

Network Engineer

In collaboration with



Overview

nbn network engineers help design, build and maintain Australia's largest infrastructure project; providing internet across the country. Whether you want to be hands-on and work outdoors or would prefer to work from an office, there's opportunities to suit both needs in this career path.

On the two sides of the network engineering coin, are network engineers and field technicians. Field technicians work in the field to physically connect customers to the network, resolving customer faults or installing new hardware, while a network engineer's role is to work on projects like network technology innovation roadmaps and solutions, systems and network architecture or technical and security engineering.

The best part of a network engineering career with nbn is the opportunities available for varying levels of expertise; whether you are just finishing school or looking to undertake a university degree. Plus, for some of their roles, you can even be earning while undertaking the required training for the role. Whether you are out in the field or based in one of the offices, the nbn works as a unified team to continually lift the digital capability of Australia.

A Day in the Life

A big part of a Data Scientists everyday job is to collect, clean, analyse and visualise organisation's data – at CommBank this includes financial and customer data to help provide better insights and advice. Let's explore what all of these terms mean in the role of a Data Scientist.

But what do all these terms mean when it comes to treating data?

Field Technician

Connecting Customers:

One of the main responsibilities of field technicians is connecting customers to the nbn network. The process involves surveying the site, following safety procedures, installing equipment and connecting it with wiring.

Resolving Faults:

If a customer has lost connection to the network or there is a problem with the connection, a technician will undergo troubleshooting to find the fault and resolve it.

Installing new hardware:

If a customer is experiencing problems with hardware, an updated piece of hardware is available, or the network is being expanded, technicians will go to the job site to install the hardware that is needed to keep the network running and customers connected.

Network Engineer

Creating roadmaps:

This involves planning and designing roadmaps for data to flow through to ensure everyone has a reliable connection while making sure the flow is as efficient as possible.

Creating network architecture:

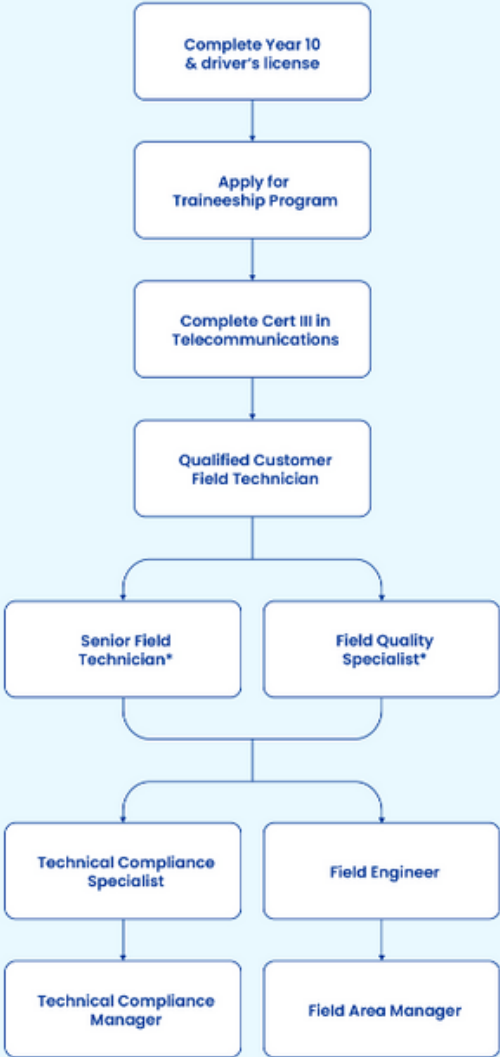
Once the roadmap has been planned, network engineers must then design the framework that will allow the network to run. They take into account safety, security and cost, among other factors, to make decisions.

Technical and security engineering:

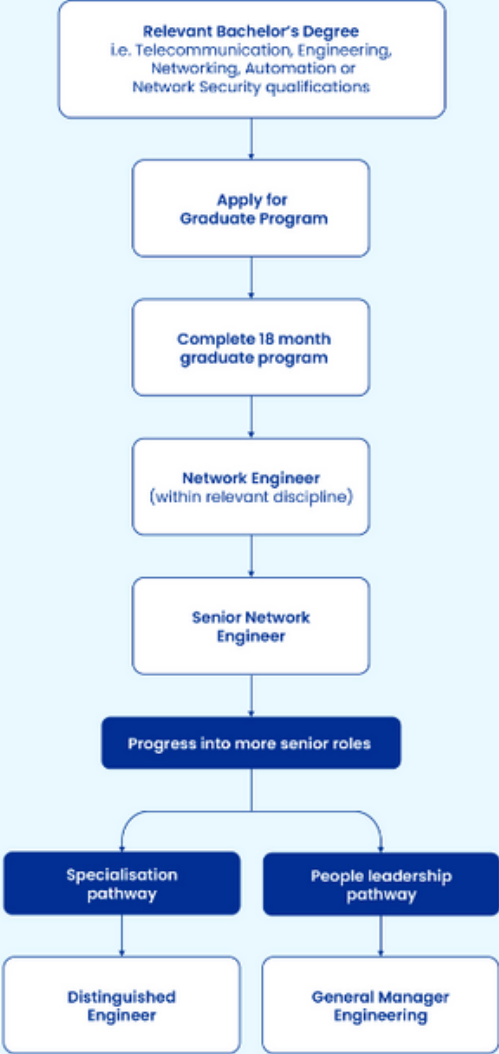
A crucial part of a network engineer's role is to ensure there are protocols in place to keep their network secure. This involves setting up encryption, firewalls and other security measures while also monitoring threats in real-time.

Pathways

Customer Field Technician



Graduate Network Engineer



*Industry experience and additional qualifications form part of the suitability assessment for additional roles

Supporting Documents

Recruitment Process

Designing and building the nbn broadband access network is an exciting, fast-paced program that's changing our nation. Meanwhile, we've designed our recruitment process to attract and find the best talent. We aim to support candidates to help them find out whether the role is a good fit, and our recruitment process is as inclusive and supportive as possible for all applicants.

nbn aims to provide a positive, barrier-free recruitment process for people with disability or accessibility needs by making reasonable adjustments to the recruitment process. If you have any support or access requirements, please contact the Talent Acquisition Team at the time of application via recruitment@nbnco.com.au so we can assist you through the recruitment process.

We recommend you prepare yourself for multiple rounds of interviews. The recruitment process below may vary based on the role you've applied for. Should you be unsuccessful at any stage, we will notify you as soon as possible.

1

Apply online

Review our current job openings and decide which role (or roles) you might want to apply for. Make sure your CV is up to date before submitting, and prepare to answer some questions about your skills and experience.

2

First round interviews

For successful applicants, the first stage of the interview process will involve a phone interview (and in some cases a video interview) with one of our recruitment business partners. Be prepared to answer additional questions about your experience and motivators. This is also an opportunity to ask any questions you may have about the company, the role or the hiring process.

3

Second round interviews

Based on the success of your phone (or video) interview, you'll be invited to an **nbn** office to meet with a hiring manager and the key individuals relevant to the position. Your skills and experience will be assessed against the required competencies for the position – you will be asked behavioural, technical and job-specific questions.

Read our tips on how to prepare for you interview >

4

Further assessments

If you're applying for a position to lead or manage a team, you will need to complete our online psychometric assessments. These assessments will tell us a bit more about your preferred working style, how you solve problems, plan ahead and draw logical conclusions. This assessment is completed between the first and second interviews – results will be discussed in the second interview.

5

Pre-employment checks

If you're successful in moving onto the next stage of our selection process, we will request you undertake pre-employment background and medical checks. This may include some or all of a 100-point identification check; eligibility to work confirmation; employment verification check; national criminal record check; reference checks; drug and alcohol testing; and qualification and licence checks.

6

Offer

If you receive and accept an offer of employment, you'll also be given an **nbn**[™] employee Orientation Welcome Booklet. This guide is filled with helpful information and tips that will provide you with everything you need to know before your first day.

You will also receive a phone call from your new manager to congratulate you and answer any questions you may have.



Network Engineer

ACTIVITY 1

SCROLL DOWN TO
GET STARTED ▾

year  nbn 

Investigating nbn Customer Service Faults

One of the main duties of a network engineer is resolving faults to help customers reconnect to the internet. They're kind of like cyber detectives, finding clues by testing the network to determine the cause of the fault.

For this activity, you are investigating why an nbn customer is experiencing dropouts. Their Retail Service Provider has raised an incident with nbn and you would use the variety of systems and testing tools to help find the cause of the fault. Refer to the incident notes and loopback test results below to help resolve this incident.

Quick Definitions

Use the definitions below to help you with this activity.

Access Seeker	A customer acquiring NBN Co wholesale services with the intention to supply internet services to Retail Service Providers (RSPs) or end-users.
Access Virtual Circuit (AVC)	The bandwidth allocated to the end-user premises. The AVC for an end user is determined by the internet plan an end user purchases from their RSP, for example, 25mbps download 5mbps upload.
Retail Service Provider (RSP)	Internet providers like Telstra, Optus and iiNet.
Connectivity Virtual Circuit (CVC)	Determines the capacity required to serve each Connectivity Serving Area (CSA). The CVC is an aggregation of the Access Virtual Circuits (AVCs) from the end-user premises back to the Point of Interconnect (PoI). RSPs decide how much bandwidth (CVC) they purchase from nbn in order to service the end users connected. CVC bandwidth includes downstream and upstream data.
Discards	A discard is when data traffic is prevented from being passed through the nbn network. This can occur for a number of reasons including incorrect configuration of an end user's service, CVC congestion (exceeding the Access Seeker/RSP CVC bandwidth allowance) or incorrect network configuration. Discards can impact an end user's service (dropouts or slow internet speeds).
End Users	Customers to NBN Co's Access Seekers and/or Retail Service Providers (RSPs). Quite simply residential and business customers who subscribe to an internet service through a RSP. RSPs decide how much bandwidth (CVC) they purchase from nbn in order to service the end users connected. CVC bandwidth includes downstream and upstream data.
Loopback Tests	Test the connectivity between the point where NBN's network transitions to the RSP network through to the closest point of an end user's premises this is usually the Network Termination Device or boundary point (also known as the point of demarcation). This test helps validate the customer has a working connection through to the nbn device at the customer's premises and data throughput is being sent and received without error (downstream and upstream data).

What Are Intermittent Dropouts?

When a network is having intermittent dropouts, customers will lose internet connection. This fault can be caused by a variety of issues:

- 1 Wiring issues at the customer's premises
- 2 Network faults
- 3 Incorrect configuration of a customer's service (nbn or RSP)
- 4 The RSP is close to or at their bandwidth capacity

Q1. What is a discard?

- An intermittent fault
- A faulty internet modem
- Data traffic that fails to pass through the nbn network
- An RSP that has reached its bandwidth capacity

Incident Notes

Take a look at the information below to find clues to help you determine the cause of the fault.

Incident ID → INC60003981223

RSP/Company Name → RSP A

Customer (Access Seeker) → RSP A Access Seeker

RSP Fault Notes → End user is experiencing intermittent dropouts

AVC000543656

Customer Location → QLD URBAN

PRI000235434676

Impact Level
i.e 1 end user, multiple customers or network wide. → 4-Minor localised

Urgency → 3-Medium

Priority → Medium

Incident Type → User Service Restoration

How the incident was raised → Web

Environment (Production or Test) → PROD

Incident - Notes

End-User is experiencing intermittent dropouts with the connection.

- power cycled the modem
- ensured cords are connected securely

Our Radius logs also indicate multiple dropouts in a day, Radius Logs below:

```
Username,Start,Stop,BNG,MAC,AVC,Terminate Reason,IPv4,IPv6 Delegated Prefix
100003353051 (disconnect),2023-11-01 08:25:30,,BNG06,06:02:8e:eb:e2:77 (Netgear),
100003353051,2023-11-01 07:50:04,2023-11-01 08:00:54,BNG06,08:02:8e:eb:e2:77 (Netgear),Lost-Carrier
100003353051,2023-11-01 07:17:03,2023-11-01 07:49:53,BNG06,08:02:8e:eb:e2:77 (Netgear),Lost-Carrier
100003353051,2023-11-01 07:05:02,2023-11-01 07:16:53,BNG06,08:02:8e:eb:e2:77 (Netgear),Lost-Carrier
100003353051,2023-11-01 08:59:02,2023-11-01 07:04:52,BNG06,08:02:8e:eb:e2:77 (Netgear),Lost-Carrier
100003353051,2023-11-01 08:53:16,2023-11-01 08:58:52,BNG06,08:02:8e:eb:e2:77 (Netgear),Lost-Carrier
```

Open orders - none

Fault Type - Intermittent service/dropouts
 Is Exchange Based Voice Service Present - No
 Number Of Phone Sockets - 1
 Power Status - Green
 Power Behaviour - Solid
 DSL/Sync Status - Green
 DSL/Sync Behaviour - Solid
 Internet Status - Green
 Internet Behaviour - Flashing
 Is Central Splitter installed - No
 CPE Modem Model - NA
 CPE Model Number - NA

Cancel

Incident Notes
Radius log shows a number of dropouts on the end user's service all on the same day.

INC60003981223 || AVC000543656

AVC000543656

ServiceDetails | Service History | **Workflow**

Workflows

- BirthCertificate
- Bridge Tap Prediction
- CheckSAPs
- DSL PM Counter
- Fault Localisation
- Get Test Result
- LQD - Long
- LSD
- Loopback
- MLT Test
- NNI Operational Status
- Octet Count
- PerformanceTest
- Reset Port
- SELT
- Verification

Loopback

Recommended Steps:

- LOOPBACK_SUCCESS
Test Executed Successfully

Actions:

None

Details:

Property	Property Value
RESULT	Passed
TEST REFERENCE ID	TRIO1325446676
WF TEST REFERENCE ID	Passed
TIMESTAMP	2023-11-4 10:10:36
PACKET SIZE	1488
PACKETS SENT	5
PACKETS RECEIVED	1
PACKETS LOST	4
LOSS PERCENTAGE	80

Test Results

Whilst the test executed successfully, this does not mean there is no issue with the service, it does indicate the end user's service is online and connected.

Test Details

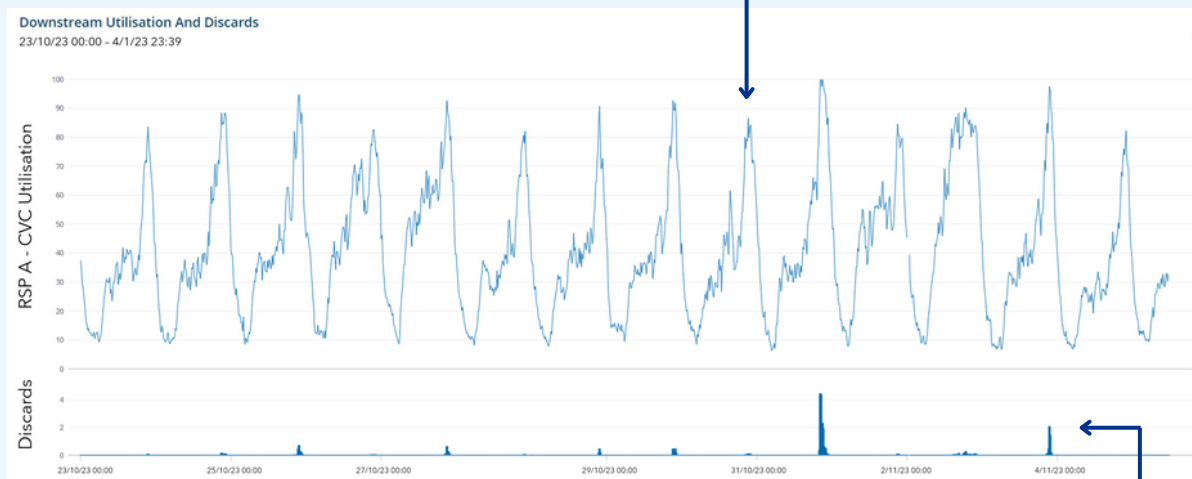
The test results show 5 packets of data sent – 4 were lost – a potential sign of discards, an issue with the customer premises equipment/internal wiring or a network degradation fault.

Q2. How many packets were lost during the loopback test?

- 1
- 2
- 3
- 4

Discards

We can see on 30 October CVC was close to maximum utilisation (keep in mind this view is showing downstream traffic ONLY) – with some traffic being discarded.



4/11

The date of the loopback test we see the CVC at full utilisation (100%) with a large amount of discards.

Q3. Now you have all the clues you need, what solution could you offer the RSP so customers stop experiencing dropouts?

- The customer needs to upgrade their internet plan
- The RSP needs to purchase extra bandwidth (CVC)
- The customer needs to upgrade their internet modem

All done!

Helping customers get back online as quickly as possible is a must as a network engineer, knowing how to identify the fault is an important part of their job.

Check your answers below, then continue on to our nbn Field Technician Virtual Work Experiences to learn more about troubleshooting faults on-site!

Answers

- 1 c) Data traffic that fails to pass through the nbn network
- 2 d) 4
- 3 b) The RSP needs to purchase extra bandwidth (CVC)



Customer Field Technician

ACTIVITY 2

year 13 nbn™

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Connecting Customers to the Network

Being an nbn Customer Field Technician, you'll often be connecting customer homes and businesses to our fibre technology.

On this occasion, your first job of the day is connecting a customer's service to the nbn network at their new home. There are three key things to remember.

- 1 The customer has waited a couple of weeks to get connected, which can be a challenge for a family with teenagers.
- 2 The family aren't sure that their Internet provider disconnected their nbn service at their last house.
- 3 Additionally, the family doesn't know if they will receive nbn's Fibre to Premise or Fibre to the Curb technology at their home as there does not appear to be any nbn infrastructure.

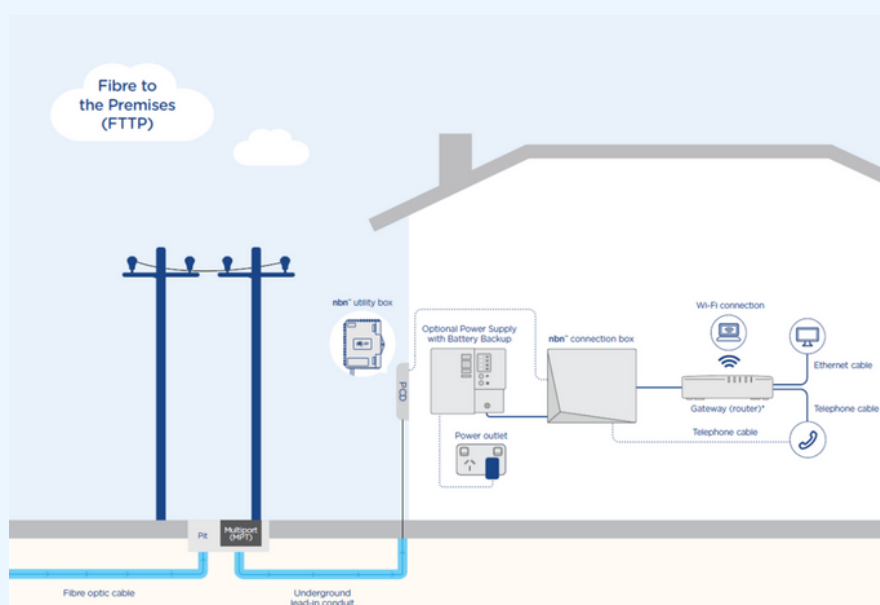
Useful Info & Definitions

Watch video "What to expect on the day of your nbn Fibre to the Premises installation".

What is a Fibre to the Premises (FTTP)?

FTTP is used when fibre optic cabling connects the nbn network directly to a customer's home.

Fibre Optic Cables are connected directly to an nbn utility box installed outside the premises. Then, the nbn network is connected to an nbn connection box inside the customer's home.



Pre-Call

Before you arrive at a customer's house, you should call the customer with some initial questions. Imagine you're on your way to fix the internet for a customer called Joseph. Please refer to the Pre-call Script Prompts below for the following questions.



01 - Introducing Yourself

"Hi my name is [Insert your name] calling from NBN regarding your [8-12 or 1-5] appointment today. I am the technician that has received your job to activate and/or fix your service. I have a couple of questions I need to ask before I arrive:



02- Health and safety questions

1. Will someone over the age of 18 years be there?
2. Is anyone at the premises/site unwell and do you have any reason to suspect that you or anyone else at the premises/site has been exposed to someone with, or suspected to have, Coronavirus (COVID-19)?
3. While it is no longer a government requirement, would you prefer that I wear a mask if I enter the premises?
4. Do you have any pets such as dogs at your premise?



03- In the pre-call for activations you could ask:

1. Do you know where the outlet/socket is?
2. Have you just moved in?
3. Are you changing service providers?
4. Do you have your modem ready?



04 - In the pre-call for faults you could ask:

1. What's the history of the service?
2. Can you tell me more about the fault?
3. Has this happened before?
4. Was there a storm recently (no sync faults)?



05 - Next steps

"Thanks for answering those question. When I arrive at the premise I will be able to take a look at the equipment. I am approximately [insert minutes] away from your place, ill see you shortly. Thank you!"

Q1. What's the first question you should ask Joseph after introducing yourself?

- Where would you like the Fibre to the Premises installed?
- Will someone over the age of 18 be at the premises when I arrive?

Q2. What should you ask Joseph next?

- Do you have any pets at the property?
- Where is your nbn Network Device located?

Q3. Should you ask the pre-call faults or activation questions?

- Ask pre-call ACTIVATION questions.
- Ask pre-call FAULTS questions.

At The Customer's Property

Once you arrive at the customers property, there are four steps you have to take.

Read through the options and match the step to the order the technician should complete it.

☰ Customer Engagement and Recap	Step 1
☰ Verify equipment and customer's choice of location	Step 2
☰ Install internal cabling and NTD	Step 3
☰ Run Testing	Step 4

All done!

As a network engineer, you'll experience many different scenarios when connecting customers to the network. You'll need to be ready to adapt to each to ensure they receive the help they need.

Check your answers below, then continue on to the next activity!

Answers

- 1 b) Will someone over the age of 18 be at the premises when I arrive?
- 2 a) Do you have any pets at the property?
- 3 a) Ask pre-call ACTIVATION questions.
- 4 Step 1: Verify equipment and customer's choice of location
Step 2: Install internal cabling and NTD
Step 3: Run Testing
Step 4: Customer Engagement and Recap

Customer Field Technician

ACTIVITY 3

year  nbn 

SCROLL DOWN TO
GET STARTED 

Troubleshooting Customer Connections

As an nbn Customer Field Technician, you'll help customers with faults relating to their nbn service.

Today, you're helping a customer experiencing connectivity issues affecting their service accessing the nbn network via the Fibre to the Premises (FTTP) technology.

FTTP technology is the physical connection between the nbn network and a customer's property. It works the same way a house's taps are connected to water pipes that run from the city's water supply, but instead of water, its light flowing through a network of optic fibre.

Useful Info & Definitions

Watch video "How the nbn™ network works".

nbn Equipment

nbn utility box

The nbn utility box or Premises Connection Device (PCD) connects the nbn network to a customer's personal modem. This is located on the outside wall of the customer's property.

The PCD connects to the fibre-optic cabling from the street, allowing a customer to access the network and internet.

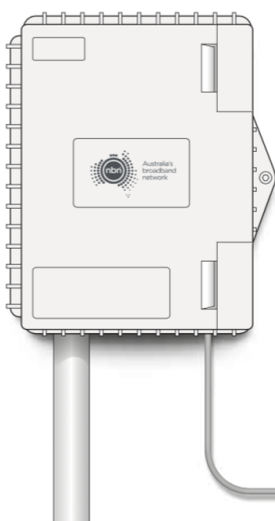
nbn connection box

The nbn connection box works like an internet modem. It is connected to the utility box via cables that run through the property's walls.

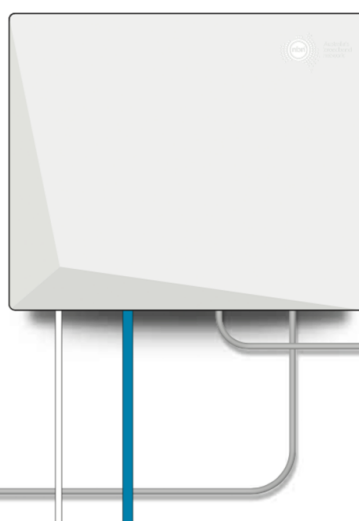
power supply

Some households will also have a power supply that is connected between the power point and the nbn connection box. The power supply has an internal backup battery in case the property loses power.

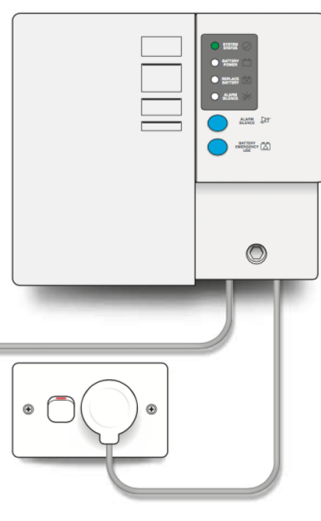
nbn™ utility box
(190 x 235mm)



nbn™ connection box
(233 x 195mm)



Power Supply
(206 x 180mm)



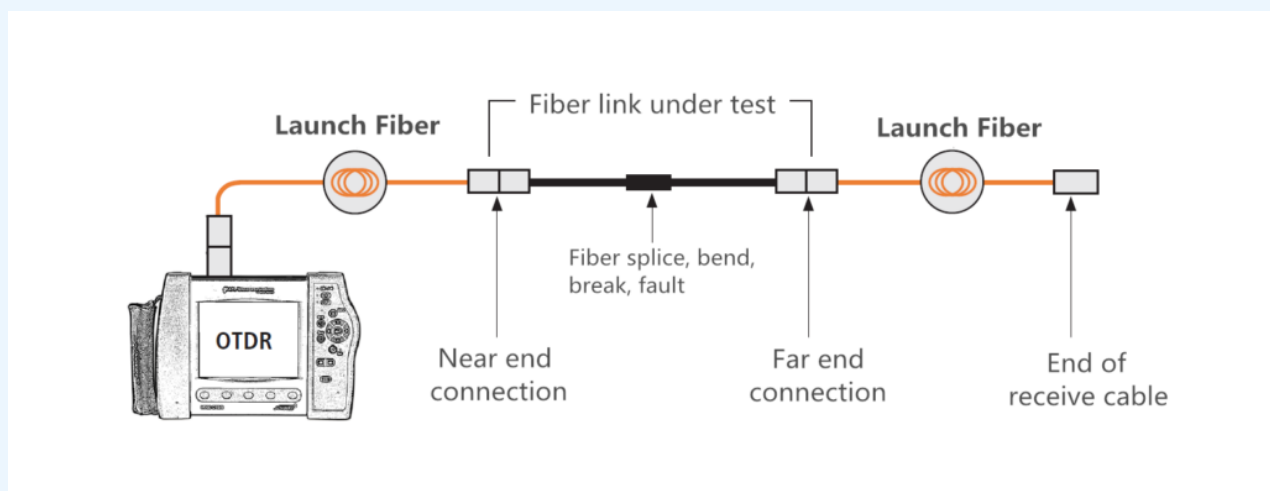
Outside your premises ◀ ▶ Inside your premises

FIC Connectors

FIC connectors are connectors that plug into nbn's Network Termination Device (NTD). They shine a light down the fibre so that technicians can identify if there is a break or fault.

OTDRs

An OTDR stands for an optical time domain reflectometer. It is an optical radar that sends a pulse up a line and analyses the echo to find a break in the line.



Activity

Following a network-related maintenance outage, the customer found they didn't have internet connectivity even after they were notified that the network was restored.

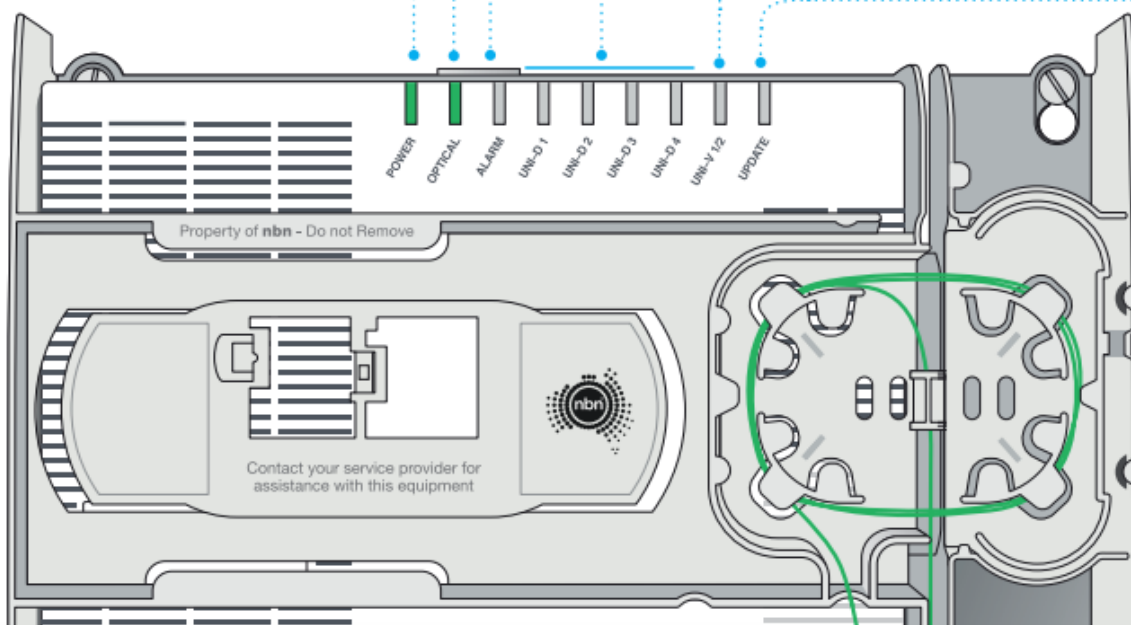
The customer has restarted their modem several times, but there still isn't any connectivity.

The customer is keen to get back online as soon as possible. Use the tables below to answer the following questions:




nbn connection box indicator lights

	Indicator	Meaning	Action
Power Indicator	● Off	This means there is no power to your nbn connection box	Check the power supply is plugged in and switched on and is connected to your nbn connection box. If there is still no power light, contact your phone and internet provider
	● Red	Your power supply is operating on backup battery power	If there is a mains power failure, you will only have services over the nbn for a limited period of up to five hours. Refer to the Power Supply with Battery Backup section of this guide
	● Green	Your power supply is working normally	No action is required
	● Green Flashing	Your nbn connection box is starting up	No action is required. The flashing light should turn into a green solid light shortly






	Indicator	Meaning	Action
Optical Indicator	● Off	Your nbn connection box has been disabled externally	Contact your provider for further instructions
	● Red	Your nbn connection box has lost connection with the fibre network	Contact your service provider for further instructions
	● Green	Your nbn connection box is connected and working properly	No action is required
	● Green Flashing	Your nbn connection box is connected and working properly	No action is required






Alarm Indicator

Indicator	Meaning	Action
 Off	Your nb n connection box is working but you have no devices connected	No action is required
 Red	Your nb n connection box has a fault and is not working normally	Contact your provider for further instructions
 Green	Your nb n connection box is working normally and is connected	No action is required




Data (UNI-D) Indicators

Indicator	Meaning	Action
 Off	You do not have an active service using this port at this time	This may simply mean that connected devices are not active at the moment. If you are having difficulty with connected devices then contact your provider for further instructions
 Orange	The device connected to your UNI-D port uses 1Gbps Ethernet	No action is required
 Orange Flashing	The device connected to your UNI-D port uses 1Gbps Ethernet	No action is required
 Green	The device connected to your UNI-D port uses 10 or 100Mbps Ethernet	No action is required
 Green Flashing	The device connected to your UNI-D port uses 10 or 100Mbps Ethernet	No action is required

Voice (UNI-V) Indicators

Indicator	Meaning	Action
 Off	You do not have an active phone service using this port at this time	No action is required
 Green	One or more telephones are off the hook (being used)	No action is required
 Green Flashing	One or more telephones have been off the hook for more than 1 hour	Check if someone in your household is using the phone, and if not check to see if any of your handsets have been left off the hook by accident

Update Indicator

Indicator	Meaning	Action
 Off	Normal	No action is required
 Red	Your nb n connection box has failed to download software	Contact your provider for further instructions
 Green	Your nb n connection box is successfully downloading software	No action is required

1. If the power indicator on the nbn connection box is off, what should you do?

- Nothing - this is normal.
- Check the power supply is plugged in and switched on.

2. If the optical indicator on the nbn connection box is flashing green, what should you do?

- Check all cables have been connected correctly.
- Contact the customer's service provider for further instructions.
- Nothing - this is normal.

3. If the alarm indicator on the nbn connection box is red, what should you do?

- Contact the customer's phone and internet provider.
- Nothing - this is normal.

4. If the data indicators on the nbn connection box is orange, what should you do?

- Contact the customer's service provider.
- Nothing - this is normal.

5. If the voice indicators on the nbn connection box is flashing green, what should you do?

- Check if anyone is using the landline phone.
- Nothing - this is normal.

6. If the update indicator on the nbn connection box is off, what should you do?

- Call the customer's service provider for further instructions.
- Nothing - this is normal.

All done!

There are many factors that can result in an interruption or fault to a customer's nbn service. It may be isolated to that customer's individual service such as faulty equipment or issues at their premise or a network-wide problem.

As a customer field technician, you'll be responsible for investigating, communicating and troubleshooting these issues to help keep Aussies connected.

Answers

- 1 b) Plug in the device and switch the power outlet on.
- 2 c) Nothing - this is normal.
- 3 a) Contact the customer's phone and internet provider.
- 4 a) Contact the customer's service provider.
- 5 a) Check if anyone is using the landline phone.
- 6 b) Nothing - this is normal.