Router Hardware

An important requirement for establishing any peering link is to ensure that there is suitable router hardware available. This section looks at what considerations need to be made when choosing a router for the new connection being planned.

For completeness, the section will also cover the router consideration for the entity's first Internet connection (to its upstream provider).

- First Internet Link
- Private Peering Link
- Public Peering Link

First Internet Link

For an organisation embarking on establishing their first Internet connection, a router will be required. The Peering Toolbox can't provide an exhaustive summary of all the options and combinations available but the key points to note are documented here.

- Router Type
- Interface Considerations
- Router Throughput
- IPv4 & IPv6
- BGP needs

Type

The Peering Toolbox is aimed at organisations who are or are planning to take part in peering. For this reason a consumer/home router (often erroneously called an “internet modem”) is not sufficient and cannot be recommended (even through there are some quite capable devices available).

The type that needs to be looked at need to be “enterprise grade” which means it is offered with warranty, a support contract (often required by enterprises), is usefully rack (or shelf) mountable, has possibility of redundant power supplies, and supports a command line interface suitable for human or automated tool use.

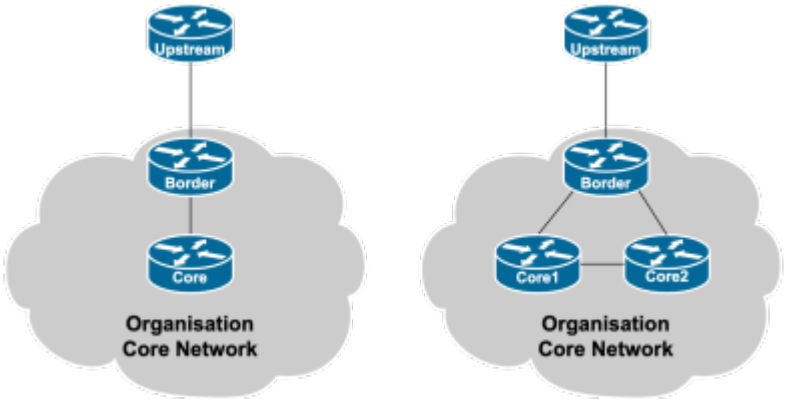
Alternatively, there are several software routers available which could be installed on a Linux container or virtual machine or small Linux appliance. These might be entirely suitable, as the software is usually fully featured (like the main stream vendor routers) and very capable.

Interfaces

The router needs to have internal and external interfaces to match the physical media in use.

Internal interface types are usually only Gigabit Ethernet today, at a minimum, even on the most inexpensive devices. The number of internal interfaces needed depends entirely on the organisational

needs. Usually a single or dual interfaces are all that are needed, connecting to the organisation's core router, or routers. The diagram shows two possibilities - the core router drawn represents the existing network infrastructure, be it an existing router or layer-3 switch.



It's a good idea to separate the router that has the upstream connection from the core of the network, for the security of having a clear demarcation point, and so that specific border functions don't overload the core devices in the network.

External interface types can range from Gigabit Ethernet, SFP-based fibre optics, various coaxial or copper telephony wiring, to point-to-point wireless. Many of the enterprise routers come with a dizzying amount of configuration options - if the future trajectory for the upstream (and peering) physical media access is uncertain, perhaps specifying a router that has a range of upstream link options would be the most prudent choice to make.

Throughput

The router needs to be able to handle the throughput of the link being purchased, and leave sufficient CPU and memory capacity for future upgrades.

Note that even if the router may have Gigabit or fibre optic interfaces, there is no guarantee that it can actually deliver Gbps rates. This is especially true for the CPU based routers whose throughput slows down significantly with increasing traffic, packet filtering configured, and Network Address Translation (if sufficient IPv4 address space is not available).

It is important to check with the vendor what the true throughput is in a realistic use case (known as Internet Mix or IMIX, representing the typical average packet size seen on the Internet today), not lab testing!

IPv4 & IPv6

If the transit provider has deployed both IPv4 and IPv6 on their network and offers the capability to customers, it is strongly recommended that the router be able to handle IPv4 and IPv6 (known as dual-stack operation).

Using IPv6 is advantageous as it means that content traffic (which forms about 80% of typical Internet traffic today) will not have to traverse Network Address Translation devices in the upstream's network or use the NAT feature on the router, reducing the resource burden, and also improving the service quality experienced by the end-users.

BGP

Most “first time” Internet connections will simply use a static default routing pointing to the upstream provider, with the upstream pointing a default route to their customer.

However, it pays to think forwards, especially considering that this Toolbox is all about how an organisation should go about peering! And for that, BGP will be required, and it is recommended that any new procured router is BGP capable.

Some end-sites will start off with using BGP even for their first Internet connection, from day one. Historically they'd use a private AS number for this, but with the relaxation of policies in some of the Regional Internet Registry regions, an public AS number can now be obtained simply by becoming a member of the RIR and receiving address space.

If BGP is going to be used on the link, the router must be BGP capable, although it does not have to or need to carry the full BGP table (which is large and growing rapidly). Most modern routers have implemented the latest BGP standards and extended capabilities - reviewing BGP Best Practices documentation and comparing with vendors' claimed feature support is strongly recommended.

Private Peering Link

When implementing the first private peering link, it is recommended to procure a separate router for this function. This router is normally dedicated only for peering connections, whether connecting to public peers at an IXP or private peers.

If procuring a separate router is not a possibility, it is possible that an existing router could be used, so long as it meets the appropriate technical requirements for participating in a peering infrastructure (full support of BGP, sufficient control-plane memory and CPU capacity). There is a security caveat with using one router for connecting to both a transit provider and a peer though - that router will have a default route which could potentially be abused by the private peer (who could simply point a default route at it, and get “free” outbound transit - if they wanted to).

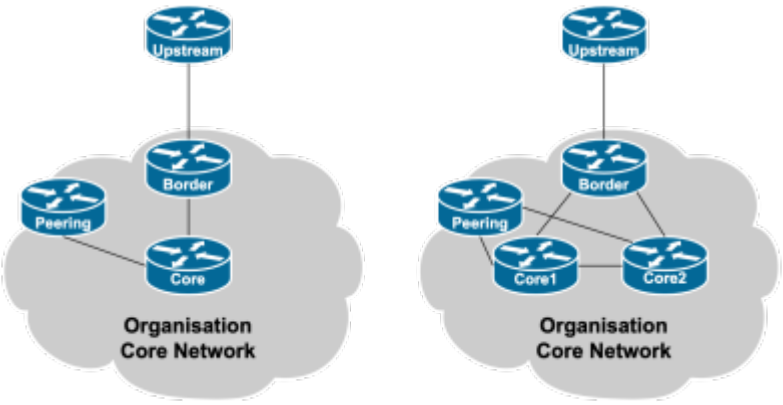
This section gives recommendations on the assumption that the organisation will be procuring a separate router for their private peering connection.

- Router Type
- Interface Considerations
- Router Throughput
- IPv4 & IPv6
- BGP needs

Type

Interfaces

The interface consideration is the same as for the router being used for the Transit Connection. As a separate router is being procured, the connectivity diagram might end up looking like those shown below.



Throughput

IPv4 & IPv6

BGP

Public Peering Link

This router is normally dedicated only for peering connections, whether connecting to public peers at an IXP or private peers. If procuring a separate router is not a possibility, it is possible that an existing router could be used, so long as it meets the appropriate technical requirements for participating in a peering infrastructure (full support of BGP, sufficient controlplane memory and CPU capacity).

Type

Interfaces

Throughput

IPv4 & IPv6

BGP

Back to "What I need to Peer" page