Section I: Client-Side Operations and Connections to Database

1. Joomla details

- Username: admin, Password: ****
- Joomla version: 3.4.8
- In the AWS virtual machine, Joomla is installed in the folder /var/www/html/joomla
- Install the modules in Section 1.1 under Extensions > Manage, edit their settings under Extensions > Modules
- Site is available at by clicking the link in the top right corner with the website name

1.1 Installing Modules

To install modules, upload the package file to Joomla (Extensions -> Manage -> Upload from Package File). Settings should be set (Extensions -> Modules -> Module_name) as given. Access to modules should be given as required (public, registered user, or administrator).

1.1.1 Module for File Upload to Imperial Cloud

- File name: mod_imperial_upload
- Adapted from Simple File Upload extension (http://extensions.joomla.org/extension/simple-file-upload) under the GNU GPL license
- Added PHP code to communicate details of currently logged in user, their uploaded file and user inputs of Gender and Age to the database of user jobs
- Added code to rename files to unique names if they clash with existing files
- Basic settings:
    - - Default upload location: ./imperialinput
    - - Max. Upload Size (bytes): 15728640
    - - Allowed file types: application/x-gzip
    - - Block double extension: no
    - - If file exist: Backup
    - - Allow multiple upload: no
- Advanced settings:
    - - Use Form Fields: yes
    - - Form fields: Age;Gender (M or F)
    - - Form fields file name: imperial_formfields.txt
    - - Form fields divider: |
    - - Show files in directory: no
    - - Load FancyBox through Joomla: Joomla
    - - Load FancyBox: yes
    - - Popup settings: show filename/path:no
- User Directories settings:

- - Use User Named Directories: no

1.1.2 Module for Displaying MALPEM Reports

This is a custom module for viewing individual reports, and deleting all past reports. Currently you don't need to adjust any settings, just install in Joomla and as long as database is setup with correct name, it should work.

1.1.3 Module for MALPEM Administrator View

This is a custom module for administrators. Currently you don't need to adjust any settings, just install in Joomla and as long as database is setup with correct name, it should work.

1.1.4 Sign In Module

The Sign In module is provided by Joomla. The pre-text (Extensions -> Modules -> Sign In) should be set as: Sign in or create an account to upload brain MR images and receive analysed reports!

1.1.5 MALPEM Institution Viewer module

This is a module to display affiliated institutions on the FAQ page. Currently you don't need to adjust any settings, just install in Joomla and as long as database is setup with correct name, it should work.

1.2 Setting up or altering Joomla content

To set up the content on the webpages, create an article (Content -> Articles -> Add New Article). Write whatever content is required on the page, and then press Save & Close. Then, add this to the main menu (Menu -> Main Menu -> Add New Menu Item). Access can be altered to only allow the page to be viewed by logged in users or administrators.

To change the content on a webpage, simply go to the Article's page (Content -> Articles) and click to edit, then save.

1.3 Installing custom Joomla template

To install the custom Joomla template, go the install extensions page (Extensions -> Manage), and then go to Upload From Package File. Modules can then be moved to the correct locations (Extensions -> Modules).

- The Menu should be at position header
- The Sign In module should be at position right-middle
- The File Upload module should be at position right-middle
- The MALPEM Admin Viewer module should be at position right-middle
- The MALPEM Report Viewer module should be at position right-middle
- The MALPEM Institutions Viewer module should be at position right-middle

1.4 Adding institution option to account

The ‘region’ field is overridden and changed to ‘institution’, as Joomla does not allow custom profile fields. This only needs to be done once at setup - any Joomla updates should not change this once set.

Login to the website server and open the following file:
/var/www/html/joomla/administrator/language/overrides/en-GB.override.ini

Replace the region section as follows:
PLG_USER_PROFILE_FIELD_REGION_DESC="Choose an option for the field Affiliated Institution."
PLG_USER_PROFILE_FIELD_REGION_LABEL="Affiliated Institution:"

Similarly, change the region section in /var/www/html/joomla/language/overrides/en-GB.override.ini :
PLG_USER_PROFILE_FIELD_REGION_DESC="Please enter your Affiliated Institution."
PLG_USER_PROFILE_FIELD_REGION_LABEL="Affiliated Institution:"

The module to display institutions using MALPEM should then work correctly.

2. Database details

- Username: root, Password: **** (same password as for Joomla)
- Name of database: joomladem0
- Website user information stored in r17ie_users, information for user-submitted jobs stored in r17ie_user_jobs
- Fields in r17ie_users:

Field	Type	Null	Key	Default	Extra
id	int(11)	NO	PRI	NULL	auto_increment
name	varchar(255)	NO	MUL		
username	varchar(150)	NO	MUL		
email	varchar(100)	NO	MUL		
password	varchar(100)	NO			
block	tinyint(4)	NO	MUL	0	
sendEmail	tinyint(4)	YES		0	
registerDate	datetime	NO		0000-00-00 00:00:00	
lastvisitDate	datetime	NO		0000-00-00 00:00:00	
activation	varchar(100)	NO			
params	text	NO		NULL	
lastResetTime	datetime	NO		0000-00-00 00:00:00	
resetCount	int(11)	NO		0	
otpKey	varchar(1000)	NO			
otep	varchar(1000)	NO			
requireReset	tinyint(4)	NO		0	

- Fields in r17ie_user_jobs:

Field	Type	Null	Key	Default	Extra
job_id	int(10) unsigned	NO	PRI	NULL	auto_increment
username	varchar(30)	NO		NULL	
user_email	varchar(100)	NO		NULL	
age	int(4)	YES		NULL	
gender	varchar(6)	YES		NULL	
file_path	varchar(1000)	NO		NULL	
time_submitted	timestamp	NO		0000-00-00 00:00:00	
time_ended	timestamp	NO		0000-00-00 00:00:00	
output_path	varchar(1000)	YES		NULL	
expected_output	varchar(1000)	NO		NULL	

3. Updating of Database

- Python script: check_outputs.py
    - Script continuously checks for new files added to output (reports) folder on S3
    - When a new file is found, its name is checked against the database and the user who submitted that job is notified via email
    - Run in background using “nohup /<path_to_this_file>/check_outputs.py &”
    - Requires MySQLdb python package
        - Run “sudo apt-get install python-mysqldb” if not installed

Section II: Server-Side Operations

1. AWS Details

- Access via management console: https://aws.amazon.com/console/
- Username/ email: malpemimperial@gmail.com
- Password: *********
- “malpem.pem” file contains private key needed for SSH

1.1 Basic AWS Instance

Launch a basic instance
In the management console, go to the EC2 dashboard and select Instances from the left side menu. Click ‘Launch Instance’. Choose an AMI with the desired system configuration. For MALPEM we recommend Ubuntu. Go through each step and change settings as required.

Launch an instance with MALPEM installed
In the management console, go to the EC2 dashboard and select Instances from the left side menu. Click ‘Launch Instance’. Go to ‘My AMIs’, select ‘malpem1.2’. To process an image the instance size would need to be c4.4xlarge, otherwise t2.small is large enough to have the package installed but not running. Click on Next: Configure Instance Details. Change Shutdown Behaviour to ‘terminate’. (Advanced Details, add user data?). Click Next until reach Configure Security Group. Change to ‘select existing security group’ and choose group ‘ForMalpemEC2s’, which allows you to ssh into the instance if necessary.

Alternatively go to AMIs in management console/EC2, select desired AMI eg ‘malpem1.2’, click ‘Launch’ and follow the same steps as above.

Create a new AMI
In the management console, go to the EC2 dashboard and select Instances. Click ‘Launch Instance’, choose Ubuntu as the AMI, size t2.small, and use security group ‘ForMalpemEC2s’ as will need to ssh in.

SSH in:
ssh -i "malpem.pem" <instance’s public DNS>
(eg ssh -i "malpem.pem" ubuntu@ec2-52-10-62-234.us-west-2.compute.amazonaws.com)

Install development tools using commands:
sudo apt-get update
sudo apt-get install

Install latest version of MALPEM (see https://github.com/ledigchr/MALPEM/blob/master/README.md):

cd
wget -O malpem_installer.tar
http://www.doc.ic.ac.uk/~cl6311/Material/MALPEM/malpem_installer.tar
tar xf malpem_installer.tar
./malpem_installer/malpem-install

End the ssh connection. In the management console, right click on the instance, go to 'Image' and click 'Create AMI'. Wait for the AMI to have finished being created then terminate the instance.

Starting the Lambda function
Go the Lambda Console page at: https://us-west-2.console.aws.amazon.com/lambda/home?region=us-west-2#/functions

Select the lambda function: MalpemTrigger
Go to the tab 'Event Sources'
Select the event originating from imperialinput and change the status of the event from disabled to enabled

To replace the DOC cloud server with the AWS pipeline, there is a need to link the database to new instances as well as to create a script that boots at the start of each new instance that sends and email out containing the produced files stored in s3.

2. Mounting of S3 using S3fs

Install & Setup
Install S3fs from git here (github.com/s3fs-fuse/s3fs-fuse) using the Ubuntu 14.04 command:
sudo apt-get install automake autotools-dev g++ git libcurl4-gnutls-dev libfuse-dev libssl-dev libxml2-dev make pkg-config

Enter AWS Access Key ID and Secret Access key (found in AWS account) in ~/.passwd-s3fs in the following format:
accessKeyID:secretAccessKey
Then change permissions:
chmod 600 ~/.passwd-s3fs
If AWS keys change, this file will need to be changed manually.

In file /etc/fuse.conf, uncomment the user_allow_other option to allow outside users to upload files to the mounted bucket. Sudo may be required to gain write access.

Mounting a bucket
Create a directory where the bucket will be placed, and change permissions to 777. The bucket should be placed somewhere in the Joomla directory - for current setup, upload bucket is:
/var/www/html/joomla/ul_scans

Download bucket is:
/var/www/html/joomla/malpem_outputs

To mount the bucket, run the command:
s3fs <bucket name> -o allow_other <directory>

Unmounting a bucket
sudo fusermount -u <directory>

3. DOC Cloud Server Setup

1. Follow the instructions at https://www.doc.ic.ac.uk/csg/services/cloud to access and set up an account on DOC Private Cloud.
2. Set up a virtual machine with the maximum amount of RAM possible (at the time of setup, this was 8GB)
3. Install MALPEM according to the instructions here: https://www.doc.ic.ac.uk/~cl6311/Material/MALPEM/README.html
4. Create a folder imperialinput and change its permissions to 777 (command: “chmod 777 imperialinput”)
5. Create a folder imperialoutput and change its permissions to 777 (command: “chmod 777 imperialoutput”)
6. Mount the S3 input folder, also called imperialinput, with this command: s3fs imperialinput -o allow_other imperialinput
7. Mount the S3 output folder, also called imperialoutput, with this command: s3fs imperialoutput -o allow_other imperialoutput
8. Run the python script imperialinput_checkfiles.py which will check for new files and process them using MALPEM.

4. Website Server Setup

1. Set up an AWS account and register for an Ubuntu 14.04 T2 Micro (free tier) instance of a server.
2. Follow the instructions at https://docs.joomla.org/J3.x:Installing_Joomla to set up the Joomla system
3. Set up the 2 required databases according to the section above on Database Details
4. Set up the Joomla modules according to the section above on Installing Modules
5. Run the python script check_outputs.py which will check for reports and send the user an email notification