



d. Select "I already have a service provider" option

Add Partner VLAN attachment

1 **Check your connection** 2 Add VLAN attachments 3 Connect to your VPC networks

You need to set up physical connection with your service provider. [Check available service providers](#) for more information.

If you already have an existing physical connection provided by your service provider, you can continue.

e. Select the VLAN attachment option based on your scenario.

Add Partner VLAN attachment

1 Check your connection
2 Add VLAN attachments
3 Connect to your VPC networks

A VLAN attachment allows you to access your VPC network by adding a VLAN to your existing service provider connection. [Learn more](#)

Redundancy
 Creating a redundant pair of VLANs is recommended to increase availability. If you don't need redundancy or an SLA, you can create a single VLAN attachment (and make it redundant later). [Learn more about redundancy](#)

Create a redundant pair of VLAN attachments (recommended)
 Add a redundant VLAN to an existing VLAN
 Create a single VLAN (no redundancy)

VPC Network
 default

Region
 australia-southeast1

VLAN A

Cloud Router
VLAN attachment name

Description (Optional)

VLAN B

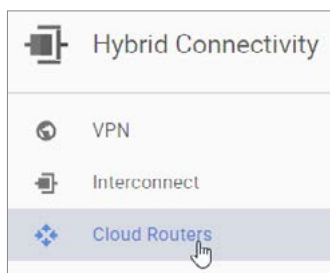
Cloud Router
VLAN attachment name

Description (Optional)

Note - There is no option to select which **“Edge Availability Domain”** the peering connects to if the “Create Single VLAN” option is selected. Google automatically selects the location (either S1 and SY3).

Note – The speed of the VLAN attachment cannot be selected. The speed will be selected via the AXON portal.

Note – Configure a “Cloud Router” first before proceeding with above step. Use the below drop down for this purpose. This step only needs to be performed once.



Note – Cloud routers cannot use any AS number for partner VLAN attachments. **The default ASN shown needs to be used (i.e. 16550, one of the Google ASN's)**

f. Once created you will be given the Pairing keys required to use on the AXON portal.

Add Partner VLAN attachment

✓ Check your connection
✓ Add VLAN attachments
3 Connect to your VPC networks

Pairing key
To complete the VLAN attachment, go to your service provider's portal and add a connection to Google. You'll be prompted to provide a pairing key to complete the connection.

VLAN attachment name	Pairing key
nextdc-s1-handoff-vlan-attachment-test1	a7c09472-66e8-4ac0-a73c-b96194415530/australia-southeast1/1
nextdc-sy3-handoff-vlan-attachment-test1	69cbc9f0-12da-4e3d-99c3-ac3d79ca0ab0/australia-southeast1/2

Pre-activate these VLAN attachments ⓘ

 Enable

OK

STEP 3 Order the Google Cloud Interconnect via AXON Portal

Login to the AXON portal at <https://portal.axonvx.com> and select "Create New Service" and fill in the required details

Google Cloud Interconnect Services

+ Create New Service

Required details/inputs to order the service

- A-End port and local VLAN
- Pairing key given by Google
- Required Speed/bandwidth of VLAN attachment (Available speeds are 50M, 100M, 200M, 300M, 400M, 500M, 1G, 2G and 5G)

STEP 4 The following will appear in the Google Cloud Platform which requires an action to finish the provisioning of the VLAN attachment

Interconnect REFRESH SHOW INFO PANEL

VLAN attachments Physical connections

⚠ Partner VLAN attachment "nextdc-s1-handoff-vlan-attachment-test1" is waiting for activation Activate

VLAN attachments are connections between your local routers and Google Cloud routers for your Dedicated or Partner Interconnects

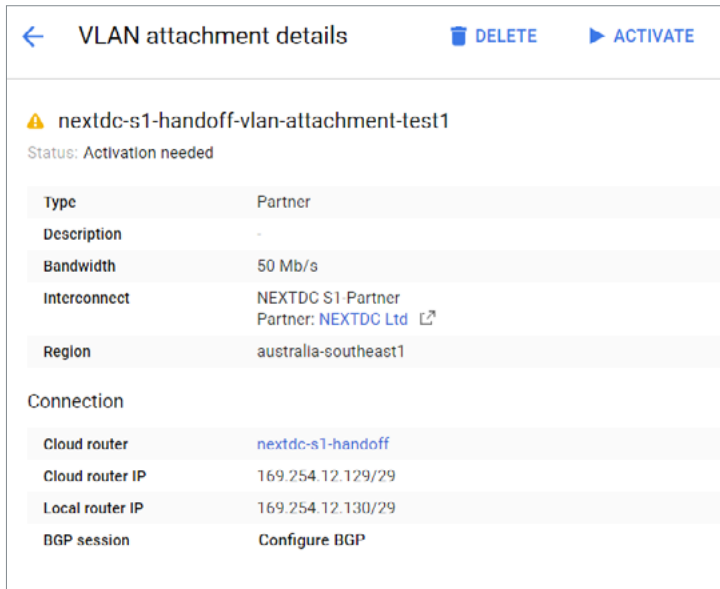
Add VLAN attachment

nextdc-s1-handoff-vlan-attachment-test1 Filter VLAN attachments

Name	Region	Status	Type	Cloud Router	VLAN ID	Cloud Router IP	On-premises router IP	Interconnect	Actions
✓ nextdc-s1-handoff-vlan-attachment-test1	australia-southeast1	⚠ Activation needed	Partner	nextdc-s1-handoff		169.254.12.129/29	169.254.12.130/29	NEXTDC S1-Partner Partner: NEXTDC Ltd	Activate

a. ACTIVATE the VLAN attachment as below.

Note – Google will automatically allocate IP addresses for VLAN attachments.



VLAN attachment details [DELETE] [ACTIVATE]

nextdc-s1-handoff-vlan-attachment-test1
Status: Activation needed

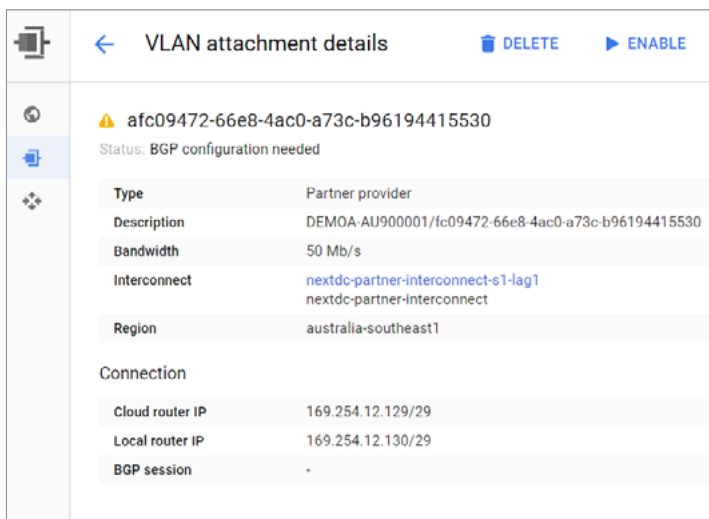
Type	Partner
Description	-
Bandwidth	50 Mb/s
Interconnect	NEXTDC S1 Partner Partner: NEXTDC Ltd
Region	australia-southeast1

Connection

Cloud router	nextdc-s1-handoff
Cloud router IP	169.254.12.129/29
Local router IP	169.254.12.130/29
BGP session	Configure BGP

Note – Once the VLAN attachment is activated, Google will create IP interfaces. MAC addresses will be learnt via the EXC, but traffic will not be allowed until “Configure BGP” is completed.

b. Configure BGP in the Google Cloud Platform by adding your ends ASN.



VLAN attachment details [DELETE] [ENABLE]

afc09472-66e8-4ac0-a73c-b96194415530
Status: BGP configuration needed

Type	Partner provider
Description	DEMOA-AU900001/fc09472-66e8-4ac0-a73c-b96194415530
Bandwidth	50 Mb/s
Interconnect	nextdc-partner-interconnect-s1-lag1 nextdc-partner-interconnect
Region	australia-southeast1

Connection

Cloud router IP	169.254.12.129/29
Local router IP	169.254.12.130/29
BGP session	-

It is important to remember the following regarding the BGP Peering and IP connectivity

- MTU of 1440 on the IP sub-interface
- **EBGP multi-hop for the BGP session**
- Use the default values for all timers such as the BGP session hold time.
- If your device supports BGP graceful restart, enable this and use the default values for the restart and stalepath timers. Graceful restart prevents BGP sessions from dropping and routes from withdrawing during Cloud Router maintenance.
<https://cloud.google.com/interconnect/docs/how-to/dedicated/configuring-onprem-routers>

c. Configure BGP on your on premises router. Once complete Google Cloud Platform will show BGP up as follows:

Interconnect [REFRESH](#)

VLAN attachments Physical connections

VLAN attachments are connections between your local routers and Google Cloud routers for your Dedicated or Partner Interconnects.

[Add VLAN attachment](#)

nextdc Filter VLAN attachments X Columns

<input type="checkbox"/> Name ^	Region	Status	Type	Cloud Router	VLAN ID	Cloud Router IP	On-premises router IP	Interconnect	Actions
<input type="checkbox"/> nextdc-s1-handoff-vlan-attachment-test1	australia-southeast1	✔ Up	Partner	nextdc-s1-handoff		169.254.12.129/29	169.254.12.130/29	NEXTDC S1-Partner Partner: NEXTDC Ltd ↗	⋮
<input type="checkbox"/> nextdc-sy3-handoff-vlan-attachment-test1	australia-southeast1	✔ Up	Partner	nextdc-sy3-handoff		169.254.42.89/29	169.254.42.90/29	NEXTDC SY3-Partner Partner: NEXTDC Ltd ↗	⋮

Steps to delete a Google Cloud Partner Interconnect via AXON

To delete the service login to the AXON portal and delete the correct service. The respective VLAN attachment will show in "Defunct" state in the Google Cloud Platform. Select the service and then delete it.

AXON Port Specifications

Interface options

Following are the standard interface options to connect to AXON.

If you have a specific requirement that is not covered by these options, please contact your account manager.

Speed (Gbps)	Distance	Optic Type
1 Gbps	10 KM	1G-LX
10 Gbps	1 KM	10G-LRL
10 Gbps	10 KM	10G-LR
40 Gbps	1 KM	40G-LRL
40 Gbps	10 KM	40G-LR

* LRL optics are compatible with LR optics, if your vendor only supplies LR optics and you are interconnecting with us over fibre that is shorter than 1km you should select LRL and use appropriate attenuators.

Service attributes

Service Attributes	Parameter
MAC Layer	802.3-2002
MTU	9100
Port Mode	802.1q Trunk
VLAN Ethertype	0x8100

* MTU of 9100 is valid for AXON network components. Please check the capabilities of the party you are connecting to.

NEXTDC support contacts

The AXON Helpdesk can be contacted using the information below.

AXON help desk

Phone (Australia)	1300 698 677
Phone (International)	+61 7 3177 4799
Technical support	nxtops@nextdc.com
Service provisioning	nxtops@nextdc.com

Day	Hours of operation	Service faults
Monday	09:00 - 18:00	24 hours
Tuesday	09:00 - 18:00	24 hours
Wednesday	09:00 - 18:00	24 hours
Thursday	09:00 - 18:00	24 hours
Friday	09:00 - 18:00	24 hours
Saturday	CLOSED	24 hours
Sunday	CLOSED	24 hours

Terms and Conditions and SLA

A copy of our Terms and Conditions and Service Level Agreement can be found here:

https://www.nextdc.com/storage/app/media/NEXTDC_AXONVX_Terms_and_Conditions_Final-20170520.pdf

Glossary

AXON network

Term	Explanation
AXON Enabled data centre (DC)	A data centre containing an AXON point of interconnect (POI)
Campus	A cluster of AXON DC's which are close to each other and are treated as if they are one datacentre.
Cross Connect	A pair of single mode optical fibre (SMOF) cables connecting the customer to an AXON point of interconnect (POI). One Cross Connect is required for every AXON port.
Cross Connect - Local	A physical cross connect for which both the A-END and B-END reside in the same AXON DC.
Cross Connect - Carrier	A physical cross connect in which the B-END is external to the AXON DC it is connecting to. eg. A cross town dark fibre, Ethernet or wavelength service.
Edge Switch	AXON System's customer facing network equipment.
Fabric	A network region usually defined by city, state/territory or international borders. AXON is built as a series of fabrics (Sydney, Melbourne, Brisbane etc.) or network islands which are interconnected by partner carriers.
Interconnect	A Cross Connect and an AXON port used to physically connect customers to the AXON fabric.
Point of Interconnect (POI)	The fibre patch panel that customers order cross connects to. Generally located in the carrier interconnect room of an AXON DC.
Single Mode Optical Fibre (SMOF)	Optical fibre cable which complies with or exceeds ITUT Recommendations G.652 or G.652D

Glossary

AXON products

Term	Explanation
AXON port	The physical switch port on an AXON edge switch that is allocated to an AXON customer. This is the point of demarcation between AXON and its customers.
Ethernet Cross Connect (EXC)	A layer 2 interconnect between two or more AXON ports.

AXON connected entities

Term	Explanation
Customer	A business or organisation that has signed up for an AXON account with a view to consuming AXON delivered services.
Integration Partner	An IT/network service organisation that has signed up for an AXON account with a view to using AXON to deliver value added products and services to their customers.
Carrier	A licensed carrier who owns significant physical network assets, has signed a carrier agreement and has interconnected with AXON with a view to consuming AXON delivered services.
Partner Carrier	A licensed carrier who owns significant physical network assets, has signed a partner carrier agreement and has interconnected with AXON with a view to consuming and also selling AXON delivered services which can be rapidly provisioned, modified and torn down ideally via API offering on demand elastic purchasing options in line with the overall ethos of the AXON product set.
Cloud Provider	A business or organisation which delivers high value cloud based services targeted at the SMB/enterprise & government markets. Cloud providers must own unique infrastructure or intellectual property which operates at scale, can be rapidly provisioned via API and offers on demand elastic purchasing options in line with the overall ethos of the AXON product set.