

# Dedicated Internet Access Product Handbook



## Business

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## Change control

| Version number | Description of change / comments                                                  | Date updated | Updated by  |
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| 10             | Overhaul                                                                          | 05/12/2023   | Ian Bunning |
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| 11.1           | Section 5 updated to reference correct Cisco device provided for managed service. | 16/07/2024   | Ian Bunning |
| 12             | Section 9 CPE updated. Section 4.3.1 updated to reflect new bandwidth profiles.   | 13/06/25     | Ian Bunning |

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## 1 Service overview

Dedicated Internet Access (DIA) is an uncontended and dedicated connection to the internet. It means your business has uniform upload and download speeds of up to 10Gbps, so you can offer a reliable and superior user experience.

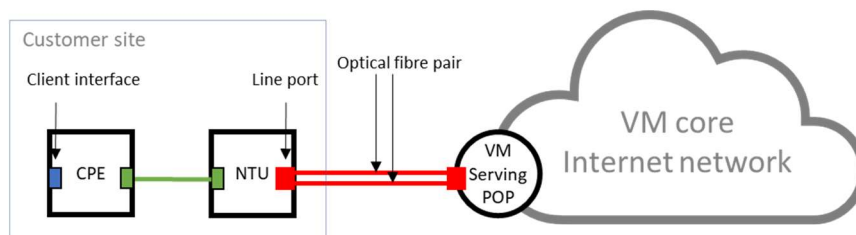
Superior levels of internet access will enable your organisation to deliver outstanding digital services to your end customers, enhancing their overall experience. It will also enable your organisation to embrace public cloud services and easier ways to make your overall day to day business transactions – across your organisation, business partners, and customers – more streamlined and efficient.

We already support 8,000 managed internet connections in the UK. This is our area of expertise. Our dedicated team of consultants will design the perfect solutions for your business, from simple internet access right through to a full end-to-end network solution. Once you're up and running, we'll provide 24/7 support, further enhancing the reliability of your internet access.

We can also provide access to an impressive range of services through our Smart Internet Access and Managed Security portfolio, designed to keep organisations secure. We offer DIA in conjunction with the award-winning Palo Alto Networks' Next Generation Firewall to ensure internet security.

## 2 Building blocks

To connect sites to the Internet, the Service comprises of a dedicated fibre pair from the customer site to the most appropriate Virgin Media point of presence, an NTU and depending on the chosen Management level, an optional CPE.



In cases where an existing NTU exists at the customer site, often at Data Centre locations, an NTU will not be provided. For fully managed services, a data centre cross connect will be used to directly connect the NTU to the CPE located in a customer provided rack.

### 3 Bandwidths

Dedicated Internet Access is available using 100Mbps, 1Gbps and 10Gbps access circuit bearers. For all bearers, the purchase bandwidth may be less than that of the bearer size to provide the capability to simply and quickly flex bandwidth to meet varying bandwidth requirements.

The following purchased bandwidths are available for the listed access circuit bearers:

| <b>Bearer</b> | <b>1Gbps</b> | <b>10Gbps</b> |
|---------------|--------------|---------------|
| Bandwidth     | 100 Mbps     | 1000 Mbps     |
|               | 200 Mbps     | 2000 Mbps     |
|               | 300 Mbps     | 3000 Mbps     |
|               | 400 Mbps     | 4000 Mbps     |
|               | 500 Mbps     | 5000 Mbps     |
|               | 600 Mbps     | 6000 Mbps     |
|               | 700 Mbps     | 7000 Mbps     |
|               | 800 Mbps     | 8000 Mbps     |
|               | 900 Mbps     | 9000 Mbps     |
|               | 1000 Mbps    | 10000 Mbps    |

### 4 Basic solution topology

#### 4.1 Single homed

Single-homed service is where internet connectivity is provided over a single leased line connection only. The service is provided using either a Virgin Media access circuit or a third party OLO access circuit at a variety of bearer sizes and purchased bandwidth options. The single homed product is available in both Fully Managed and Partially Managed variants.

#### 4.2 Dual homed (Resilient)

The Virgin Media data network architecture has an inherent resiliency in its core and backbone networks and Peering gateways. This resilience is available to all internet traffic traversing our network. However, single homed connections by their very nature have single points of failure including premise equipment, access circuit and Internet PoP.

DIA dual-homed is based upon two or more internet access connections, typically a primary and a secondary connection provided using leased line access circuits but alternative secondary circuit types can be provided. As a minimum, our standard dual homed resilient service has the following level of resilience:

- Separate access circuits, different OLO providers i.e. VMO2 circuit plus Openreach circuit can be specified and simply added at time of purchase;
- Connectivity back to different VMB internet nodes;
- For a fully managed service, each connection will be terminated on separate NTU and CPE.

In addition to the above, and where both the primary and secondary links are provided using leased line access circuits it is possible to design and deliver much greater levels of separation to guarantee availability, including:

- When delivered to the same customer site, different building access points could be used;
- Physical access circuit diversity can be planned to ensure separate routes (ducts, cabinets, etc.) from customer site to access nodes;

- Internet connection can be routed back to different Internet PoP nodes in different site locations;
- Dual PSU can be provided in CPE.

### 4.3 Backup circuit types

The following circuit types and configurations are available when choosing a dual homed DIA service.

| Resilience name    | Primary              | Secondary                    | Description                                                                                                                                                                                                                                                                       |
|--------------------|----------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Solo               | Ethernet Leased Line | None                         | No resilience                                                                                                                                                                                                                                                                     |
| Backup +           | Ethernet Leased Line | SOGEA<br>FTTP<br>Cable Modem | Two circuits terminated on separate NTU's. For fully managed services separate CPE's will be provided. Circuits may share common components on route and at sites.<br><br>Active / Standby configuration only.                                                                    |
| Assured diversity  | Ethernet Leased Line | Ethernet Leased Line         | Two circuits terminated on separate NTU's. For fully managed service, separate CPE's will be provided. Circuits may share routes or equipment from the customer site but will become more diverse away from the customer site.<br><br>Active/Active and Active/Standby available. |
| Assured Separation | Ethernet Leased Line | Ethernet Leased Line         | Two circuits terminated on separate NTU's. For fully managed service, separate CPE's will be provided. Ethernet circuits will be planned to ensure physical and logical separation throughout.<br><br>Active/Active and Active/Standby available.                                 |

#### 4.3.1 Backup circuit bandwidths

|                             |                                                                                                                                       |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ethernet Leased Line</b> | As detailed in Section 0 above.                                                                                                       |
| <b>Broadband SOGEA</b>      | 40/10Mbps, 80/20Mbps                                                                                                                  |
| <b>Broadband FTTP</b>       | 40/10Mbps, 80/20Mbps, 160/30Mbps, 220/20Mbps, 220/30Mbps, 330/30Mbps, 330/50Mbps, 500/165Mbps, 550/75Mbps, 1000/115Mbps, 1000/220Mbps |
| <b>Cable Modem</b>          | 100/10Mbps, 200/20Mbps. 400/40Mbps, 600/60Mbps, 800/80Mbps, 1000/100Mbps                                                              |

#### 4.3.2 Traffic flows

The service can be provided in either active/standby or active/active mode.

- **Active / Standby;** In this configuration and under normal operation only one connection is servicing traffic at any one time. In the event of the primary connection failing all traffic is routed via the secondary backup connection. Upon restoration of the primary connection, service will automatically return to normal operation. It is

- common for the secondary backup connection to be of a lesser bandwidth than the primary link.
- Active / Active; In this configuration and under normal operation both connections are servicing traffic. In the event of one connection failing, all traffic will be routed via the other link and the service will continue to operate. Upon restoration of a failed connection, service will automatically return to normal operation. *Both connections should be Ethernet Leased Line circuits of equal bandwidth* and therefore when a failover occurs the service is operating at 50% capacity.

#### 4.4 Multi homed

Multi homed enables customers to operate two or more internet connections from different ISPs through the use of the BGP4 protocol. It is based upon two or more Internet connections of which only one is provided by VMO2 Business. Additional connections are provided by other Internet Service Providers (ISP) and the installation, configuration and operation of these 3rd party ISP connections are the responsibility of the customer.

This provides the customer with complete Service Provider resiliency. However, be aware of who the access circuit providers are and the circuit routing so as to ensure it does not have any common points of failure.

This service is based upon a single homed connection configured with Border Gateway Protocol version 4 (BGP4).

The primary function of BGP is to exchange network reachability information to create inter-domain routing between different ISP Autonomous Systems (AS). For this configuration to work the customer must be allocated an Autonomous System Number (ASN) and Provider Independent (PI) address range by RIPE.

### 5 Management level

#### 5.1 Fully Managed

A fully managed service includes the supply, configuration and management of all equipment used in the delivery of the service up to and including the CPE. The supplied CPE shall be a Cisco device as detailed in Section 9.

#### 5.2 Partially Managed

This management level includes the supply, configuration and management of all equipment used in the delivery of the service up to and including the NTU.

For a partially managed service, the customer is responsible for the supply, configuration and management of the hardware connected to the NTU as well as ensuring that the device is capable of supporting the requested service.

NTU's are detailed in Section 10.

### 6 IP Addressing

LAN IP addressing can be allocated by us for use with the service. These IP addresses are Provider Assigned (PA) allocated to VMO2 by RIPE and will remain ours at all times. Any supplied PA address space must be returned if the customer moves to another Service Provider.

By default we will allocate a /29 IP Address space for use with the service, this provides up to six usable addresses. It is possible to provide more but these will be subject to justification and RIPE approval.

Alternatively, the customer can provide Provider Independent (PI) IP addresses for use with the service but this is typically only required and granted by RIPE where a multi homed service is required, this requires the configuration of BGP and is an additional charge.

The allocation, registration and co-ordination of internet resources (IPv4 addresses, IPv6 addresses and AS Number resources) are controlled by RIPE NCC ([www.ripe.net](http://www.ripe.net)).



## 7 Service reporting

Service reporting is available for fully managed services only.

Reporting is available via the internet using a standard web browser and access is controlled using username and password. Network Performance Management (NPM) reports are available for service availability, utilisation and packet loss and provide daily, weekly and monthly views.

[Internal link](#) to Network Performance Monitoring (NPM) documentation.

## 8 Restrictions

Where we provides a partially managed service we are unable to;

- Directly monitor, control or modify any routing equipment connected to the NTU. We will not monitor the service or any customer equipment; consequently any faults with the service may not be identified automatically and will not be worked upon until reported by the customer.
- Provide the customer with performance management reporting.

## 9 CPE

The following CPE device have been type approved for supply with a fully manage DIA service.

| Device                                                           | Bearer | Bandwidth    | Model         | SKU      |
|------------------------------------------------------------------|--------|--------------|---------------|----------|
| <a href="#">Cisco 1000 Series Integrated Services Routers</a>    | 1Gbps  | Up to 1Gbps  | C1111-4P      | 10012588 |
| <a href="#">Cisco ASR 920 Series Aggregation Services Router</a> | 10Gbps | Up to 10Gbps | ASR-920-4SZ-A | 10014294 |

| Model                                                  | C1111-4P                                                                                                                                                                                                                                                                                             | C1111-8P                                                                                                                                                                                                                                                                                             |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dimensions (H x W x D)                                 | 1.75 x 12.70 x 9.03 in. (4.45 x 32.26 x 22.94 cm)                                                                                                                                                                                                                                                    | 1.75 x 12.70 x 9.015 in.                                                                                                                                                                                                                                                                             |
| Weight                                                 | 4.37 lb. (1.98 kg)                                                                                                                                                                                                                                                                                   | 4.37 lb. (1.98 kg)                                                                                                                                                                                                                                                                                   |
| Maximum power consumption (excluding external PS loss) | C1111: 18W<br>C111x: 22W                                                                                                                                                                                                                                                                             | C1111: 19.2W<br>C111x: 35.3W                                                                                                                                                                                                                                                                         |
| External power supply                                  | <ul style="list-style-type: none"> <li>• AC input voltage: Universal 100 to 240 VAC, 50 to 60 Hz</li> <li>• Output voltage: 12 VDC</li> <li>• Maximum output power: 66W</li> <li>• Requires <u>115W</u> power supply for optional PoE and PoE+</li> <li>• PoE output voltage of -53.5 VDC</li> </ul> | <ul style="list-style-type: none"> <li>• AC input voltage: Universal 100 to 240 VAC, 50 to 60 Hz</li> <li>• Output voltage: 12 VDC</li> <li>• Maximum output power: 66W</li> <li>• Requires <u>150W</u> power supply for optional PoE and PoE+</li> <li>• PoE output voltage of -53.5 VDC</li> </ul> |
| Operating conditions                                   | <ul style="list-style-type: none"> <li>• Temperature: 0° to 40°C at sea level, 1°C/1000 ft derating from 40°C</li> <li>• Altitude: 0 to 10,000 ft (0 to 3048 m)</li> <li>• Humidity: 10% to 85% relative humidity (noncondensing)</li> </ul>                                                         |                                                                                                                                                                                                                                                                                                      |



|                         |                                                                                                                                                                                                                    |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nonoperating conditions | <ul style="list-style-type: none"> <li>• Temperature: -40° to +70°C (-40° to +158°F)</li> <li>• Altitude: 0 to 15,000 ft (0 to 4572 m)</li> <li>• Humidity: 5% to 95% relative humidity (noncondensing)</li> </ul> |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 10 NTU

The following NTU's have been type approved for supply with Ethernet leased line DIA service.

| Device                                                                                  | Bearer | Bandwidth    | Model    | SKU      |
|-----------------------------------------------------------------------------------------|--------|--------------|----------|----------|
| <a href="#">OmniSwitch 6465T Ruggedized, Industrial Network Switch</a>                  | 1Gbps  | Up to 1Gbps  | 6465T-12 | 10015437 |
| <a href="#">OmniSwitch 6570M Metro Ethernet for enterprises &amp; service providers</a> | 10Gbps | Up to 10Gbps | 6570M-12 | 10015440 |

|                              | 6465T-12                       | 6570M-12                      |
|------------------------------|--------------------------------|-------------------------------|
| MTBF (hours) @ 25C with 1 PS | 1,953,053                      | 2,813,974 / 3,258,253         |
| Height                       | 4.4 cm (1.73 in)               | 4.4 cm (1.73 in)              |
| Width                        | 21.7 cm (8.55 in)              | 21.7 cm (8.55 in)             |
| Depth                        | 28 cm (11.05 in)               | 28 cm (11.05 in)              |
| Weight                       | 1.7 Kg (3.8 lb)                | 1.7 Kg (3.8 lbs)              |
| Operating temperature        | -10°C to 60°C (14°F to 140°F)  | 0°C to 50°C (32°F to 122°F)   |
| Storage temperature          | -40°C to 85°C (-40°F to 185°F) | -20°C to 60°C (-4°F to 140°F) |
| Humidity (operating)         | 5% to 95% non-condensing       | 5% to 95% non-condensing      |

### 10.1 Power supply

As standard, the NTU's are provided with a single AC power supply.

Options for backup secondary power supply and DC supply are available upon request and must be specified at the time of ordering the DIA service.

## 11 Frequently Asked Questions

|                                                                                             |                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Is there an option to configure QoS over DIA?                                               | Not on DIA but you can configure QoS on your own device connected to DIA or using our Smart Internet Access service, however, this will have limited effect because the internet does not follow any standardised QoS queueing standards and is best efforts.                                                     |
| How many IP address does the customer get with DIA?                                         | By default, we will allocate four IP addresses for use on your service. You can request more and in theory we have no limit but all requests for more IP addresses are subject to RIPE justification and approval. Additional allocations can be added in the future.                                             |
| Do we charge for IP addresses?                                                              | We do not charge for the initial allocation of Provider Assigned (PA) IP addresses. We will charge for the configuration of additional IP addresses requested at later dates.                                                                                                                                     |
| Do you support IPv6?                                                                        | IPv6 is not supported.                                                                                                                                                                                                                                                                                            |
| How quickly can we upgrade and downgrade bandwidth?                                         | 10 working day lead time for changes where the new bandwidth is no bigger than the connection bearer size. If a new, bigger connection is required then lead times will be subject to survey.                                                                                                                     |
| Can the customer access the VMO2 provided Router?                                           | Read only SNMP access can be provide upon request. There may be a small configuration charge.                                                                                                                                                                                                                     |
| Do we offer DDOS protection?                                                                | We have implemented a DDOS solution to protect the core network and data centres. For individual links we work in partnership with Akamai.                                                                                                                                                                        |
| Can I use DIA alongside another service providers internet connection for added resilience? | Yes, you will need to request BGP to be configured on your service. There is a charge for providing this, the charge covers configuring routing tables and maintaining the RIPE database records.                                                                                                                 |
| Does DIA also provide Wi-Fi for local users in the office?                                  | No, DIA provides a dedicated connection between your local network and the internet using fixed wired connections to guarantee performance. If wi-fi is also required, our Smart Internet Access service is available and does include wi-fi as well as an integrated firewall and network control functionality. |