Route Management

Guide to manage your routes and (RPKI) ROA

APNIC

Route/ROA management 3

1 MyAPNIC routes and Whois route objects 4
1.1 How MyAPNIC routes and WHOIS route objects are different 4
1.2 Synchronizing MyAPNIC routes and WHOIS route objects 4
1.3 Conflicts between MyAPNIC routes and WHOIS route objects 4

2 Import routes 5

3 Create Routes 8
3.1 ROA option 9
3.2 'Whois Route Attributes' option 10
3.3 'Notify additional contacts' option 12
3.4 Sub-route selection 13
3.5 Route Requests – Action log 15
3.6 Route Task Details 16

4 Edit Routes 17

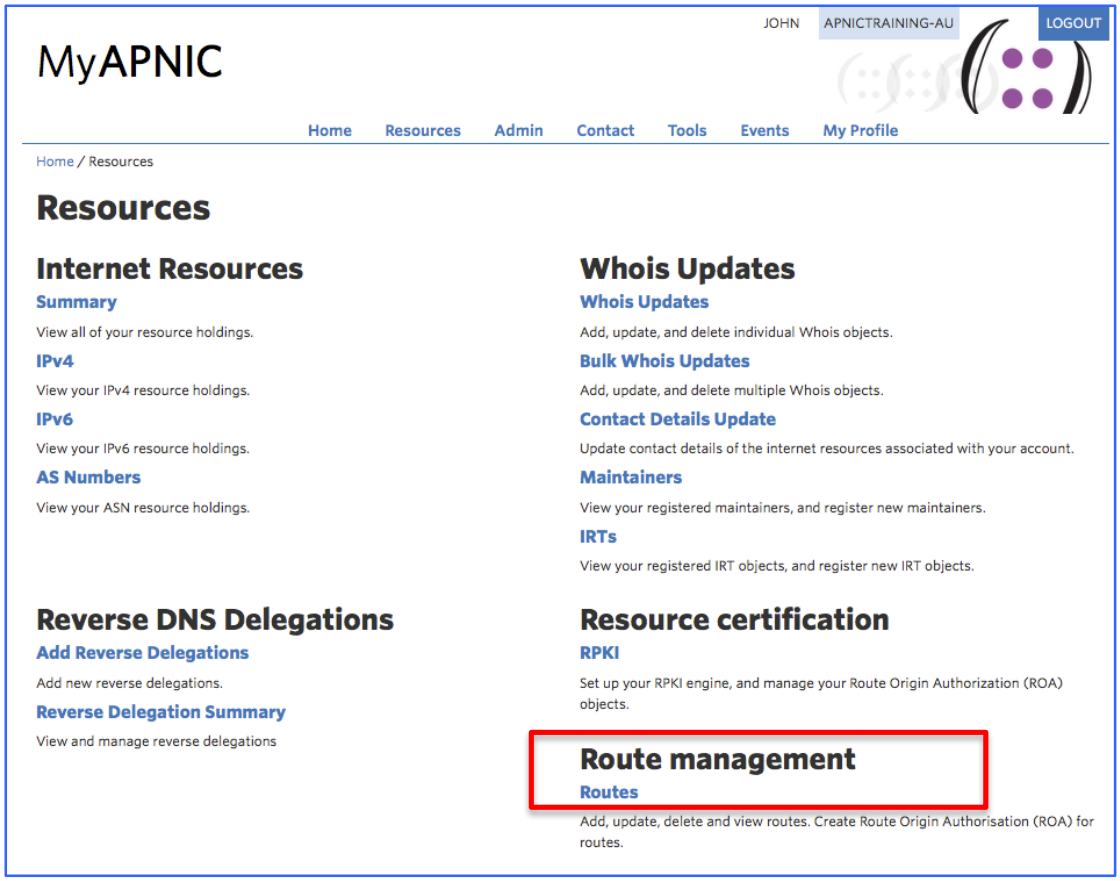
5 User permission 19
5.1 Checking user permission 19

6 FAQ 20
6.1 What is ROA and RPKI 20
6.2 Why do I get "authorization failed" 20
6.3 How does authorization work? 20
6.4 How do I enable Two factor authentication (2FA) 21
6.4.1 Time-based One Time Password (TOTP) 21
6.4.2 Digital Certificates 21

Route/ROA management

To access the Route/ROA management feature:

1) Login to MyAPNIC
2) Go to: Resources → Route Management (see image below)



1 MyAPNIC routes and Whois route objects

The route management tool is an interactive feature in MyAPNIC where users can manage routes and ROAs at once.

1.1 How MyAPNIC routes and WHOIS route objects are different

Through this tool, users can create/manage MyAPNIC routes, which are mentioned as “routes” throughout this document. These ‘routes’ act as a template for creating actual routes in whois database, which are mentioned as “route objects” in this document.

Routes and route objects can exist separately; that is a route in MyAPNIC can exist without an actual route object in whois database, and route objects in whois database can exist without a route entry in MyAPNIC.

1.2 Synchronizing MyAPNIC routes and WHOIS route objects

Users can decide to import routes in the whois database through Route Management tool. This will ensure a route entry in MyAPNIC is created for every route object associated to that account. (routes with accounts IP prefixes and ASNs). Once a route entry is created in MyAPNIC, users can manage whois route objects through the tools interface.

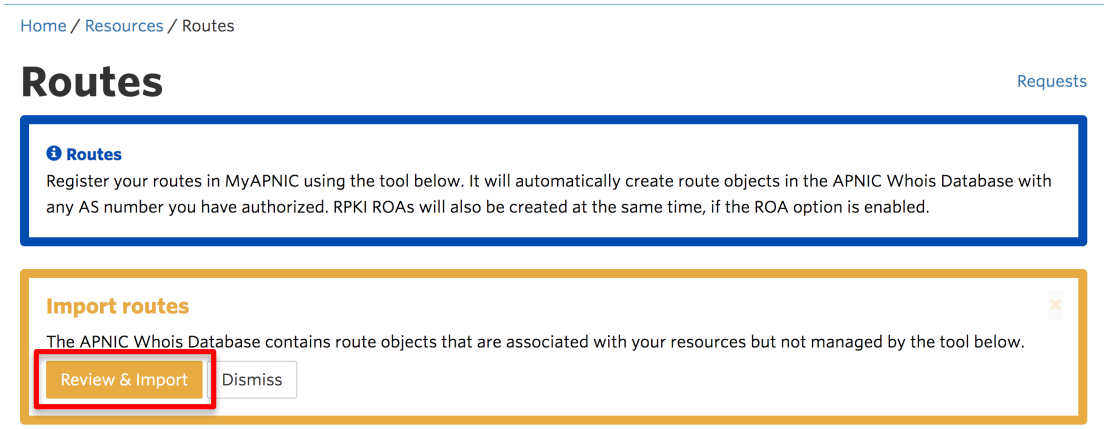
When a user creates/updates/deletes a route through this tool, the tool will attempt to create a whois route object as soon as possible. If you are updating multiple objects at the same time, the tool may show “pending” status against the routes which are not yet synchronized.

1.3 Conflicts between MyAPNIC routes and WHOIS route objects

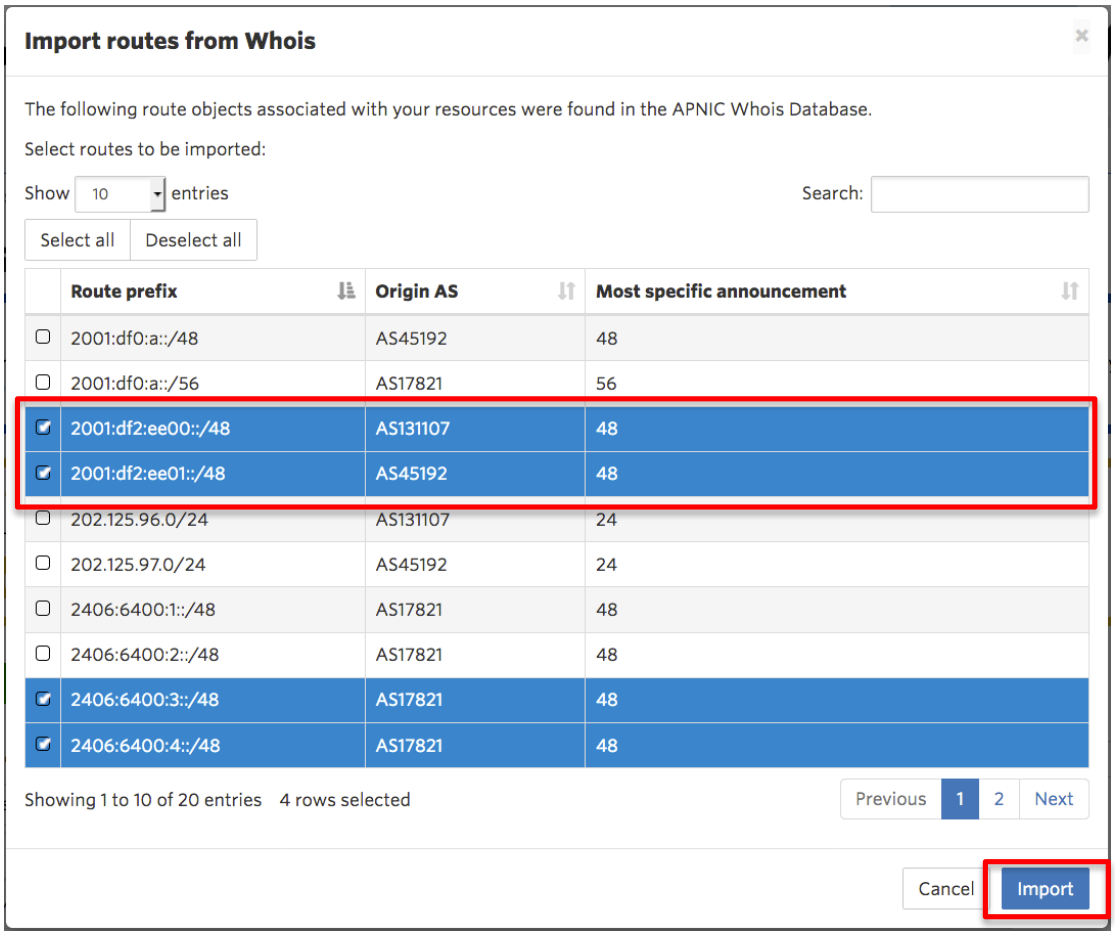
Route management tool is not the only way that a whois route object can be managed. If a whois route object is changed, the MyAPNIC route entry will not change. It will indicate that there is conflict. This ensures that user is made aware of changes done outside the Route Management tool. The user can then take action to resolve the conflict. Either accept the changes, or revert the route object back to MyAPNIC route template.

2 Import routes

When a user opens or refreshes the Route management page, the tool checks for any route objects in the APNIC whois database which are not managed by the route management tool in MyAPNIC. If any such route objects exist, the user can select and import them and start managing them through the tool.



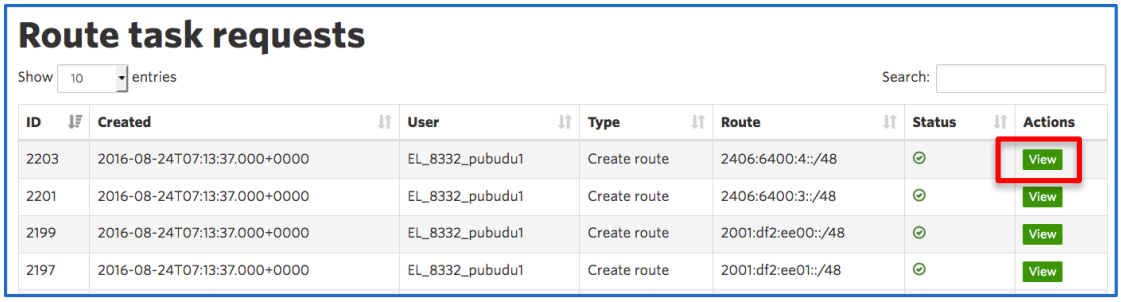
If user clicks on “Review & Import”, following screen will appear.

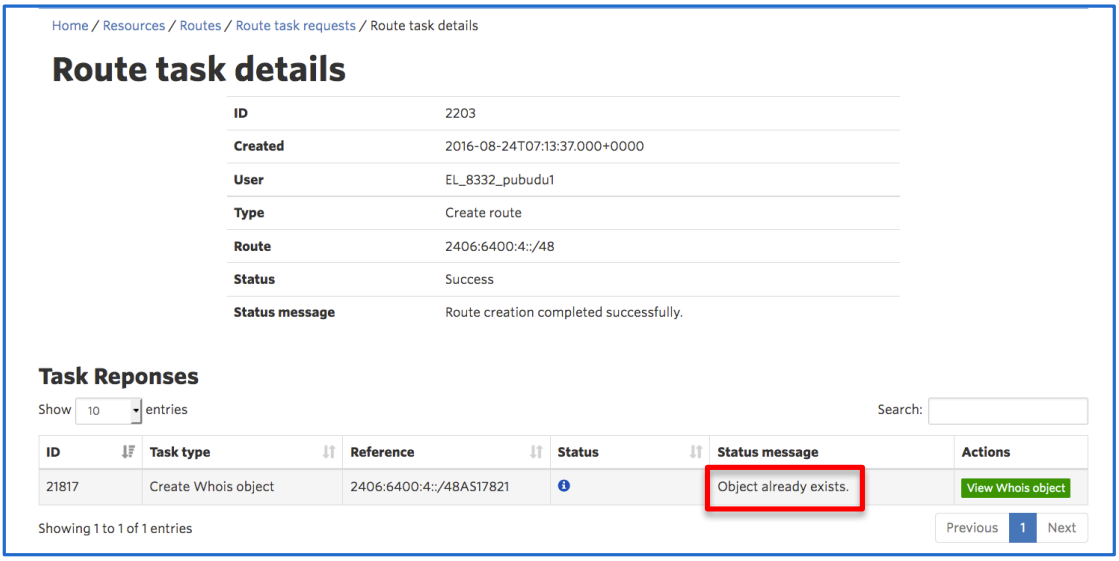


From this page, the user can view and select route objects to be managed by the tool.

When the user finishes selecting, and clicks on “Import” the following message will appear on the screen to confirm that the import task is being handled in the back ground.

To see more details about the task, the user can either click on the above message while its being displayed, or click on the “Requests” link at the top of Route Management page. By clicking either of the links, user can see following detailed information about the task.





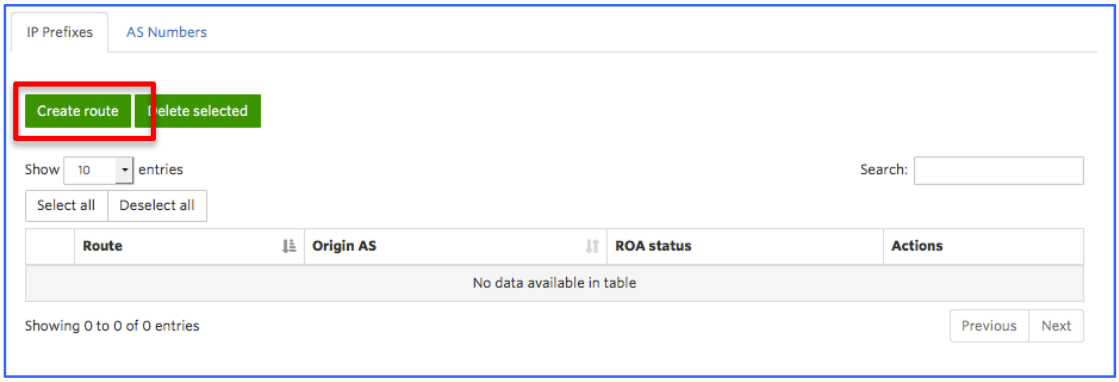
By clicking on the “View” button a particular request on the Route task request window, the tool will show any changes that were done in the APNIC whois database regarding this request. In the case of importing, the route object will not be changed, hence the message “Object already exists” is displayed.

Once the routes are imported, any further changes to the route object will change the route object in the APNIC whois database.

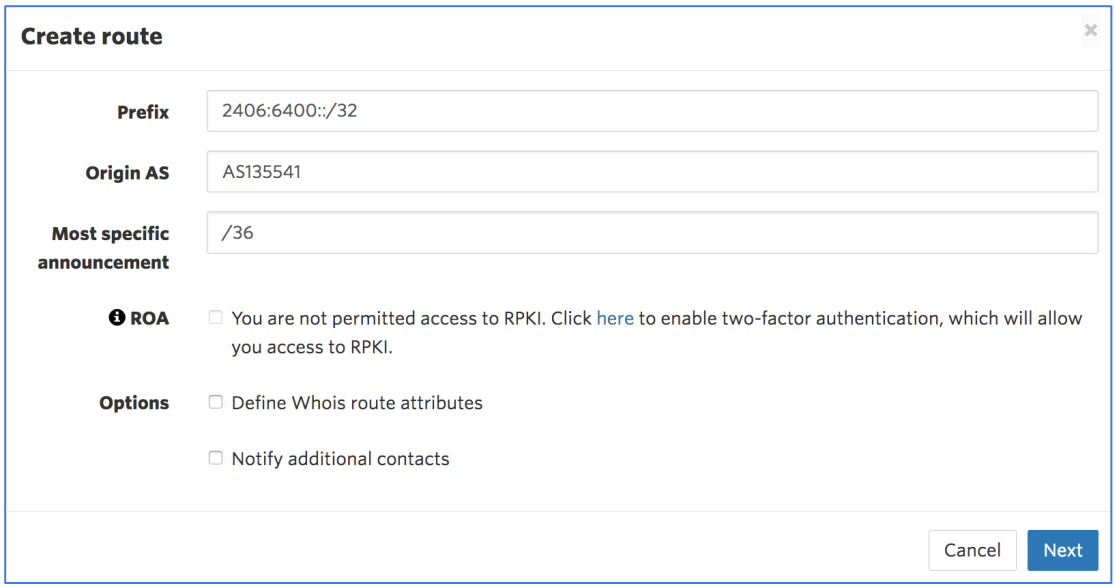
See section 3, Edit routes for more information about making changes to an existing route.

3 Create Routes

To create a new route object, please select the 'create route object'



The following template shows the minimum information that a user needs to input to create a route.



Prefix	The IPv4 or IPv6 prefix in CIDR notation
Origin AS	The AS Number which is used to announce the IP prefix
Most Specific Announcement	By default, this will be prefilled by the IP prefixes size. However, the user can chose to announce more specific IP prefixes if he wishes to. If a more specific announcement is chosen, the tool will create all the route objects from the least specific announcement, up to the most specific announcement, including any prefixes in between.
ROA	See ROA option
Define whos is route attributes	See 'Whois Route Attributes' option
Notify Additional Contacts	See Notify Additional Contacts

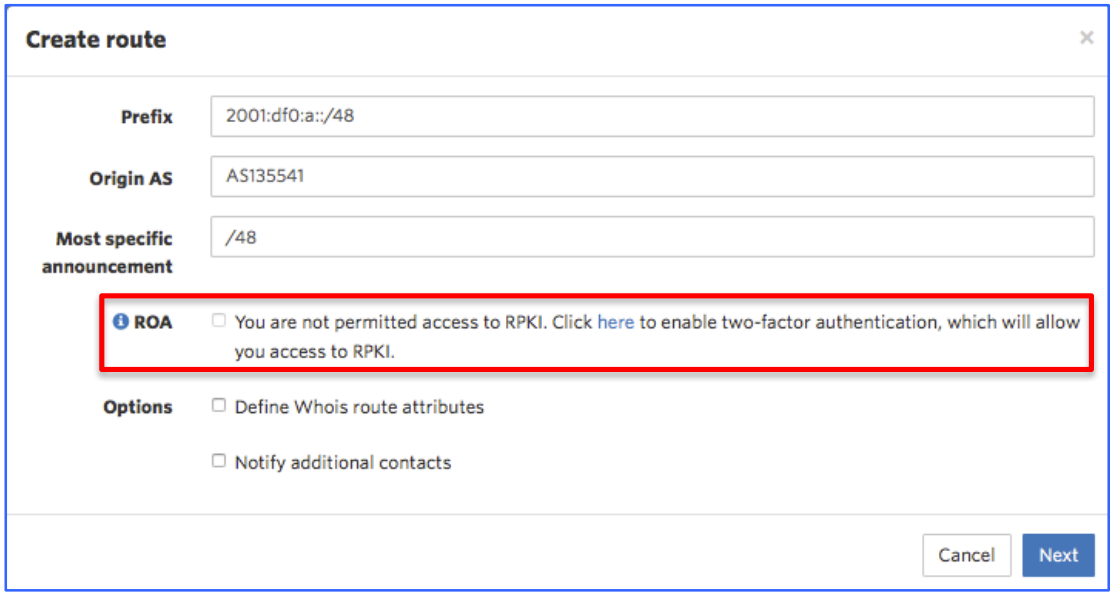
3.1 ROA option

If the member who logs into MyAPNIC has :
- RPKI update permission –AND-
- Two Factor Authentication enabled

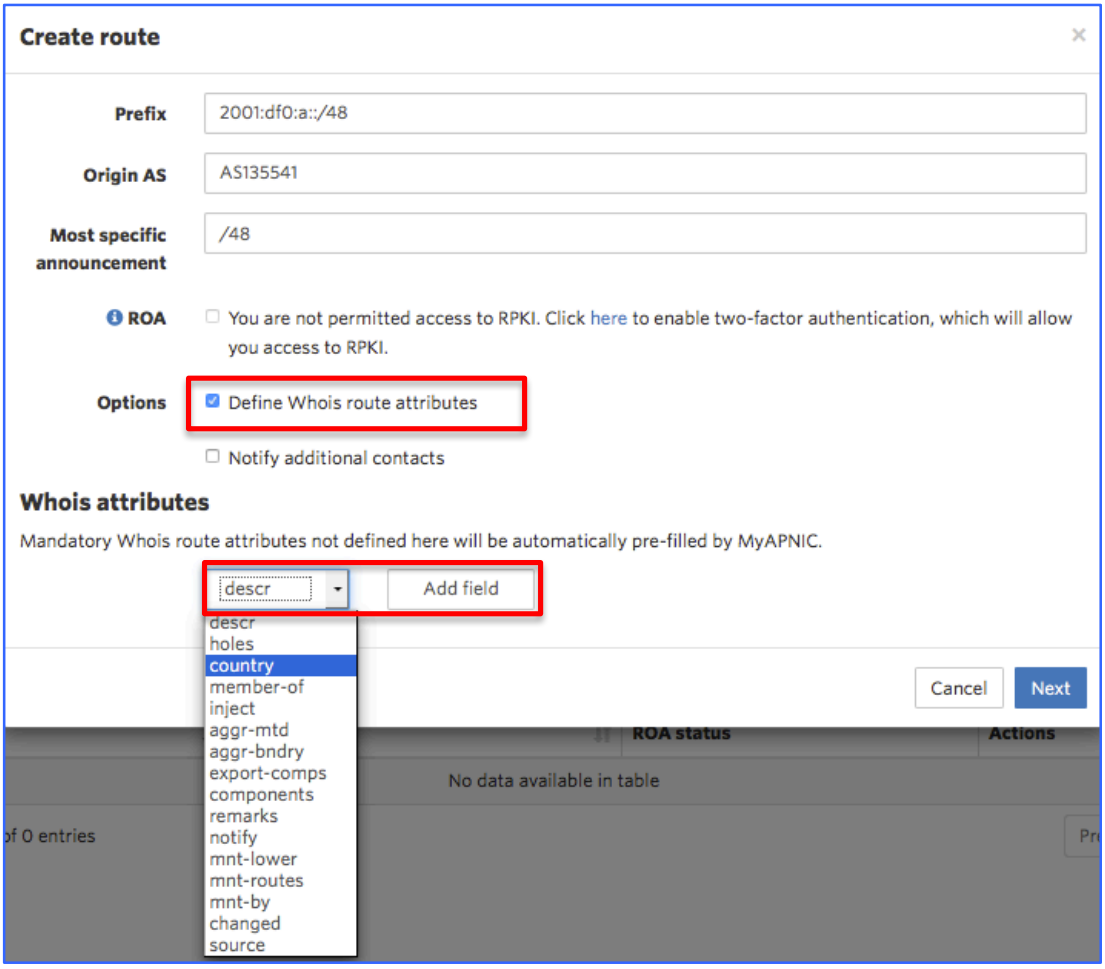
The ROA option will be ticked by default. If proceeded, with the option, matching ROAs will be created for the prefix and also for most specific announcement. Option can be un-ticked if the user does not require ROAs to be created.

If the member who logs into MyAPNIC has :
- RPKI update permission revoked –OR-
- Two Factor Authentication disabled

The ROA option will be un-ticked by default. User cannot tick this option. If the user wants to create ROAs, he can click "here" to go to the Two Factor Authentication configuration page.



3.2 'Whois Route Attributes' option



User can add number of attributes through this option, from the drop down menu, one by one.

To see a detailed explanation about all these attributes please visit the following URL.

https://www.apnic.net/apnic-info/whois_search/using-whois/guide/route

If this option is not selected, a route will be created with the mandatory attributes filled with information from your.

Route object template for ‘route’ (IPv4 routes)

```
route:          [mandatory]  [single]     [primary/look-up key]
descr:          [mandatory]  [multiple]   [ ]
origin:         [mandatory]  [single]     [primary/inverse key]
holes:          [optional]   [multiple]   [ ]
country:        [optional]   [single]     [ ]
member-of:      [optional]   [multiple]   [ ]
inject:         [optional]   [multiple]   [ ]
aggr-mtd:       [optional]   [single]     [ ]
aggr-bndry:     [optional]   [single]     [ ]
export-comps:   [optional]   [single]     [ ]
components:     [optional]   [single]     [ ]
remarks:        [optional]   [multiple]   [ ]
notify:         [optional]   [multiple]   [inverse key]
mnt-lower:      [optional]   [multiple]   [inverse key]
mnt-routes:     [optional]   [multiple]   [inverse key]
mnt-by:         [mandatory]  [multiple]   [inverse key]
changed:        [mandatory]  [multiple]   [ ]
source:         [mandatory]  [single]     [ ]
```

Route object template for ‘route6’ (IPv6 routes)

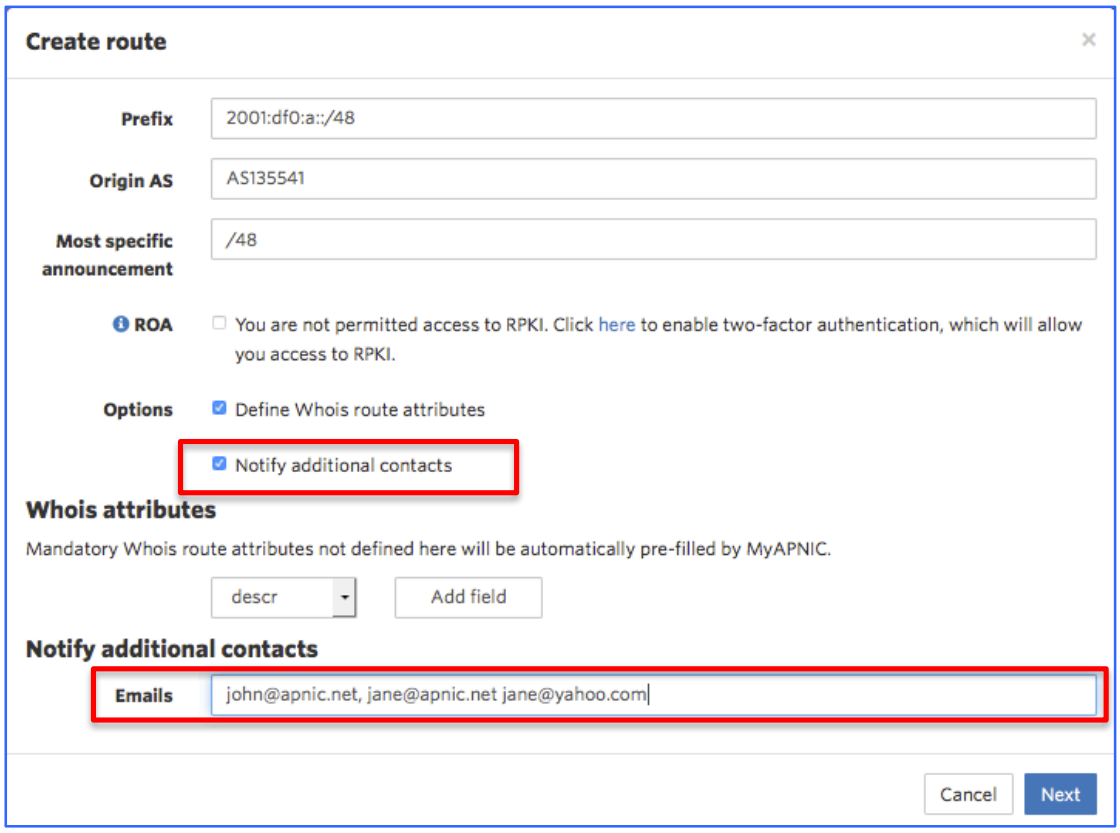
```
route6:         [mandatory]  [single]     [primary/look-up key]
descr:          [mandatory]  [multiple]   [ ]
origin:         [mandatory]  [single]     [primary/inverse key]
holes:          [optional]   [multiple]   [ ]
country:        [optional]   [single]     [ ]
member-of:      [optional]   [multiple]   [ ]
inject:         [optional]   [multiple]   [ ]
aggr-mtd:       [optional]   [single]     [ ]
aggr-bndry:     [optional]   [single]     [ ]
export-comps:   [optional]   [single]     [ ]
components:     [optional]   [single]     [ ]
remarks:        [optional]   [multiple]   [ ]
notify:         [optional]   [multiple]   [inverse key]
mnt-lower:      [optional]   [multiple]   [inverse key]
mnt-routes:     [optional]   [multiple]   [inverse key]
mnt-by:         [mandatory]  [multiple]   [inverse key]
changed:        [mandatory]  [multiple]   [ ]
source:         [mandatory]  [single]     [ ]
```

3.3 'Notify additional contacts' option

By default, if a route is created, automatic notifications will be send to ASN custodian. Notifications will be send to APNIC account contacts. If the ASN is from a different RIR, 'whois' database contacts associated to that ASN will be notified.

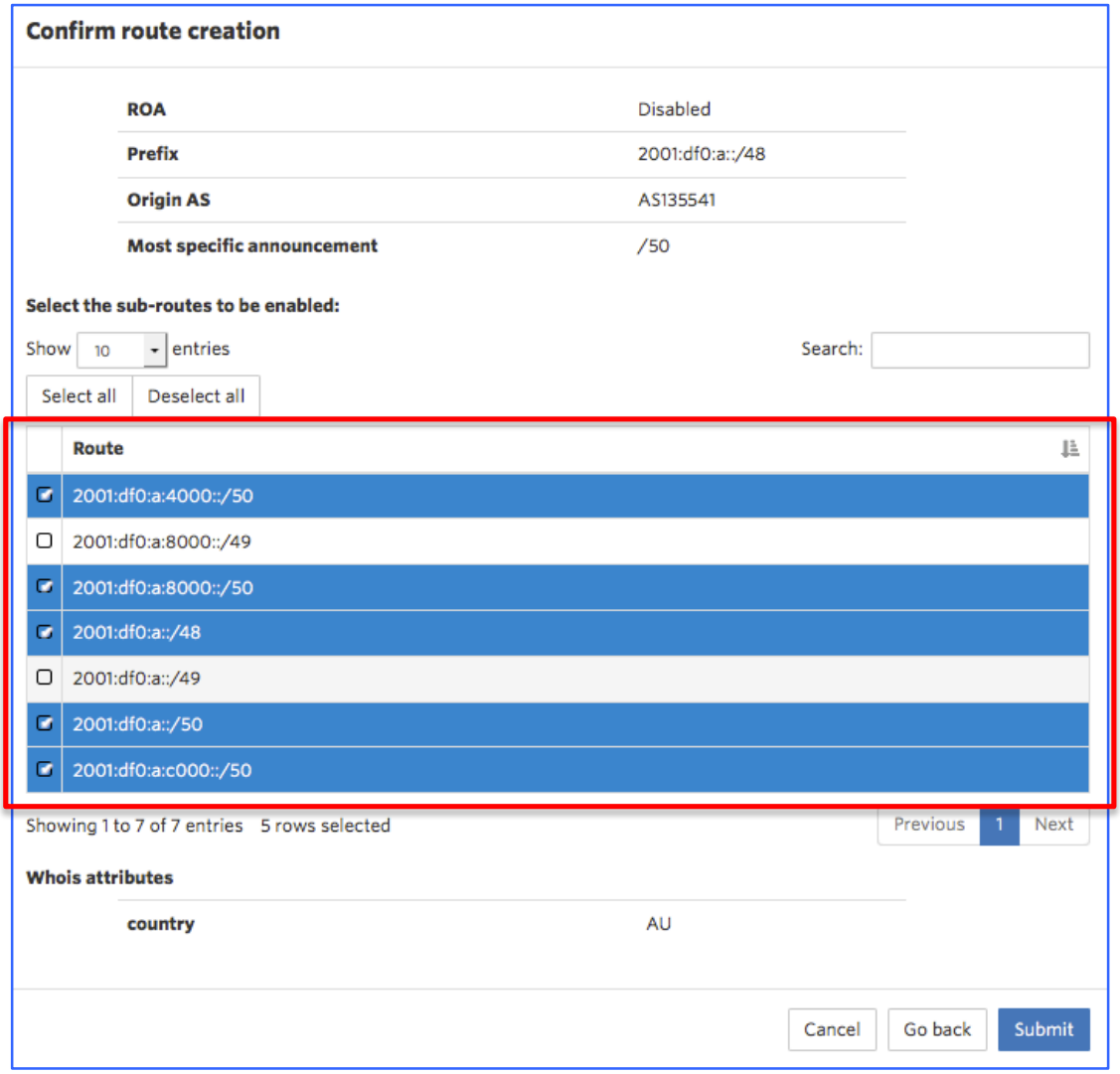
If neither of the above contacts were found, APNIC helpdesk will be notified.

With the Notify 'Notify additional contacts', the user is able to send route creation notices to any other party that he wishes to inform. Multiple e-mail contacts can be included by separating them with commas or spaces.



3.4 Sub-route selection

Once all the information is filled, and when user clicks “NEXT”, the Confirmation window appears, where further adjustments can be made.

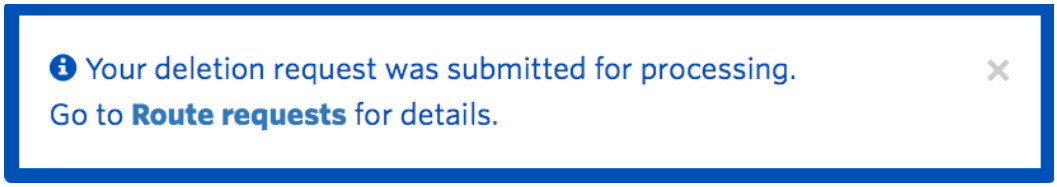


The confirmation screen above shows all the routes that are going to be created. The mandatory attributes the user entered are displayed at the top of the screen. It is followed by a list of routes that will be created. List will have more than one route if the ‘***most specific announcement***’ is higher than ‘***prefix size***’.
All routes in the list would be selected by default. The user has the option to unselect any route if required.

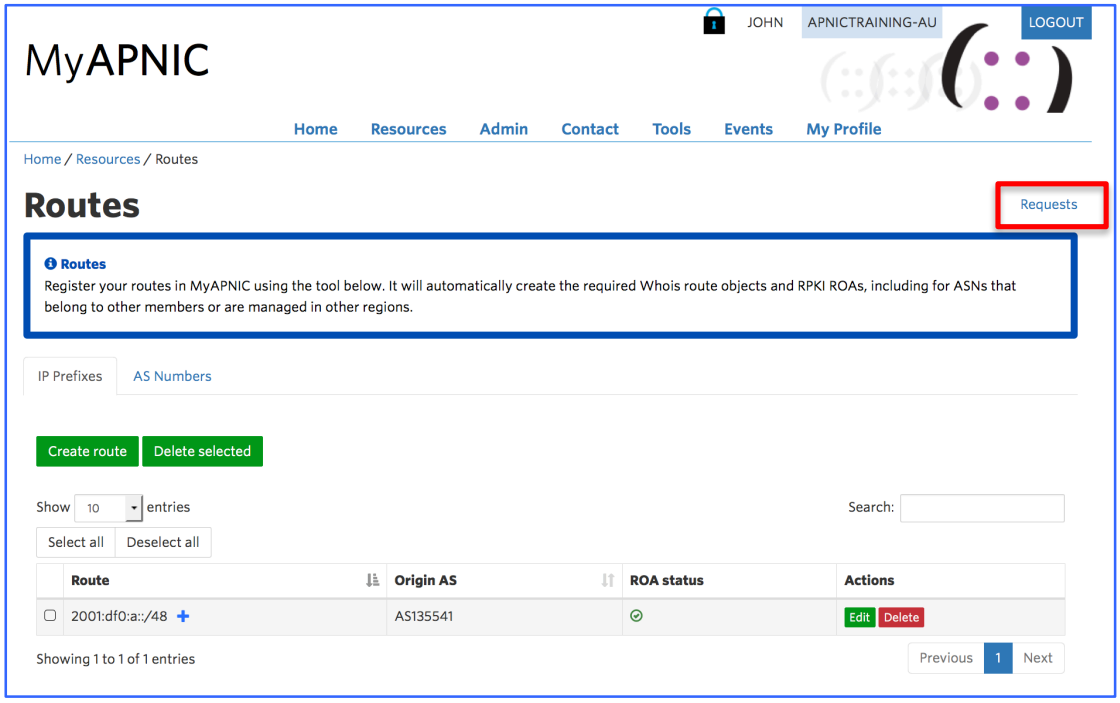
Select all	Ticks all the sub-routes in the list
Deselect all	Un-tick all the sub-routes in the list
Show ‘X’ entries	Determines the number of sub-routes to be displayed per page. Options are 10, 25, 50 and 100
Previous	Goes to the previous page of the list if the number of sub-routes does not fit in to a new page

Next	Goes to the next page of the list if the number of sub-routes does not fit in to a new page
Cancel	Aborts the route creation
Go back	Goes to the previous page where route attributes can be updated
Submit	All selected sub-routes will be created. Route objects will be injected to the whois database. If ROA option is enabled, matching ROAs will be created

Once thee '***Submit***' button is clicked, the tool will start processing the route creation. A dialog box appearing as below will indicate this.

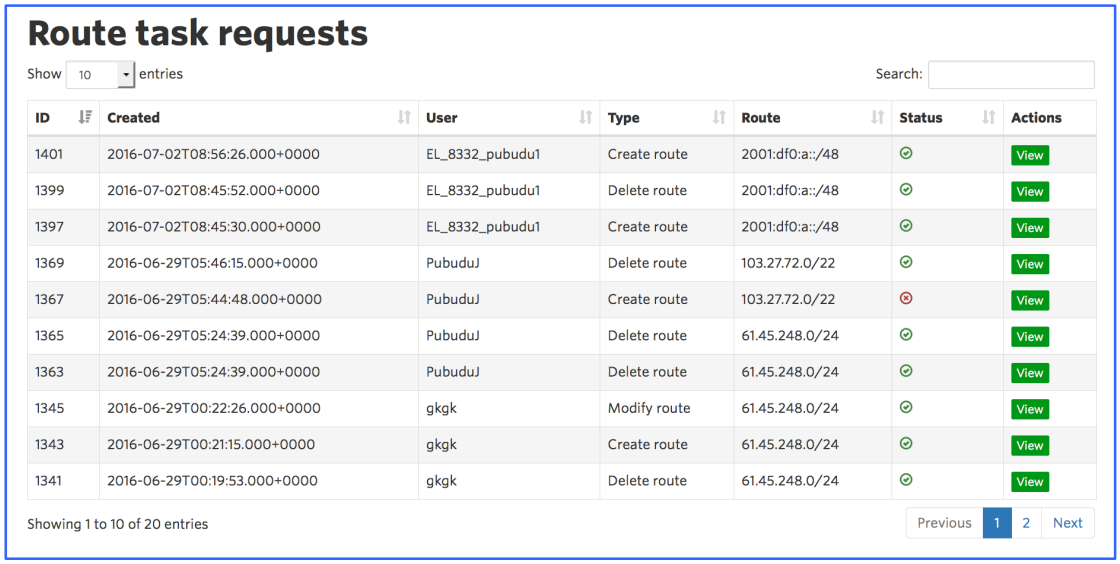


This dialog box will disappear automatically once the routes are created in MyAPNIC. As shown in the dialog box, to see details click the '***Route requests***' link shown below.



3.5 Route Requests – Action log

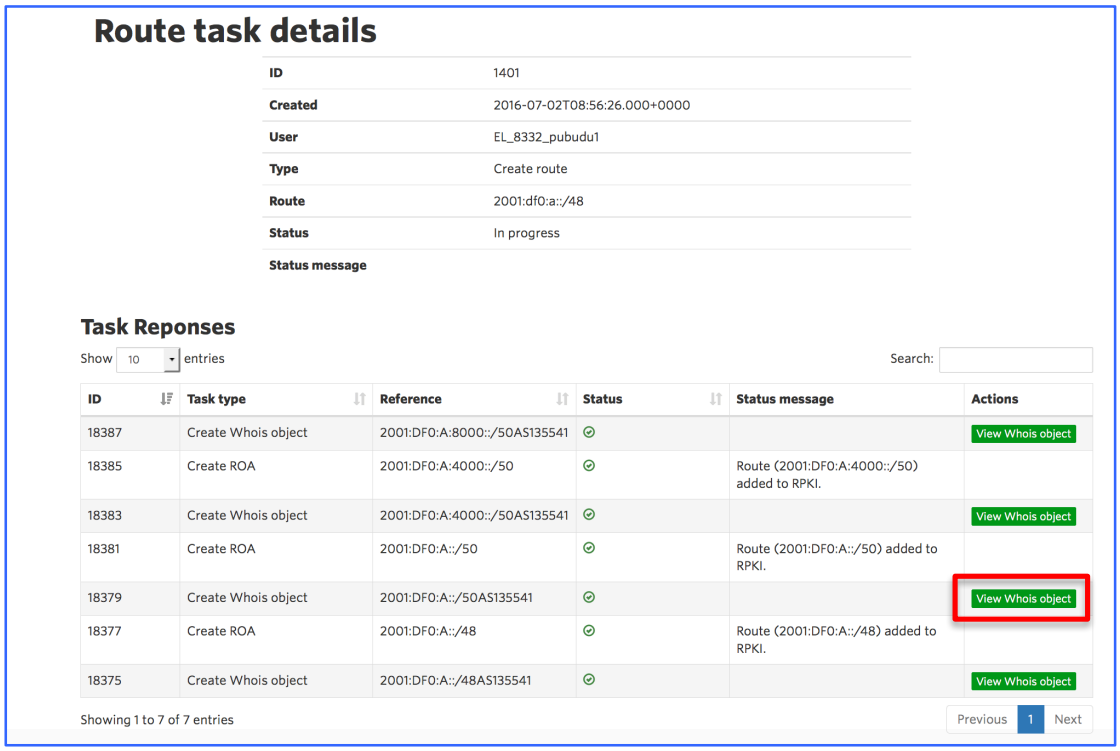
The 'Route requests' link (please 1.1.4 Confirm and Submit) will take the user to a log of all activities associated the Route Management page. Action log will look similar to the below screen.



ID	Action log ID
Created	Date and time stamp of the submission
User	MyAPNIC user ID
Type	Type of action requests. Create Route, Modify Route or Delete Route
Route	The IP prefix which will be announced. Sub-route prefixes can be viewed by clicking '***View***'
Status	Green tick mark indicates all sub-routes are created successfully. Red cross icon indicates that at least one sub-route creation has failed.
View	Shows more details about a specific action item

3.6 Route Task Details

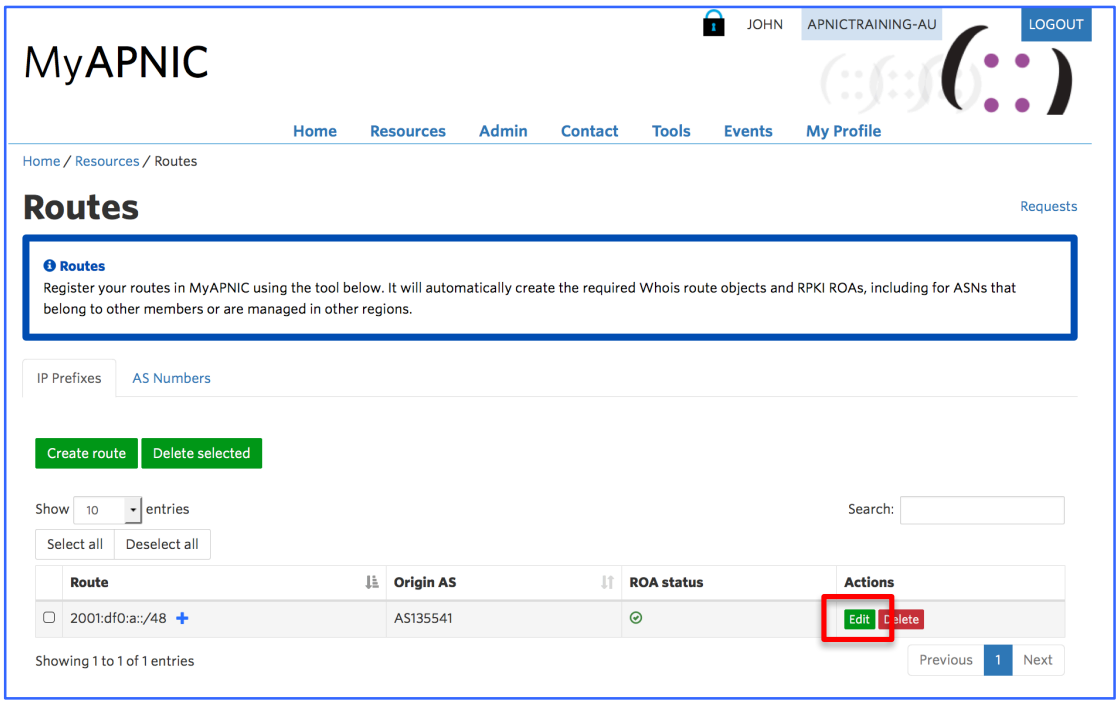
The screen below shows how route task details will appear if the '**view**' button is clicked in the route requests page (see 1.1.6 Route Requests)



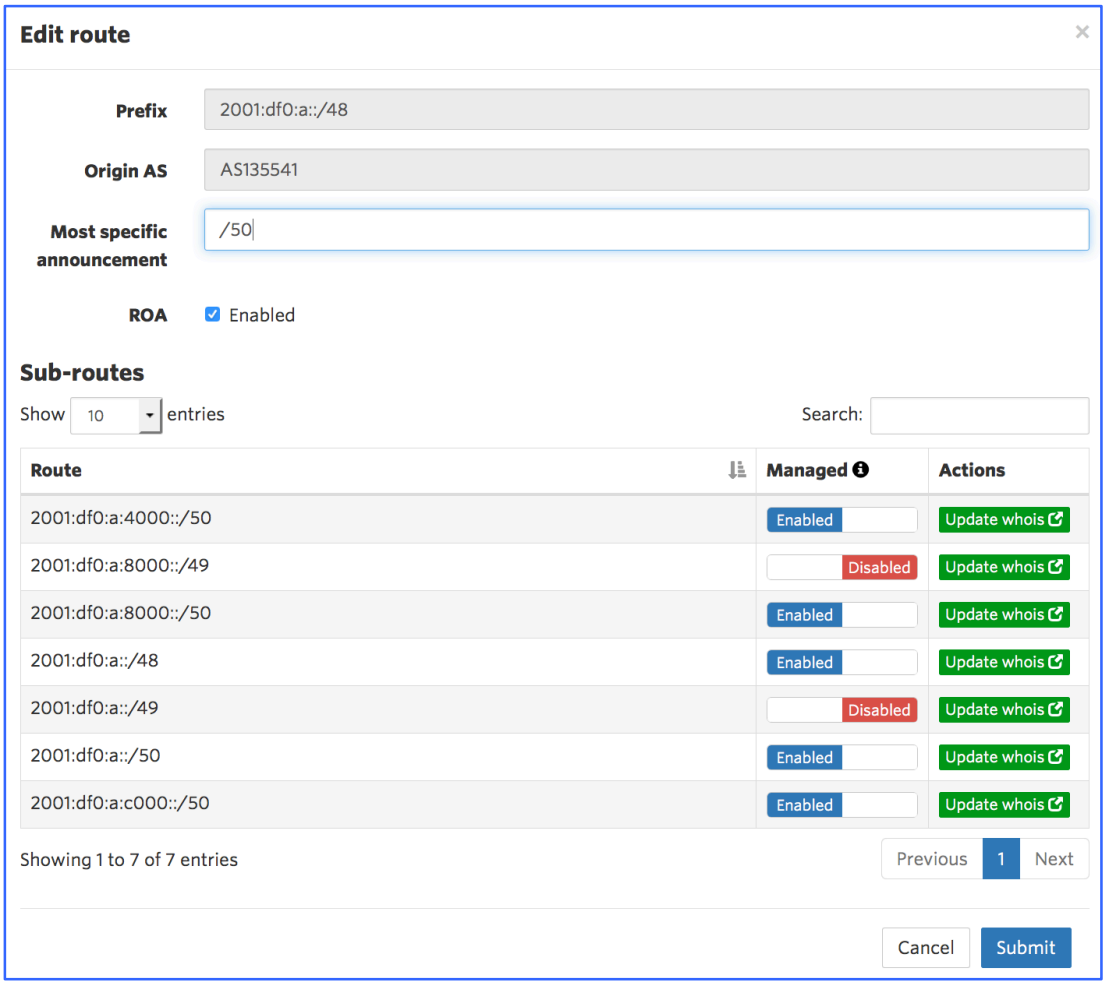
If the task selected is either "Create Route" or "Edit Route", the user can view the actual whois route object by clicking the "***View Whois Object***" button in the above screen.

4 Edit Routes

The routes created through MyAPNIC or through other methods such as e-mail updates can be modified through this interface.



Clicking on the edit button in front of a route entry can modify the specific route.



Most Specific Announcement	User can change this attribute. By changing this, the number of sub-route entries will automatically change.
ROA	User can toggle between ROA enable and ROA disable. User need to have permission to enable ROA (See : User Permission)
Enable/Disable	If Managed set to 'Enabled', it means there is a whois route object existing. If Managed set to 'Disabled', it means whois route object does not exist. By toggling between the two states, the user can create and delete whois route objects. If the user disables a sub-route for which ROA is enabled, ROA will automatically get deleted as well.
Submit	Changes will be processed, and whois route objects will be updated accordingly.
Update Whois	This button will open whois update page for that particular whois route object.

5 User permission

To be able to create ROAs together with routes, user require:

1) Resource Certification permission enabled – AND-
2) Two Factor Authentication enabled (2FA)
    a. Timebased One Time Passwords (TOTP) – OR
    b. Digital Certificates

To learn more about:
Resources Certification: www.apnic.net/ROA
Two Factore Authentication: www.apnic.net/2FA

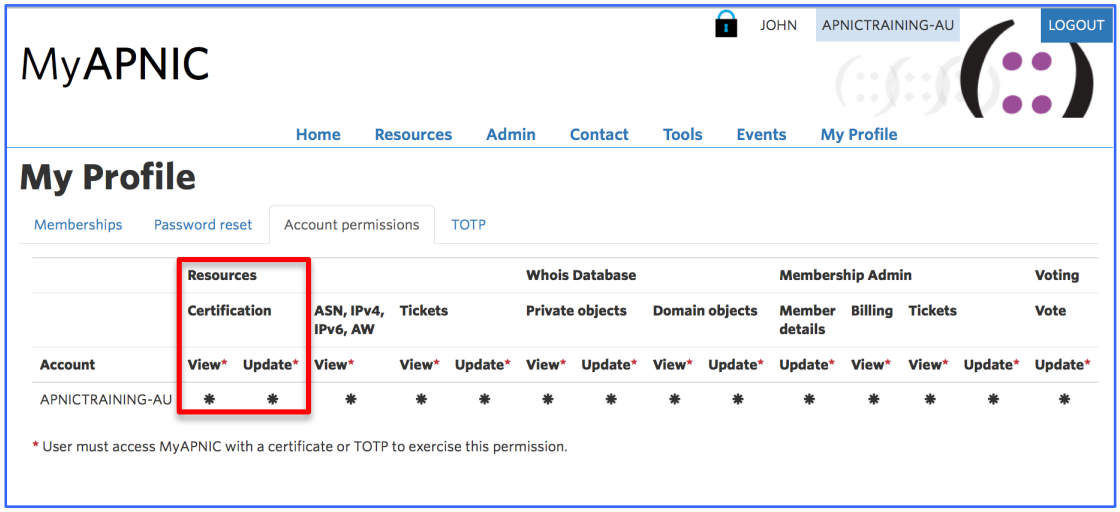
By default, **Corporate Contacts** have **Resource Certification** permission **Enabled**. Technical Contacts and Billing (Admin) Contacts do not have access by default. The Corporate Contact can grant them access through MyAPNIC.

None of the contacts have 2FA enabled. Therefore, all contact persons must selected one of the above 2FA methods and configure it before they can create ROAs.

5.1 Checking user permission

Users can check what permissions are enabled for them by going to :

Home→ MyProfile → Account Permission



To be able to create ROAs both “View” and “Update” permissions should be enabled.

6 FAQ

6.1 What is ROA and RPKI

Please visit APNIC website for more information.
www.apnic.net/ROA

6.2 Why do I get "authorization failed"

It could be due to one or more of the following reasons.

1) IP prefix not in the APNIC account. Route objects can be created by IP prefix custodians only. Please goto : Home → Resources → IPv4/IPv6 and check if the IP prefix is available.

2) The account maintainer has not been added to your MyAPNIC. You can request for the password if there are other users who already have the maintainer added. Please goto : Home → Resources → maintainers and check if the maintainer is registered.

3) Anther route object exists which is same or larger than the route object you are trying to create, and it has a different "mnt-lower" or "mnt-routes". In that case, please register that maintainer in your MyAPNIC and use it for more specific route announcements.

6.3 How does authorization work?

Whois objects are protected by maintainers. In the case of route objects, it's a little bit more complicated. To be consistent with the objects which already exist, there are different levels of checks which needs to be validated before a route can be injected into whois database.

If you are creating a route object (eg : **198.51.100.0/24 with AS**64511), maintainer authorization will be checked in the following order.

1) Is there a route object with the same IP prefix ?
    a. If yes : Goto 5
    b. If No : Goto 2

2) Is there a route object with a less specific IP prefix ? (overlapping the route you want to create)
    a. If yes : Goto 5
    b. If No : Goto 3

3) Is there an inetnum object with the same IP prefix ?
    a. If yes : Goto 5
    b. If No : Goto 4

4) Is there an inetnum object with a less specific IP prefix ? (overlapping the route you want to create)
    a. If yes : Goto 5
    b. If No : **route creation fail error given**

5) Is there a mnt-routes defined in the existing object

a. If yes : Goto 8
b. If No : Goto 6

6) Is there a mnt-lower defined in the existing object
   a. If yes : Goto 8
   b. If No : Goto 7

7) Is there a mntner defined in the existing object
   a. If yes : Goto 8
   b. If No : **route creation fail error given**

8) Does the mnt-routes/mnt-lower/mntner of the existing object match the mntner of the route you wish to create ?
   a. If yes : **Create Route**
   b. If No : **route creation fail error given**

If you still cannot find the reason why it fails, please contact APNIC helpdek. (helpdesk@apnic.net)

6.4 How do I enable Two factor authentication (2FA)

There are two options to enable 2FA. For more information about 2FA, please visit www.apnic.net/2FA

6.4.1 Time-based One Time Password (TOTP)

To configure, please see following guide:
www.apnic.net/2fa

6.4.2 Digital Certificates

To configure, please see following guide:
https://www.apnic.net/manage-ip/myapnic/digital-certificates