

AXON TECHNICAL BRIEF

Google Cloud Interconnect

USER GUIDE



Contents

Introduction to AXON	3
Google Cloud	4
Dedicated Interconnect (POP)	7
Partner Interconnect	8
Onboarding process	9
Technical requirements	10
Redundant design technical requirements	11
Steps to delete a Google Cloud Partner Interconnect via AXON	12
AXON port specifications	13
NEXTDC support contacts	14
Glossary	15



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.

Dedicated Interconnect is available as 10Gbps and 100Gbps.

Partner Interconnect capacity ranges from 50Mbps to 10Gbps 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:



Each geographic area has different regions and within each region are different zones.

Google Cloud **Australia-Southeast1** in Sydney, Australia comprises of 3 zones:

- Australia-Southeast1-a
- Australia-Southeast1-b
- Australia-Southeast1-c.

Google Cloud **Australia-Southeast2** in Melbourne, Australia comprises of 3 zones:

- Australia-Southeast2-a
- Australia-Southeast2-b
- Australia-Southeast2-c.

More information

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>

NEXTDC offers three Google cloud interconnect products:

DEDICATED INTERCONNECT (POP)

A Dedicated Interconnect is available in NEXTDC locations which have an on-site Google Cloud point of presence (POP) and is available in 10Gbps or 100Gbps.

MANAGED DEDICATED INTERCONNECT

A Managed Dedicated Interconnect is for customers who require 10Gbps access into Google Cloud from an AXON POP that does not have an on-site Google Cloud POP. Managed Interconnect can be delivered to any AXON POP nationally.

PARTNER INTERCONNECT

A Partner Interconnect is for customers who require 50Mbps to 10Gbps access into AWS. Partner Interconnect services are delivered within 60 seconds of ordering to your AXON Port and can be delivered to any AXON POP nationally.

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More information

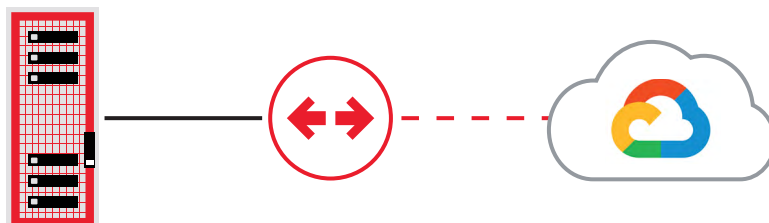
For the latest details on Google on-ramps in Oceania see:
<https://cloud.google.com/network-connectivity/docs/interconnect/concepts/choosing-colocation-facilities#oceania>

Dedicated Interconnect (POP)





Google Dedicated Interconnect is available in NEXTDC locations which have an on site Google Dedicated Interconnect POP and is available in 10Gbps or 100Gbps.

To order use the following procedure:

- 1 Sign up for Google Cloud and order a Dedicated Interconnect port via the Google Cloud console. You will be directly billed by Google for the dedicated port in addition to your usage charges.
- 2 Wait for the Google Cloud Letter of Authority (LOA) for your Dedicated Interconnect port on the Google Cloud network, this letter will contain the information you need to order your cross connect and an authority to connect from Google Cloud.
- 3 Login to ONEDC and order a Cross Connect to the location mentioned in the LOA documentation.
- 4 You will receive an email from NEXTDC confirming your order, reply to this email and attach the LOA as confirmation that you are authorised to connect to Google Cloud infrastructure.
- 5 NEXTDC will email you a notice of completion, once this has arrived your Dedicated Interconnect will be ready for activation on your equipment.
- 6 Your Dedicated Interconnect will be configurable via the Google Cloud web portal.



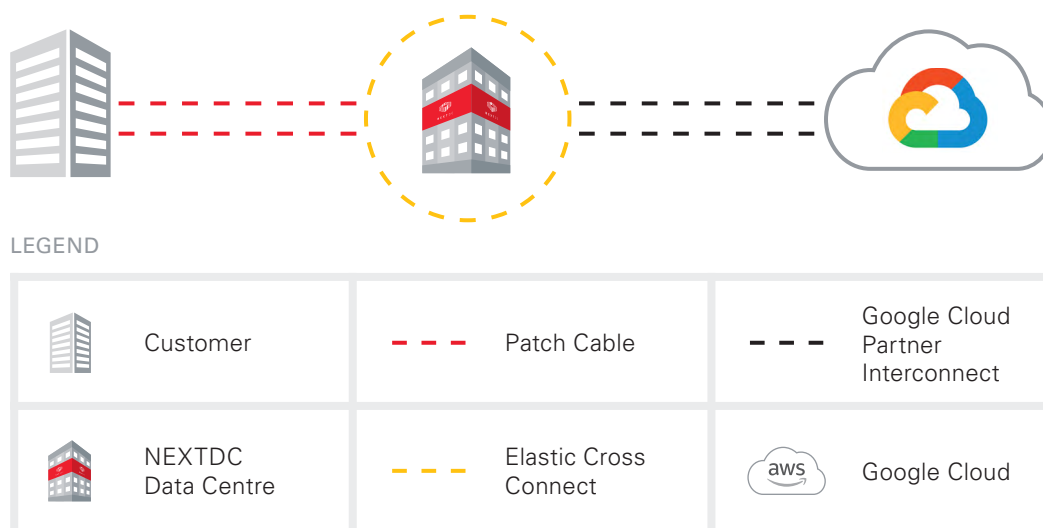
LEGEND

	Customer Rack		Physical Cross Connect		Dedicated Interconnect		Google Cloud
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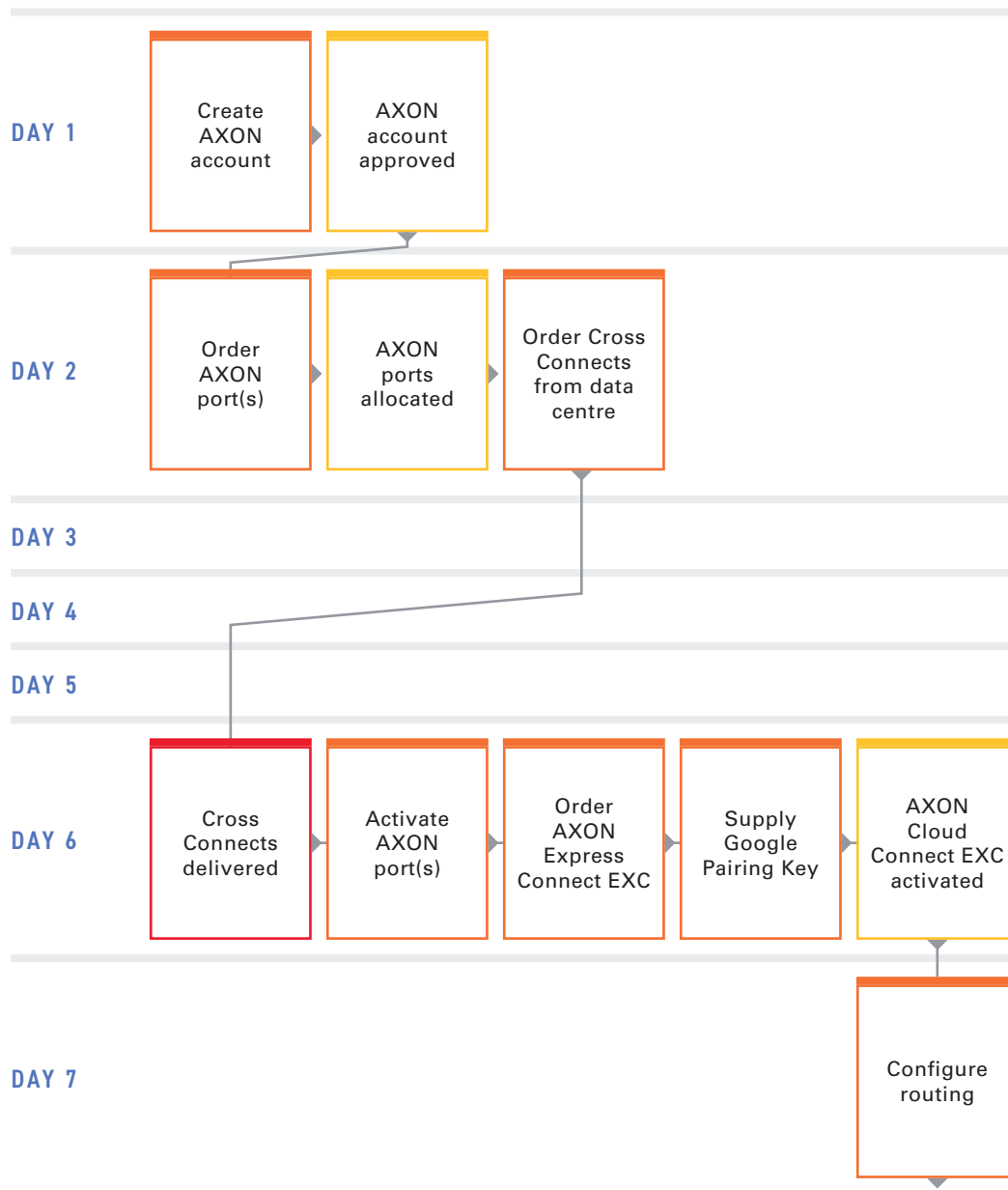
Partner Interconnect

To order use the following procedure:

- 1 Sign up for AXON - your sales person will send you a link.
- 2 Order minimum 1 x AXON port via the AXON portal (1Gbps, 10Gbps, 40Gbps or 100Gbps in selected locations) depending on your total connectivity capacity requirements. You will receive an email with Point of Interconnect (POI) information.
- 3 Order 1 x Single Mode Fibre (SMOF) Cross Connects per AXON port to the AXON POI from your data centre provider.
- 4 Sign up for Google Cloud.
- 5 Activate your AXON ports by plugging the cross connects in and activating the port on your network equipment.
- 6 Order Partner Interconnect from your Google Cloud account
- 7 Order Elastic Cross Connects (EXCs) from AXON. Supply
 - a. Google Cloud account ID.
 - b. Bandwidth – Available options (50Mbps, 100Mbps, 200Mbps, 300Mbps, 400Mbps, 500Mbps, 1Gbps, 2Gbps, 5Gbps and 10Gbps).
 - c. VLAN ID(s) for AXON to deliver Partner Interconnect on your AXON Port. AXON will provision and activate your Partner Interconnect.
- 8 Configure Layer 3 routing via your Google Cloud account.



Onboarding process



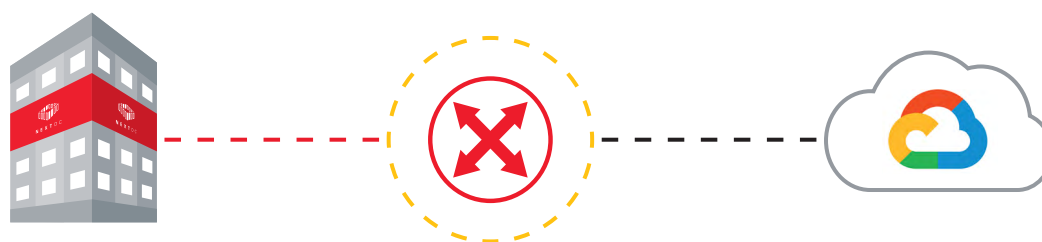
LEGEND









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.
1Gbps, 10Gbps or 100Gbps capable network switches or routers	1	You can connect to AXON using either routers or switches. If you choose to use switches, you will need to pass Google Cloud traffic to BGP capable routers via appropriately dimensioned connectivity.
1Gbps, 10Gbps or 100Gbps capable network optics	1	Optic options are: <ul style="list-style-type: none"> ■ 1G-LX (10KM) ■ 10G-LRL (1KM) ■ 10G-LR (10KM) ■ 100G-LR4 (10KM) 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.
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



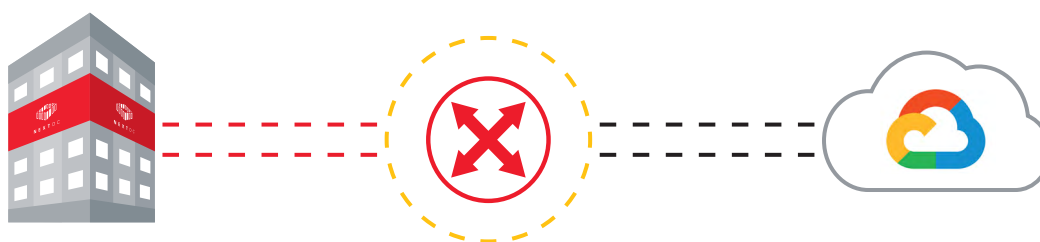
LEGEND

 Cross Connect	 Ethernet Cross Connect (EXC)	 Google Cloud Interconnect
 NEXTDC Data Centre	 AXON Fabric	 Google Cloud







Redundant design technical 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.
1Gbps, 10Gbps or 100Gbps capable network switches or routers	2	You can connect to AXON using either routers or switches. If you choose to use switches, you will need to pass Google Cloud traffic to BGP capable routers via appropriately dimensioned connectivity.
1Gbps, 10Gbps or 100Gbps capable network optics	2	Optic options are: <ul style="list-style-type: none"> 1G-LX (10KM) 10G-LRL (1KM) 10G-LR (10KM) 100G-LR4 (10KM) 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.
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 - MINIMUM REQUIREMENTS



LEGEND

 Cross Connect	 Ethernet Cross Connect (EXC)	 Google Cloud Interconnect
 NEXTDC Data Centre	 AXON Fabric	 Google Cloud

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.

More information

Customers can obtain all Google product documentation here:

<https://cloud.google.com/docs>

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
100 Gbps	10 KM	100G-LR4

* 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

AXON help desk

The AXON help desk can be contacted using the information below:



Phone (Australia)

1300 698 677



Phone (International)

+61 7 3177 4799



Technical support

nxtops@nextdc.com



Service provisioning

nxtops@nextdc.com

Hours of operation:



Monday – Friday

09:00 - 18:00

Sunday & Saturday

Closed



Service faults

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/axon-terms-of-service>

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 data centre.
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.

AXON products

Term	Explanation
AXON port	<p>The physical switch port on an AXON edge switch that is allocated to an AXON customer.</p> <p>This is the point of demarcation between AXON and its customers.</p>
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.