

# 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 Paper includes 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 the 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, the localpref parameter with default value 100 is being used.

## 3. ASNET-AM NETWORK TOPOLOGY

ASNET-AM has a two-site distributed topology with some core routers and border routers for each external link (Pic.).

Powerful border routers for upstream connections store full view BGPs from all ISPs via a 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 the exchanges is GEANT - European Scientific Network [3].

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

For some local ISPs ASNET-AM has both a peering link and an Internet link. Each link is monitoring by NetFlow probes for used bandwidth to find out proper time for link upgrade.

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

## 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 the peering link is slower than the exchange link with the same ISP. Here the BGP community parameter should be used and ISP should be warned not to filter traffic via exchange even if the peering link is up.

For external links the following tasks should be completed:

Private IP addresses should be filtered

Unneeded protocols should be filtered

Use ISP, which has DDOS protection for customers.

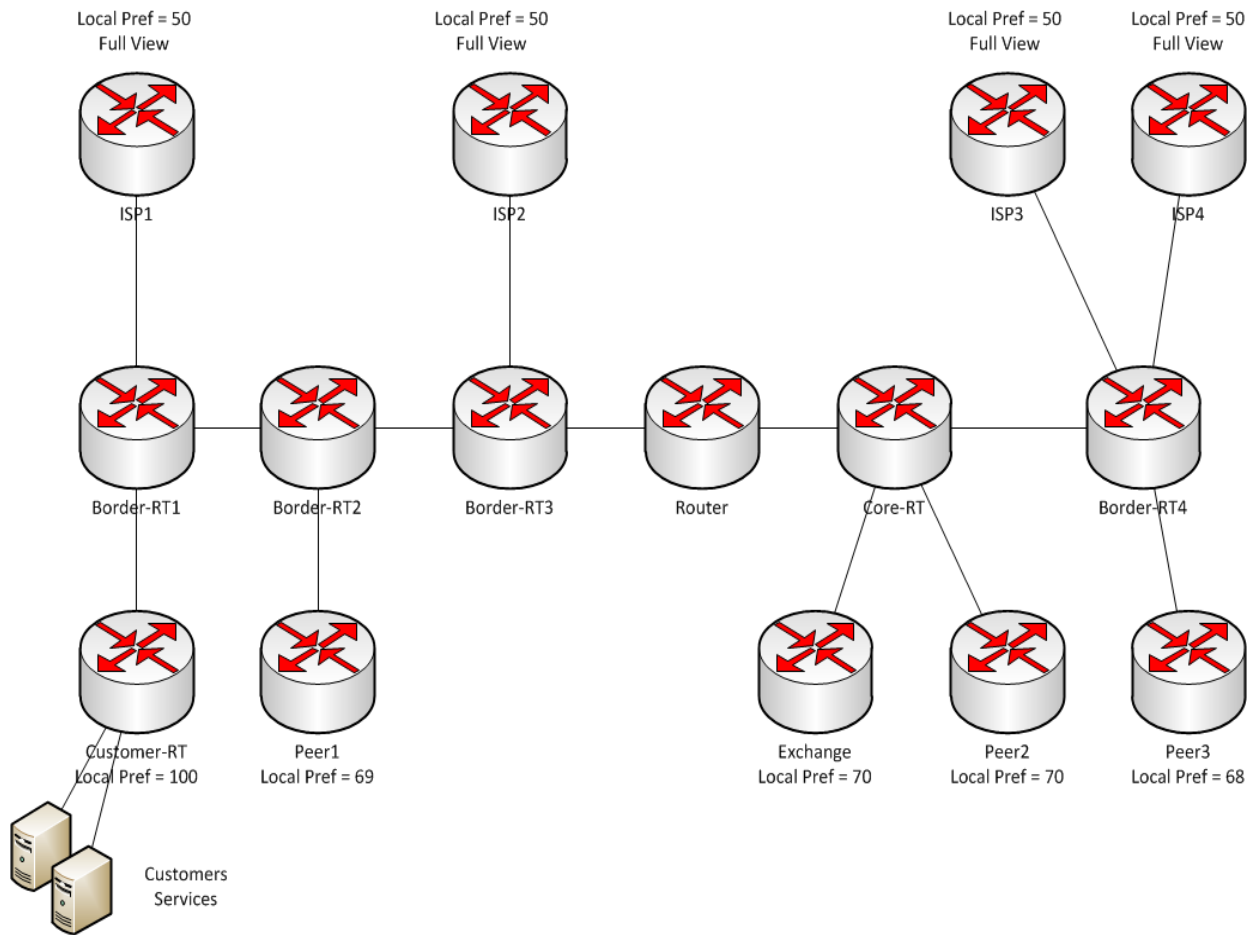
## 5. FUTURE PLANS

ASNET-AM is 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 implemented with the two links between sites and four border routers.

ASNET-AM is testing NetFlow protocol to implement SDN.



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

## 6. REFERENCES

- [1] Academic Scientific Research Computer Network of Armenia, <https://asnet.am/>.
- [2] 11<sup>th</sup> International Conference on Computer Science and Information Technologies, <https://csit.am/2017/>.
- [3] GÉANT 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/>.