XNAT WORKSHOP 2022

XNAT Admin 101 - Basic and Best Practices for XNAT Administration

UCL ICR The Institute of Cancer Research NCITA National Cancer Imaging Translational Accelerator SyneRBI Health+Bioscience IDEAS Flywheel

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- Senior Director of Customer Solutions and Support
- Developed for and administered multiple XNAT systems since 2010 in Academia, Pharma and then with Radiologics, Inc.
- London is still warmer than either Glasgow or my current hometown of Philadelphia right now.
  - London 66F/18C
  - Glasgow 56F/13C
  - Philadelphia 50F/10C

XNAT Administration - Agenda

- Backend configuration
- Basic Site configuration
- Manage Notifications
- User Administration
  - Registration
  - Authentication
- Customization
  - Themes
  - Plugins

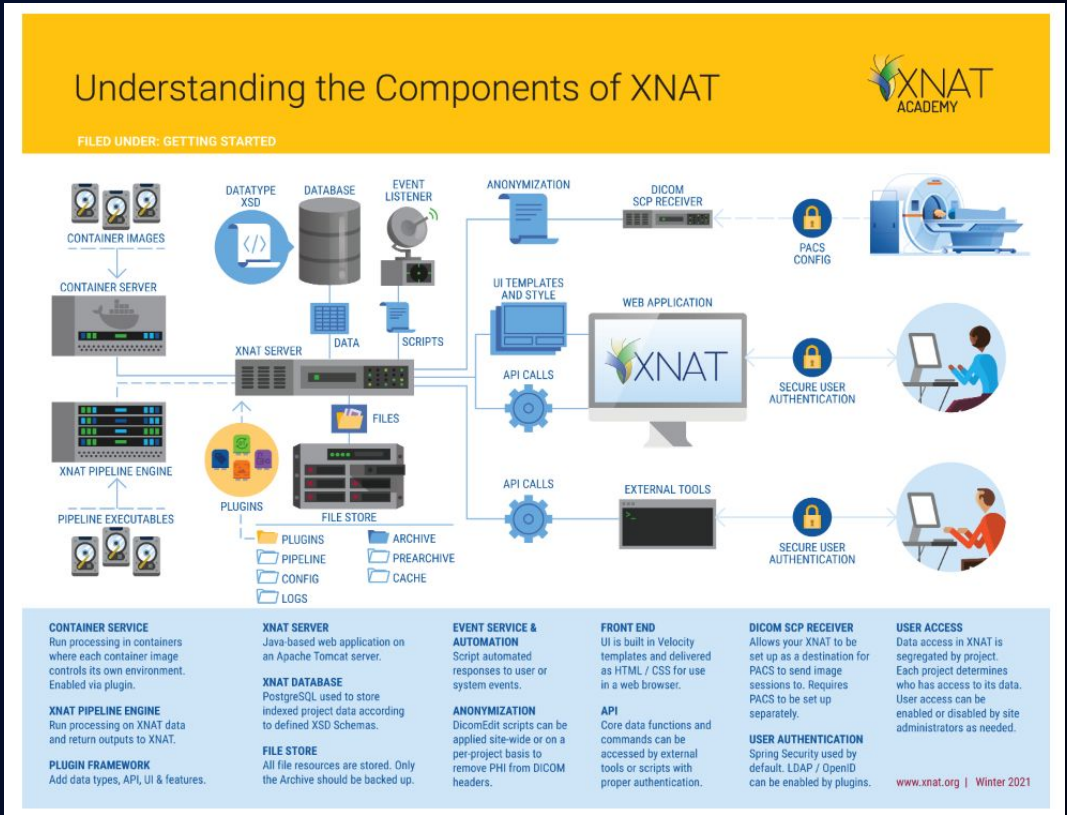
XNAT Administration - Getting Started

1. What do I do with this new shiny XNAT instance?
2. We have some boring backend configurations/optimizations to do.

XNAT Administration - Backend Items

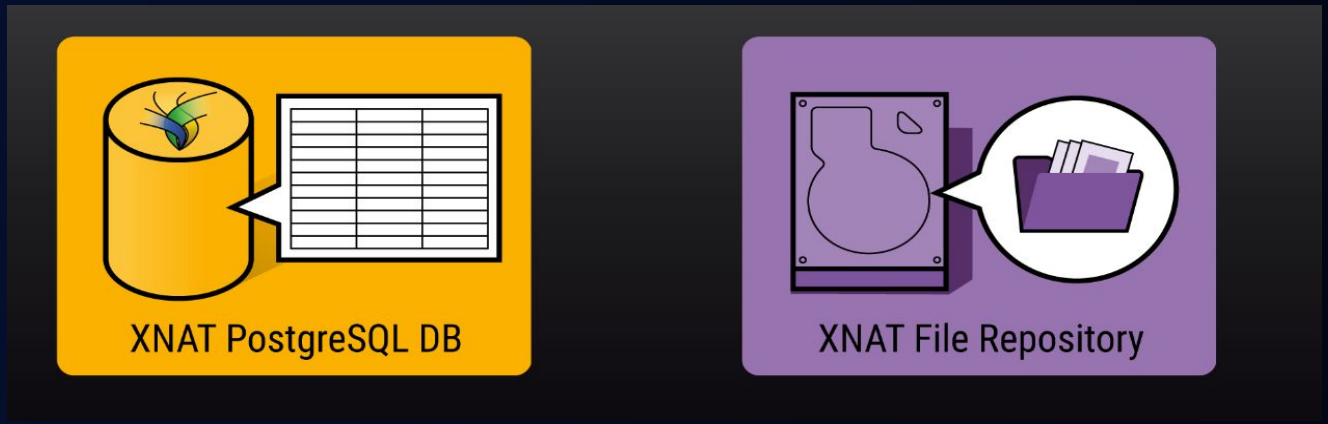
- Postgresql Optimization and configuration
- Tomcat (XNAT) configuration
- Common XNAT cron jobs

XNAT Administration - Complicated View



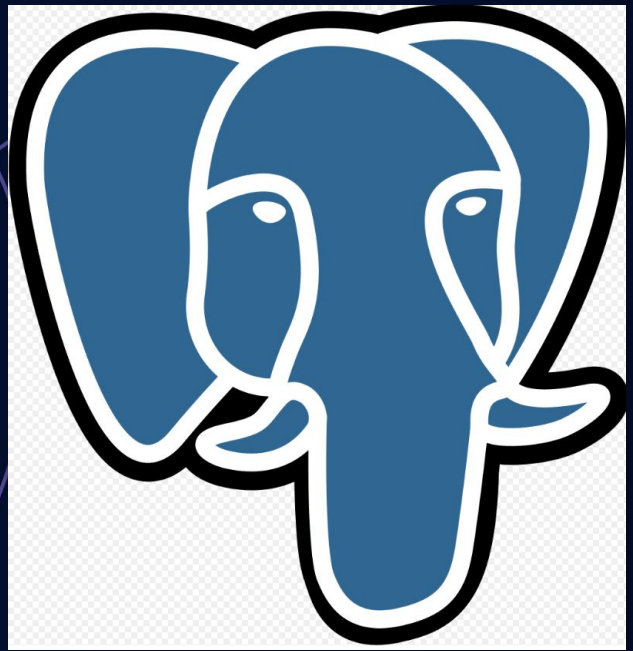
XNAT Administration - Slightly Simplified

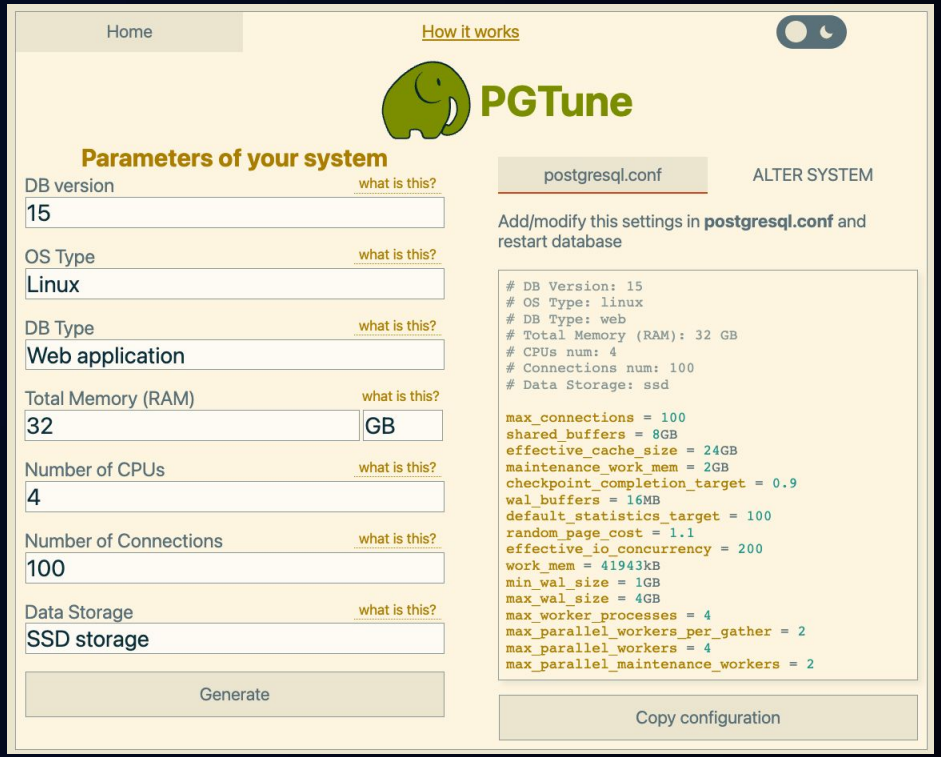
Apache Tomcat Web Application



Postgresql Optimization

https://pgtune.leopard.in.ua/#/

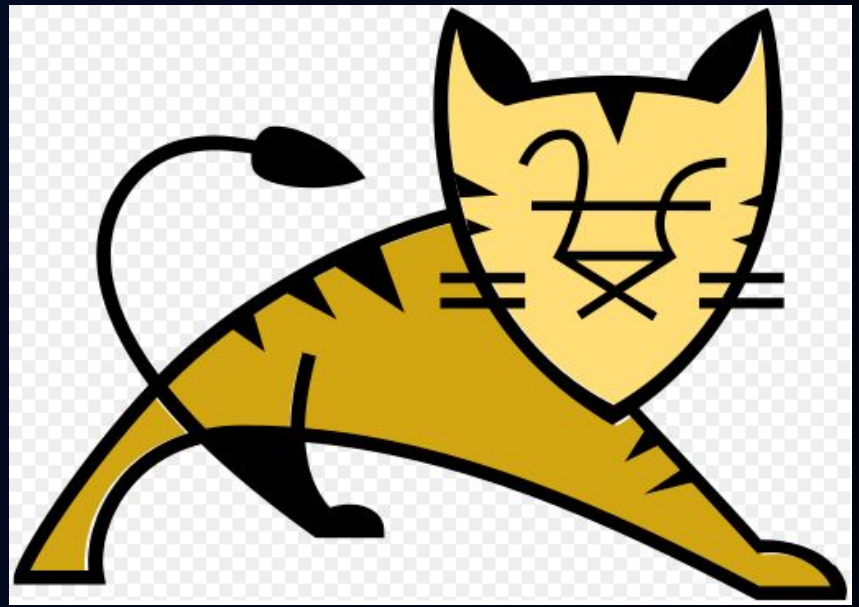




Tomcat Memory Config

```
MYMEM=$(free -m| grep Mem | awk '{print $7}')

MYJAVAMEM=$(bc <<< "scale=0;($MYMEM-1024) * .70" | cut
-f1 -d'.')

echo "CATALINA_OPTS=\"-Xmx${MYJAVAMEM}m -Xms512m
-XX:MaxPermSize=256m \


-Djavax.sql.DataSource.Factory=org.apache.commons.dbcp.Ba
sicDataSourceFactory \

  -Dxnat.home=/home/xnat/
 -Djava.library.path=/usr/lib64:/usr/local/lib64/\" " >>
 /home/xnat/tomcat/bin/setenv.sh
```

-Xmx3096m -Xms512m
-XX:MaxPermSize=256m



XNAT Filesystem Layout

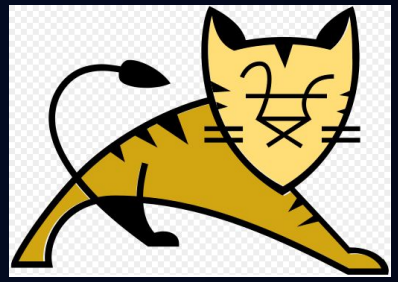
Folder Name	Standard Location	Purpose
archive	/data/xnat/archive	The XNAT Archive is the permanent storage location for all XNAT files, such as uploaded DICOM files or project resource files. All files in this folder are catalogued in the XNAT web application, and tracked in the XNAT audit trail. ⚠ For any non-clinical XNAT, take steps to prevent files with personal health information (PHI) from being stored in this location.
build	/data/xnat/build	This path is currently unused, but is reserved for potential future enhancements to the build process.
cache	/data/xnat/cache	The XNAT user cache is a place where XNAT can store user-specific files. These are often temporary files. When users or processes mark a file for deletion, XNAT does not actually delete the file. Instead, it is sent to the **cache/DELETED** directory. It is a good idea to monitor usage of this folder periodically, as it can retain large amounts of unneeded data.
ftp	/data/xnat/ftp	This is a reserved path for the now-deprecated XNAT FTP server.
prearchive	/data/xnat/prearchive	The XNAT Prearchive is an interim file storage area separate from the XNAT Archive, where uploaded files can be safely reviewed for PHI. It is common for ongoing studies to upload image sessions to the Prearchive rather than directly to the archive.
pipeline	/data/xnat/pipeline	This is a reserved path that is used when installing the XNAT Pipeline Engine

Common cron jobs

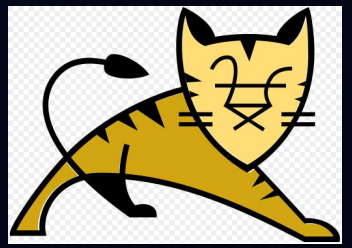
1. Security patches
2. XNAT log compression and archival.
3. Cache directory cleanout (older than x days)
4. Backing up Postgresql (pg_dump)
5. Backup the XNAT archive (rsync, zfs-snapshots etc)

Primary and Shadow Node

- Primary Tomcat node used for UI interaction.
- A ‘shadow’ node can be installed that point to the same filesystem and postgres.
- Shadow nodes will be used for pipeline and container rest api calls.



Primary Tomcat node (UI)



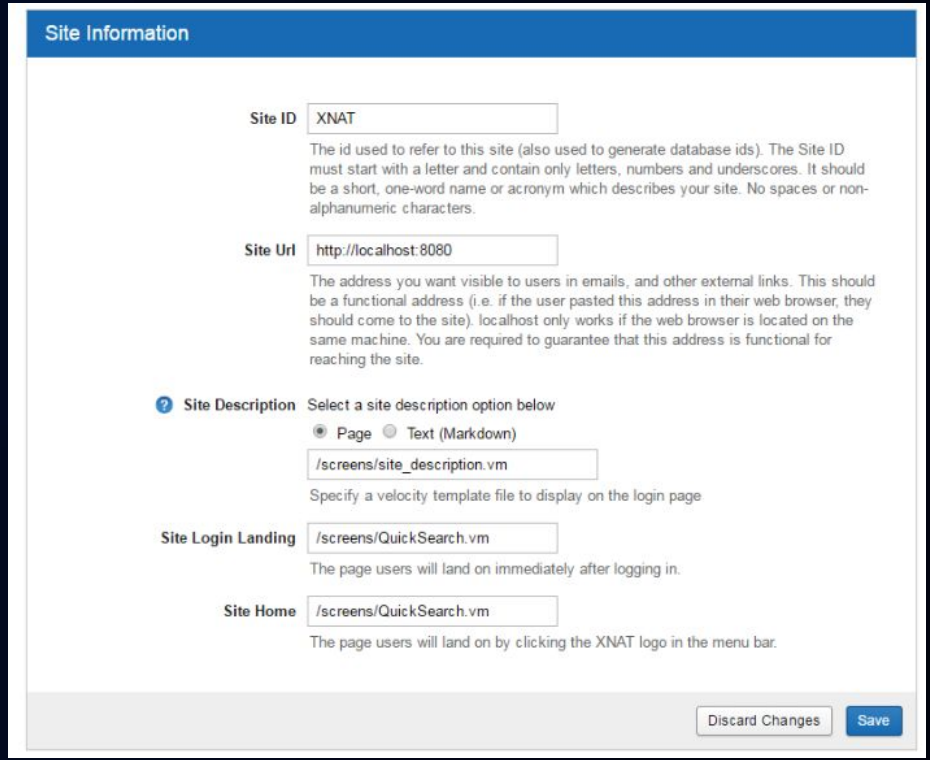
shadow node

Deployment Strategies

- Docker compose
- Bare metal
- Hypervisor base local
  - ESXi, proxmox etc
- Hypervisor base cloud
  - aws, azure, gcp

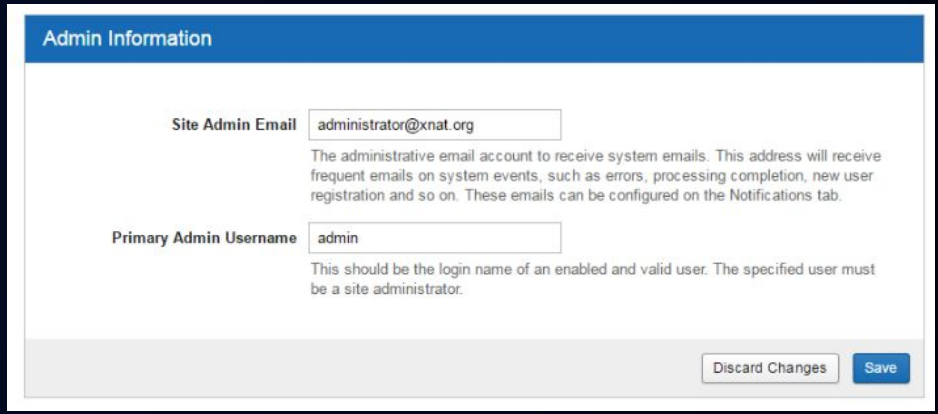
Basic Site Configuration - Site Information

1. Set Site ID
2. Set Site Url
3. Set Site description



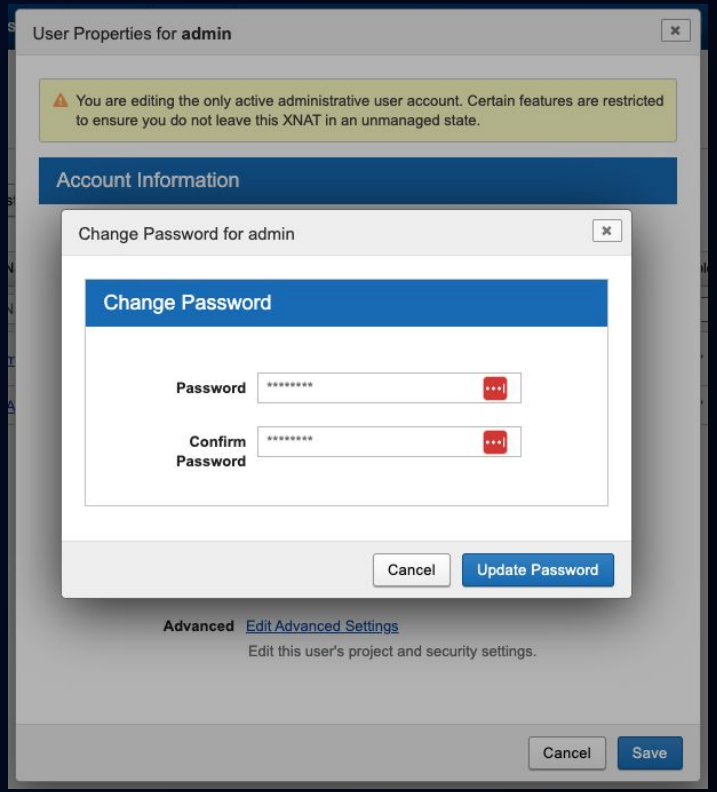
Basic Site Configuration - Admin Information

1. Set Admin Email
2. Set Primary Username



Change the Admin Password!

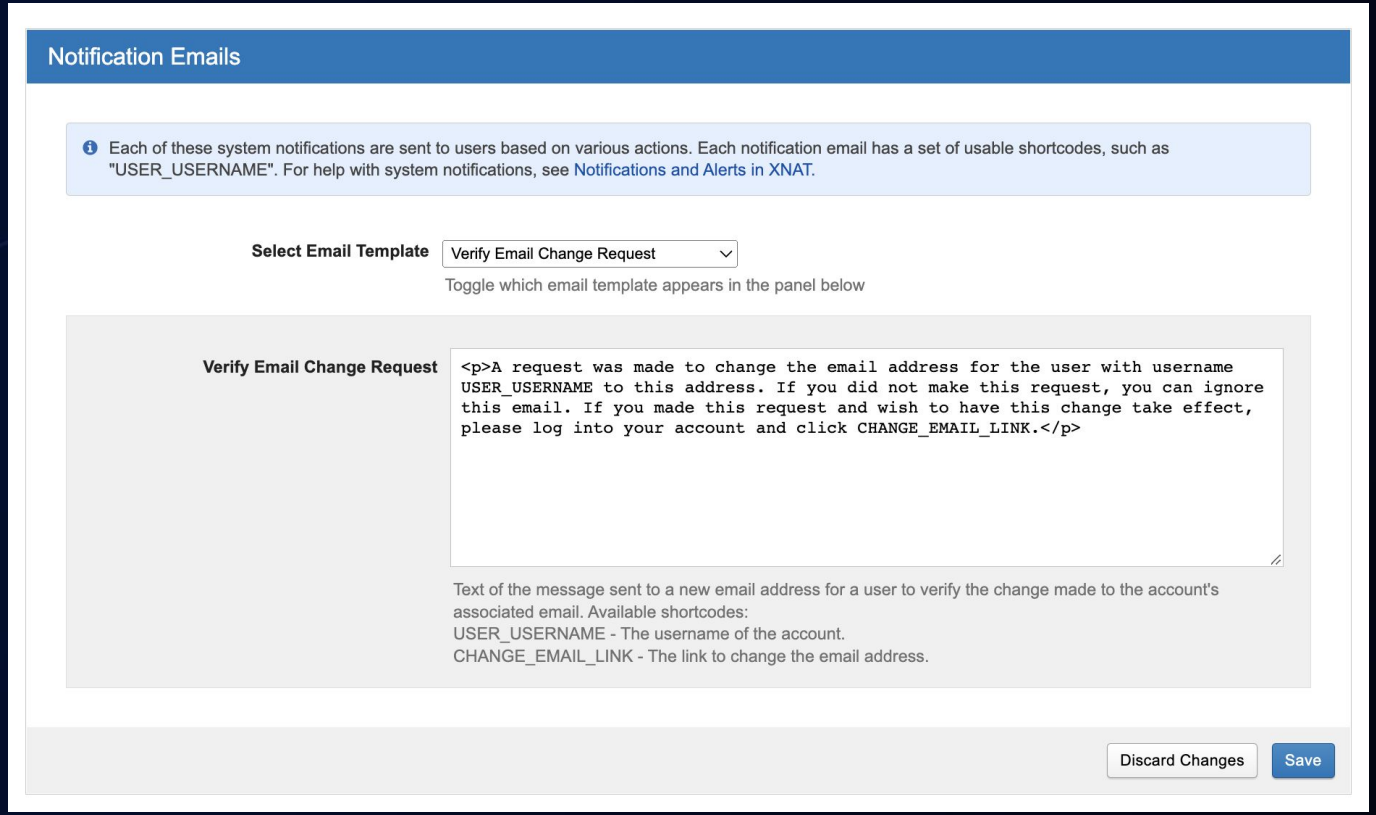
1. You'd be amazed….



Manage Notifications

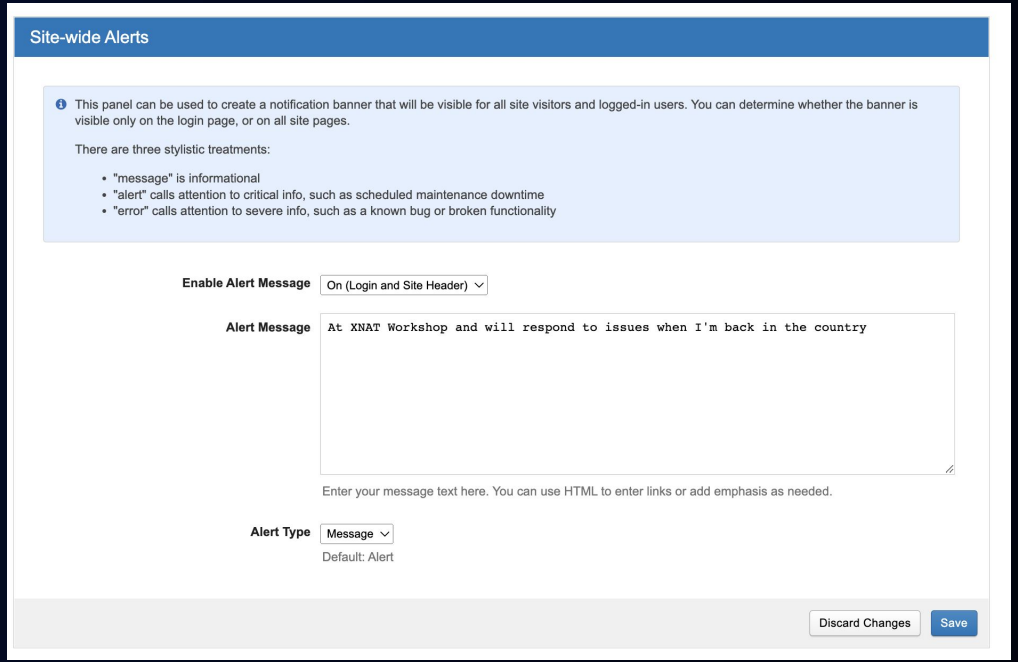
1. Mail Server Settings
2. Notification Emails
3. Site-wide Alerts

Notification Emails



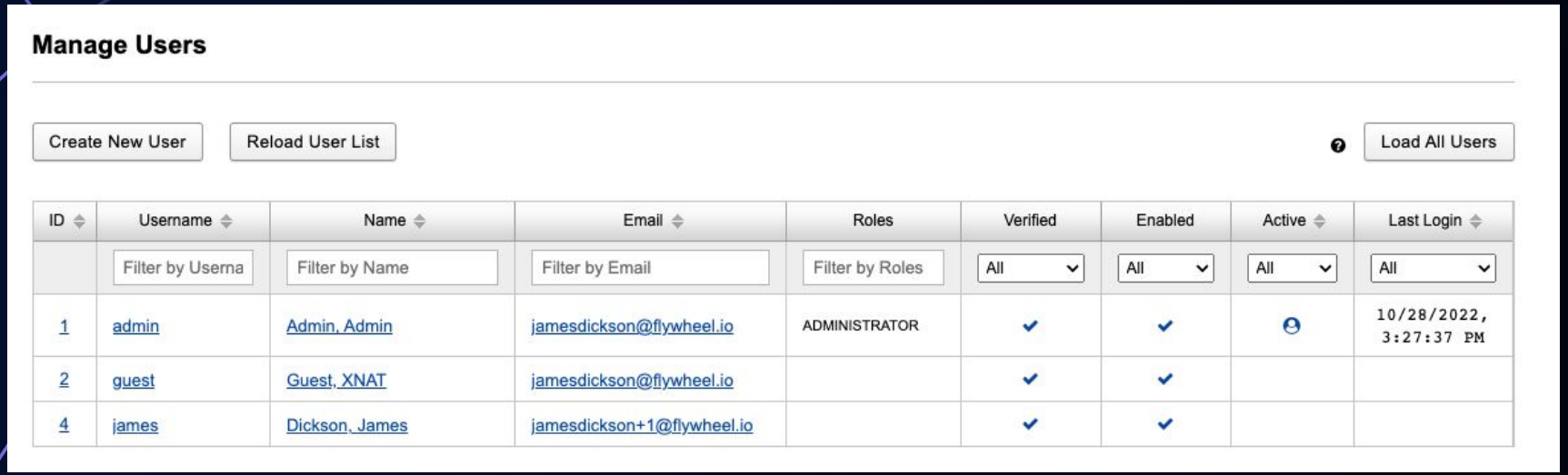
Site-wide Alerts

1. Turn on the site wide alert when scheduling any downtime for updates or maintenance.



User Administration

1. Local users (XNAT managed authentication and authorization)
2. LDAP users (LDAP authentication with XNAT managed authorization)
3. OpenID users (OpenID authentications with XNAT managed authorization)



Manage Users

Create New User | Reload User List | Load All Users

ID	Username	Name	Email	Roles	Verified	Enabled	Active	Last Login
	Filter by Userna	Filter by Name	Filter by Email	Filter by Roles	All	All	All	All
1	admin	Admin, Admin	jamesdickson@flywheel.io	ADMINISTRATOR	✔	✔		10/28/2022, 3:27:37 PM
2	guest	Guest, XNAT	jamesdickson@flywheel.io		✔	✔		
4	james	Dickson, James	jamesdickson+1@flywheel.io		✔	✔		

LDAP Configuration

Jumpcloud-provider.properties

name=JumpCloud

provider.id=jumpcloud

auth.method=ldap

auto.enabled=true

auto.verified=false

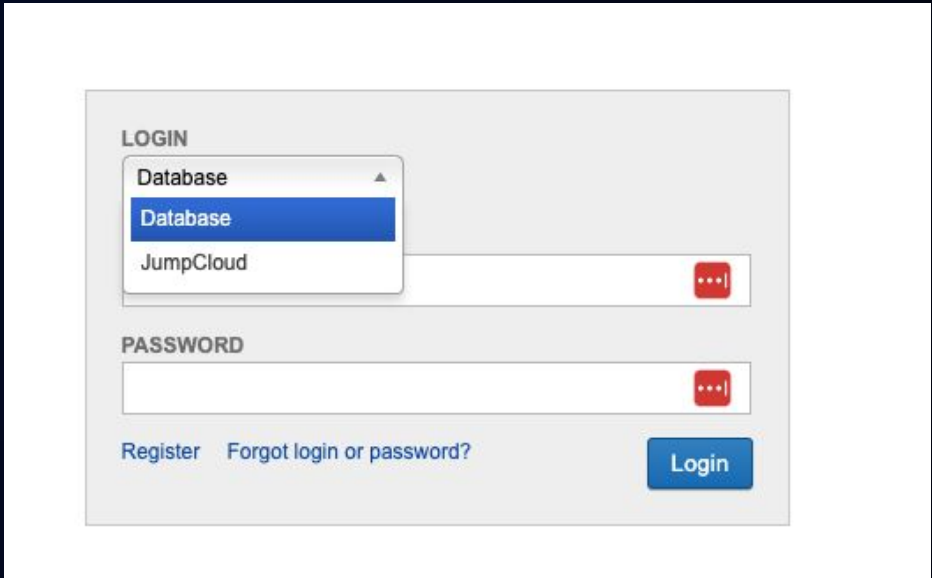
address=ldap://ldap.jumpcloud.com

userdn=uid=ldap,ou=Users,o=sthshsthsthsthsth,dc=jumpcloud,dc=com

search.base=o=sthshsthsthsthsth,dc=jumpcloud,dc=com

search.filter=(uid={0})

password=&^%&^%*^%*&^%*&^



Registration Options

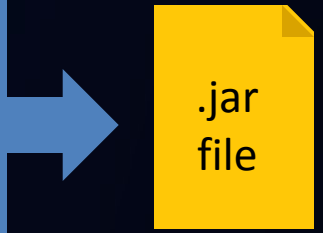
1. The user can register an account for themselves
2. A new user can be invited to join XNAT by a current user who is a project owner
3. A new user account can be created by an XNAT administrator

Customizing XNAT

1. Adding a theme.
2. Adding custom variables.
3. Creating an XNAT Plugin for a new DataType

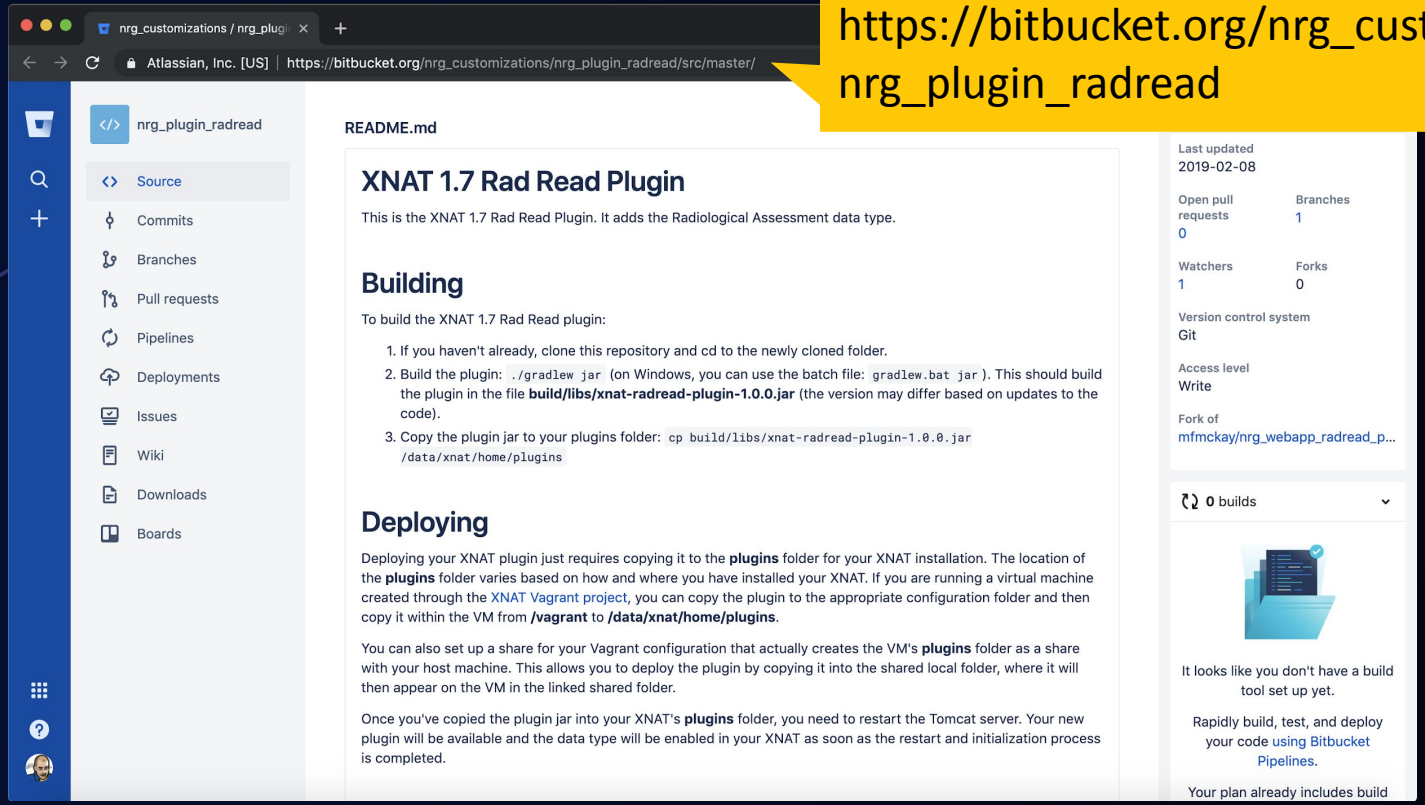
Customizing XNAT - Installing Data Type Plugins

- XSD Schema Entry
- XML Display Document
- UI Templates and custom scripts (optional)
- XNAT Plugin Java Class



Customizing XNAT - Rad Read Plugin

https://bitbucket.org/nrg_customizations/nrg_plugin_radread



Customizing XNAT - Building a Data Type Plugin

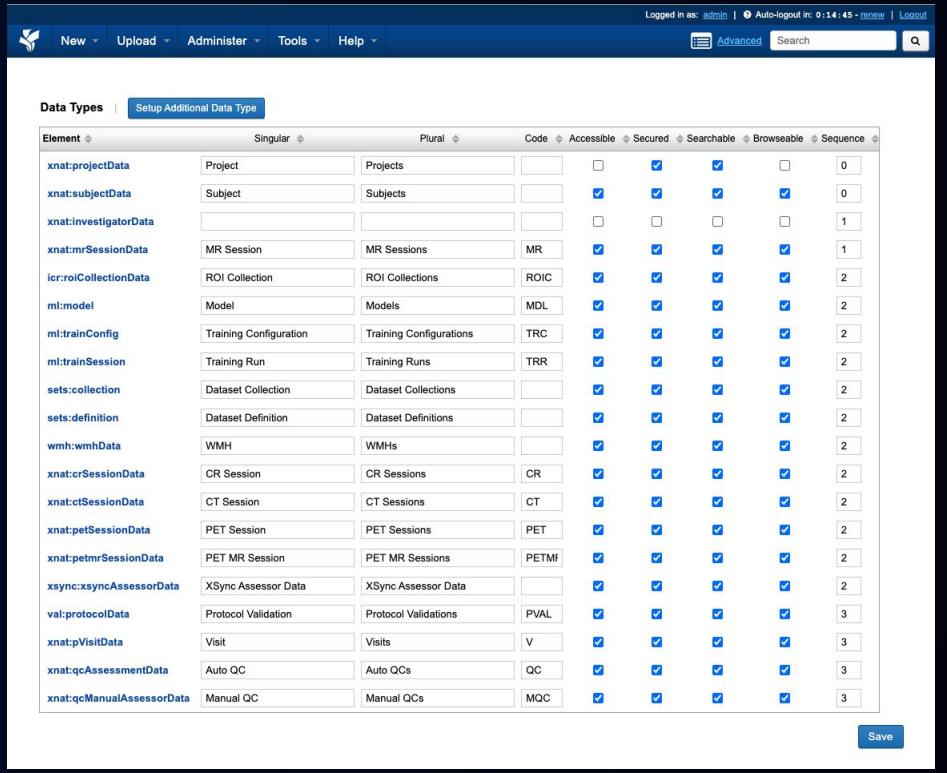
1. Checkout the plugin.
    - git clone https://bitbucket.org/nrg_customizations/nrg_plugin_radread
2. Build the plugin.
    - ./gradlew jar

Customizing XNAT - Plugin Installation Process

1. Shut down the Apache Tomcat Server
    - systemctl stop tomcat
2. Copy the Plugin jar file into XNAT's Plugin directory
    - cp build/libs/*.jar /home/xnat/plugins/
3. Start up the Apache Tomcat Server
    - systemctl start tomcat

Configuring a new Data Type

1. Click Administrator-> Data Type menu.
2. Choose Setup Additional Data Type
3. Select new data type.
4. Insert singular/plural name
5. Click next, next, next ……..



Enabling Rad Reads

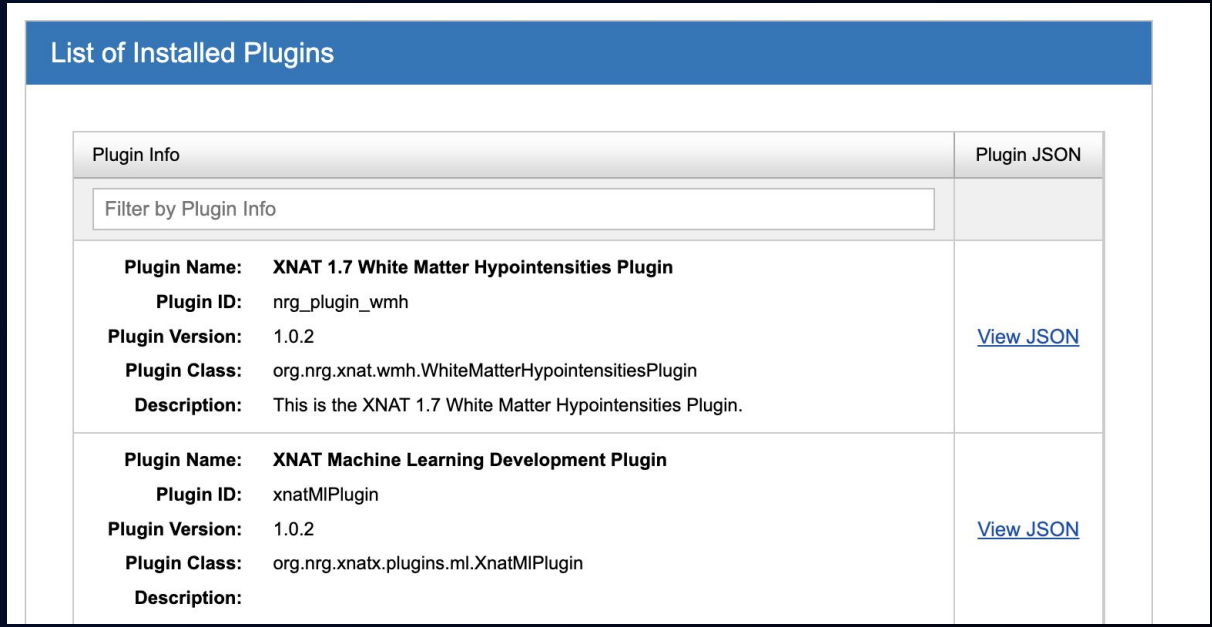
The easiest way for users to add a new Rad Read assessor to an image session in your XNAT is if you give them a link in the Actions menu of that image session report page. To add this action, do the following for **each image session data type** you want to add this functionality to:

1. In the top navigation of your XNAT, go to `Administer > Data Types`.
2. Click on the image session xsiType link for the data type you want to modify; for example, **xnat:mrSessionData**.
3. Click "Edit" in the summary dialog that opens for that data type.

In the "Available Report Actions" table in the edit data type dialog, insert this information to configure the Actions Menu link: 1. Name: **XDATScreen_edit_rad_radiologyReadData** 1. Display Name: **Add Radiology Read** 1. Popup: **never** 1. Secure Access: **edit**

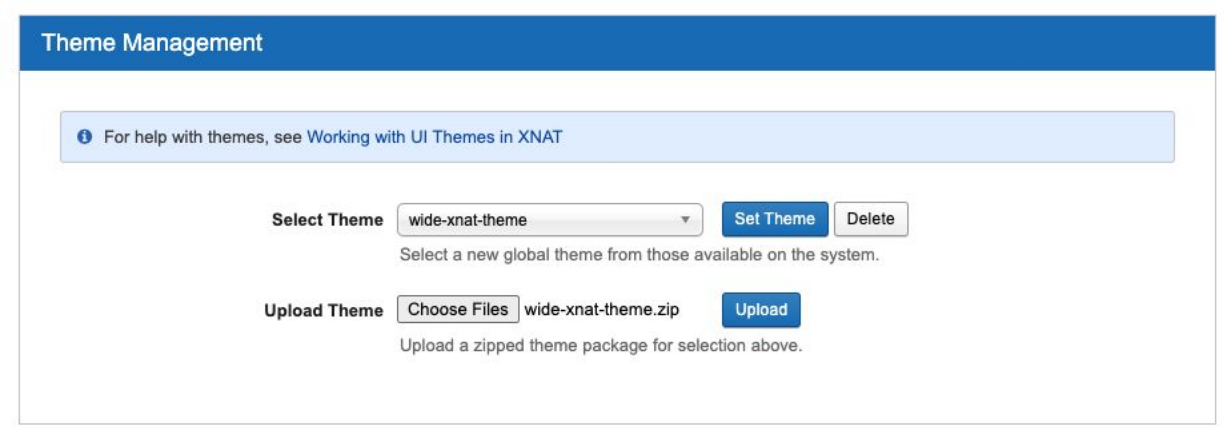
Plugin Administration

1. Removing a plugin usually results in the datatype being hidden.
2. Recommend versioning data types.



Theme support

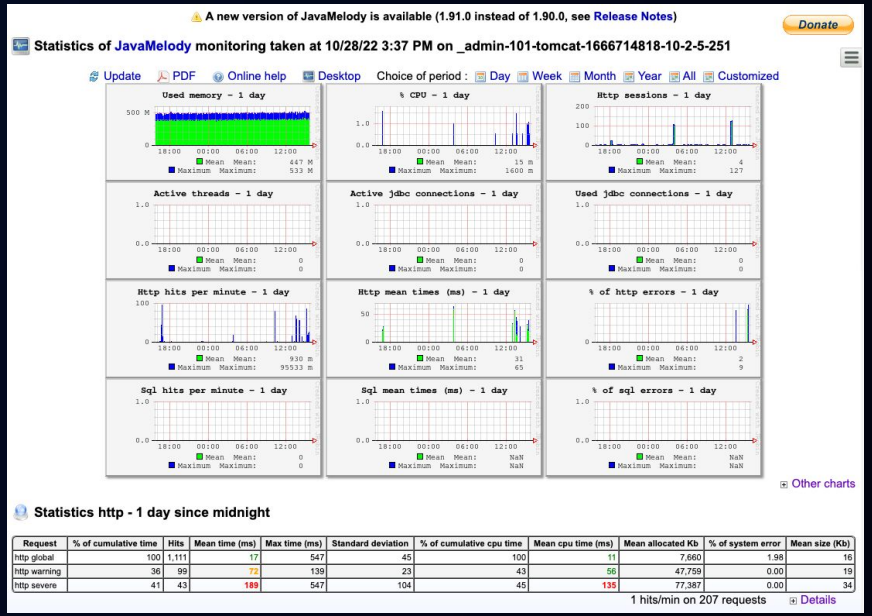
https://wiki.xnat.org/documentation/xnat-administration/working-with-ui-themes



Monitoring

Probably the least know page in XNAT.

https://admin-101.workshop.xnat.org/monitoring



Logging

https://admin-101.workshop.xnat.org/xapi/swagger-ui.html#/logging-api/downloadLogFilesUsingPOST

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