


RIPE NCC

Routing Registry Hands-on Course




Creating Contact Info Objects

- Aut-Num object requires:
 - Person object (contact details)
 - Maintainer (protection)

Exercises:

- Task 1 - Create unprotected person object
- Task 2 - Create mntner Object
- Task 3 - Protect your person object

• Time: 30'



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To create a person object, you can use webupdates on the server. Alternatively, you can take the example person (“Example Person” EP1-RRTEST) object in the database and change the necessary parts. Be sure to take out the maintainer line for now.

To create a maintainer, you cannot use webupdates, so you have to use syncupdates. To get an example, you can either go to the whois client on the webserver and type “-t mntner” or you can use the example maintainer (EXAMPLE-MNT) as a template to make your own.


The password used for both auth: attributes is “secret” (without the quotes), but you can choose to create a new password through the webserver.

Make sure to change the mnt-by: attribute to list your own maintainer!

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Your AS number: AS
Your prefix: 10.10. .0/24
Your nic-hdl: -RRTEST
Your maintainer: -MNT




Creating RPSL Objects

- To create a routing policy in RPSL you need:
 - Aut-num object (place to put the policy)
 - Route object (prefix to announce)

Exercises:

- Task 1 - Create aut-num object (without policy)
- Task 2 - Create route object

• Time: 15 mins



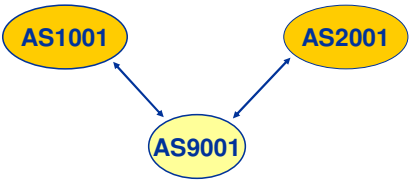
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To create your aut-num update, you can use either webupdates or syncupdates. For syncupdate, you can look at AS9000 for a template. Make sure to replace the appropriate parts with your information. Above, we've made some space for you to write down your details, this will be a handy reference later in the course.

The route object can be also be created through webupdates or syncupdates. For the address space we've used a special maintainer that does not require a password, so you only need the passwords for the maintainer on your aut-num object and the maintainer you will use to protect your route object with.

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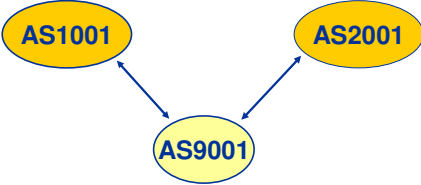
<p>Case 1 - Multihoming</p>  <p>Exercises</p> <p>April 2005 • Routing Registry Hands-On Course • http://www.ripe.net/training/tr/ 47</p>	<p>Scenario A</p> <ul style="list-style-type: none">• AS1001 is your upstream provider• AS2001 is a private peer <p>Exercise:</p> <ul style="list-style-type: none">• Create RPSL policy reflecting this scenario• Put this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 • Routing Registry Hands-On Course • http://www.ripe.net/training/tr/ 47</p>
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Things to consider:

- even though the AS path length will probably be enough, you can force how traffic flows with prefs

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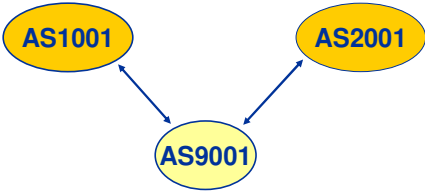
<p>Case 1 - Multihoming</p>  <pre>graph TD; AS1001((AS1001)) --> AS9001((AS9001)); AS2001((AS2001)) --> AS9001((AS9001));</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/rr/ 47</p>	<p>Scenario B</p> <ul style="list-style-type: none">• AS1001 is your preferred upstream provider• AS2001 is your backup upstream provider <p>Exercise:</p> <ul style="list-style-type: none">• Create RPSL policy reflecting this scenario• Put this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/rr/ 47</p>
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Things to consider:

- even though you use AS2001 as a backup, you might want to still exchange traffic between your backup provider and you directly
- more than one import and export line for the same peer are possible

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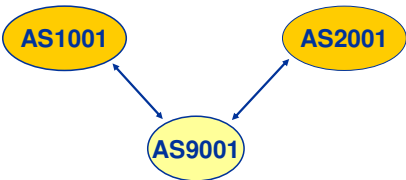
<p>Ripe NCC</p> <h3>Case 1 - Multihoming</h3>  <pre>graph TD; AS1001((AS1001)) --> AS9001((AS9001)); AS2001((AS2001)) --> AS9001((AS9001));</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/rr/ 47</p>	<p>Ripe NCC</p> <h3>Scenario C</h3> <ul style="list-style-type: none">AS1001 is your upstream providerAS2001 is your upstream provider <p>Exercise:</p> <ul style="list-style-type: none">Create RPSL policy reflecting this scenarioPut this policy in your aut-num object <ul style="list-style-type: none">Time: 15 mins <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/rr/ 50</p>
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Things to consider:

-BGP is useful, not everything has to be specified in actions...

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<p>Case 1 - Multihoming</p>  <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/rr/ 47</p>	<p>Scenario D</p> <ul style="list-style-type: none">AS1001 is your upstream providerAS2001 gives you transit<ul style="list-style-type: none">– AND you give AS2001 transit <p>Exercise:</p> <ul style="list-style-type: none">Create RPSL policy reflecting this scenarioPut this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/rr/ 51</p>
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Things to consider:

-BGP is useful, not everything has to be specified in actions

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<p>Ripe NCC Case 2 – Simplifying Policy</p> <pre>graph TD; AS1002 <--> AS9002; AS2002 <--> AS9002; AS3002 <--> AS9002; AS4002 <--> AS9002; AS5002 <--> AS9002; AS6002 <--> AS9002; AS7002 <--> AS9002;</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 58</p>	<p>Ripe NCC Scenario A</p> <ul style="list-style-type: none">You have private peerings with:<ul style="list-style-type: none">AS3002, AS4002, AS5002, AS6002, AS7002 <p>Exercise:</p> <ul style="list-style-type: none">Create an AS-set for your peersCreate RPSL policy for this AS-setPut this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 59</p>
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Things to consider:

- Private peerings have been seen in case 1
- PeerAS
- Whois –t as-set

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<p>Case 2 – Simplifying Policy</p> <pre>graph TD; AS9002 <--> AS1002; AS9002 <--> AS2002; AS9002 <--> AS3002; AS9002 <--> AS4002; AS9002 <--> AS5002; AS9002 <--> AS6002; AS9002 <--> AS7002;</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 58</p>	<p>Scenario B</p> <ul style="list-style-type: none">You have customers that prefer you as upstream provider:<ul style="list-style-type: none">AS3012, AS4012, AS5012, AS6012, AS7012 <p>Exercise:</p> <ul style="list-style-type: none">Create an AS-set for your peersCreate RPSL policy for this AS-setPut this policy in your aut-num object <ul style="list-style-type: none">Time: 15 mins <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 60</p>
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Things to consider:

- It is possible to make routes less attractive, but by default they are as attractive as they can get
- Whois -t as-set

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<p>Ripe NCC Case 2 – Simplifying Policy</p> <pre>graph TD; AS1002 --> AS9002; AS2002 --> AS9002; AS3002 --> AS9002; AS4002 --> AS9002; AS7002 --> AS9002; AS5002 --> AS9002; AS6002 --> AS9002;</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 58</p>	<p>Ripe NCC Scenario C</p> <ul style="list-style-type: none">You have multiple upstream providers:<ul style="list-style-type: none">AS1002, AS2002 <p>Exercise:</p> <ul style="list-style-type: none">Create an AS-set for your peersCreate RPSL policy for this AS-setPut this policy in your aut-num object <ul style="list-style-type: none">Time: 15 mins <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 61</p>
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Things to consider:

- The policy has been seen in case 1
- Whois –t as-set

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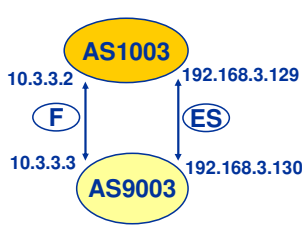
<p>Ripe NCC Case 2 – Simplifying Policy</p> <pre>graph TD; AS9002 <--> AS1002; AS9002 <--> AS2002; AS9002 <--> AS3002; AS9002 <--> AS4002; AS9002 <--> AS5002; AS9002 <--> AS6002; AS9002 <--> AS7002;</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 58</p>	<p>Ripe NCC Scenario D</p> <ul style="list-style-type: none">You have customers that use you as backup provider :<ul style="list-style-type: none">AS3022, AS4022, AS5022, AS6022, AS7022 <p>Exercise:</p> <ul style="list-style-type: none">Create an AS-set for your peersCreate RPSL policy for this AS-setPut this policy in your aut-num object <ul style="list-style-type: none">Time: 15 mins <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 62</p>
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Things to consider:

- The policy has been seen in case 1
- PeerAS
- Whois -t as-set

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<p>Ripe NCC Case 3 – Multiple Links, Same Peer</p>  <p>AS1003</p> <p>AS9003</p> <p>10.3.3.2</p> <p>10.3.3.3</p> <p>192.168.3.129</p> <p>192.168.3.130</p> <p>F</p> <p>ES</p> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 70</p>	<p>Ripe NCC Scenario A</p> <ul style="list-style-type: none">You peer with AS1003 in Spain and FranceAS1003 has route-sets differentiated per country:<ul style="list-style-type: none">as1003:rs-franceas1003:rs-spain <p>Exercise:</p> <ul style="list-style-type: none">Create RPSL import policy for these peerings<ul style="list-style-type: none">Using the IP addresses of the routersUsing your peer's route-setsHonouring your peer's MEDsPut this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 71</p>
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Things to consider:

-If no prefs are given, MEDs are taken into account

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<p>Ripe NCC Case 3 – Multiple Links, Same Peer</p> <pre>graph TD; AS1003((AS1003)) <--> F AS9003((AS9003)); AS1003 <--> ES AS9003;</pre> <p>10.3.3.2 (F) ↔ 10.3.3.3 (AS9003)</p> <p>192.168.3.129 (ES) ↔ 192.168.3.130 (AS9003)</p> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 70</p>	<p>Ripe NCC Scenario B</p> <ul style="list-style-type: none">You peer with AS1003 in Spain and FranceAS1003 has route-sets differentiated per country:<ul style="list-style-type: none">as1003:rs-franceas1003:rs-spain <p>Exercise:</p> <ul style="list-style-type: none">Create RPSL import policy for these peerings<ul style="list-style-type: none">Using the IP addresses of the routersUsing your peer's route-setsNot honouring your peer's MEDsPut this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 72</p>
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Things to consider:

- Multiple import lines per peer are possible
- import: from <other AS> <their IP> at <my IP> accept <filter>
- “pref” takes precedence over “med”

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<p>Ripe NCC Case 3 – Multiple Links, Same Peer</p> <pre>graph TD; AS1003((AS1003)) <--> 10.3.3.2 (F) 10.3.3.3 AS9003((AS9003)); AS1003 <--> 192.168.3.129 (ES) 192.168.3.130 AS9003;</pre> <p style="text-align: center;">Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 70</p>	<p>Ripe NCC Scenario C</p> <ul style="list-style-type: none">You peer with AS1003 in Spain and FranceYou have route-sets differentiated per country:<ul style="list-style-type: none">rs-course-francers-course-spain <p>Exercise:</p> <ul style="list-style-type: none">Create RPSL export policy for these peerings<ul style="list-style-type: none">Using the IP addresses of the routersUsing your route-setsSetting different MEDs for local and global prefixesPut this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 73</p>
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Things to consider:

- Multiple export lines per peer are possible
- export: to <other AS> <their IP> at <my IP> announce <filter>

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<p>Ripe NCC</p> <h3>Case 4 – Communities</h3> <p>AS1004 AS2004</p> <p>AS3004 AS4004</p> <p>AS7004 AS5004</p> <p>AS6004</p> <p>AS9004</p> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 83</p>	<p>Ripe NCC</p> <h3>Scenario A</h3> <ul style="list-style-type: none">• You want to give your customers the option to indicate to you that you are their preferred upstream• You want to do this with communities <p>Exercise:</p> <ul style="list-style-type: none">• Create RPSL import and export policy for these peerings<ul style="list-style-type: none">– Using communities to filter• Put this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 84</p>
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You have the following communities announced:

9xxx:100 = pref will be set to 100
AND we will announce you to our peers

9xxx:500 = pref will be set to 500
AND we will prepend 2 times to our peers

Your customers are in as-set AS-CUSTOMERS.
Your peers are in as-set AS-UPSTREAMS

Things to consider:

-To show the effect of the communities, you need to have import and export lines for your customers, as well as an export line to your peers.

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<p>Ripe NCC</p> <h3>Case 4 – Communities</h3> <p>AS1004 AS2004</p> <p>AS3004 AS4004</p> <p>AS7004 AS5004</p> <p>AS6004</p> <p>AS9004</p> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 83</p>	<p>Ripe NCC</p> <h3>Scenario B</h3> <ul style="list-style-type: none">• You want to give your customers the option to indicate to you that you are their backup upstream• You want to do this with communities <p>Exercise:</p> <ul style="list-style-type: none">• Create RPSL import and export policy for these peerings<ul style="list-style-type: none">– Using communities to filter• Put this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 85</p>
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You have the following communities announced:

9xxx:100 = pref will be set to 100
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9xxx:500 = pref will be set to 500
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Your customers are in as-set AS-CUSTOMERS.
Your peers are in as-set AS-UPSTREAMS

Things to consider:

-To show the effect of the communities, you need to have import and export lines for your customers, as well as an export line to your peers.

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<p>Ripe NCC</p> <h3>Case 4 – Communities</h3> <pre>graph TD; AS1004 --> AS9004; AS2004 --> AS9004; AS3004 --> AS9004; AS4004 --> AS9004; AS5004 --> AS9004; AS6004 --> AS9004; AS7004 --> AS9004;</pre> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 83</p>	<p>Ripe NCC</p> <h3>Scenario C</h3> <ul style="list-style-type: none">• Upstreams AS1004 tags their routes with a community so that you can distinguish between routes from their EU and US upstreams• They also allow you to tag your routes with a community that they will use to prepend 2 times to either their EU or US upstreams <p>Exercise:</p> <ul style="list-style-type: none">• Create RPSL import and export policy for peer AS1004<ul style="list-style-type: none">– prefer EU traffic• Put this policy in your aut-num object <p>• Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 86</p>
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AS1004 has the following communities announced:

1004:555 = route comes from a EU peer
1004:1 = route comes from a US peer
1004:995 = we wil prepend 2 times to our EU peers
1004:991 = we wil prepend 2 times to our US peers

Things to consider:

-You can use communities to create more specific filters

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<p>Ripe NCC</p> <h3>Case 4 – Communities</h3> <p>AS1004 AS2004 AS3004 AS4004 AS7004 AS5004 AS6004</p> <p>Exercises</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 83</p>	<p>Ripe NCC</p> <h3>Scenario D</h3> <ul style="list-style-type: none">Upstreams AS2004 tags their routes with a community so that you can distinguish between routes from their EU and US upstreamsThey also allow you to tag your routes with a community that they will use to prepend 2 times to either their EU or US upstreams <p>Exercise:</p> <ul style="list-style-type: none">Create RPSL import and export policy for peer AS2004<ul style="list-style-type: none">prefer US trafficPut this policy in your aut-num object <p>Time: 15 mins</p> <p>April 2005 · Routing Registry Hands-On Course · http://www.ripe.net/training/tr/ 87</p>
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AS2004 has the following communities announced:


2004:555 = route comes from a EU peer
2004:1 = route comes from a US peer
2004:995 = we wil prepend 2 times to our EU peers
2004:991 = we wil prepend 2 times to our US peers

Things to consider:

-You can use communities to create more specific filters

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Using RtConfig

- To use RtConfig conveniently you need:
 - Template files
 - Scripts

Exercises:

- Task 1 - Create RtConfig template file
- Task 2 - Run RtConfig with this template file
 - easiest to use “rt” alias

- Time: 15 mins



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Log in with your SSH client to `rrtest.example.net`.

The user name and password are both “guest” (without quotes). In the home directory of the guest account you can create your template file. To avoid confusion, give the template file the name of your AS, i.e. `as9000.txt`.

If you are not familiar with UNIX style editing programs, `pico` and `nano` are editors that are relatively friendly. You can have them create your file by typing “`pico as9000.txt`” from the command line.

The IP addresses you specify are important for specifying the IP address of your peer in the output, as well as for more specific configurations if you have multiple connections to 1 peer.

The server has an alias “rt”, but feel free to experiment with other options than are in the alias.

The easiest way to get RtConfig to produce output is “`rt <as900.txt`” (without quotes).

Things to consider:

- Choose which scenario you would like to see the output of and make sure your aut-num object reflects that scenario