

ASNET-AM Experience in Implementation of Multihome BGP Configuration with Several Border Routers

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ABSTRACT

This paper gives details of complex BGP configuration of ASNET-AM scientific network [1].

Keywords

BGP, multihome.

1. INTRODUCTION

The 2017 Computer Science and Information Technologies Conference will be held at Yerevan, Armenia, 25 - 29 September 2017 [2].

The major topics include the following:

- Classic Network Topology
- ASNET-AM Network Topology
- Tasks to be considered to get working Configuration
- Future Plans

2. Classic Network Topology

In classic network there exists one border router, connected to three different groups of external links:

Upstreams (ISPs)
Peers/Exchanges
Clients.

All packets enter border router to be routed to correct destination. Border router is getting routing information by eBGP from upstreams (full view BGP), Peers/Exchanges, Clients (with own ASes).

To send packets to optimal paths, localpref parameter with default value 100 is using.

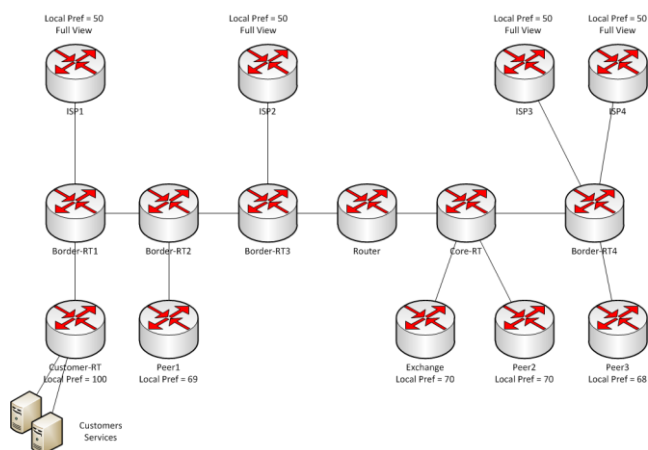
3. ASNET-AM Network Topology

ASNET-AM has two-site distributed topology with some core routers and border routers for each external link (pic. 1). Powerful border routers for upstream connections store full view BGPs from all ISPs via full mesh topology. Core routers and internal routers are getting country wide prefixes from peers/exchanges and sending packets according to fine-tuned localpref setup. One of exchanges is GEANT - European scientific network [3].

ASNET-AM has main upstream link and five backup channels, managing Internet traffic when main link goes down.

For some local ISPs ASNET-AM has both peering link and Internet link. Each link is monitoring for used bandwidth to find out when link upgrade must be done.

Multiple routing tables are using on each router for proper load balancing.



Pic. 1. ASNET-AM network's two-site distributed topology

4. Tasks to be considered to get working configuration

After many experiments (including RIPE NCC training [4]), the following localpref setup was chosen:

100 – for clients (currently only AM TLD backup link. Traffic is going to Internet and to country-wide ARMIX exchange)

70 – for peers/exchanges

50 – for upstreams

Those policies must be registered in RIPE DB

Depending on link bandwidth finer groups can be defined for maximal channel utilisation:

69 – peer1

68 – peer2

70 – exchange1

There are some cases, when peering link is slower than exchange link with the same ISP. Here community BGP parameter must be used and ISP must be warned not to filter traffic via exchange even if peering link is up.

For external links the following tasks must be completed:

Private IP addresses must be filtered

Unneeded protocols must be filtered

Use ISP, which has DDOS protection for customers.

5. Future Plans

ASNET-AM implementing 10G backbone on a new hardware from MikroTik (CRS212-1G-10S-1S+IN; CCR1072-1G-8S+; CCR1036-8G-2S+; CCR1016-12S-1S+; CRS226-24G-2S+RM; CRS210-8G-2S+IN) [5].

Juniper router and switch will be part of 10G backbone.

Redundancy will be implementing with the two links between sites and four border routers.

ASNET-AM is testing NetFlow protocol to implement SDN.

6. Literature

1. Academic Scientific Research Computer Network of Armenia
<https://asnet.am/>
2. 11th International Conference on Computer Science and Information Technologies
<https://csit.am/2017/>
3. GEANT is the leading collaboration on e-infrastructure and services for research and education
<https://www.geant.org/>
4. BGP Operations and Security Training Course
<https://www.ripe.net/support/training/courses/bgp>
5. MikroTik provides hardware and software for Internet connectivity
<https://mikrotik.com/>