ICN – Examination date: 13-02-2013 "Rocks"

Available time: 120 minutes.

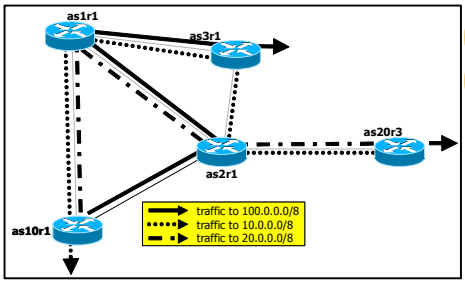
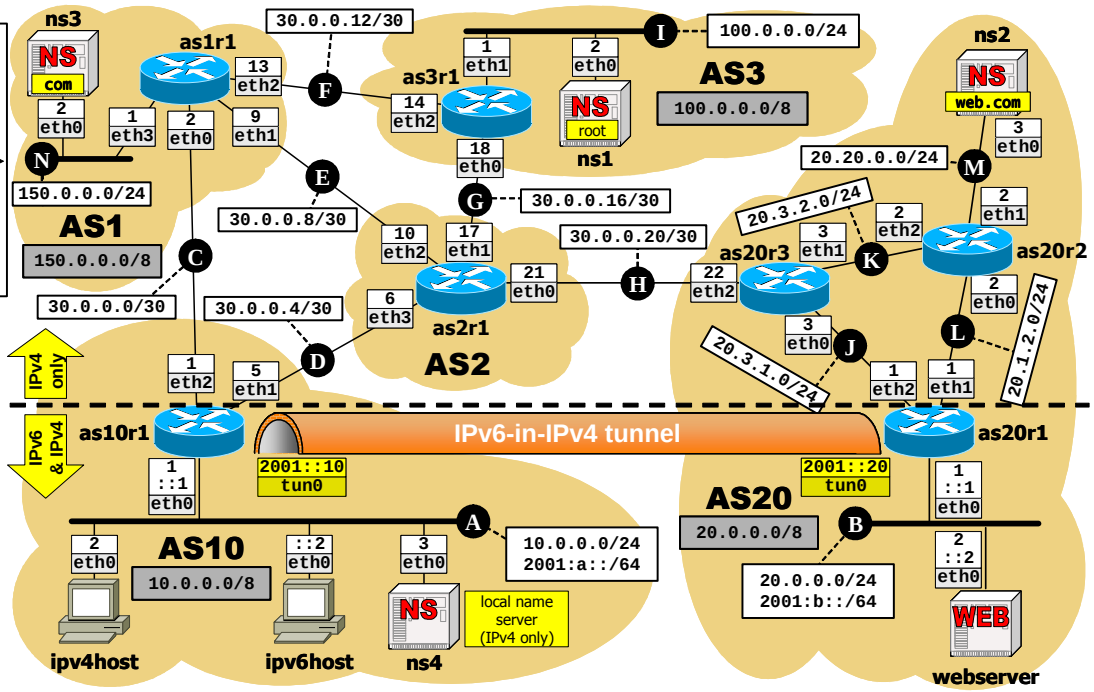


Figure 1



IP

- For each interface, only the last byte of the IPv4 or IPv6 address is specified.
- All network nodes are IPv4-only, except **`ipv6host`**, which is IPv6-only, and **`as10r1`**, **`as20r1`**, and **`webserver`**, which are dual stack.
- **Relevant nodes must be enabled to act as IPv6 routers by using the command specified in the box alongside.**
- IPv6 routing is implemented statically.

IGP and BGP

- **`AS20`**'s internal network runs RIP.
- Peering LANs and networks internal to each AS (in gray) must be announced in BGP.
- Suitable BGP policies must be implemented to direct traffic as indicated in Figure 1.
- No router announces **`0/0`** nor applies customer-provider policies or configuration settings that discard announcements.
- Routers must not announce any IPv6 subnets, neither in RIP nor in BGP.

Useful Commands (parts in square brackets are optional):

- Assign the IPv6 address ***`ipv6addr/mask`*** to interface ***`interface`***:
  ```
  ifconfig interface up
  ifconfig interface add ipv6addr/mask
  ```
- Enable a network node to act as an IPv6 router:
  ```
  echo 1 >/proc/sys/net/ipv6/conf/all/forwarding
  ```
- Add a static route towards ***`ipv6addr[/mask]`***:
  ```
  route -A inet6 add ipv6addr[/mask] [gw nexthop] [dev interface]
  ```
- Display the IPv6 routing table (different from the IPv4 table):
  ```
  ip -6 route
  ```
  or, alternatively, `route -A inet6`
- Set up an IPv6 tunnel named ***`tunnelName`*** between ***`ipv4LocalAddr`*** and ***`ipv4RemoteAddr`*** (note: the same setup must be performed at both the endpoints):
  ```
  ip tunnel add tunnelName mode sit remote ipv4RemoteAddr local
       ipv4LocalAddr ttl 10
  ifconfig tunnelName up
  ifconfig tunnelName add ipv6LocalAddr
  route -A inet6 add ipv6RemoteAddr dev tunnelName
  ```

Services

- **`ns1`**, **`ns2`**, **`ns3`**, and **`ns4`** are name servers that only resolve names to IPv4 addresses. **`ns1`** is root, **`ns3`** is the authority for **`com`**, **`ns2`** is the authority for **`web.com`**.
- **`webserver`** is a web server running Apache, and serving a single page **`http://www.web.com/`**.

Goals

- **`ipv4host`** must be able to display the web page offered by **`webserver`** by using this command: **`links http://www.web.com/`**
- **`ipv6host`** be able to display the web page offered by **`webserver`** by using this command:
  `echo -e "GET / HTTP/1.0\n" | nc6 2001:b::2 80`.