




UKERNA IPv6 Hands-on Workshop

Lab 5: **Multicast**

UKERNA, Lancaster University
and University of Southampton, 2006



Multicast

- We will now try to set up an IPv6 multicast BGP peering
- Due to support, the configuration varies greatly between JUNOS and IOS:
 - IOS has full support for MLD v1 and MLD v2
 - JUNOS supports MLD v1 and MLD v2 (MLD v2 - no ASM support)
 - Linux 2.6.11+ supports MLD v1 and MLD v2 in full
 - XP only supports MLD v1, Vista has MLD v2 as well
- Here we are going to be using MLD v1 – (ASM only)

September 2005

UKERNA IPv6 Workshop

2

Multicast comes in two flavors over IPv6:

Any Source Multicast (ASM)

Source Specific Multicast (SSM)

For the purposes of this lab we are going to focus on ASM using embedded-RP addressing. If you wish to try SSM you will have to configure your router and Linux client to use MLD v2. Linux supports this natively but we are going to force Linux to use MLD v1 to avoid the 60 seconds timeout while we wait for it to fallback to MLD v1.

Configuration - 1

- Enable IPv6 multicast routing
- CISCO
 - Make a new “address-family ipv6 multicast” config section.
- View your new received routes.

September 2005

UKERNA IPv6 Workshop

3

CISCO

Enable multicast routing by adding the global setting:

```
ipv6 multicast-routing
```

Copy your current “address-family ipv6 unicast” config into a new “address-family ipv6 multicast” section minus the following line:

```
neighbor 2001:630:81:4a0::X:1 prefix-list denygt60 in
```

Check your status and your newly gained routes with:

```
show bgp ipv6 multicast summary
show bgp ipv6 multi neighbors 2001:630:81:4a0::X:1 advertised-routes
show bgp ipv6 multicast neighbors 2001:630:81:4a0::X:1 routes
show bgp ipv6 multi neighbors 2001:630:81:4a0::X:1 received-routes
```

Now do:

```
clear bgp ipv6 multicast * soft
```

JUNIPER

Enable IPv6 multicast routing through your BGP tunnel, by default these are unicast only.

```
From [edit protocols bgp group session-to-AS6500X]
set family inet6 any
```

View new routes you have received:

```
show route table inet6.2
```

Configuration - 2

- Configure your default Rendezvous Point (RP)
- Configure MLD support on your down interfaces

JUNIPER

We need to configure a default RP for ASM to use, for this lab we will be using one located on the GEANT network:

```
From [edit protocols pim rp static]
  set address 2001:660:3007:300:1::
```

We will enable this as our RP for globally scoped multicast:

```
From [edit protocols pim rp static address 2001:660:3007:300:1::]
  set group-ranges ff0e::/16
  set group-ranges ff1e::/16
```

We will also enable embedded RP:

```
From [edit protocols pim rp]
  set ebedded-rp
```

Configure MLD v1 on your down interfaces (any interface that faces a host):

```
From [edit protocols]
  set mld interface fe-1/0/X version 1
```

Configuration - 3

- Configure local multicast routing tables
- Import the unicast routing table
- Import RPF Interface routes into PIM

September 2005

UKERNA IPv6 Workshop

5

JUNIPER

Modify the routing-options such that you have the following:

(note we are being mean and not giving you the exact commands)

```
interface-routes {
    rib-group inet6 mc-pseudo-rib;
}
rib-groups {
    mcast-rpf6-rg {
        import-rib [ inet6.2 inet6.0 ]
    }
    mc-pseudo-rib {
        export-rib inet6.0;
        import-rib [ inet6.0 inet6.2 ]
    }
}
```

Import RPF Interface routes into PIM:

```
From [edit protocols pim]
    set rib-group inet6 mcast-rpf6-rg;
```

Multicast Verification

- Show your PIM neighbours:
 - CISCO
 - show ipv6 pim neighbor detail
 - JUNIPER
 - show pim neighbors inet6 detail
- We are almost ready to test multicast on the workstations
- Linux clients under Juniper routers require an extra step
 - Force MLD v1

JUNIPER

Since we can only use MLD v1 for ASM in the Juniper environment we need to force our Linux kernel to use this (2.6.4+ kernels):

```
echo 1 > /proc/sys/net/ipv6/conf/all/force_mld_version
```

Testing multicast connectivity

- We will use a tool called ssm ping to check multicast connectivity
 - SSM requires MLD v2, which we are not using here, so we shall use asmping to test our connectivity
- ssm ping/asmping is available from <http://www.venaas.no/multicast/ssmping/>
- Now try and receive some Video!
- BBC News 24 available globally for this workshop on `udp://@[ff7e:140:2001:630:d0:f000:feed:24]:1234`

September 2005

UKERNA IPv6 Workshop

7

ssmping/asmping

This is available on your machines and can be run in the following way:

```
asmping ff1e::1234 ssm ping.uninett.no
```

Allow some time to establish the multicast link (due to RPF check)

Receiving video

VLC is also installed on your machines and this can be tuned to the address above by clicking “file” -> “open network stream” and entering the address above in the box. Alternatively, under Linux you can type the following from the command line:

```
vlc "udp://@[ff7e:140:2001:630:d0:f000:feed:24]"
```

Have you got a picture?

Finished?

- Summary
 - Any source IPv6 multicast via 2 tunnels.
 - Edge router to head router, head router to UKERNA
 - Applications
 - IP-TV, scope controlled (ECS-TV @ www.zepler.tv)
- Want more?
 - Try SSM. It requires MLD v2 support to hosts.
 - Are Juniper routers viable as edge routers?