

# ASNET-AM Experience in Implementation of Hybrid VLANs for Customers Links

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## ABSTRACT

This paper gives details of Hybrid VLANs in ASNET-AM scientific network [1].

## Keywords

VLAN, Hybrid VLAN.

## 1. INTRODUCTION

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

The paper topic includes the following:

- Classic Hybrid VLAN Topology
- ASNET-AM Hybrid VLAN Topology
- Example of usage Hybrid VLAN in ASNET-AM network

## 2. CLASSIC HYBRID VLAN TOPOLOGY

In classic network two switches can be connected with the following three link types:

Access Link (no VLANs)

Trunk Link

Hybrid Link

Access Link connects VLAN-untagged switch port (customer device port) to VLAN-untagged switch port.

Trunk Link connects VLAN-tagged switches (network devices) where all frames from each VLAN must have the same special header attached.

Hybrid Link is a combination of Access Link and Trunk Link (one VLAN frames are untagged) [3].

## 3. ASNET-AM NETWORK TOPOLOGY

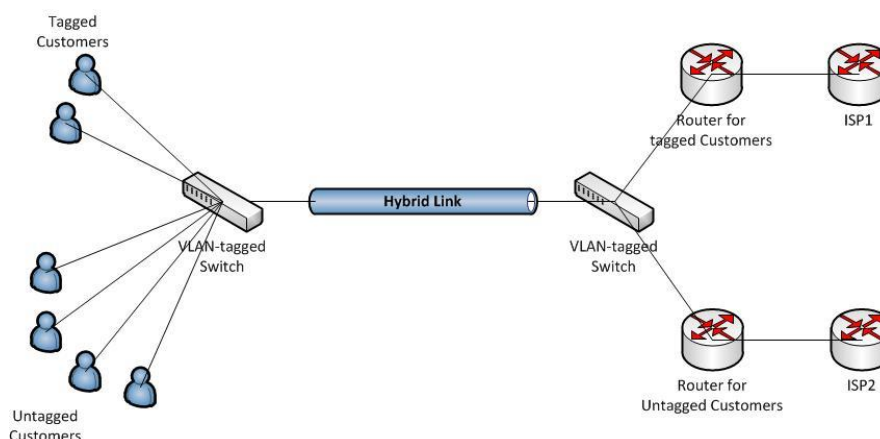
Because of complicate structure of ASNET-AM network, administration must provide special treatment for GRID-AM traffic (larger MTU 9000) and for other non-GRID customers. See Pic. 1 as a typical way of customer connection.

Different customers have different policy for Internet connection assured with two different border routers, connected to different ISPs.

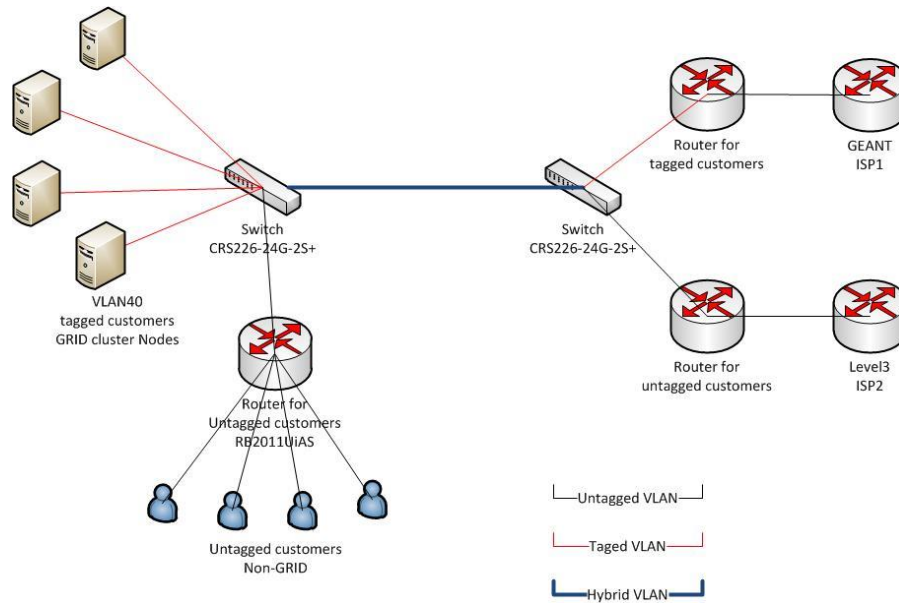
## 4. EXAMPLE OF USAGE HYBRID VLAN IN ASNET-AM NETWORK

As an example of usage of Hybrid VLAN we consider F/O link ASNET-AM – National Polytechnic University of Armenia (NPUA) site. There is GRID cluster and several non-GRID customers: Armenian State Pedagogical University after Khachatur Abovyan (ASPU), Yerevan State Medical University after Mkhitar Heratsi (YMSU), Armenian State Institute of Physical Culture and Sport (ASIPCS), Center for Ecological-Noosphere Studies of the National Academy of Sciences of the Republic of Armenia (CENS). See Pic. 2 for details.

GRID cluster nodes are connected to access ports on a switch and its traffic directed to ASNET-AM with VLAN ID 40. On ASNET-AM site VLAN 40 directed to GRID-AM border router, providing connection to GEANT in Frankfurt. Other NPUA customers' untagged traffic is directed to ASNET-AM border router, giving connection to Level3 ISP in Frankfurt. All VLANs configuration was done on MikroTik devices (both on switches and on routers) [4].



Pic 1. Generic type of customer connections to ASNET-AM network.



Pic 2. Example of usage Hybrid VLAN in ASNET-AM network.

## 5. 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] The Cisco Learning Network, <https://learningnetwork.cisco.com/thread/51854>, [http://www.cse.wustl.edu/~jain/cis788-97/ftp/virtual\\_lans/index.html](http://www.cse.wustl.edu/~jain/cis788-97/ftp/virtual_lans/index.html).
- [4] MikroTik provides hardware and software for Internet connectivity, <https://mikrotik.com/>, [https://wiki.mikrotik.com/wiki/Manual:CRS\\_examples](https://wiki.mikrotik.com/wiki/Manual:CRS_examples).