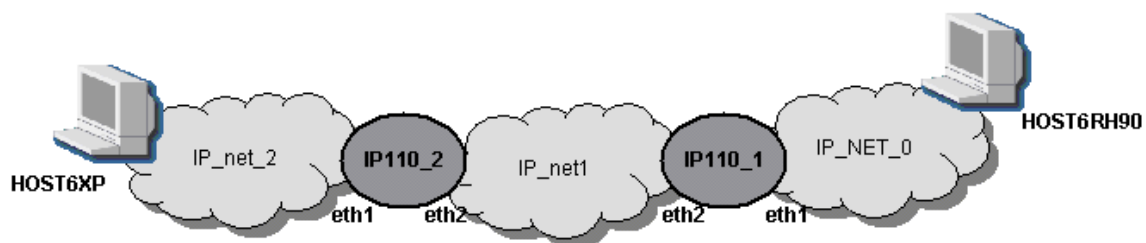


1 Installing Ipv6 on Linux and Windows.

Installing Ipv6 on Linux and windows is fairly easy. Please refer to a tutorial on this at <http://www.radarhack.com/dir/papers/ipv6.pdf> for more info. Do not add additional IP addresses, this will be taken care of in this setup automatically.

2 Building the network.

Before actually configuring Ipv6, connect everything via Ipv4 addresses, to simplify the configuration, via the console and voyager.



HOSTNAME	Ipv4 address
HOST6XP	192.168.12.33/24
HOST6RH90	192.168.10.33/24
IP110_2_eth1	192.168.12.1/24
IP110_2_eth2	192.168.11.233/24
IP110_1_eth1	192.168.10.222/24
IP110_1_eth2	192.168.11.222/24
IP_net_2	192.168.12.0/24
IP_net_1	192.168.11.0/24
IP_net_0	192.168.10.0/24

3. Assigning Ipv6 addresses on IPSO

Login with Voyager and go to **Config -> IPv6 Configuration -> Logical Interfaces** and configure the Ipv6 addresses on the appropriate interfaces.

HOSTNAME	Ipv6 address
HOST6XP	See later
HOST6RH90	See later
IP110_2_eth1	3ffe:0:0:2::233/64
IP110_2_eth2	3ffe:0:0:1::233/64
IP110_1_eth1	3ffe::222/64
IP110_1_eth2	3ffe:0:0:1::222/64
IP_net_2	3ffe:0:0:2::/64
IP_net_1	3ffe:0:0:1::/64
IP_net_0	3ffe::/64

The screenshot shows the 'IPv6 Interface' configuration page in the Nokia Voyager web interface. The browser window title is 'IPv6 Interface - Microsoft Internet Explorer'. The address bar shows 'http://192.168.10.222/cgi-bin/v6interface.tcl?interface=eth-s1p1c0'. The page header includes 'Nokia Voyager: IP110-1', the 'networkVOYAGER' logo, and the date 'Sun Nov 30 16:05:57 2003 CET'. Below the header are navigation buttons: Home, Top, Up, Apply, Save, Help, and Logout. A green success message reads 'Success Apply successful.'. The main form contains the following fields:

- 'New IPv6 prefix' with the value '3ffe::222' (circled in red)
- 'New mask length' with the value '64' (circled in red)
- 'Logical name' with the value 'eth-s1p1c0'

Below the form are links for 'Anycast Addresses' and 'Interface Statistics', each with a small 'H' icon. At the bottom, there is a note: 'Physical interface for eth-s1p1c0 (this links to the IPv4 physical interface page):'. The browser's status bar at the bottom shows 'Internet'.

If everything is configured, verify the configuration on the command line.

```
IP110-1[admin]# ifconfig -a
eth-s1plc0:  lname eth-s1plc0
flags=e7<UP,PHYS_AVAIL,LINK_AVAIL,BROADCAST,MULTICAST,AUTOLINK>
inet6 mtu 1500
inet6 fe80::2a0:8eff:fe20:88f --> fe80::/64
inet6 3ffe::222 --> 3ffe::/64 broadcast 3ffe::
inet mtu 1500 192.168.10.222/24 broadcast 192.168.10.255
phys eth-s1p1 flags=4133<UP,LINK,BROADCAST,MULTICAST,PRESENT>
ether 0:a0:8e:20:8:8f speed 100M full duplex

eth-s2plc0:  lname eth-s2plc0
flags=e7<UP,PHYS_AVAIL,LINK_AVAIL,BROADCAST,MULTICAST,AUTOLINK>
inet6 mtu 1500
inet6 fe80::2a0:8eff:fe20:890 --> fe80::/64
inet6 3ffe:0:0:1::222 --> 3ffe:0:0:1::/64 broadcast 3ffe:0:0:1::
inet mtu 1500 192.168.11.222/24 broadcast 192.168.11.255
phys eth-s2p1 flags=4133<UP,LINK,BROADCAST,MULTICAST,PRESENT>
ether 0:a0:8e:20:8:90 speed 100M full duplex
```

...

4. Setting the correct routes on the appliances

To make this setup work, we need to add a route on
IP110_1 : for network 3ffe:0:0:2::/64 to 3ffe:0:0:1:233
IP110_2 : for network 3ffe::/64 to 3ffe:0:0:1:222

Config -> IPv6 Configuration -> Static Routes

The screenshot shows a web browser window displaying the IPv6 Static Routes configuration page. The page title is "IPv6 Static Routes" and the device is identified as "Nokia Voyager: IP110-1". The date and time are "Sun Nov 30 16:16:43 2003 CET". The page contains a table for configuring static routes. The table has columns for "Static route", "Gateway", "Next hop type", "Preference", and "Interface". The first row shows a route for "3ffe:0:0:2::/64" with a gateway of "3ffe:0:0:1:233" and an interface of "eth-s2p1c0". The second row is for "Additional Gateway" configuration. Below the table, there is a form for adding a new static route with fields for "New static route:" and "Mask length: 64".

Static route	Gateway	Next hop type	Preference	Interface
Default:	<input type="radio"/> on <input checked="" type="radio"/> off			
3ffe:0:0:2::/64	<input checked="" type="radio"/> on <input type="radio"/> off	normal		eth-s2p1c0
	3ffe:0:0:1:233	<input checked="" type="radio"/> on <input type="radio"/> off		eth-s2p1c0
Additional Gateway:				eth-s2p1c0

IP110-1[admin]# netstat -rn
Routing tables:

IPv4: instance 0 name "default"

Destination	Gateway	Flags	Refs	Use	Netif	Expire
default		RCU	1	0		
0.0.0.0		CU	0	0		
127/8		BCU	0	0		
127.0.0.1	127.0.0.1	CG	0	0		
192.168.10/24		CGUX	0	0	eth-s1plc0	
....						

IPv6: instance 0 name "default"

Destination	Gateway	Flags	Refs	Use	Netif	Expire
default		RCU	1	0		
::/96		CU	0	0		
::		CU	0	0		
::1	::1	CG	0	0		
::ffff:0:0/96		CU	0	0		
3ffe::/64		CGUX	0	0	eth-s1plc0	
3ffe::	3ffe::	CGU	0	0	eth-s1plc0	
3ffe::222	3ffe::222	CGU	0	0	eth-s1plc0	
3ffe:0:0:1::/64		CGUX	0	0	eth-s2plc0	
3ffe:0:0:1::	3ffe:0:0:1::	CG	0	0	eth-s2plc0	
3ffe:0:0:1::222	3ffe:0:0:1::222	CGU	0	0	eth-s2plc0	
3ffe:0:0:1::233	eth-s2plc0	CGU	1	0	eth-s2plc0	
3ffe:0:0:2::/64	3ffe:0:0:1::233	CU	0	0	eth-s2plc0	
fe80::/64		CGUX	0	0	eth-s1plc0	
fe80::2a0:8eff:fe20:88f	fe80::2a0:8eff:fe20:88f	CGU	0	0	0	eth-s1plc0
fe80::2a0:8eff:fe20:890	fe80::2a0:8eff:fe20:890	CGU	0	0	0	eth-s2plc0
ff00::/8		RCU	0	0		
ff02::1		CDU	0	0		
ff02::2		CDU	0	0		
ff02::1:ff00:0		CDU	0	0		
ff02::1:ff00:222		CDU	0	0		
ff02::1:ff20:88f		CDU	0	0		
ff02::1:ff20:890		CDU	0	0		

5. Setting up Router advertisement.

Router advertisement is a mechanism to facilitate the configuration of Ipv6 hosts on the network. It is known as 'stateless configuration'. The host will automatically calculate his Ipv6 address, using the announced network by the router (together with other options if activated) and his MAC address. We need to activate it on all populated segments.

Goto **Config -> IPv6 Configuration -> Router Discovery**

Nokia Voyager: IP110-1

NOKIA networkVOYAGER

Sun Nov 30 16:27:00 2003 CET

IPv6 Router Discovery

Home Top Up Apply Save Help Logout

eth-s1p1c0	<input checked="" type="radio"/> on <input type="radio"/> off	Managed Config Flag	<input type="radio"/> Yes <input checked="" type="radio"/> No	Other Config Flag	<input type="radio"/> Yes <input checked="" type="radio"/> No	Send MTU Option	<input type="radio"/> Yes <input checked="" type="radio"/> No
		Min adv interval		Max adv interval		Router lifetime	
		Reachable time		Retransmission timer		Current hop limit	
		3ffe::222/64	Onlink Flag	<input checked="" type="radio"/> Yes <input type="radio"/> No	Autonomous Flag	<input checked="" type="radio"/> Yes <input type="radio"/> No	
			Prefix valid lifetime		Prefix preferred lifetime		
eth-s2p1c0	<input type="radio"/> on <input checked="" type="radio"/> off						
eth-s3p1c0	<input type="radio"/> on <input checked="" type="radio"/> off						

Home Top Up Apply Save Help Logout

The Ipv6 interface addresses on the client machines will now be configured automatically, together with the default gateway.

6. Verifying the Ipv6 clients

6.1 On Linux

```
[root@localhost root]# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:4F:4E:07:E1:BB
          inet addr:192.168.10.92  Bcast:192.168.10.255  Mask:255.255.255.0
          inet6 addr: 3ffe::24f:4eff:fe07:e1bb/64 Scope:Global
          inet6 addr: fe80::24f:4eff:fe07:e1bb/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:915 errors:0 dropped:0 overruns:0 frame:0
          TX packets:537 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:100
          RX bytes:204134 (199.3 Kb)  TX bytes:67755 (66.1 Kb)
          Interrupt:5 Base address:0x6000
```

```
[root@localhost root]# /sbin/ip -6 route show
3ffe::/64 dev eth0  proto kernel  metric 256  expires 2591863sec mtu 1500 advmss 1440
fe80::/64 dev eth0  proto kernel  metric 256  mtu 1500 advmss 1440
ff00::/8 dev eth0  proto kernel  metric 256  mtu 1500 advmss 1440
default via fe80::2a0:8eff:fe20:88f dev eth0  proto kernel  metric 1024  expires 1663sec
mtu 1500 advmss 1440
unreachable default dev lo  metric -1  error -101
[root@localhost root]#
```

Tracepath6

```
[root@localhost root]# tracepath6 -n HOST_XP/80
1?: [LOCALHOST]                pmtu 1500
1:  3ffe::222                    0.719ms
2:  3ffe:0:0:1::233              0.947ms
3:  3ffe::2:202:3fff:feb2:c063   1.446ms reached
    Resume: pmtu 1500 hops 3 back 3
[root@localhost root]#
```