



SHL AB

IPv6 BGP/OSPF config for a "small" ISP
with Hurricane Electric peering

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Objective

- To get our RIR assigned IPv6 running, even if our internet provider is not providing IPv6
- BGP IPv6 Peering with HE/or any other BGP provider
- OSPFv3 internal

Think FIRST!

- Google Authenticator for RIPE and HE account
- Resource Certification at RIPE
- Route Origin Authorisations (ROAs)

BGP Peering HE

- Get an account first
- Edit or add 'admin-c'
- Edit or add 'tech-c'
- Send e-mail to ipv6@he.net
- Create BGP Tunnel

BGP Peering HE



HURRICANE ELECTRIC
INTERNET SERVICES

Create New BGP Tunnel

You currently have 1 of 5 tunnels configured.

Through this interface you can request a static, IPv6 BGP tunnel that will receive full transit routes from AS6939 and be able to announce your RIR allocated IPv6 space. To minimize any issues or delays in turnup please note the following:

- Your ASN must be allocated from a RIR. (Public ASNs only)
- We must be able to validate that this is your ASN/address space (SWIP entries or a LoA will do)
- We will prefix-filter your BGP session. If you are adding new announcements, please let us know via an email to ipv6@he.net.
- We do not filter traffic. However, we do reserve the right to filter at our sole discretion as needed.
- If this is your first tunnel for this ASN, you should receive a message to your account's email address. Please follow the instructions in the email to complete the verification process. During this period the tunnel and BGP session will be unavailable. If you have not heard from us within 48 hours then please email ipv6@he.net.

IPv4 Endpoint (Your side):

Your ASN:

Prefixes announced:

Available Tunnel Servers:

Asia

Hong Kong, HK 216.218.221.2

Europe

Frankfurt, DE 216.66.84.54

London, UK 216.66.84.50

North America

Ashburn, VA, US 216.218.229.118

Fremont, CA, US 64.71.128.26

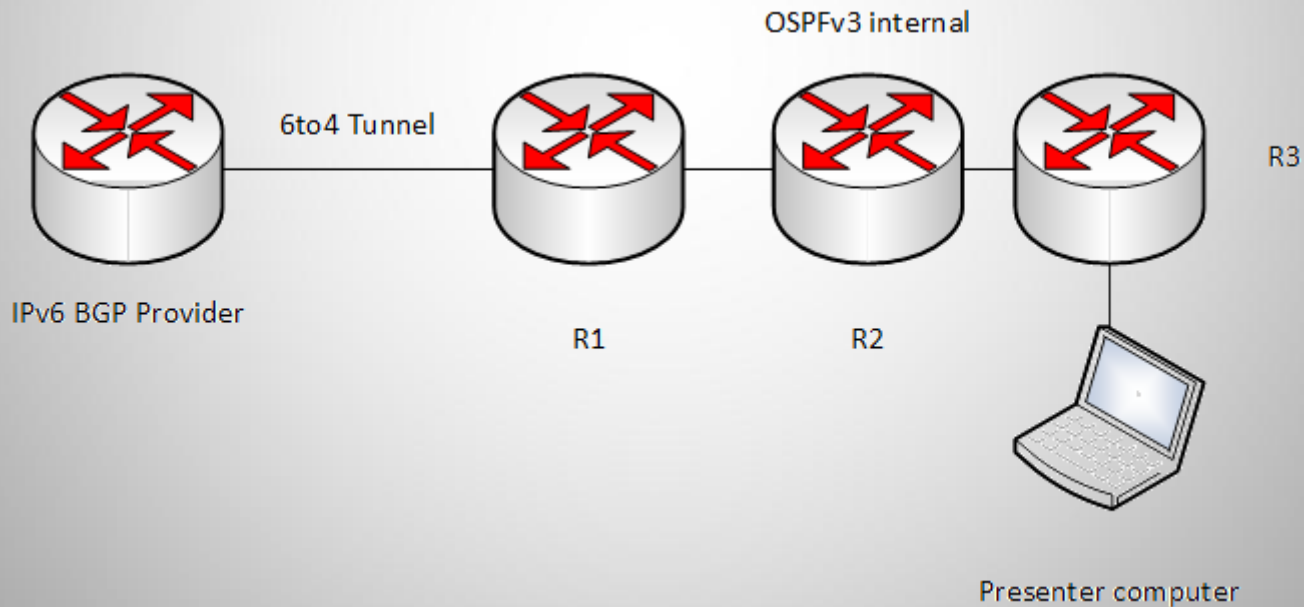
Miami, FL, US 216.66.70.2

Let's do it live

- This will be connected to my core router, not to HE
- One 6to4 tunnel to my core.

Setup to be done

- All routers Dual stack
- Last 3 routers local at MUM



Setup the 6to4 tunnel

The screenshot shows a configuration window titled "Interface <6to4 at core>". It has three tabs: "General", "Status", and "Traffic". The "General" tab is active. The configuration fields are as follows:

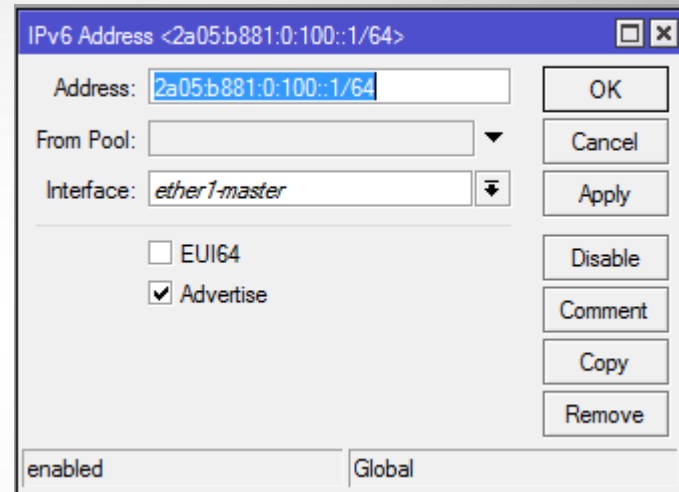
- Name: 6to4 at core
- Type: 6to4 Tunnel
- MTU: (empty)
- Actual MTU: 1480
- L2 MTU: 65535
- Local Address: 10.19.10.2
- Remote Address: 10.19.10.1
- IPsec Secret: (empty)
- Keepalive: (empty)

On the right side of the window, there is a vertical stack of buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove, and Torch.

At the bottom of the window, there are three status indicators: "enabled", "running", and "slave".

Add local IPv6

- Local are going to be
- 2a05:b880:0:6::2/64
- 2a05:b881:0:100::/64
- 2a05:b881:0:101::/64
- 2s05:b881:0:102::/64



OSPFv3 instance on R1

The screenshot shows a configuration window titled "OSPFv3 Instance <default>". It has three tabs: "General", "Metrics", and "Status", with "General" selected. The window contains several input fields and dropdown menus for configuring the OSPFv3 instance. On the right side, there are several action buttons: "OK", "Cancel", "Apply", "Disable", "Comment", "Copy", and "Remove". At the bottom of the window, there are two status indicators: "enabled" and "default".

Field	Value
Name	default
Router ID	10.104.0.29
Redistribute Default Route	always (as type 1)
Redistribute Connected Routes	as type 1
Redistribute Static Routes	no
Redistribute RIP Routes	no
Redistribute BGP Routes	no
Redistribute Other OSPF Routes	no
Status 1	enabled
Status 2	default

OSPFv3 instance on R2 & R3

The screenshot shows the 'OSPFv3 Instance <default>' configuration window. The 'General' tab is selected, and the 'Name' field is highlighted. The 'Router ID' is set to 10.100.200.253. The 'Redistribute' options are set as follows: Default Route (never), Connected Routes (as type 1), Static Routes (no), RIP Routes (no), BGP Routes (no), and Other OSPF Routes (no). The window also includes buttons for OK, Cancel, Apply, Disable, Comment, Copy, and Remove. At the bottom, the instance is shown as 'enabled' and 'default'.

Field	Value
Name	default
Router ID	10.100.200.253
Redistribute Default Route	never
Redistribute Connected Routes	as type 1
Redistribute Static Routes	no
Redistribute RIP Routes	no
Redistribute BGP Routes	no
Redistribute Other OSPF Routes	no

Buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove

Status: enabled | default

OSPFv3 interface R1

The screenshot shows a configuration window titled "OSPFv3 <ether23>". It has two tabs: "General" and "Status". The "General" tab is active. The configuration fields are as follows:

- Area: backbone (dropdown menu)
- Interface: ether23 (dropdown menu)
- Cost: 10 (text input)
- Priority: 254 (text input)
- Network Type: default (dropdown menu)
- Instance ID: 0 (text input)
- Passive
- Use BFD

Below these fields are four more text inputs, each followed by a unit "s":

- Retransmit Interval: 5
- Transmit Delay: 1
- Hello Interval: 10
- Router Dead Interval: 40

On the right side of the window, there are six buttons: OK, Cancel, Apply, Disable, Copy, and Remove.

At the bottom of the window, there are four status indicators: "enabled", "passive", "inactive", and "State: designated router".

OSPFv3 interface R2

The image displays two side-by-side configuration windows for OSPFv3 on different interfaces. The left window is titled 'OSPFv3 <ether1>' and the right window is titled 'OSPFv3 <ether3>'. Both windows have a 'General' tab selected. The configuration parameters for both are as follows:

Parameter	ether1	ether3
Area	backbone	backbone
Interface	ether1	ether3
Cost	10	10
Priority	0	254
Network Type	default	default
Instance ID	0	0
Passive	<input type="checkbox"/>	<input type="checkbox"/>
Use BFD	<input type="checkbox"/>	<input type="checkbox"/>
Retransmit Interval	5 s	5 s
Transmit Delay	1 s	1 s
Hello Interval	10 s	10 s
Router Dead Interval	40 s	40 s

At the bottom of each window, there are status indicators: 'enabled', 'passive', and 'inactive'. The 'State' for ether1 is 'dr other' and for ether3 is 'designated router'. Action buttons (OK, Cancel, Apply, Disable, Copy, Remove) are located on the right side of each window.

OSPFv3 interface R3

The screenshot shows a configuration window titled "OSPFv3 <ether1>". It has two tabs: "General" and "Status". The "General" tab is active. The configuration fields are as follows:

- Area: backbone (dropdown menu)
- Interface: ether1 (dropdown menu)
- Cost: 10 (text input)
- Priority: 0 (text input)
- Network Type: default (dropdown menu)
- Instance ID: 0 (text input)
- Passive
- Use BFD

Below these fields are four more text inputs, each followed by a unit "s":

- Retransmit Interval: 5
- Transmit Delay: 1
- Hello Interval: 10
- Router Dead Interval: 40

On the right side of the window, there are six buttons: OK, Cancel, Apply, Disable, Copy, and Remove.

At the bottom of the window, there are four status indicators: "enabled", "passive", "inactive", and "State: dr other".

Setup the BGP instance

The screenshot shows a configuration window titled "BGP Instance <AS44746>". The window contains several input fields and checkboxes. The "Name" field is set to "AS44746", "AS" is "44746", and "Router ID" is "10.104.0.29". There are four checkboxes for redistribution: "Redistribute Connected", "Redistribute Static", "Redistribute RIP", and "Redistribute OSPF" (which is checked). "Redistribute Other BGP" is unchecked. Below these are several dropdown menus: "Out Filter", "Confederation", "Confederation Peers", "Cluster ID", and "Routing Table". At the bottom, there are two more checkboxes: "Client To Client Reflection" and "Ignore AS Path Length", both of which are unchecked. A status bar at the bottom left shows the word "enabled". On the right side of the dialog, there are buttons for "OK", "Cancel", "Apply", "Disable", "Comment", "Copy", and "Remove".

BGP Instance <AS44746>

Name: AS44746

AS: 44746

Router ID: 10.104.0.29

Redistribute Connected

Redistribute Static

Redistribute RIP

Redistribute OSPF

Redistribute Other BGP

Out Filter: []

Confederation: []

Confederation Peers: []

Cluster ID: []

Routing Table: []

Client To Client Reflection

Ignore AS Path Length

enabled

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Routing filter

Route Filter <>

Matchers BGP Actions BGP Actions

Chain: IPv6:BGP-IN

Prefix:

Prefix Length:

Match Chain:

Protocol:

Distance:

Scope:

Target Scope:

Pref. Source:

Routing Mark:

Route Comment:

Route Tag:

Route Targets:

Invert Route Targets

Site Of Origin:

Invert Site Of Origin

Address Family:

OSPF Type:

Invert Match

OK

Cancel

Apply

Disable

Comment

Copy

Remove

enabled

Routing filter

The screenshot shows a 'Route Filter' configuration window with the following elements:

- Window Title:** Route Filter <>
- Tabs:** Matchers, BGP, Actions, BGP Actions (selected)
- Action:** bassthrough
- Jump Target:** (empty)
- Set Distance:** (empty)
- Set Scope:** (empty)
- Set Target Scope:** (empty)
- Set Pref. Source:** (empty)
- Set In Nexthop:** (empty)
- Set In Nexthop Direct:** (empty)
- Set Out Nexthop:** (empty)
- Set Routing Mark:** (empty)
- Set Route Comment:** (empty)
- Set Check Gateway:** (empty)
- Set Disabled:** (empty)
- Set Type:** (empty)
- Set Route Tag:** (empty)
- Set Use TE Nexthop:** (empty)
- Set Route Targets:** (expanded, empty)
- Append Route Targets:** (expanded, empty)
- Set Site Of Origin:** (expanded, empty)
- IPv6:** (expanded)
 - Set In Nexthop IPv6:** 2a05b880:0:6::1
 - Set In Nexthop Linklocal:** (empty)
 - Set Out Nexthop IPv6:** (empty)
 - Set Out Nexthop Linklocal:** (empty)

Buttons on the right side: OK, Cancel, Apply, Disable, Comment, Copy, Remove.

Status bar: enabled

Setup the BGP peer

BGP Peer <CORE>

General | Advanced | Status

Name: CORE

Instance: AS44746

Remote Address: 2a05:b880:0:6::1

Remote Port: [dropdown]

Remote AS: 44746

TCP MD5 Key: [password field]

Nexthop Choice: default

Multihop

Route Reflect

Hold Time: 180 s

Keepalive Time: [dropdown]

TTL: default

Max Prefix Limit: [dropdown]

Max Prefix Restart Time: [dropdown]

In Filter: IPv6-BGP-IN

Out Filter: [dropdown]

AllowAS In: [dropdown]

Remove Private AS

AS Override

Default Originate: never

Passive

Use BFD

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Refresh

Refresh All

Resend

Resend All

enabled | established

Setup the BGP peer

The screenshot shows a configuration window titled "BGP Peer <CORE>". It has three tabs: "General", "Advanced", and "Status". The "General" tab is active. The configuration options are as follows:

- Address Families: ip, ipv6, l2vpn, vpn4, l2vpn-cisco
- Update Source: (dropdown menu)
- Cisco VPLS NLRI Length Format: (dropdown menu)

On the right side of the window, there is a vertical stack of buttons: OK, Cancel, Apply, Disable, Comment, Copy, Remove, Refresh, Refresh All, Resend, and Resend All.

At the bottom of the window, there are two status indicators: "enabled" on the left and "established" on the right.

Setup the BGP peer

BGP Peer <CORE>

General | Advanced | Status

Remote ID: 10.9.9.3

Local Address: 2a05b880:0:6::2

Uptime: 05:08:52

Prefix Count: 37600

Updates Sent: 2

Updates Received: 46 193

Withdrawn Sent:

Withdrawn Received: 1 056

Remote Hold Time: 180 s

Used Hold Time: 180 s

Used Keepalive Time: 60 s

Refresh Capability

AS4 Capability

OK

Cancel

Apply

Disable

Comment

Copy

Remove

Refresh

Refresh All

Resend

Resend All

enabled established

BGP Aggregates

BGP Aggregate <2a05:b881:0:100::/56>

Instance: AS44746

Prefix: 2a05:b881:0:100::/56

Summary Only

Inherit Attributes

Include IGP

Attribute Filter:

Suppress Filter:

Advertise Filter:

Routes Used Count: 3

enabled

OK

Cancel

Apply

Disable

Copy

Remove

Q & A

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