AXON

Technical Brief

AWS Direct Connect

NEXTDC

aws

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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 award-winning[1] Software Defined Networking platform, AXON.

AXON's high-speed 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.

1 Australian Communications Industry Awards (ACOMMs) 2024 Winner: Best Digital Platform (AXON).

AWS Direct Connect

AWS Direct Connect is a service that enables you to create private connections between your AWS cloud services and your infrastructure located on your premises or in a colocation environment. AWS Direct Connect connections do not go over the public internet therefore offering greater reliability, faster speeds, lower latencies and greater levels of security than typical connections over the public internet. NEXTDC offers both AWS Direct Connect variants:

Dedicated Connection

AWS Direct Connect – Dedicated Connection is available in NEXTDC locations which have an on-site AWS Direct Connect Point of Presence (PoP) and is available in 1Gbps, 10Gbps, 100Gbps and 400Gbps. You connect directly to a dedicated AWS port.

Hosted Connection

AWS Direct Connect – Hosted Connection is for customers who require 50Mbps to 10Gbps access into AWS via an AWS Direct Connect partner. You connect via AXON ports in AXON PoPs. AXON delivers Hosted Connections to your AXON ports at any AXON PoP in Australia within a minute of ordering.

AWS Direct Connect guide

Further information on configuring AWS Direct Connect can be found at:

http://docs.aws.amazon.com/directconnect/latest/UserGuide/

GUIDE

AWS Direct Connect – Dedicated Connection

Dedicated Connections are available in NEXTDC locations which have an on-site AWS Direct Connect Point of Presence and are available in 1, 10, 100 and 400Gbps speeds.

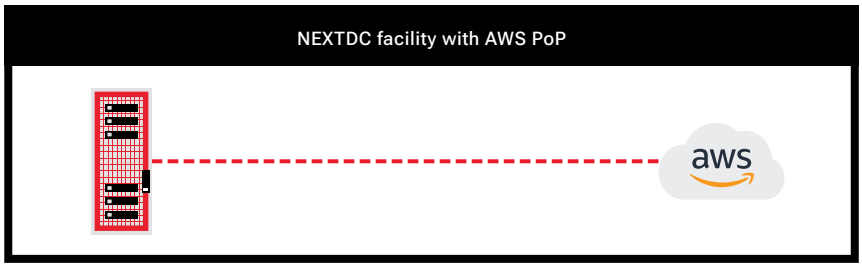
The diagram below shows four use cases and their solutions. Use case A shows how to connect to an AWS PoP within a NEXTDC facility. Use case B addresses how to connect to an AWS PoP in a NEXTDC facility from another NEXTDC facility in the same metro area.

To order use the following procedure:

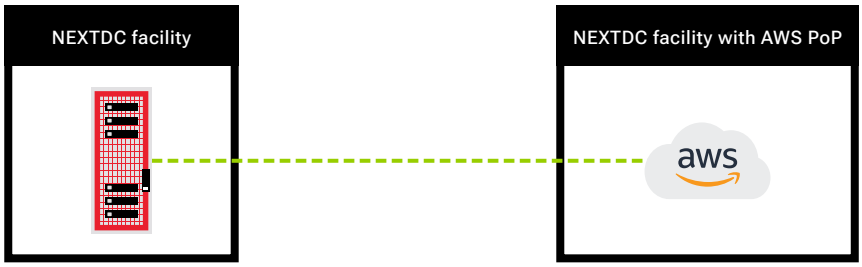
1. Sign up for AWS Direct Connect from Amazon and order a Dedicated Connect via the AWS console. You will be directly billed by Amazon for the dedicated port in addition to your usage charges.
2. Wait for the AWS Letter of Authority (LOA) for your dedicated port on the Amazon network. This letter will contain the authorisation by AWS to connect into their network device and the information you need to order your cross connect from NEXTDC.
3. Login to ONEDC and order a cross connect, or between facilities within a metro area a DCIe service or a DCIf[1] service, from your rack to the location mentioned in the LOA documentation, uploading the LOA when adding the AWS location details.
4. NEXTDC will notify you of completion, and your Dedicated Connection will be ready for activation on your equipment.
5. Your Dedicated Connection will be configurable in the AWS Console.

1 You will be able to connect to a AWS Direct Connect PoP in a facility from your rack in another facility via dark fibre if the fibre path between the facilities is 10km or less.

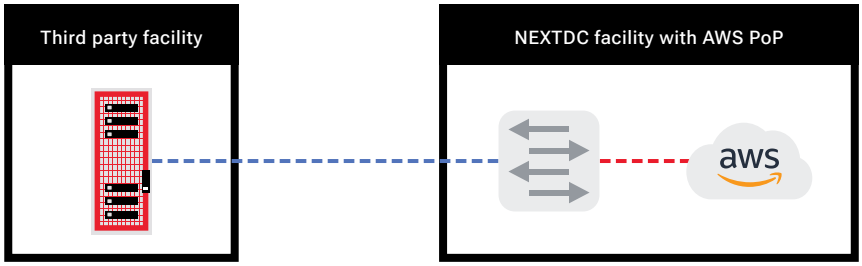
Use case A:
Connect to AWS on-ramp via Cross Connect (XC)



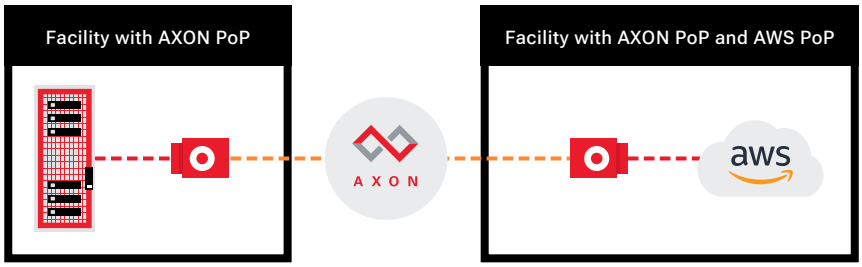
Use case B:
Connect to AWS on-ramp via Data Centre Interconnect (DCIe or DCIf)



Use case C:
Connect to AWS on-ramp from on-premises infrastructure



Use case D:
Connect to AWS via AXON



In case you need to connect from a 3rd-party facility outside the NEXTDC network – use case C – you can get a carrier to connect you into the AWS PoP. Please work with a carrier of your choice to get the service delivered.

In those scenarios where your colocation is located in a facility with an AXON PoP, you can connect to an AWS PoP via a point-to-point connection built on AXON.

LEGEND

Customer rack	AXON port	Interconnect room	AWS Cloud
Cross connect	DCIe or DCIf service	Carrier service	EXC

AWS Direct Connect – Hosted Connection

Hosted Connections are available from any AXON Point of Presence to any AXON Point of Presence that is collocated with an AWS Direct Connect Point of Presence.

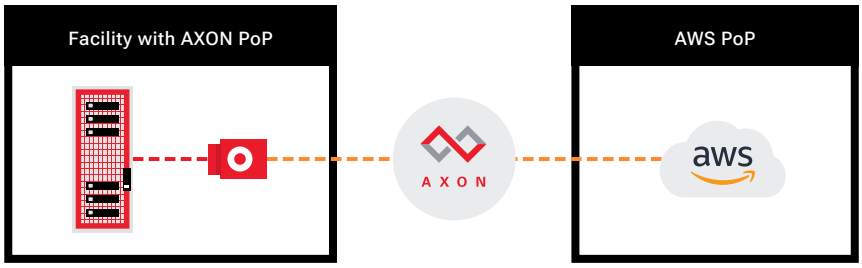
The diagram below shows two use cases and their solutions. Use case A shows how to connect to an AWS PoP from a facility with an AXON PoP.

To order use the following procedure:

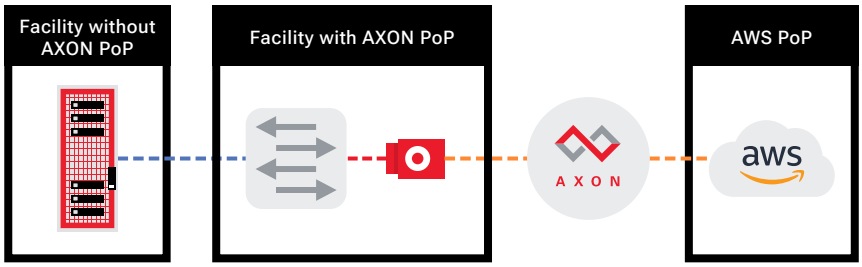
1. Sign up for AXON - your sales account manager will send you a link.
2. Accept the email invite to log in to the AXON portal.
3. Sign up for AWS Direct Connect from AWS.
4. Log in to the AXON portal and order 1 x AXON port per diverse connection you wish to establish. You will see the MeetMe information in the AXON port details and in an email sent to you.
5. Order 1 x dual-core single-mode cross connect per AXON port from your rack to the AXON port MeetMe location from your data centre provider. NEXTDC facilities cross connects are ordered in ONEDC.
6. Activate your AXON ports by plugging the cross connects in within your rack and activating the port on your network equipment.
7. Order AWS Direct Connect - Hosted Connection from your AWS account.
8. Order Elastic Cross Connects (EXCs) in the AXON portal.
9. Supply AWS account ID.
10. Choose an AXON port and bandwidth option – available as 50Mbps, 100Mbps, 200Mbps, 300Mbps, 400Mbps, 500Mbps, 1Gbps, 2Gbps, 5Gbps and 10Gbps.
11. Select VLAN IDs for AXON EXCs to deliver AWS Direct Connect on your AXON port.
12. AXON will provision and activate your AWS Direct Connect.
13. Configure Layer 3 routing in the AWS Console.

In case you need to connect to an AWS PoP from your colocation in a facility that does not have an AXON PoP – use case B – you can get a carrier of your choice to connect you to your AXON port at an AXON PoP.

Use case A:
Connect to AWS on-ramp via AXON



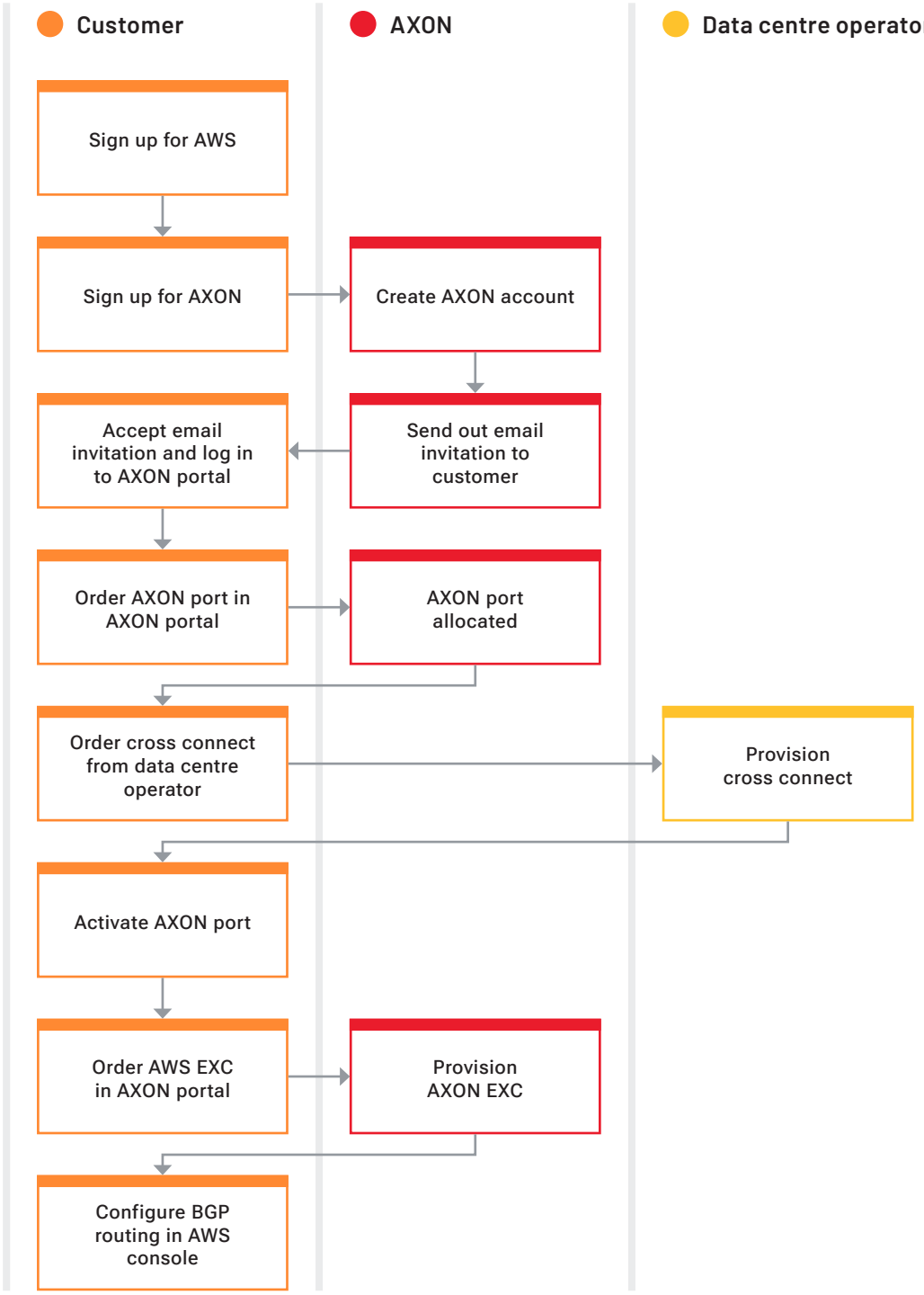
Use case B:
Connect to AWS on-ramp via third-party carrier service and AXON



LEGEND

Customer rack	AXON port	Interconnect room	AWS Cloud
Cross connect	DCIe or DCIf service	Carrier service	EXC

Setting up your AWS Direct Connect - Hosted Connection



Technical requirements

Following are the minimum requirements to connect to AWS Direct Connect via AXON.

Prerequisites

Item	Qty	Comment
Cross Connect	1 for single connection OR 2 for redundant connection (recommended)	Dual Core - Single Mode Fibre (SMOF) Cross Connects are required to interconnect with AXON for connection to AWS Direct Connect.
10Gbps or 100Gbps Network Switch or Router	1 for single connection OR 2 for redundant connection (recommended)	You can connect to AXON using either a router or a switch. If you choose to use a switch, you will need to pass Direct Connect traffic to a BGP capable router via appropriately dimensioned connectivity.
Network Optics	1 for single connection OR 2 for redundant connection (recommended)	Optics options for AXON ports are: ▪ 1G-LX (10KM) ▪ 10G-LRL (1KM) ▪ 10G-LR (10KM) ▪ 100G-LR4 (10KM) 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. Longer distances are supported on demand. Please discuss unique requirements and solution options with NEXTDC sales representatives. You will need to set the 1Gbps port that connects to a 1G AXON port to 1G/full-duplex.
BGP Router	1 for single connection OR 2 for redundant connection (recommended)	BGP capable routers are required to connect to Direct Connect.
Autonomous System Number (ASN)	1	You will require a BGP ASN to connect to Direct Connect.
Amazon AWS Account ID	1	To sign up for Direct Connect you will require a working AWS account ID with active virtual networking resources in it.

Handoff options

When ordering Direct Connect via AXON you will need to use the handoff option VLAN Trunk Mode (802.1q).

Item	Qty	Comment
Handoff	VLAN Trunk Mode (802.1q)	
Direct Connect VLAN IDs	1 for single connection OR 2 for redundant connection (recommended)	You will need to provide the local VLAN IDs for each of your Direct Connect peering sessions.

Service attributes

Service Attributes	Parameter	Comment
MAC Layer	802.3-2002	
MTU	9100	MTU of 9100 is valid for AXON network components. Please check the capabilities of the party you are connecting to.
Port Mode	802.1q Trunk	
VLAN Ethertype	0x8100	

AWS Direct Connect peering

STEP 1

Connecting to AWS via AXON

Once AXON completes the provisioning of the AWS Direct Connect, you will see a Hosted Connection in “pending acceptance” state under the Connections menu of the AWS Direct Connect console.

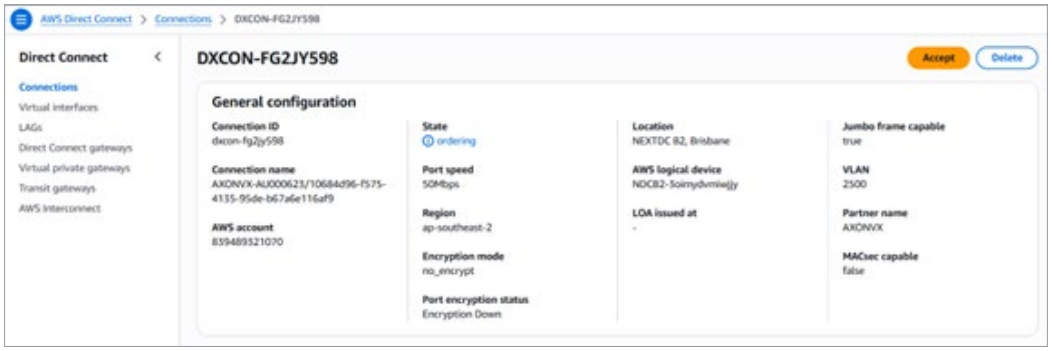


Image 1: AWS Hosted Connection in Pending Acceptance State

During completion of this phase you will receive an AWS Direct Connect provisioning completion email by AXON.

STEP 2

Accept the Hosted Connection

Accept the connection Provided by “AXON”. Once the connection has been accepted the connection will appear as below in “pending” state.

Image 2: AWS Hosted Connection in Pending State

After few minutes Hosted Connection goes to available state. This time can vary.

Image 3: AWS Hosted Connection in available state

STEP 3

Create AWS Virtual Private Gateway

Create virtual interface in order to setup the peering between your AXON connected equipment and AWS VPC (Virtual Private Cloud).

Create Virtual Private Gateway under “AWS -> Networking -> VPC”.

Image 4: AWS Console Networking Menu

After selecting VPC select “Virtual Private Gateway” as follows.

Image 5: AWS VPC Dashboard

Then Create Virtual Private Gateway as follows.

Image 6: Creating Virtual Private Gateway in AWS

STEP 4

Attach Virtual Private Gateway to VPC

After selecting the newly created Virtual Private Gateway, attach it to VPC as follows.

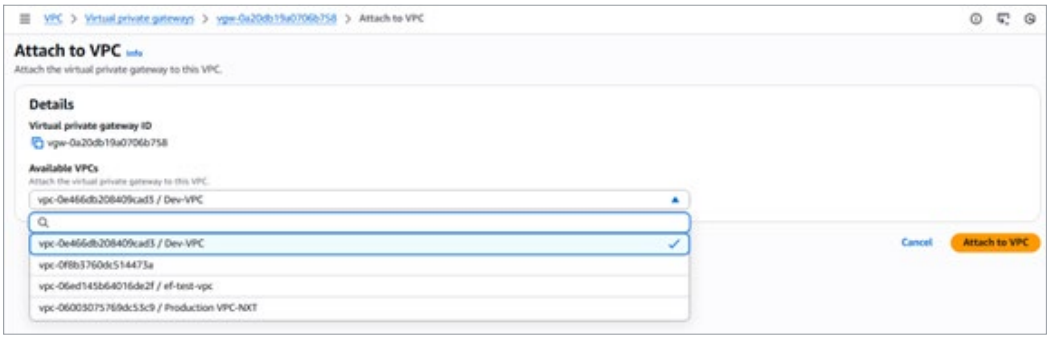


Image 7: Attaching Virtual Private Gateway in AWS

STEP 5

Create AWS Virtual Interface with BGP peering

Once VPC configuration has been completed we can create a Virtual Interface under Connections. Click on Create Virtual Interface as follows.

Image 8: Create Virtual Interface in AWS

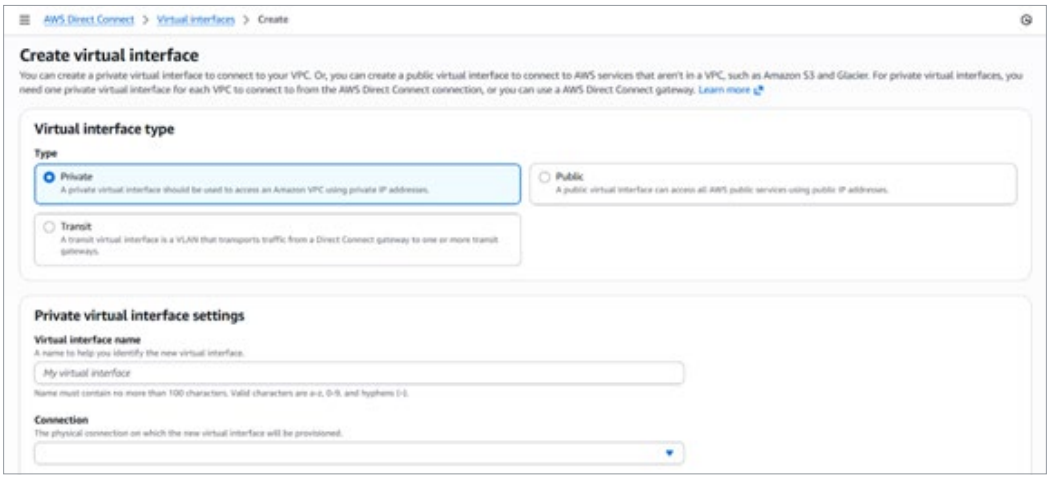


Image 9: Virtual Interface Configuration in AWS

Once the Virtual Interface is created it will show as state “pending” initially and move to “down”.

Image 10: Virtual Interface in pending state

Image 11: Virtual Interface in down state

Then configure the local site according to the specified BGP information. Once BGP peering establishes the state of the virtual interface will change to “available”.

STEP 6

Setup BGP peering

The final step is to set up the BGP peering. Choose Virtual Interfaces, select the virtual interface and Add peering.

AWS allows you to configure your BGP peering in two ways:

- **Active/Active (BGP Multipath)**
  Network traffic will get load balanced across connections. This is the AWS recommended method and AWS end default configuration.
- **Active/Passive (Failover)**
  One connection is active and the other one is standby. If the active connection becomes unavailable, all traffic routed via the other path.

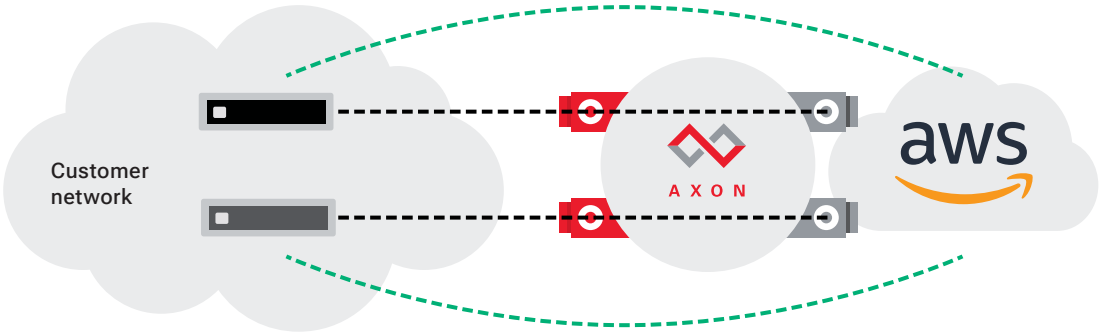


Image 12: BGP peering setup for AWS

LEGEND

AXON port	VIF	AWS Cloud
Customer's primary networking device	Customer's secondary networking device	BGP peering

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

TERMS

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) connecting the customer to an AXON point of interconnect (POI) within a facility. One Cross Connect is required for every AXON port.
DCIe	NEXTDC's layer 1 interconnect between its facilities within the same metro area.
DCIf	NEXTDC's dark fibre interconnect between its facilities within the same metro area.
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	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.
Elastic Cross Connect (EXC)	A layer 2 interconnect between two or more AXON ports.
AWS Direct Connect – Dedicated Connection	An AWS Direct Connect service delivered directly to the customer over a cross connect. Dedicated Connections are available in NEXTDC locations which have an on-site AWS Direct Connect Point of Presence (PoP).
AWS Direct Connect – Hosted Connection	Hosted Interconnect is for customers who require flexible bandwidth access into AWS. Hosted Connections are delivered over AXON and can be delivered to any AXON point of presence.

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.
Cloud Provider	A business or organisation which delivers high value cloud-based services targeted at the SMB/enterprise & government markets. Cloud providers own unique infrastructure or intellectual property which operates at scale, can be rapidly provisioned via API and offers on demand elastic purchasing options.