

# Network Management & Monitoring

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## 1 Request Tracker (RT) Installation and Configuration

### 1.1 Notes:

- Commands preceded with “\$” imply that you should execute the command as a general user - not as root.

- Commands preceded with “#” imply that you should be working as the root user.
- Commands with more specific command lines (e.g. `RTR-GW>` or `mysql>`) imply that you are executing commands on remote equipment, or within another program.
- If a command line ends with “`"`” this indicates that the command continues on the next line and you should treat this as a single line.

## 2 Exercises

### 2.1 Exercise 0

Log in to your virtual machine as the `sysadm` user.

### 2.2 Exercise 1

Install the necessary packages for RT You should have `mysql-server` already, but we do the install just in case. This won’t cause problems.

Copy the “`sudo apt-get install`” lines below including the “`"`” character, minus the “`$`” and paste this in to your terminal session on your virtual machine.

```
$ sudo apt-get install rt4-apache2 rt4-clients rt4-db-mysql \
request-tracker4 libapache2-mod-fastcgi libfcgi-perl mutt
```

Respond “Yes” when prompted if you wish to install the packages.

You will now be presented with several windows. Read the following instructions to see how to respond:

#### **Name for this Request Tracker (RT) instance:**

Remove what is shown and replace with “`netmgmt`”, then select `<Ok>` and press `ENTER` to continue.

#### **Handle `RT_SiteConfig.pm` permissions?**

- Select `<Yes>` and press `ENTER` to continue.

#### **Configure database for `request-tracker4` with `dbconfig-common`?**

- Select `<Yes>` and press `ENTER` to continue.

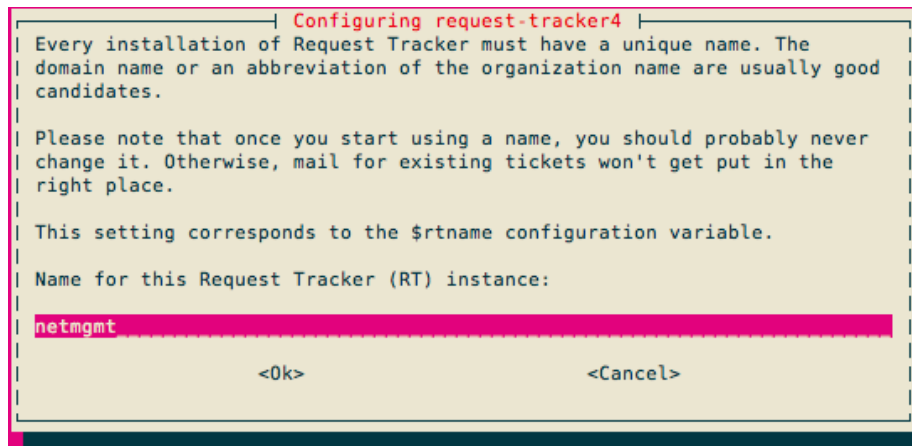


Figure 1: RT installation name

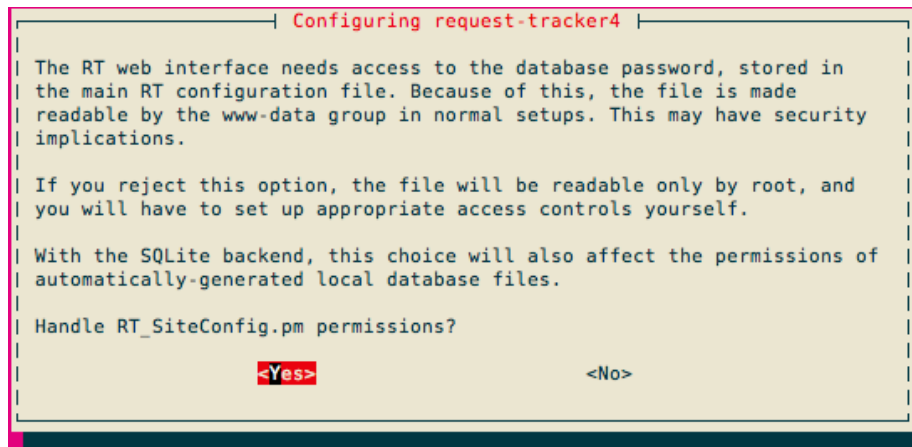


Figure 2: DB configuration

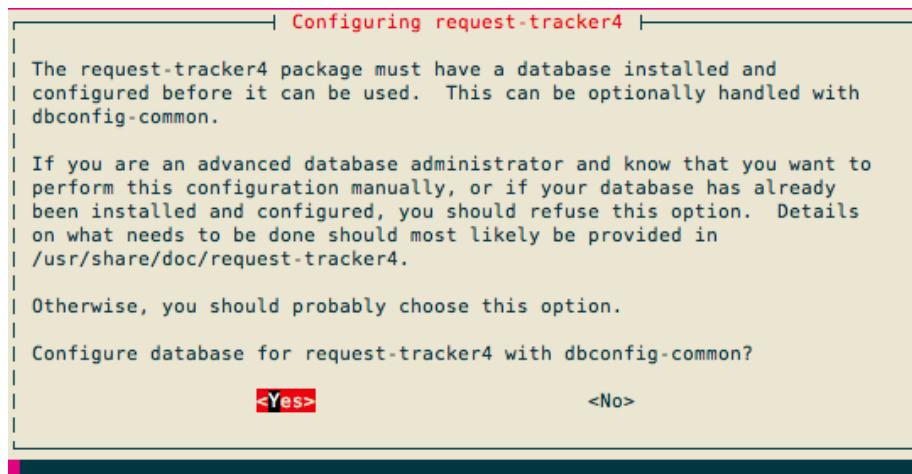


Figure 3: DB admin password

#### Password of the database's administrative user:

Enter the MySQL **root** or **admin** password. This was set earlier in the workshop (probably when you installed Cacti). If you do not remember what this is, or if it's not written at the front of the classroom, ask an instructor for help.

#### MySQL application password for request-tracker4:

You may enter any password you wish. This will be used by Request Tracker to connect to MySQL. You generally do not need to remember this password. Pick something that cannot be guessed easily (i.e., don't use **rt**, **requesttracker**, **1234**, etc...).

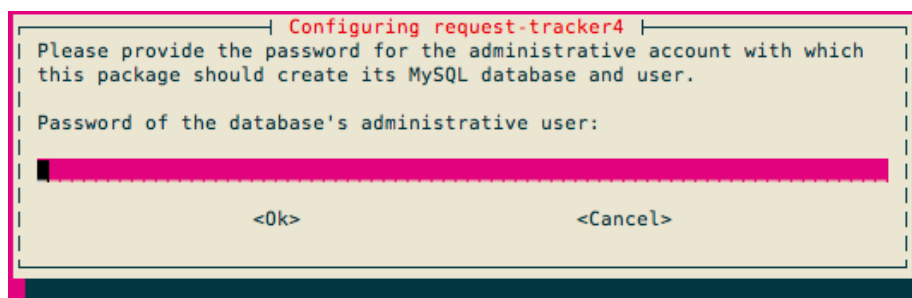


Figure 4: DB application password

#### Password confirmation:

- Enter the same password that you created in the previous step.

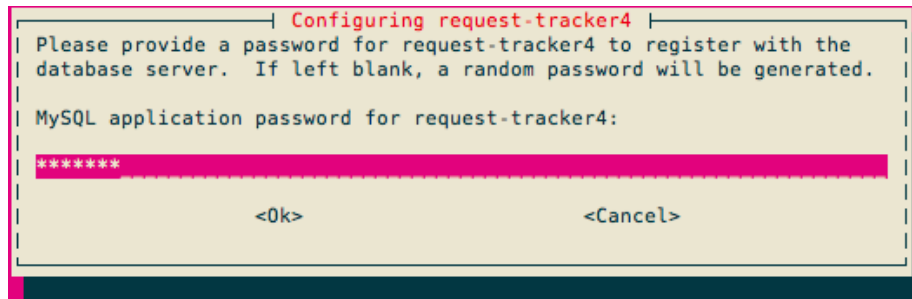


Figure 5: DB application password

#### Initial root password for RT system:

- Use the same password as we used for the MySQL database administrative user.

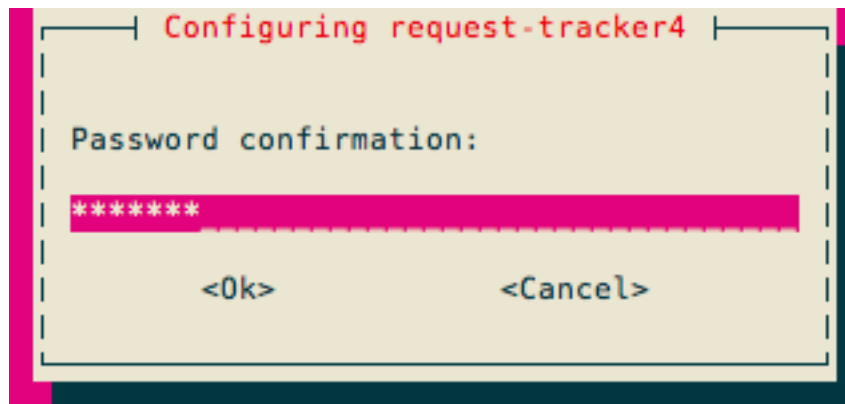


Figure 6: Initial root password

Now you will see quite a bit of information go across your screen as the Request Tracker installation process completes - It's a big package.

At this point you have installed Request Tracker version 4. In order to access RT via the Apache web server you need to make a few small changes.

```
$ cd /etc/apache2/conf.d
$ sudo ln -s /etc/request-tracker4/apache2-fastcgi.conf .
$ sudo a2enmod fastcgi
$ sudo service apache2 restart
```

The last step could take up to 30 seconds, so be patient! RT should now be up and running!

## 2.3 Exercise 2

Log in to RT as the root User

If you go to <http://pcN.ws.nsrc.org/rt/> you will see the RT login screen:

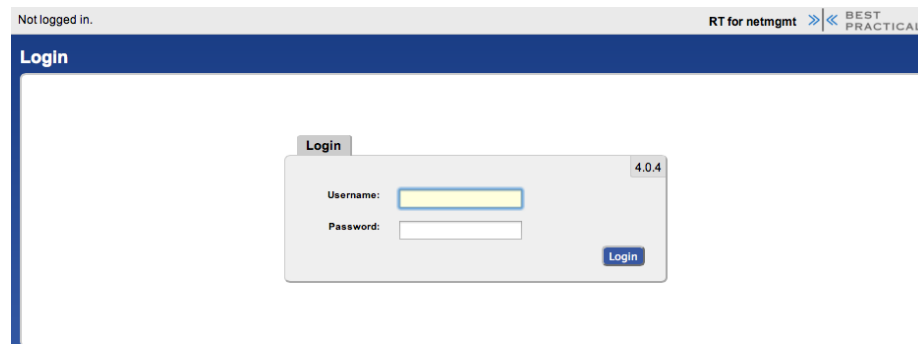


Figure 7: Login screen

Enter the following information to log in as **root** on RT:

**Username:** root

**Password:** [SELECTED AT INSTALL]

## 2.4 Exercise 3

### RT Configuration: Create a User

Now that you are logged in we will create a new user for the rest of these exercises.

On the top of the screen choose Tools => Configuration => Users and then click on the **Create** item in the menu.

You will now be presented with the following dialogue. Fill in the fields, and make sure the checkbox **Let this user be granted rights** is checked. Set your email to **sysadm@pcX.ws.nsrc.org** (X = your PC)

Use the same password for **sysadm** as you are using in class. Be sure you check **Let this user be granted rights**. Once done, scroll down the page and click on the **Create** button (bottom right). You should see this:

## 2.5 Exercise 4

### RT Configuration: Create a Group

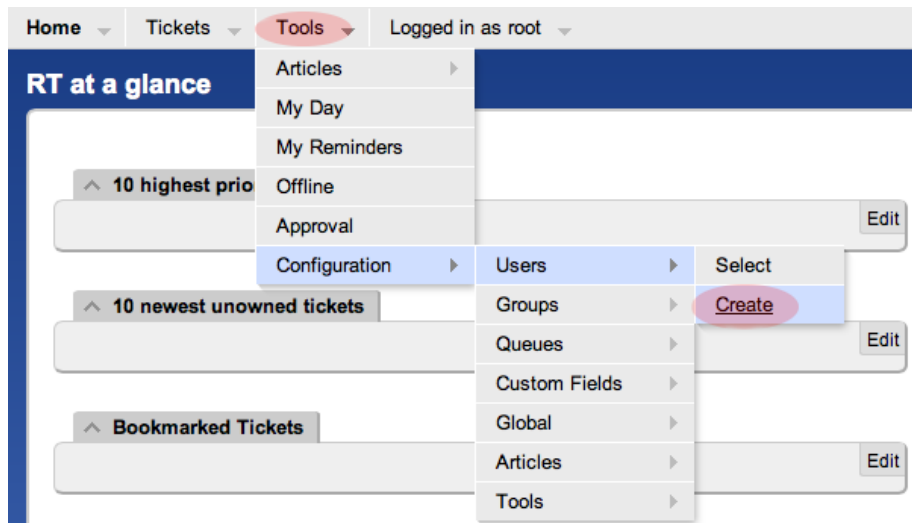


Figure 8: Create User

The screenshot shows the 'Create a new user' form. The form has a header with 'Create a new user', 'New ticket in', 'General', and a search bar. Below the header, there are tabs for 'Identity', 'Location', 'Access control', 'Phone numbers', and 'Custom Fields'. The 'Identity' tab is active, showing fields for 'Username' (sysadm), 'Email' (sysadm@pcx.ws.nsrc), 'Real Name' (System Admin), 'Nickname', 'Unix login', 'Language', and 'Extra info'. The 'Location' tab is also active, showing fields for 'Organization', 'Address1', 'Address2', 'City', 'State', 'Zip', and 'Country'. The 'Access control' tab is active, showing checkboxes for 'Let this user access RT' and 'Let this user be granted rights (Privileged)'. The 'Phone numbers' tab is active, showing fields for 'Home', 'Work', 'Mobile', and 'Pager'. The 'Custom Fields' tab is collapsed. At the bottom right, there is a 'Create' button highlighted with a red circle. A red arrow points to the 'Let this user be granted rights (Privileged)' checkbox.

Figure 9: User creation form

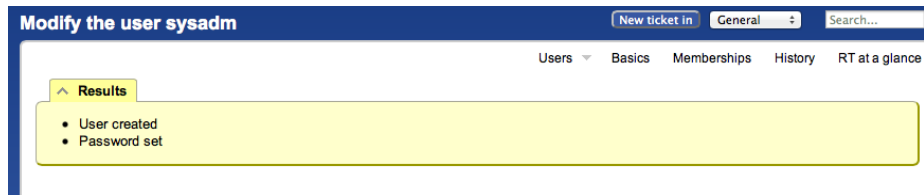


Figure 10: User created

- At the top, choose the menu item **Tools => Configuration => Group => Create**

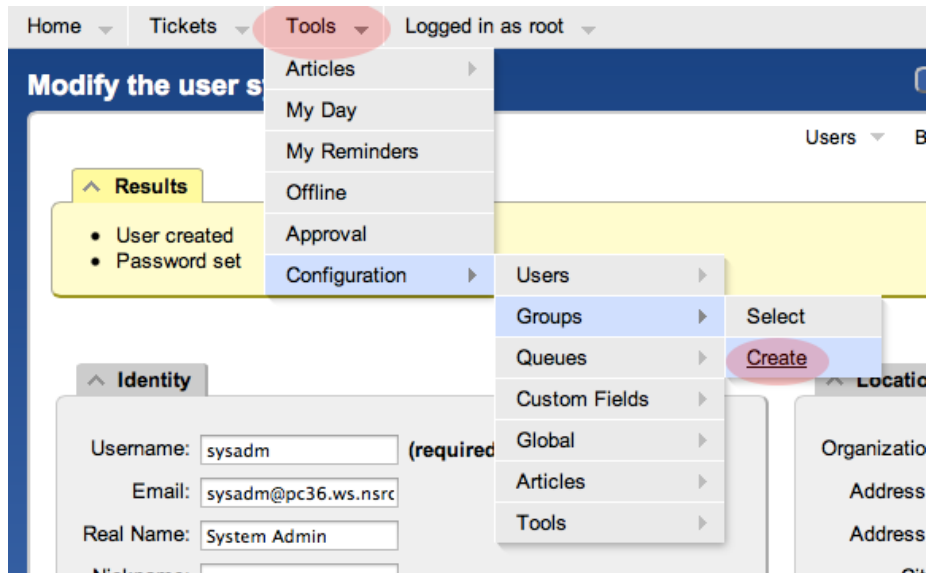


Figure 11: Create group

- Fill in the name: **netmgmt**, and add a description, then click on **Create**
- You should see the following result:
- Click on Members (top menu)
- In the **Add members** field (right), type in the name of the user you created in step 3. This is the **sysadm** user. Then click on **Modify Members** (bottom right):

## Create a new group

Name:

Description:

☒ Enabled (Unchecking this box disables this group)

[Reset](#)

Figure 12: Create group form

## Modify the group netmgmt

[New ticket in](#) [Ge](#)

Groups ▾ Basics Members Group f

**Results**

- Group created
- Group netmgmt: Description changed from (no value) to 'Network Management Administrators' by root

Name:

Description:

☒ Enabled (Unchecking this box disables this group)

[Reset](#)

Figure 13: Group created

## Modify the group netmgmt

[New ticket in](#) [General](#)

Groups ▾ Basics **Members** Group Rights

**Results**

- Group created
- Group netmgmt: Description changed from (no value) to 'Network Management Administrators' by root

Name:

Description:

☒ Enabled (Unchecking this box disables this group)

[Reset](#)

Figure 14: Group members

Figure 15: Add member

- You should see this:

Figure 16: Member added

## 2.6 Exercise 5

### RT Configuration: Create a New Queue

- At the top, choose the menu item **Tools => Configuration => Queue => Create**
- Fill in the fields. Let's use the following values and then click on **Create**:

**Queue Name:** net

**Description:** Network Problems

**Subject Tag:** RT: NET

**Reply Address:** net@pcX.ws.nsrc.org

**Comment Address:** net-comment@pcX.ws.nsrc.org

**Note:** Remember to replace pcX with the correct number of your machine

You should see this:

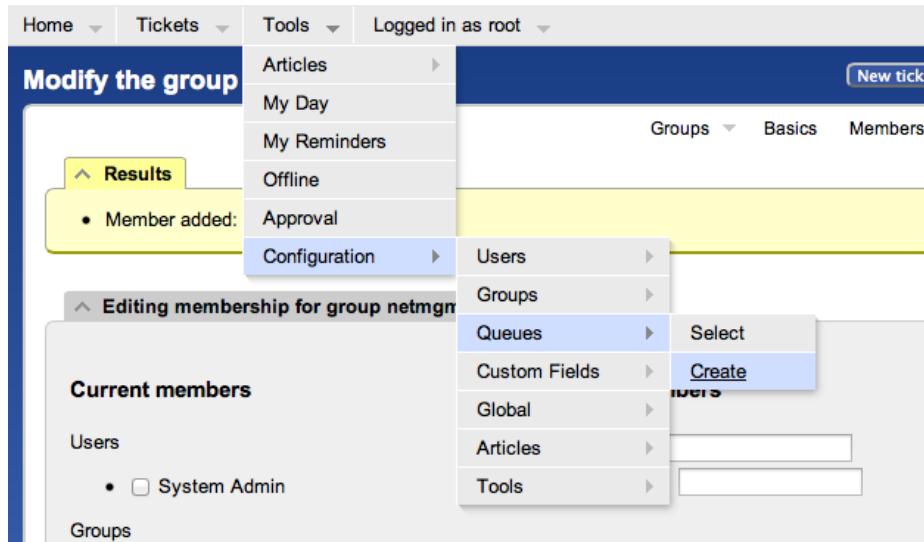


Figure 17: Create queue

The screenshot shows the 'Create a queue' form. At the top, there's a 'New ticket in' button and a 'General' tab. The form fields are as follows:

- Queue Name:
- Description:
- Lifecycle:
- Subject Tag:
- Reply Address:  (If left blank, will default to rt@pc36.ws.nsrc.org)
- Comment Address:  (If left blank, will default to rt-comment@pc36.ws.nsrc.org)
- Priority starts at:
- Over time, priority moves toward:  (requires running rt-crontool)
- Requests should be due in:  days.
- ☐ Sign by default
- ☒ Enabled (Unchecking this box disables this queue)
- ☐ Encrypt by default
- GnuPG private key(s) for rt@pc36.ws.nsrc.org
- GnuPG private key(s) for rt-comment@pc36.ws.nsrc.org
- 

Figure 18: Queue create form

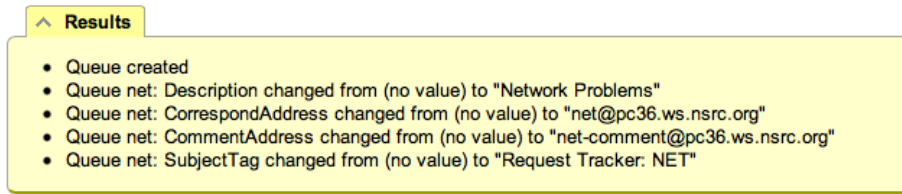


Figure 19: Queue created

## 2.7 Exercise 6

### RT Configuration: Give Rights to our Group on the Queue

From the top menu, select **Tools => Configuration => Queue => Select**  
 You should see:

#### Enabled Queues

Select a queue:

#	Name	Description	Address	Priority	DefaultDueIn	
1	General	The default queue	-/-	0-0	0	Enabled
3	net	Network Problems	net@pc36.ws.nsrc.org/net-comment@pc36.ws.nsrc.org	0-0	0	Enabled

Figure 20: Enabled Queues

- Select **net** (click on it) then choose **Group Rights** (top right)

**Configuration for queue net**

Queues ▾ Basics Watchers Templates ▾ Scripts ▾ Ticket Custom Fields Transaction Custom Fields **Group Rights** User Rights

Queue Name:

Description:

Lifecycle:

Subject Tag:

Reply Address:   
*(If left blank, will default to rt@pc36.ws.nsrc.org)*

Comment Address:   
*(If left blank, will default to rt-comment@pc36.ws.nsrc.org)*

Priority starts at:  Over time, priority moves toward:   
*requires running rt-crontool*

Requests should be due in:  days.

☐ Sign by default ☐ Encrypt by default

☒ Enabled (Unchecking this box disables this queue)

Figure 21: Group rights

The following page should look like this:

Note the three categories: **General rights**, **Rights for Staff**, **Rights for Administrators**

Here, we want to give **Everyone** (including people who are not yet known to RT) some privileges, but only the minimum required. These are found under **General Rights**, and are the following:

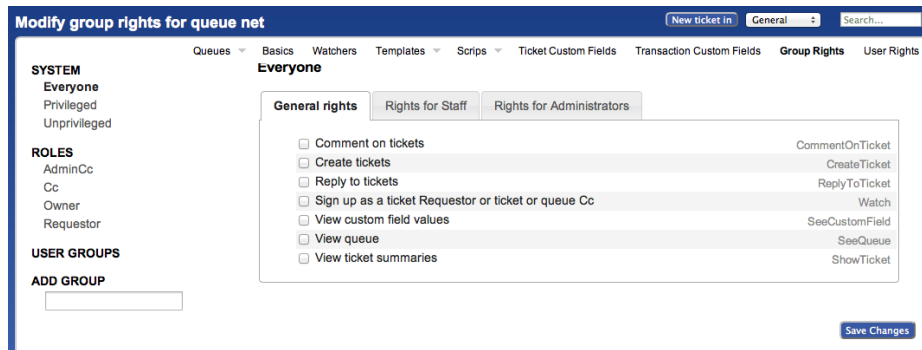


Figure 22: Group rights overview

- Create tickets (CreateTicket)
- Reply to tickets (ReplyToTicket)
- View queue (SeeQueue)
- View ticket summaries (ShowTicket)

So start by selecting these 4 privileges by checking the 4 boxes in your browser. Notice that **Everyone** on the left is already highlighted.

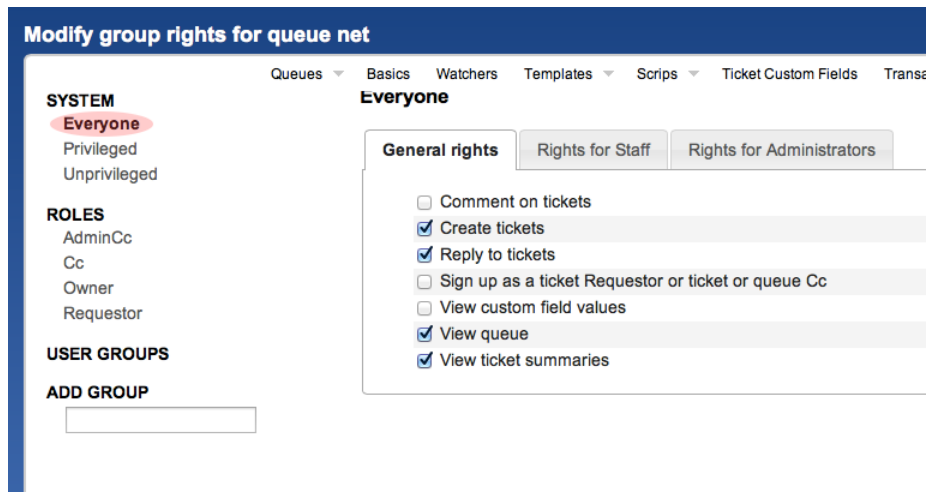


Figure 23: Modify group rights

Now, click **Save Changes** (bottom right) to make sure the changes are applied. Staying on the same page, we're going to now give the **netmgmt** Group all rights...



Figure 24: Saved rights

To do this, first type in the name of the group in the **ADD GROUP** field in the lower left:

**SYSTEM**

Everyone

Privileged

Unprivileged

**ROLES**

AdminCc

Cc

Owner

Requestor

**USER GROUPS**

**ADD GROUP**

netmgmt

**Add rights for this group: netmgmt**

**General rights** Rights for Staff Rights for Administrators

☐ Comment on tickets

☐ Create tickets

☐ Reply to tickets

☐ Sign up as a ticket Requestor or ticket or queue Cc

☐ View custom field values

☐ View queue

☐ View ticket summaries

Figure 25: Add rights to group

Now check **ALL** the boxes in **General Rights**, **Rights for Staff**, **Rights for Administrators**.

Once this is done, press the **Save Changes** button on the bottom right of the page. You should see:

This is after having selected items. Remember to press **Modify Group Rights** after selecting the new rights. Once you press the **Modify Group Rights** button you will see a bunch of this:

## 2.8 Exercise 7

**RT Configuration: Log in as sysadm**

**SYSTEM**  
Everyone  
Privileged  
Unprivileged

**ROLES**  
AdminCc  
Cc  
Owner  
Requestor

**USER GROUPS**

**ADD GROUP**

**Add rights for this group: netmgmt**

General rights   **Rights for Staff**   Rights for Administrators

- ☒ Delete tickets
- ☒ Forward messages outside of RT
- ☒ Modify custom field values
- ☒ Modify tickets
- ☒ Own tickets
- ☒ Sign up as a ticket or queue AdminCc
- ☒ Steal tickets
- ☒ Take tickets
- ☒ View exact outgoing email messages and their recipients
- ☒ View ticket private commentary

Figure 26: All rights selected

^ **Results**

- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted
- Right Granted

Figure 27: Rights granted

Log out of RT (top menu, select the item **Logged in as root => Logout**)

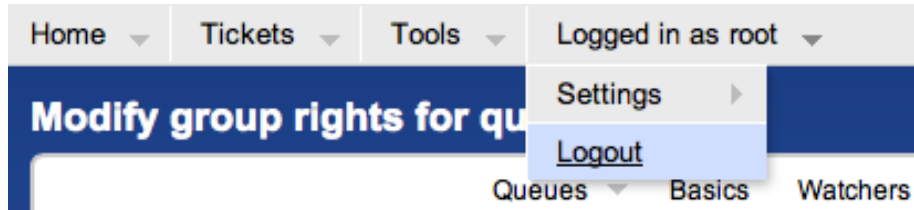


Figure 28: Logging out

Now log back in as the **sysadm** user you have created:

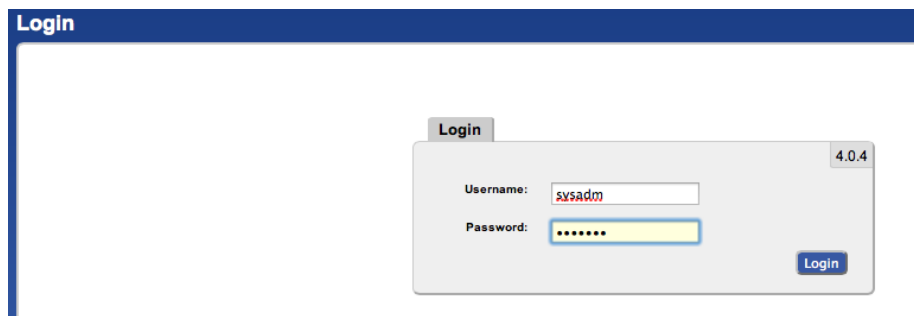


Figure 29: Logging in as sysadm

You should see the following:

At this point RT has been properly configured for initial operation. Now we must configure email properly to talk with our new **net** queue in RT.

## 2.9 Exercise 8

### RT Configuration: Email

RT will work with the MTA (Mail Transfer Agent) of your choice. In our case we are using Postfix configured to run as an MTA for an <> - that is, to deliver email locally and remotely using SMTP.

Edit the file `/etc/aliases`

```
$ sudo editor /etc/aliases
```

Add the following two lines at the end of the file (copy and paste!):

```
net-comment: "|/usr/bin/rt-mailgate --queue net --action comment --url http://localhost/rt/"
net:         "|/usr/bin/rt-mailgate --queue net --action correspond --url http://localhost/rt/"
```

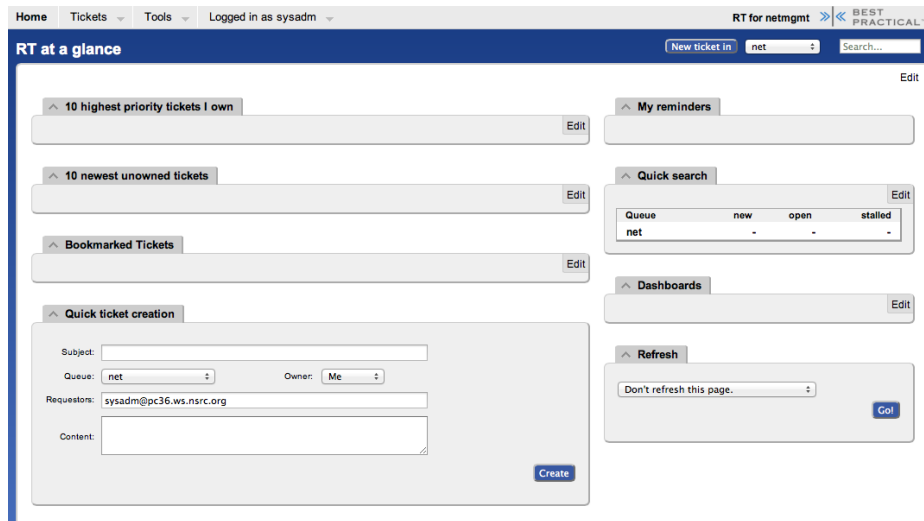


Figure 30: Main page view for sysadm

Save the file and exit. Some editors might cause the above-lines to become multiple lines. Be sure that you only have two new lines in your `/etc/aliases` file after copying and pasting in the text above.

Now run the command:

```
$ sudo newaliases
```

## 2.10 Exercise 9

### RT Configuration: Create an Email and Tickets

Let's create an email and send it to the RT **net** queue. Do this as the **sysadm** user (not as **root**):

If you are currently **root**:

```
# su - sysadm
```

```
$ echo "Problem with my router" | mail -s "Router problem" net@pcX.ws.nsrc.org
```

Remember to replace pcX with the correct name of your server.

Now check that you have received email:

```
$ mutt
```

You should see an email from Request Tracker acknowledging that your ticket has been created.

The mail should say something similar to this:

```
Date: Fri, 9 Nov 2012 00:29:27 +0000
From: Network Problems via RT <net@pcX.ws.nsrc.org>
To: sysadm@pcX.ws.nsrc.org
Subject: [Request Tracker: NET #1] AutoReply: Router problem
```

Greetings,

This message has been automatically generated in response to the creation of a trouble ticket regarding:

"Router problem",  
a summary of which appears below.

There is no need to reply to this message right now. Your ticket has been assigned an ID of [Request Tracker: NET #1].

Please include the string:

[Request Tracker: NET #1]

in the subject line of all future correspondence about this issue. To do so, you may reply to this message.

Thank you,

net@pcX.ws.nsrc.org

If, for some reason, you do not see mail try taking these steps, and then send the mail again:

```
$ sudo touch /var/mail/sysadm
$ sudo chown sysadm:mail /var/mail/sysadm
```

## 2.11 Exercise 10

### RT Configuration: View, Reply, Resolve, Reopen Tickets in Request Tracker

Go back to your web browser where you are logged in to RT as the sysadm user and click on the **Home** menu item (top left).

You should then be presented with an updated view with the current ticket:

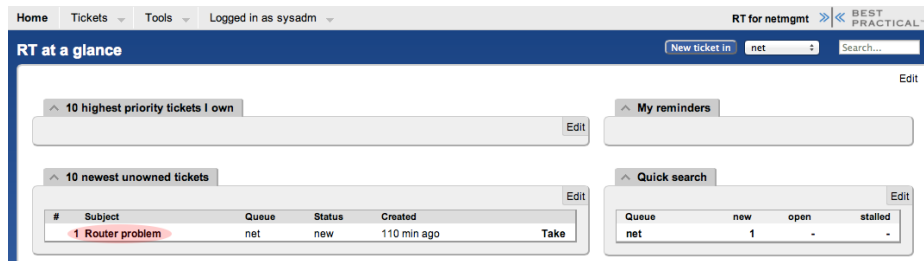


Figure 31: Main page - ticket overview

Now, click on the ticket subject.

You will see many pieces of information about the ticket. Scroll to the bottom of the page.

Here you can **Reply** to the ticket:

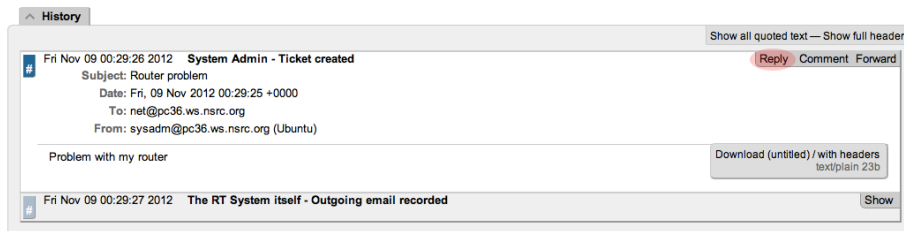


Figure 32: Display ticket

Go ahead and type in a reply, set the **Status** of the ticket to **Resolved** (upper-right drop-down menu), and then click on **Update Ticket** (bottom-right):

**You should see this:**

The ticket is currently <> but you can reopen the ticket via the RT web interface at any time, or if the original ticket creator (**sysadm** in this case) replies to the email you just sent, then the ticket will be reopened.

View the history at the bottom of the page to see that the ticket is currently closed:

If you went back to your terminal session as the sysadm user and typed:

```
$ mutt
```

and responded to the email generated from Request Tracker, then your ticket status will change. You can see this by reloading the RT web page for the ticket and viewing the history at the bottom of the page:

**Update ticket #1 (Router problem)** New ticket in  Search...

Display History Basics People Dates Links Jumbo Reminders Actions ☆

**Message**

One-time Cc:

One-time Bcc:

Sign ☐ using Queue's key Encrypt ☐

Subject: Router problem

Message: Search for Articles matching

Include Article:

On Fri Nov 09 00:29:26 2012, sysadm wrote:  
> Problem with my router

Hellol! We think the problem should be fixed now.

body strong

Attach:  no file selected

**Ticket and Transaction**

Update Type:

Status:

Owner:

Worked:  Minutes

Figure 33: Replying to ticket

**#1: Router problem** New ticket in  Search...

Display History Basics People Dates Links Jumbo Reminders Actions ☆

**Results**

- Message recorded
- Ticket 1: Status changed from 'new' to 'resolved'

**Ticket metadata**

**The Basics**

Id: 1

Status: resolved

Priority: 0/

Queue: net

**Reminders**

New reminder:

Subject:

Owner:

Due:

Figure 34: Reply sent

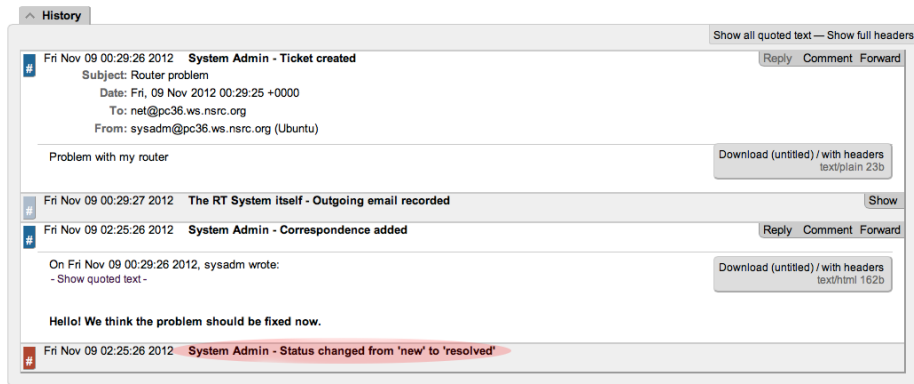


Figure 35: View history

## Using Mutt to Reply to an Email

- After typing **mutt**, select the message you want to respond to using the arrow keys
- Press the `<<*>` key for `<<*>reply`.
- At the bottom of the page you will see, **To: System Admin via RT <net@localhost>** - Press ENTER to continue
- Next you'll see a suggested `<>` line. Press ENTER to choose what is shown.
- When you see, **Include message in reply? ([yes]/no):** press ENTER to include the message.
- Now you will be placed in an editor - possibly **vi**. Type in your response. We suggest to answer below the original message.
- Save and exit from the text editor (`:wq` in **vi**).
- The next screen to appear looks complicated but simply press the **y** key to send the message.
- That's it. You are done. You can press **q** to exit Mutt at this point if you wish.

You now have a functioning RT instance with email integration!

You can experiment a bit. Now, this is not a very realistic setup, since you are communication with yourself! But in fact, other users in the classroom can send you email:

- Make sure they have configured their mail software (`sudo apt-get install postfix` then accept the defaults)
- Have the users send a mail to you, for example:

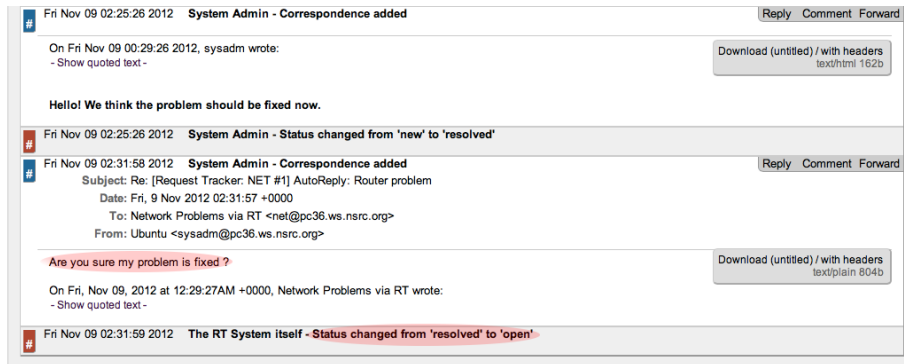


Figure 36: Ticket history showing reply

```
echo "Where is my cat ?" | mail -s "Missing cat" net@pcX.ws.nsrc.org
```

- This should automatically create tickets in the **net** queue on your pc “pcX”  
- verify that you do receive the tickets!

## 2.12 Adding Watchers to a Queue

We are still missing an important feature: it’s not practical to have to log into RT to check if tickets have arrived. It would be much more convenient if we received an email every time a problem request had been submitted, no?

- To do these exercises you need to log out as the sysadm user and log back back in to Request Tracker as the root user.
- Now log back in as root:

Now to receive an email every time a request is submitted we’re going to modify the Queue settings for **net**:

- From the top menu, select **Tools => Configuration => Queue => Select**

From the **Queue** page, select the **net** queue by clicking on its name, and you select the **Watchers** menu option at the top:

You should now see this:

Under **New watchers**, enter the group name **netmgmt** in the field: <>, as such:

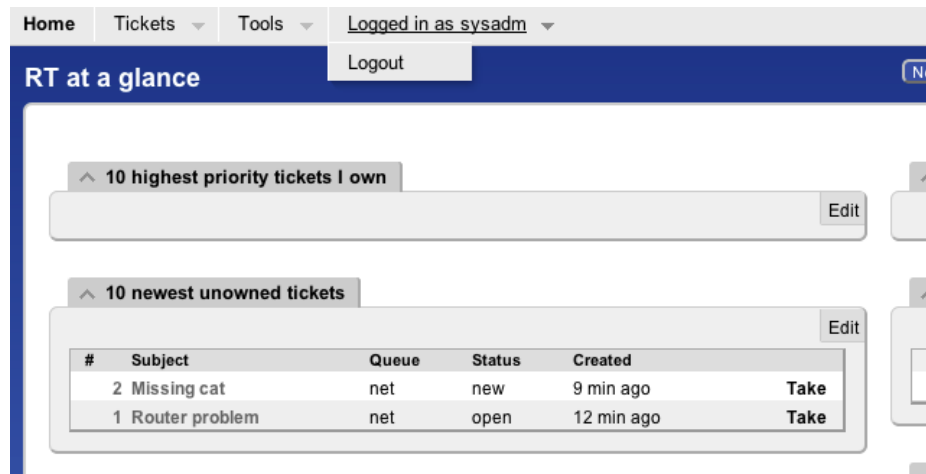


Figure 37: Logout as sysadm

The screenshot shows the RT 'Login' form. It has a title 'Login' and a version number '4.0.4' in the top right corner. The form contains two input fields: 'Username:' with the value 'root' and 'Password:' with a masked password represented by seven dots. A 'Login' button is located at the bottom right of the form.

Figure 38: Log in as root

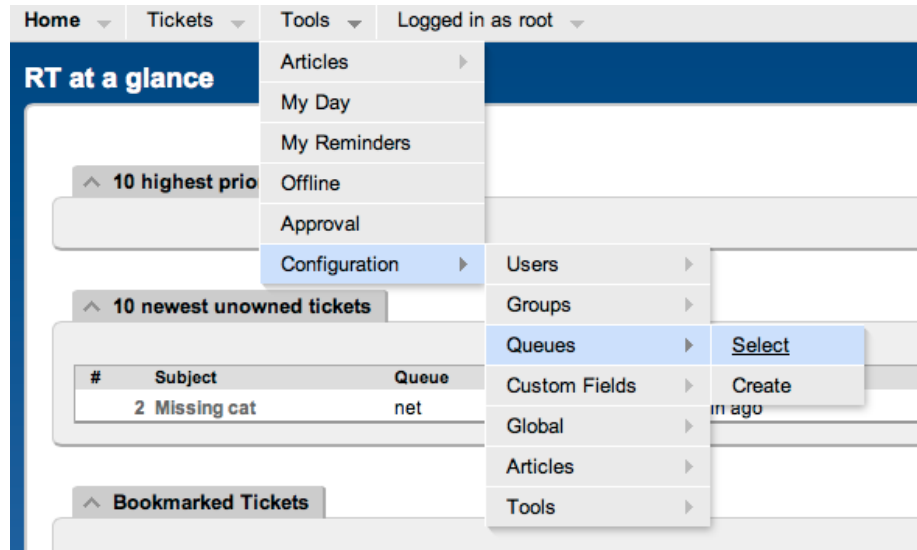


Figure 39: Select queue

The screenshot shows the 'Configuration for queue net' page. The 'Watchers' tab is selected. The form contains the following fields and options:

- Queue Name: net
- Description: Network Problems
- Lifecycle: default
- Subject Tag: Request Tracker: NET
- Reply Address: net@pc36.ws.nsrc.org (If left blank, will default to rt@pc36.ws.nsrc.org)
- Priority starts at: (empty field) Over time, priority m
- Requests should be due in: (empty field) days.
- ☐ Sign by default
- ☒ Enabled (Unchecking this box disables this queue)

Figure 40: Queue watchers

**People related to queue net** New ticket in General Search...

Queues ▾ Basics **Watchers** Templates ▾ Scripts ▾ Ticket Custom Fields Transaction Custom Fields Group Rights User Rights

**Current watchers**

Cc:

- none

(Check box to delete)

AdminCc:

- none

(Check box to delete)

[Reset](#)

**New watchers**

Find people whose

Username ▾ matches ▾  [Go!](#)

Find groups whose

Name ▾ matches ▾  [Go!](#)

Add new watchers:

**Users**

No principals selected.

**Groups**

No principals selected.

If you've updated anything above, be sure to [Save Changes](#)

Figure 41: Modify queue watchers

## New watchers

Find people whose

Username ▾ matches ▾  [Go!](#)

Find groups whose

Name ▾ matches ▾  [Go!](#)

Add new watchers:

### Users

No principals selected.

### Groups

No principals selected.

Figure 42: New watchers

And click on **Go!**

RT will search for all groups matching **netmgmt**. Of course there is only one right now, which we created earlier. RT finds it and displays the following:

**New watchers**

Find people whose  
Username matches  **Go!**

Find groups whose  
Name matches  **Go!**

Add new watchers:

**Users**  
*No principals selected.*

**Groups**

- ☒ - netmgmt (Network Management Administrators)  
Cc  
AdminCc

Figure 43: Matched groups

Notice how we select **AdminCc** from the pull down menu **Groups** next to **netmgmt**. Do this and click on **Save Changes** at the bottom right.

The result should look like this:

^ **Results**

- Added netmgmt to members of AdminCc for this queue.

Figure 44: Watchers modified

What does it mean ? Well, ask another user to send you a mail, like before, but this time you should receive a mail from RT with the ticket notification - run **mutt** as **sysadm**.

A bit later we will extend the use of RT by integrating it with other Network Monitoring software using the **rt-mailgate** facility that we have already configured in the **/etc/aliases** file.

## 2.13 Exercise 11

### Finding a ticket once it's closed.

After a ticket has been resolved or closed may notice that it disappears from your Queue. Actually finding a closed ticket requires a few steps. First, click on **Tickets => New Search** on the top menu in RT:

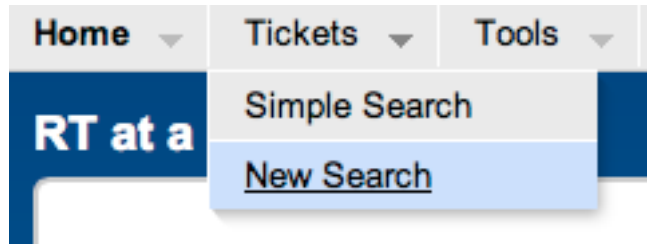


Figure 45: Search tickets

and you will see a screen like this:

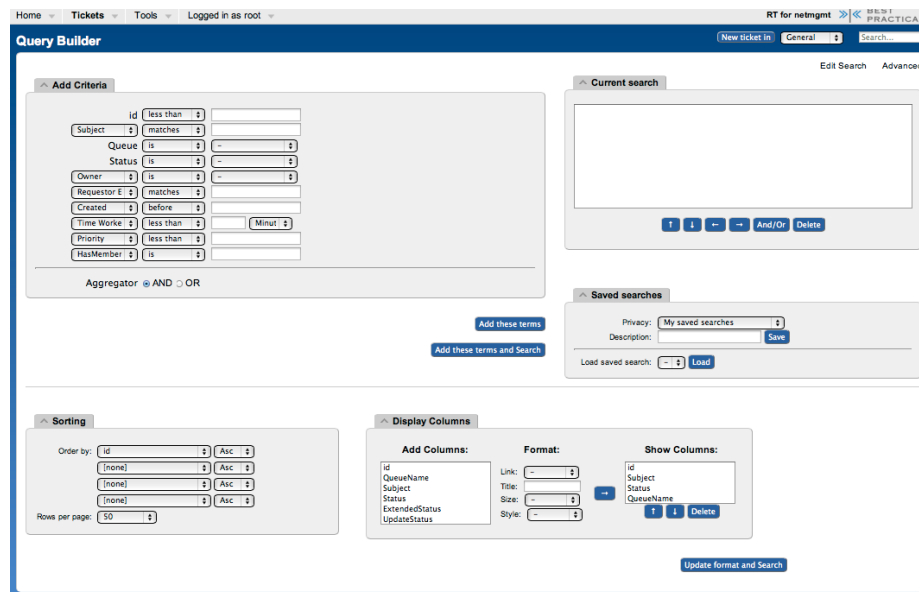


Figure 46: Ticket search form

If you are going to search for items in a queue and there are already items in the <> box, then you should delete the items from the <> box first. Next in the <> box in the <<**Queue**>>" choice select the <<**net**>> queue from the drop-down menu (see below):

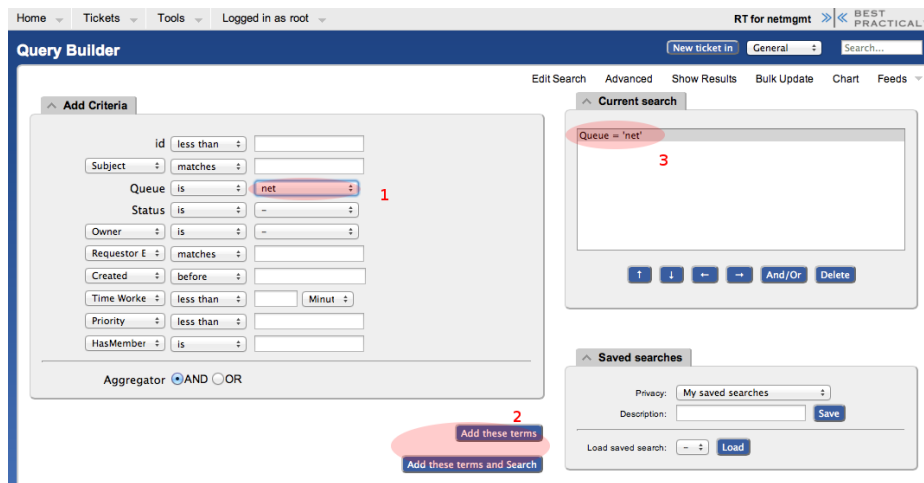


Figure 47: Adding search terms

Click on <> or <> - If you just do <> then go to the bottom of the page and click on <> - RT will keep the search terms until you delete them at a later time.

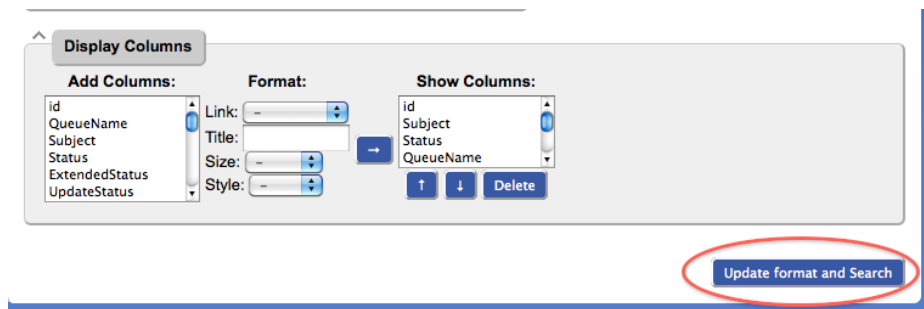


Figure 48: Execute search

And the results of your search will look something like this and you will be able to view tickets that have been closed, resolved, etc. Clearly there will be more tickets in the results over time:

Home Tickets Tools Logged in as root				
Found 3 tickets				
New ticket in				
Edit Search Advanced Show Result				
#	Subject Requestors	Status Created	Queue Told	Owner Last Updated
1	Router problem sysadm@pc36.ws.nsrc.org	resolved 3 hours ago	net	Nobody 49 min ago
2	Missing cat nsrc@noc.ws.nsrc.org	new 45 min ago	net	Nobody 45 min ago
3	Missing cat nsrc@noc.ws.nsrc.org	new 10 min ago	net	Nobody 10 min ago
Don't refresh this page. Change				

Figure 49: Search results