

Protocol RIPng in OMNeT++

Bc. Jiří Trhlík, supervised by: Ing. Vladimír Veselý
Brno University of Technology, Faculty of Information Technology, Department of Information Systems
Božetěchova 2, 612 66 Brno

Protocol IPv6

Communication protocol IPv6, in compare with protocol IPv4, especially provides an expansion of address space (from 32b to 128b).

IPv6 addresses consist of eight groups of hexadecimal digits separated by colons, e.g.:

2001:0db8:85a3:0042:0000:8a2e:0370:7334

and are logically divided into two parts: a 64-bit (sub-)network prefix, and a 64-bit interface identifier.

IPv6 address space is divided into the following scopes:

Prefix	Meaning
::/128	unspecified
::1/128	loopback
ff00:/8	multicast
fe80::/10	link-local (valid only in one broadcast domain)
fc00::/7	unique-local (similar to IPv4 private addresses)
other	global

Table 1: IPv6 address space

Protocol RIPng

RIPng (Routing Information Protocol next gen.) is a routing protocol for support of IPv6 networks and is an extension of distance-vector routing protocol RIPv2. The main advantage of RIP is its simplicity but due to its limitations is suited for small networks.

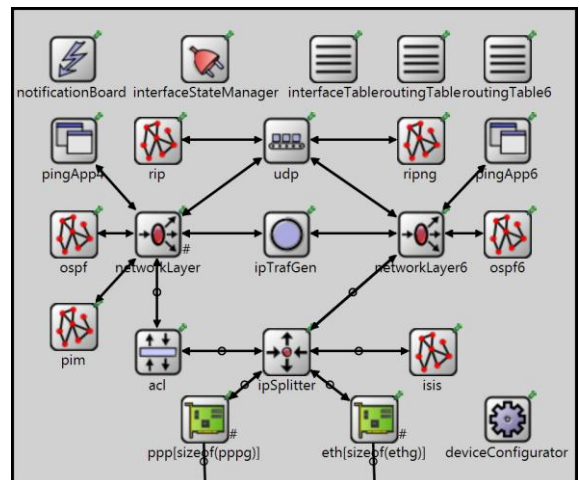
As a routing metric RIP uses the hop count and the maximal hop count is 15.

To prevent creation of routing loops, RIP uses the split horizon mechanism and a hop count of 16 – infinity = a network is unavailable.

RIPng sends updates containing complete routing table every 30 seconds on UDP port 521 using the multicast group FF02::9.

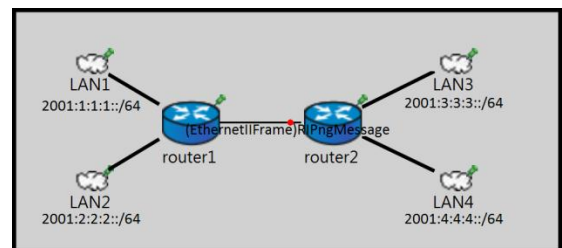
Model of a router in OMNeT++

Project OMNeT++ is an integrated development environment, library and framework for creation of simulations. For easier creation of communication networks simulations is designed framework INET, which explores and extends ANSA project at FIT BUT.



Picture 1: ANSA router module extended by RIPng module

Example of a network using RIPng protocol



Picture 2: A simple network for demonstration of RIPng

```
routeList[8] (IPv6Route *)
[0] = 2001:1:1:1::/64 --> if=101 next hop:fe80::8a:ff:fe00:4 ROUTING_PROT
[1] = 2001:2:2:2::/64 --> if=101 next hop:fe80::8a:ff:fe00:4 ROUTING_PROT
[2] = 2001:1:2:2::/64 --> if=101 next hop:<unspec> STATIC
[3] = 2001:3:3:3::/64 --> if=102 next hop:<unspec> STATIC
[4] = 2001:4:4:4::/64 --> if=103 next hop:<unspec> STATIC
[5] = fe80::/10 --> if=101 next hop:<unspec> STATIC
[6] = fe80::/10 --> if=102 next hop:<unspec> STATIC
[7] = fe80::/10 --> if=103 next hop:<unspec> STATIC
```

Picture 3: Routing table of the router router2



evropský
sociální
fond v ČR



EVROPSKÁ UNIE



MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY



OP Vzdělávání
pro konkurenceschopnost

