Basic Mistakes by ISP's on Network setup & BGP

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At New Delhi MUM, AUGUST 10, 2018

ABOUT THE SPEAKER

- Shekhar Gupta, IsolNet Network Solution Pvt. Ltd., Chhattisgrah. India
- Electronic and Telecommunications Engineer
- 3 Years worked for Nokia & LG
- In networking field for 17 years.
- Certified from MikroTik (MTCNA)
- Running his own ISP in Chhattisgrah

OBJECTIVES

- Startups need to be guided when venturing into ISP business.
- Our experience helps us guide entrepreneurs.
- QoS is a concern for ISP’s

We Serve. We Connect. We Care.

Before We Start

Clean India Green India

Reason to MikroTik

- Efficiency
- Performance
- Maintenance
- Cost
- Growth

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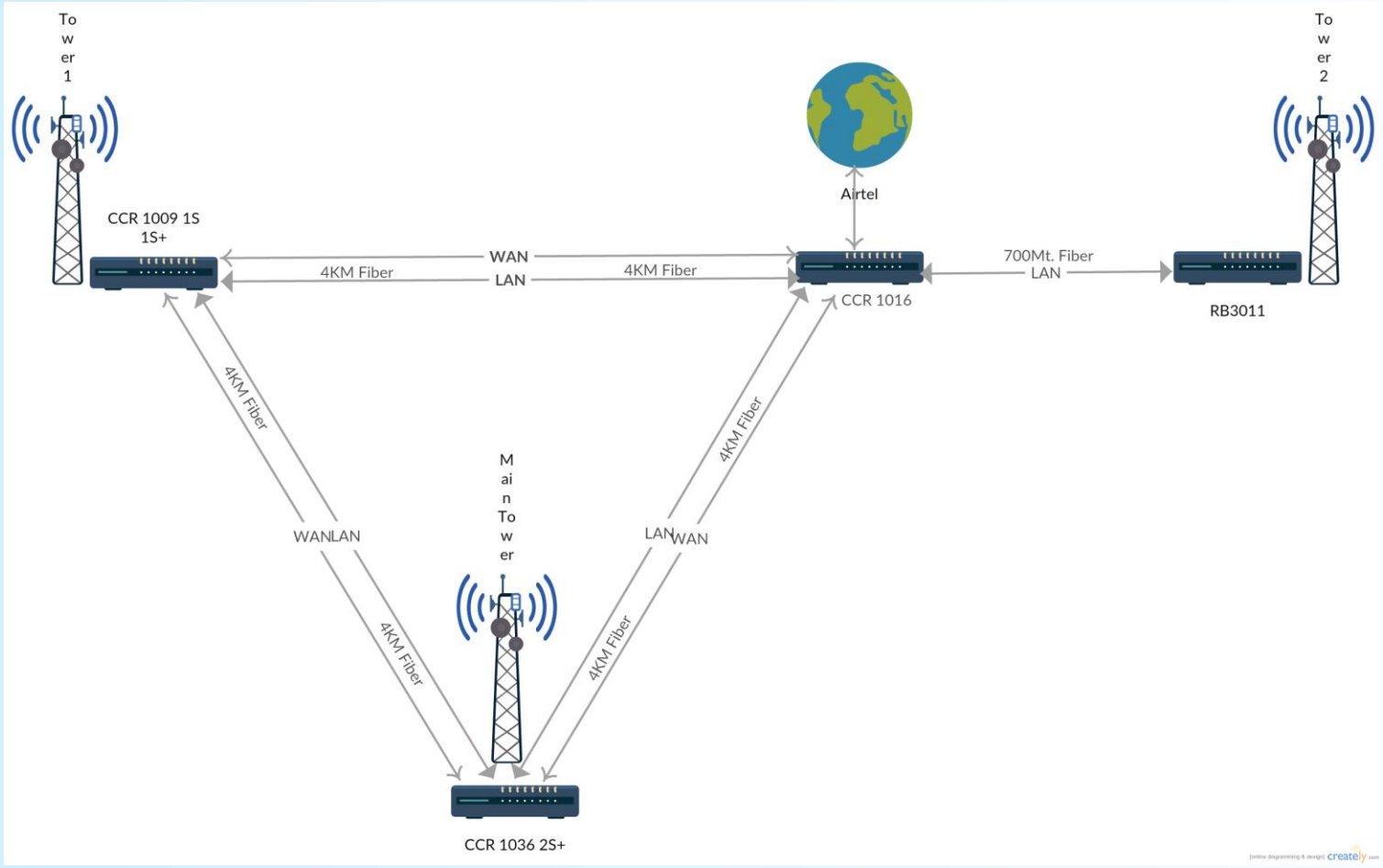
Network Diagram



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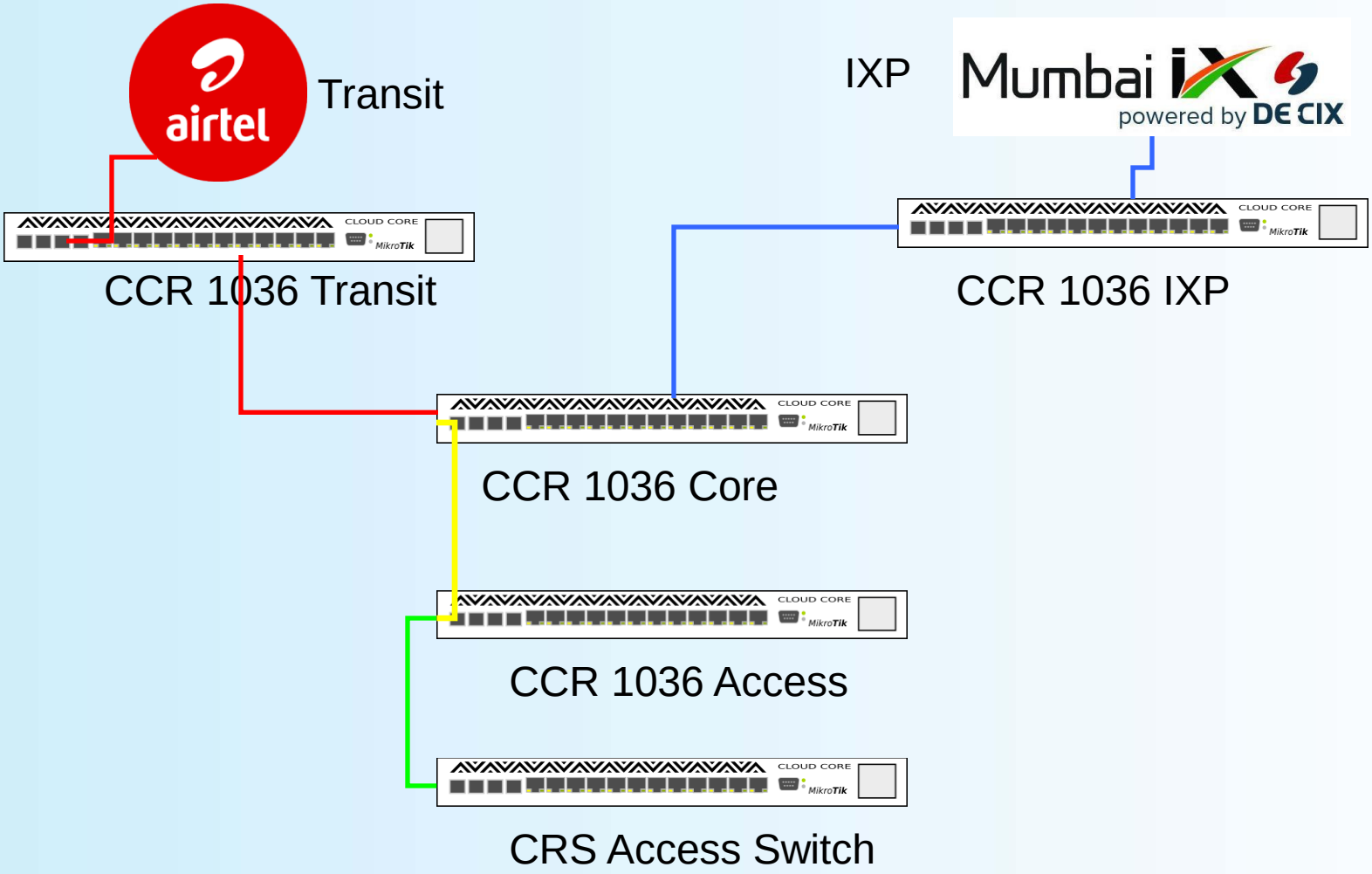
Physical Network Diagram



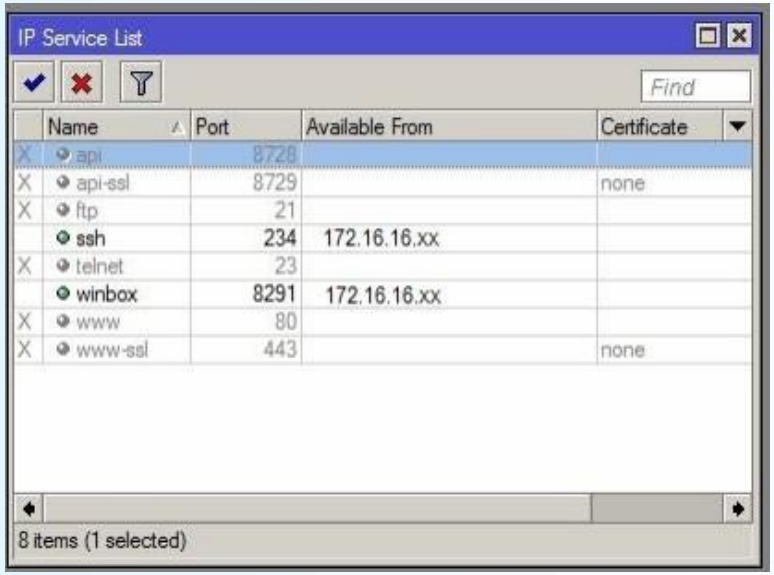
Physical Network Diagram

Don't forget!

* 3 - Separate Earthing (Electrical Grounding)
    - 1st for Lightning Arrester
    - 2nd for Tower
    - 3rd for Equipments
* They should not be inter-connected
    - Each other Earth pit distance minimum 10 Meter
* Avoid Wireless devices back reflection.
* Always Use Outdoor STP cable

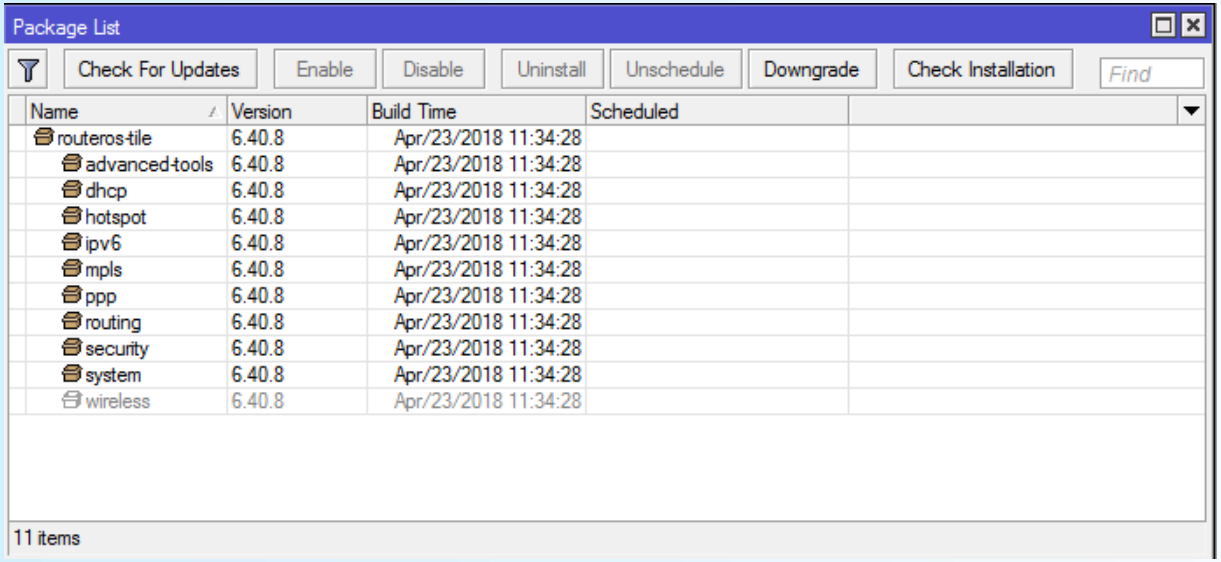
Don't forget! On ROS

* Pre-config
* Turn off unused service features
* Web,telnet,ftp,etc
* Change default port



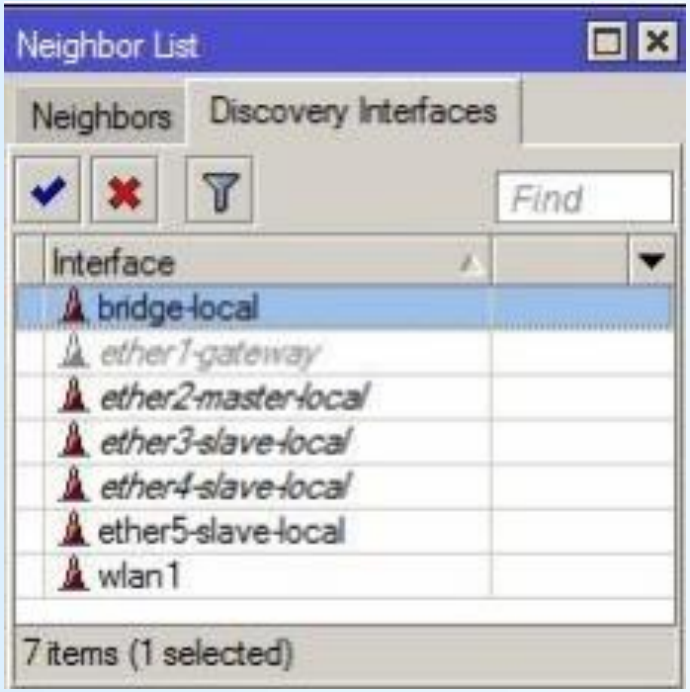
Turn off unused packages features

- Disable features/packages



Neighbour discovery

- Disable interface



Configuration

- User / Password

  Proper credentials
- Latest stable OS
- Disable LCD / Minimal information
- Must use Vlan
- Implement a good firewall according to the article here .. https://wiki.mikrotik.com/wiki/Manual:Securing_Your_Router

BGP

Always use Full Routing.

[NOC@IsolNet Core Router] > ip route print count-only
1427676
[NOC@IsolNet Core Router] > ip route print count-only where active=yes
517747

BGP

The way to influence BGP decision is by configuring routing filters.

Filtering **incoming** routes will change, how we see the external world, thus influencing how we **send** traffic;

Filtering **outgoing** routes will change how the world see us, thus influencing how we **receive** traffic.

BGP

Good practices for ingress filters for all peers are:

- ❑ Discard receiving own prefix;
- ❑ Discard default route (For Full Routing)

/ip firewall connection tracking> set **enabled=no**

BGP

How to check results?

- Tools that don't tell all the true:

  Ping, traceroute, torch, bandwidth test…

- Where should we see:

  Results of our upload policy: **Our routing table**

  Results of our download policy: **Our routes as seen by other AS's (looking glasses)**

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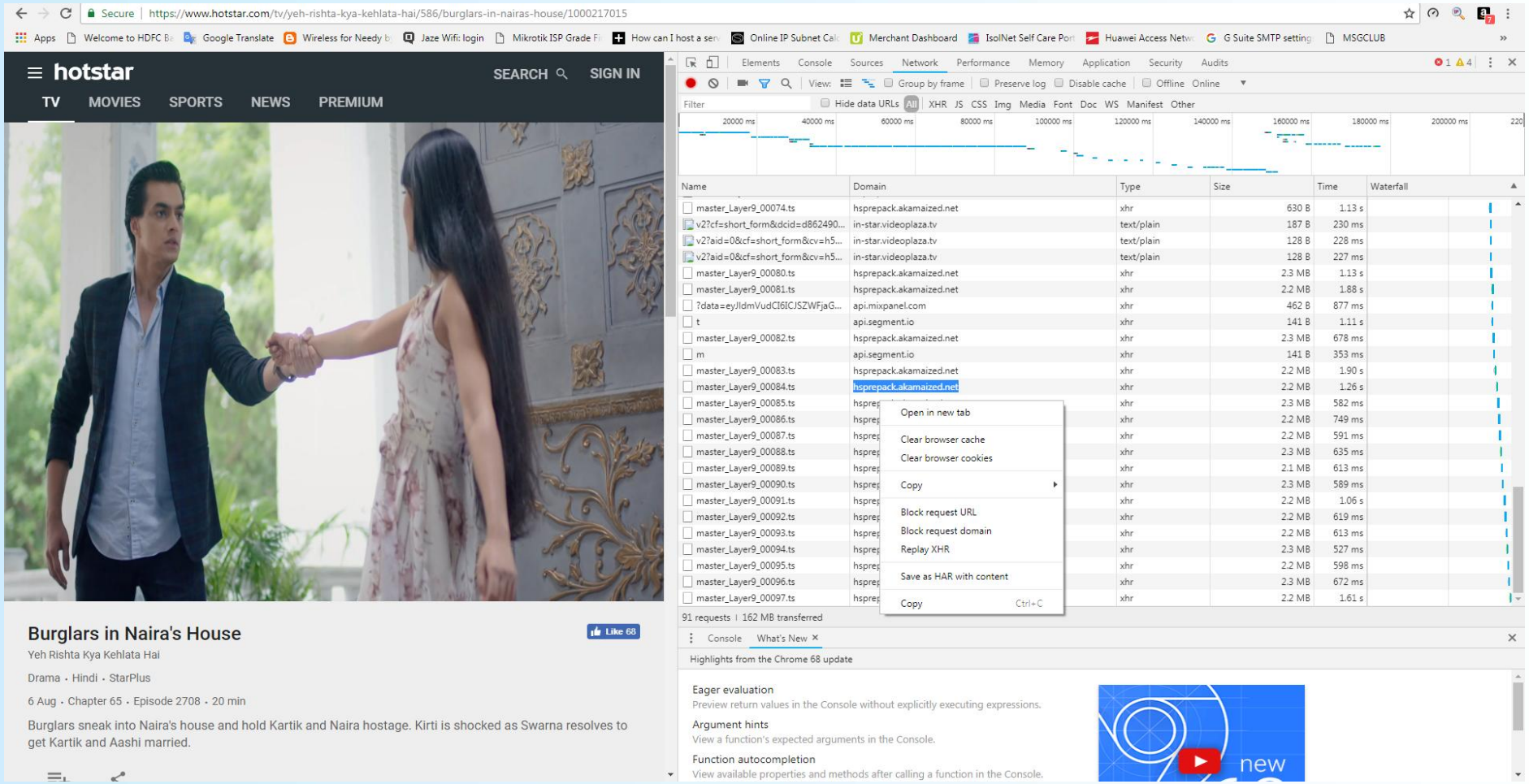
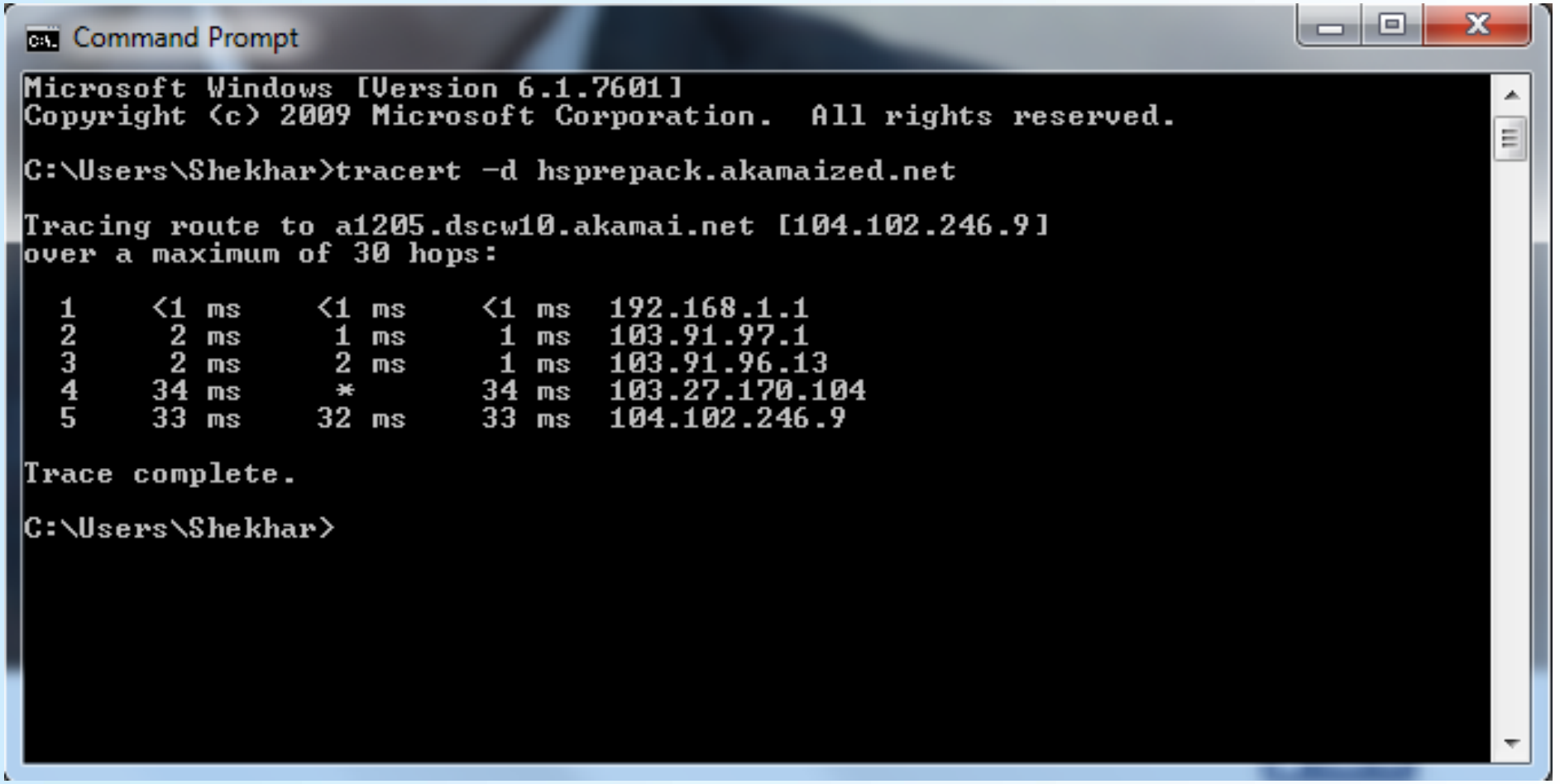
BGP

How to check results?



BGP

How to check results?



Problem

Some websites not opening and some

websites very slow ?

User is PPPoE mode

Solution

MTU and TCP-MSS

MTU and TCP-MSS

Overview

MTU

This is the maximum packet size that can be sent over the interface. Different types of interfaces will have different MTU's depending on the overheads of the interface.
Ethernet = 1500
PPPoE = 1492

MTU and TCP-MSS

Overview

MSS

This is the maximum segment size of a TCP packet.
Remember that a TCP packet consists of the Segment + TCP header (20 bytes) + IP header (20 bytes)

For the TCP packet to be sent over the router interface without being fragmented it will need to not be bigger than the interface MTU.
We can therefore conclude that the MSS is the MTU - 40 bytes

MTU and TCP-MSS

Overview

TCP-MSS

This is where the segment size is set between two devices communicating with TCP

The MSS is sent in the SYN packet of the TCP 3-way handshake and should be accepted and used by the other party. This is not a negotiation and both sides will send their MSS in their SYN to the other side.

On any router you should be able to look into the SYN packet of the 3-way handshake and identify the MSS. If the MSS is too high for the interface the packet is being sent over, then the router should change this to a suitable value.

MTU and TCP-MSS

Configuration

On a Mikrotik router the TCP-MSS gets picked up and set in a mangle rule.
For this example we will set the MSS for traffic going over the PPPoE interface.
We will set the MSS at 1452 which is calculated as per below:
MSS = MTU of interface - TCP Header - IP Header
MSS = 1492 - 20 - 20
MSS = 1452
The mangle rule will catch the TCP SYN for both upload and download traffic and will replace the MSS with 1452 only if a higher value has been set

/ip firewall mangle
add action=change-mss chain=forward new-mss=1452 out-interface=pppoe-out1 passthrough=yes protocol=tcp tcp-flags=syn tcp-mss=1453-65535
add action=change-mss chain=forward in-interface=pppoe-out1 new-mss=1452 passthrough=yes protocol=tcp tcp-flags=syn tcp-mss=1453-65535

Q/A

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Thank You

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