Facility Manager and Restricted Admin Workshop

Description

Demonstrate the capabilities of OMERO in:

1. Data Import for others as well as advanced import options
2. Group/user organization in OMERO
3. User and group organization in OMERO via LDAP
4. Data organization for others
5. Command line interface plugins
6. Upload of official scripts for analysis
7. Analysis of data for others
8. User and data handling when a scientist leaves institution

In the following steps, new specific OMERO users called **restricted administrators** will be created for each task listed above. This gives the full administrator in OMERO additional flexibility. The full administrator does not have to deal with all the tasks concerning all other OMERO users. Instead, the full administrator can delegate these tasks to **restricted administrators**, as suggested in this workflow. See also https://docs.openmicroscopy.org/latest/omero/sysadmins/restricted-admins.html

Setup

Three different types of users were set up.

1. The non-administrative users in OMERO (*user-x)* in OMERO *user-x*,
2. the administrators in OMERO *fmX* and
3. operating system users (non-OMERO users, also named *fmX*)

X goes from 1 to 40 in each case. The *user-x* users have some data pre-imported in OMERO. The *fmX* operating system users will enable access to the machine on which OMERO.server runs and thus to command line interface for each participant of the workshop.

The OMERO server was configured for LDAP and a separate LDAP server was set up on the same machine for ease of operation during this workshop. Dropbox folders were set up too, with the correct permissions.

Create a restricted administrator *importer*

    a. Go to http://outreach.openmicroscopy.org/ and login

    b. Click the *Admin* button.

    c. Click on *Add New User* button.

    d. Fill in the form for the new user, calling the user *importer* and under *Roles:*

        i. select the radio button option *Administrator with Restricted Privileges*.

ii.   In the options, check *Sudo* only and click *Save.* Navigate to the full documentation about the restricted administrators feature by clicking onto *administrator privileges* in the sentence.

> For more info see administrator privileges.

2. Import on behalf of others

a. Log out of the webclient.
b. Log in to OMERO.insight as the *importer* (the user just created by a full administrator).
c. Perform an import As for your user, *user-x*.
d. Select an image and check that it belongs to *user-x*. Further, click on the File Path button to see the file path for where the data was imported from and its path in the OMERO data repository.
e. Open a terminal on your computer and connect via ssh (replacing first the *X* in *fmX* with your credentials number) i.e. `ssh` fmX@outreach.openmicroscopy.org and give the password provided when prompted.
f. This will log you into the server machine as operating system user "*fmX*". This gives you the access to the command line interface, which is a client of OMERO.
g. **Note:** For this workshop, you will use the command line interface (CLI) on the server machine for all the CLI actions. Nevertheless, the CLI can also be used locally, after installation on your laptop/desktop as described in http://docs.openmicroscopy.org/latest/omero/users/cli/installation.html
h. Log in again, sudoing as *user-x*, using the *importer* user just created as the restricted admin with powers to *sudo*:
    i.   `bin/omero --sudo importer -u user-x login`
    ii. When prompted, confirm `localhost` with *Enter* and then give the password for *importer*.
i. On the CLI, create a Dataset and Project on behalf of *user-x*.
    i.   `DID=$(bin/omero obj new Dataset name=Dataset-of-user-x)`
    ii. `PID=$(bin/omero obj new Project name=Project-of-user-x)`
j. Link the Dataset to the Project. The link will also belong to *user-x*.
    i.   `bin/omero obj new ProjectDatasetLink parent=Project:$PID child=Dataset:$DID`
k. Perform Import for user-x into the freshly created Dataset.
    i.   `IID=$(bin/omero import /OMERO/in-place-import/siRNAi-HeLa/CSFV_11.r3d_D3D_PRJ.dv -d $DID)`
l. Copy the `$IID` and log into the webclient on outreach.openmicroscopy.org as *importer.*

m. Into the *Search* field [Search:] in the top right of the user interface, paste the `$IID` and then click on *Browse* to navigate from the list in the Search results to the same image in the tree. Verify that the image is in the Dataset and the Dataset is in the Project you just created on the command line. Also double check the owner of the objects in the *General* tab on the right-hand pane, to verify that the Image, Dataset and Project belong to *user-x*, not the *importer.*

3. **In-place import**
   a. Back in your terminal window, import in-place with
      i. `IID2=$(bin/omero import -- --transfer=ln_s`
         `/OMERO/in-place-import/siRNAi-HeLa/CSFV_11.r3d_D3D_PRJ.dv -d`
         `$DID)`
      ii. When prompted, log in with the credentials provided.
   b. Again in the webclient, still logged in as *importer,* search for `$IID2`. Once found
   c. select the Image

   d. click onto the icon   in the right-hand pane. You should see the note *Imported with --transfer=ln_s* in the first line of the expanded box, which denotes the in-place soft-link import.

   e.
   f. For full documentation about in-place import see https://docs.openmicroscopy.org/latest/omero/sysadmins/in-place-import.html. See also the import videos on YouTube https://www.youtube.com/channel/UCyySB9ZzNi8aBGYqcxSrauQ

4. **Import using OMERO.dropbox**
   a. In your terminal, while still ssh-ed to outreach.openmicroscopy.org as *fmX*, do
      i. `cd /home/DropBox/fmX`
   b. Execute the following command to copy an image file into your OMERO.dropbox folder.
      i. `scp /OMERO/in-place-import/siRNAi-HeLa/scram_05.r3d ./`

    c. Run

        i. `bin/omero config get`

    d. Observe the output

        i. `omero.fs.importArgs=-T Dataset:@name:from-Dropbox`

        ii. `omero.fs.watchDir=/home/DropBox`

    e. The value of the `omero.fs.watchDir` determines the folder watched by DropBox

    f. The value of the `importArgs` contains the target Dataset for the import via DropBox

    g. Go to webclient and open the Data tree for your user, then find the Dataset *from-Dropbox* and expand it.

    h. Find the image `cram_05.r3d` inside the Dataset.

    i. For further documentation on DropBox see
https://docs.openmicroscopy.org/latest/omero/sysadmins/dropbox.html

5. **Create a restricted administrator *organizer***

    a. Log out of the webclient.

    b. Log back into webclient as a full administrator *fmX*. Click the *Admin* button.
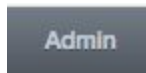
    c. Click on *Add New User* button.

    d. Fill in the form for the new user, calling the user *organizer* and under *Roles:*

        i. select the radio button option *Administrator with Restricted Privileges*.

        ii. In the options select the checkbox *WriteData, DeleteData, Chgrp, Chown, Create and Edit Groups, Create and Edit Users,* and *Add Users to Groups* and click *Save.*

6. **Create and organize groups and users in OMERO**

    a. Log out of the webclient.

    b. Log in again as the *organizer* you have just created. Click the *Admin* button.
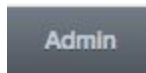
    c. Add existing users to groups: Click onto the *Groups* tab.

    d. Click on *Add new Group* button.

    e. Fill in the form for the new group. In *Group Owners* field, click into the field and start typing the names of users which you want to add as Group Owners for this group.

The drop-down list under the box will narrow down as you type.

f. Select the Group Owner(s) from the drop-down list.
g. **Note**: a group can have 0 Group Owners or as many as you like in OMERO.
h. Repeat the process for the *Group Members* field.
i. Select the permission level of the newly created group using the radio buttons at the bottom of the form. See http://help.openmicroscopy.org/sharing-data.html#groups to make an informed decision. Click *Save.*
j. To create a new user (with, for example Username "*newbieX*"), follow the workflow of step 5. above. Instead of selecting *Administrator with Restricted Privileges*, select any other type of user. You have to add the new user (in case you did not choose to create an Administrator) into at least 1 group.
k. **Note:** an *Administrator with Restricted Privileges* can create new *Administrator with Restricted Privileges* as long as they have the *Create and Edit Users* privilege.
l. Add an existing user to a group: Click on the *Groups* tab. Click on the pencil icon

      next to a group you want to edit. Click into the *Members* field and start typing the user's name. Select the user. Click *Save.*

7. **Organize groups and users in OMERO via LDAP**
   a. Go to your terminal.
   b. Run `cd`
   c. Create an LDAP user as follows, replacing the variables like `$LOGINNAME` with names of your choice
   d. Run
      i. `./ldapmanager user $USERNAME --first $FIRSTNAME --last $SURNAME --password $PASSWORD`
   e. The output should be similar to:
      i. `dn: uid=$USERNAME,ou=Users,dc=openmicroscopy,dc=org`
      ii. `…`
      iii. `userPassword: {SSHA}+csNku11UVAiKDG25/AJm9Lp7eNzr7+L1AQUFA==`
   f. Now, in OMERO, add the newly created user from LDAP to OMERO
      i. `bin/omero logout`
   g. Log in as the newly created *organizer*
      i. `bin/omero login -u organizer`
   h. Add the LDAP user you just created with `$USERNAME` as a new user in OMERO:
      i. `bin/omero ldap create $USERNAME`
   i. The output should be similar to
      i. Added user pstack (id=304) with DN=uid=$USERNAME,ou=Users,dc=openmicroscopy,dc=org

j. **Note:** LDAP users will be added to a group according to your server configuration. This can be either one specific group hard-coded in the configuration (like on this training server, the group name is "MyData") or the group can be created mirroring the groups in LDAP. For more information go to https://docs.openmicroscopy.org/latest/omero/sysadmins/server-ldap.html#group-lookup

k. Add the user $USERNAME which you just created in LDAP and added to OMERO and the user *newbie* (created by *organizer* earlier in the webclient) to the Lab1 group `bin/omero group adduser --name Lab1 --user-name jmsmith newbie`.

l. **Note:** You can have a mixture of LDAP controlled and non-LDAP users in OMERO. See also https://docs.openmicroscopy.org/latest/omero/sysadmins/server-ldap.html

m. Go to your browser. Make sure you are still logged into OMERO as *organizer.* Go to the *Admin* tab, and filter for user $USERNAME which you just created and added from

LDAP. The user will have in column *Roles* a red icon   highlighting them as LDAP user.

n. Click on the *pencil icon*   to edit the user.

o. Note that you cannot change the password (the button is missing) and you cannot edit the *Username* of the user. Check that the *Username*, *First name* and *Last name* match what you have entered when creating your LDAP user.

p. Open a new tab in your browser, go to http://outreach.openmicroscopy.org/ and log in as the newly created LDAP user (with $USERNAME and $PASSWORD you gave when creating this user in LDAP).

8. **Organize data in OMERO for others**
    a. Go back to the tab in the webclient where you are logged in as *organizer.* From the Group/User menu in the top-left of the UI, select the group *Lab1* and user *user-x*

(replace *x* with your assigned number).

b. Click on the grey folder icon   in the top-left corner of the UI (tooltip says *Create new Project*). Create a new project, giving it a name and click OK. Verify in the right-hand pane that the owner of the newly created project is *user-x*

c. Still browsing the data of *user-x*, select an existing project and right-click on it.

d. In the menu, select *Create new > Dataset* and click OK.   .
   Again, verify that the new *Dataset* is owned by *user-x.*

e. **Note:** Even the link between the Dataset and the Project belongs to *user-x* in this situation, so *user-x* can move the Dataset into another Project (and thus delete the link) themselves.

f. Move data to another group: Still in webclient, select a Dataset of *user-x* and right-click on it.

g. Select the group to move the data to *Lab2.* Click on *New*   button to create a new target Project to move the Dataset to. Type the name of the project

and click OK.

h. In the Activities drop-down (top-right corner of the central pane) click on the *Show*

Dataset.

i. This will bring you to the Dataset you have just moved into the *Lab2* group. Verify that the new Project you created during the move belongs to *user-x.*

j. **Note:** *organizer* can create new objects, move them between groups and change their ownership using the Command line interface. This will be explored in the "leaving user" section of this workshop. See also https://docs.openmicroscopy.org/latest/omero/users/cli/index.html

9. **CLI plugins:** See also https://docs.openmicroscopy.org/latest/omero/developers/cli/extending.html

10. **Upload of official scripts for analysis**:

a. In the webclient, log out and log back in as an administrator *fmX*. Create an *Administrator with restricted privileges* named *analyst* with *Write Data* and *Upload Scripts* privileges. Click *Save.* Go to your terminal.
    i.   `bin/omero logout`
    ii. `cd #to get you to your home directory`

b. Replacing the `$NAME` in following line with an original and unique name for the following directory (like "just_janes_own")
    i.   `mkdir $NAME` (to create a script directory).
    ii. `cd $NAME`

c. Create a script: For simplicity, copy an existing script and give it a different name.
    i.   `scp /opt/omero/server/OMERO.server/lib/scripts/omero/util_scripts/ Channel_Offsets.py`

d. Rename the script
    i.   `mv Channel_Offsets.py Training.py`

e. Edit the script as necessary (here, the usage of the editor `vi` is suggested, but skip the editing step if you are not familiar with `vi`. In more realistic workflows, *analyst* would have edited or written your script in the environment of their choice.

i.   `vi Training.py`
f.   Exit `vi` by pressing `Esc` and typing `q!`
    i.   `cd /opt/omero/server/OMERO.server`
    ii. `bin/omero script upload --official /home/fmX/$NAME/Training.py`
g.   Log in as *analyst* when prompted
h.   The output ends similarly to:
    i.   `Uploaded official script`
    ii. `OriginalFile:29175`
i.   Go to the webclient in your browser. Log out and log back in as *analyst.*
j.   Find an image belonging to *user-x* and select it.

k.   Find the *Scripts* icon in the top-right corner of central pane.   .
l.   Click on it and select *home > fmX > $NAME > Training*
m.   Click OK
n.   A new Activities item will pop up. Once finished, In the Activities, click the *bin icon*

        .

o.   The UI will refresh and the image just created by the script will be selected. Verify
     that the image belongs to *analyst,* but is attached to the dataset of the *user-x.* **Note** if
     analyst executes a script, the results (new objects created by the script)
     automatically belong to *analyst*.
p.   **Note:** *o*ther users can execute an official script on their own data as well.

11. Analysis of data for others
a.   ImageJ workflow on others' data with upload of images and attachment results
b.   Run a script in Fiji to circumvent the problem with not being a member of the group.
    i.   Open your Fiji, go to *File > New > Script*

    ii. In the script dialog, select *Language > Python*
    iii. Go to
         https://github.com/ome/training-scripts/blob/master/practical/jython/analyse_p
         articles_for_another_user.jy and paste the text of the script into the Script
         dialog in Fiji
    iv. Enter a valid image ID *$ID* (obtain the ID from webclient as described above)
    v.   Enter a valid password for the *analyst*
    vi. Select *Run > Run* to run the script
    vii. Observe that your image is being opened in Fiji and new ROIs were drawn
         and added to Fiji's *ROI Manager*
    viii. Go to webclient and find the image with your $ID
    ix. Double-click on it to open it in OMERO.iviewer
    x.   In OMERO.iviewer select the *ROIs* tab, and observe the ROIs imported by
         the script from Fiji to OMERO

c. Log into the Webclient as *fmX*. Go to *Admin* tab. Find *analyst* and put them into group *Lab1.* Log out.

-

12. User and data handling when a scientist leaves institution
   a. This workflow covers the situation when a user e.g. *user-x* leaves the institution. There is another user who will takeover the data of *user-x*. The username of that user is *receiver.* The *receiver* is a member of group *Lab2*, but not a member of group *Lab1* where the data resides. *user-x is a* member of both *Lab1* and *Lab2* groups.
   b. Log into the webclient as *organizer.* Find the data of *user-x* in group *Lab1.* Move all the data of *user-x* to group *Lab2.*
   c. **Note**: Alternatively, we could have added *receiver* as member of group *Lab1*. In any case, we want to prevent the situation where the *receiver*'s data are in a group *receiver* is not a member of.
   d. Go to your terminal.
      i. `bin/omero logout`
      ii. `bin/omero login -u organizer`
   e. Transfer one Project of *user-x* to *receiver.* Obtain the ID of the Project in webclient,

      selecting the Project and noting the ID from right-hand pane
      i. `bin/omero chown receiver Project:359 --report`
   f. Transfer all data of *user-X* (which has ID $ID) to *receiver* (advanced, might be slow)
      `bin/omero chown receiver Experimenter:$ID`
   g. In the webclient, verify that all the objects you wanted to transfer the ownership of really belong to *receiver*.
   h. Still in the webclient, go to *Admin* tab and find *user-X* by typing into the filtering box

   i. Click onto the pencil icon next to the right-hand side.   .
   j. In the following form, deactivate *user-x* by unchecking the *Active* checkbox.

   k. Remove *user-x* from the *Lab1* group. Click *Save.*
   l. **Note:** The deactivation will prevent *user-x* from logging in. Nevertheless, *organizer* can still access and work on *user-x*'s data.

m. **Note:** The "leaving user" workflow can also be performed by a group owner of group *Lab1* in a modified version. The group owner, typically a PI, a leader of the working group *Lab1*, would have to add *receiver* as member of group *Lab1* and then proceed with transferring of the ownership of the data of *user-x* to *receiver* on the CLI, followed by deactivation of *user-X* as described above.