Multi-homing

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- A Guide to Requesting Multi-homing on Janet [1] - this document is a guide for organisations that wish to have two network connections operating simultaneously, one to JANET and the other to an ISP.
- Cisco: Sample Configuration for BGP with Two Different Service Providers (Multi-homing) [2]
- Sam Halabi: Internet Routing Architectures [3] - the definitive bible on the subject of BGP and includes an overview of the Internet, routing protocol basics, effective routing design and routing device configuration.
- Cisco: In-depth Technical Information on Border Gateway Protocol (BGP) [4]
- Cisco: Internetworking Technology Overview - Border Gateway Protocol (BGP) [5]
- Cisco: Configuring BGP [6]
- Cisco: Command reference for BGP [7]
- Cisco: BGP Frequently Asked Questions (FAQ) [8]
- Cisco: Using Regular Expressions in BGP [9]
- Cisco: BGP Case Studies [10]
- Cisco: Internetworking Case Studies - Using BGP for Interdomain Routing [11]
- Connect.com: Frequently Asked Questions on Multi-homing and BGP [12]

Guide to requesting multi-homing on Janet

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1 Introduction

This document is a guide for organisations connected to Janet that wish to have two network connections operating simultaneously, one to Janet and the other to another ISP. Such an arrangement is commonly called **multihoming**.

The guide explains the issues that a customer should take into consideration before submitting a multihoming request to Janet(UK) A multihoming request form is provided in Appendix 1.

Due to the complexity of establishing a multihomed connection and the amount of involvement by Janet(UK) required, there is an extra charge for this service in addition to the standard Janet tariff. This is a flat rate of £1,000 per annum.

If you wish to proceed with this type of connection please complete the form provided in Appendix 1 and return it to the Janet Service Desk.

2 Management Overview: Multihoming Issues and Limitations

When considering the benefits of multihoming, the impact of significantly increased complexity, a higher level of internal technical support and additional costs must also be taken into account.

Organisations should be clear in their requirements for multihoming, on political, technical and financial levels. The statement that multihoming is necessary for ‘resilience’ does not cover all the eventualities the organisation may be guarding against. Multihoming a site network to two ISPs does not necessarily provide significantly increased resilience. A truly resilient solution will have independent circuits to different ISPs, connected to discrete internal infrastructures. All equipment will be fed from separate redundant power supplies. Simply connecting a low-end router with one power supply to two different circuits only helps to protect against certain failures. An analysis of the various models of failure will help to determine the best solution.

It is vital that staff at the organisation requesting a multihoming arrangement are sufficiently knowledgeable in the field of Internet routing, especially BGP (Border Gateway Protocol), and are capable of configuring their equipment in a suitable fashion. Without adequate skills available at the multihomed site, it can be very difficult to maintain problem-free external connectivity.

3 Technical Essentials in Planning for Multihoming

It is essential that the organisation produces a routing policy. This should describe the number of upstream links desired and how they are expected to operate (for example, for fallback or load sharing). If the links are expected to undertake load sharing, a precise description should be included of how traffic is to be routed – both to and from the site – over each link. This routing policy is often generated as a short descriptive document, or as a RIPE-181/RPSL style routing registry database object.

Multihoming to Janet requires the use of BGP on the organisation’s access router. It also

requires the organisation's network to be capable of redistributing routing information to and from its internal network architecture.

BGP requires the use of an AS (Autonomous System) number and provider-independent IP addresses. A public AS number must be obtained from the RIPE (Réseaux IP Européen) Network Control Centre. Existing IP addresses used in the organisation's network may have to be changed to ensure traffic can be routed properly.

Configuration on the Janet routers is limited to adjusting route filters to accept and announce agreed prefixes to and from the organisation. The organisation will need to carry out the majority of the configuration work and maintenance within its own network. Commonly, BGP Multi-Exit Discriminators and/or AS path propensity would be used to influence how traffic is routed **to** the organisation, while local preference or weighting would be used to influence traffic routing **from** the organisation. This allows the organisation's staff to have almost total control and responsibility over their network, giving maximum flexibility for adjusting their model. It also removes the need for extra configuration on the Janet backbone, and effectively removes the Janet backbone as a source of problems should the multihomed routing not work as expected.

When a Regional Network is involved in the multihoming arrangement, the connection to Janet needs to be terminated on a nearby Janet backbone node to avoid complications. This means the organisation may have to run a longer telecommunication circuit direct to the nearest backbone node. Alternatively, the organisation may require the Regional Network to provide a layer 2 circuit from the organisation to the nearest backbone node, if it can be supported by the network infrastructure.

4 Procedure for Submission of a Multihoming Request

It is likely that many multihoming requests will not fit a common model, so each particular case is likely to need careful individual consideration. The procedure for submission is as follows:

1. The organisation submits a copy of the completed request form (see Appendix 1) to the Janet Service Desk. If multihoming is required in association with a new connection, the request should be submitted alongside the other connection documentation.

2. The request is then forwarded to a group of IP routing experts for recommendations on possible solutions. It is important for the smooth progress of this stage that the routing plan in the request form is very specific. An unclear routing plan will require further clarification and will delay the whole process.
3. For a load-sharing multihoming arrangement, a meeting of technical personnel from the multihoming organisation, the Janet NOC (Network Operations Centre) and the ISP is usually required. This meeting is to discuss technical issues involved in the desired solution and to clarify individual responsibilities for achieving the multihoming organisation's objectives.

A Customer Project Manager appointed by Janet can assist with completion of the multihoming request form.

Appendix 1: Request for Multihoming to Janet – to be completed by the

requester

Section 1: Your information

Your name

Telephone Number

Your Job Title

E-mail address

Organisation

Name

Date of request

Name and contact details of 1st technical person at your organisation

Name and contact details of 2nd technical person at your organisation (if appropriate)

Are you a new Janet Customer? * (delete as applicable) Yes/No *

Funding source for your Janet connection (Leave blank if existing Janet Customer)

Section 2: Your other upstream service provider’s information

Name of your other upstream service provider

Status of your other upstream connection (please indicate one:)

- Under consideration
- Contract signed
- Link delivered
- In service

IP address space in use if applicable

Capacity of your connection to other upstream service provider

Section 3: Multihoming planning

Your desired objectives for multihoming

Is it purely for fallback? * (delete as applicable) Yes / No *
(If Yes, you do not need to fill in the remainder of the request)

Your public AS number if available

Your independent IP address range if available

Do you plan to use separate routers? * (delete as applicable) Yes / No *

Details of multihoming routing plan **

Diagram of your existing network connectivity **

Diagram of proposed multihoming network **

** Please continue on separate sheet if necessary, and attach to this form.

Please return completed form to the Janet Service Desk, Lumen House, Library Avenue, Didcot, Oxfordshire OX11 0SG

E-mail: mailto:service@ja.net [13]

Tel: 0870 850 2212

Fax: 0870 850 2213

Links
[1] http://community.ja.net/library/advisory-services/guide-requesting-multi-homing-janet
[2] http://www.cisco.com/warp/public/459/27.html
[3] http://www.amazon.co.uk/exec/obidos/search-handle-form/202-5131425-5765419
[4] http://www.cisco.com/en/US/tech/tk365/tk80/tsd_technology_support_sub-protocol_home.html
[5] http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/bgp.htm
[6] http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121cgcr/ip_c/ipcprt2/1cdbgp.htm
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[12] http://info.connect.com.au/docs/routing/general/multi-faq.shtml
[13] mailto:service@ja.net