



Workshop 01:

The New Digital Age of Clinical Decision Support Tools: Open-Source and Interoperable Approaches for Health Systems

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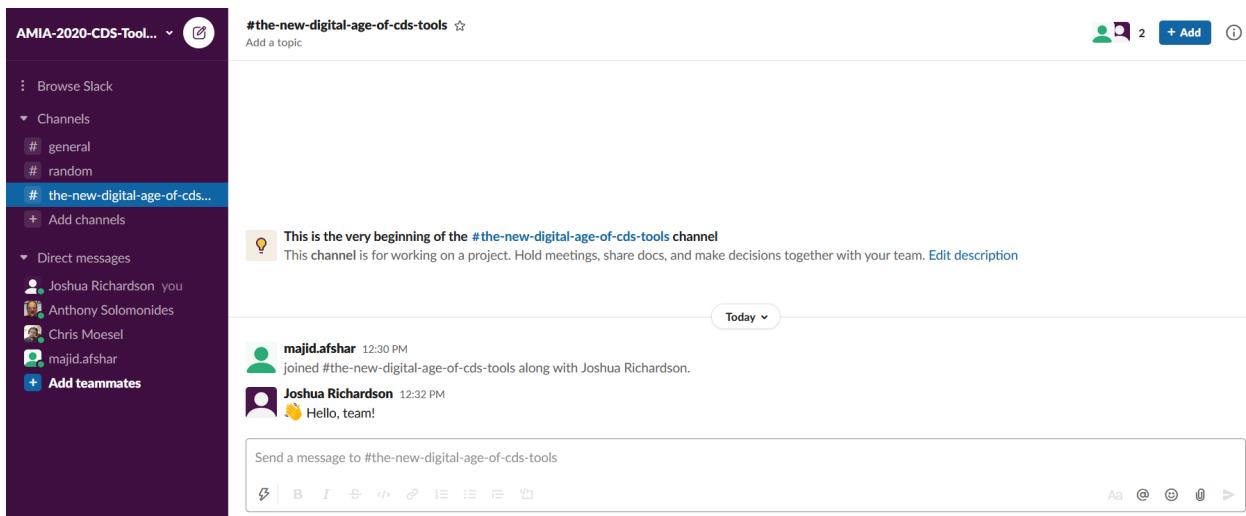
Part II - Interactive Content Delivery: CDS Hands-On Simulation Prerequisites

Prerequisite Duration:

- ~3-5 business days to obtain the UMLS account
- ~1-2 hours to download and install Oracle VirtualBox and the CDS VM

Support and Help

The presenters have created a Slack channel to engage participants and provide help on setting up their VMs and tools. The Slack channel name is: **#the-new-digital-age-of-cds-tools**



If you do not have a Slack account, you can create one by clicking on this invite link:

https://join.slack.com/t/wisc-kgx3376/shared_invite/zt-iuxeu4g-FKF7sBjDaDcT1Qs0hgfSJQ

If you already have a Slack account, then join the Channel by clicking this link:

<https://amia2020cdsto-wg54713.slack.com/home>



This Slack channel will be maintained for the duration of the AMIA 2020 Symposium.

CDS SANDBOX VM SETUP (PREREQUISITE)

Install Oracle VirtualBox



Skip this step if you already have Oracle VirtualBox installed on your computer.
Go to step **Setup VM** (page 3)

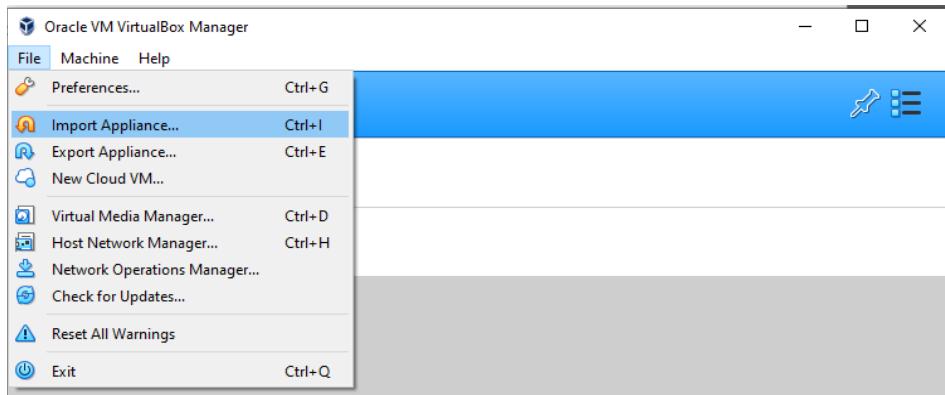
1. Go to Virtual Box Download webpage (<https://www.virtualbox.org/wiki/Downloads>) and click on the platform that matches your system



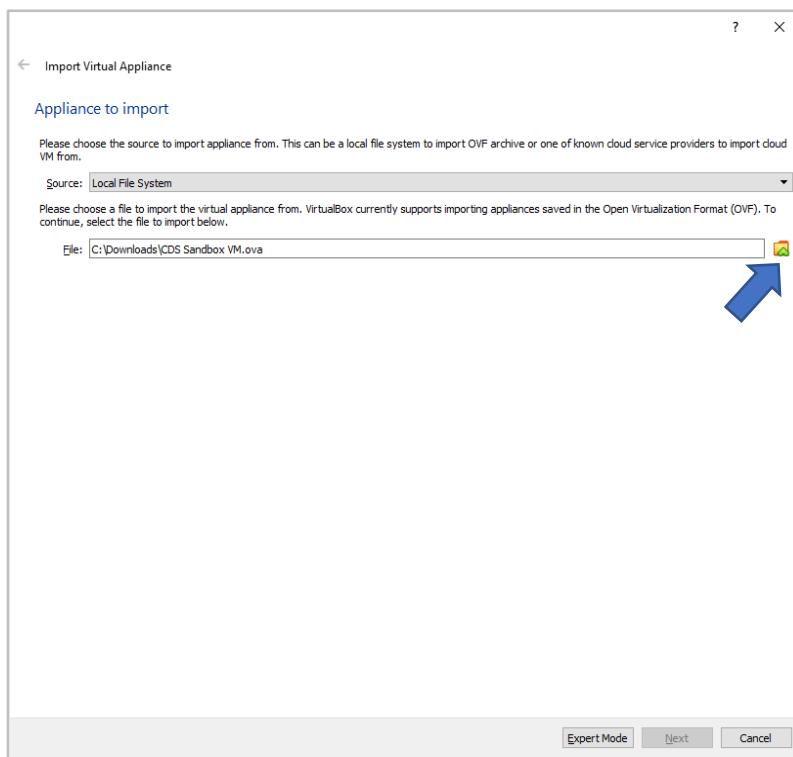
2. Download the installation file to your computer.
3. Install the application using the typical process for your platform. For example, double click the installation file and follow the instructions.

Setup VM

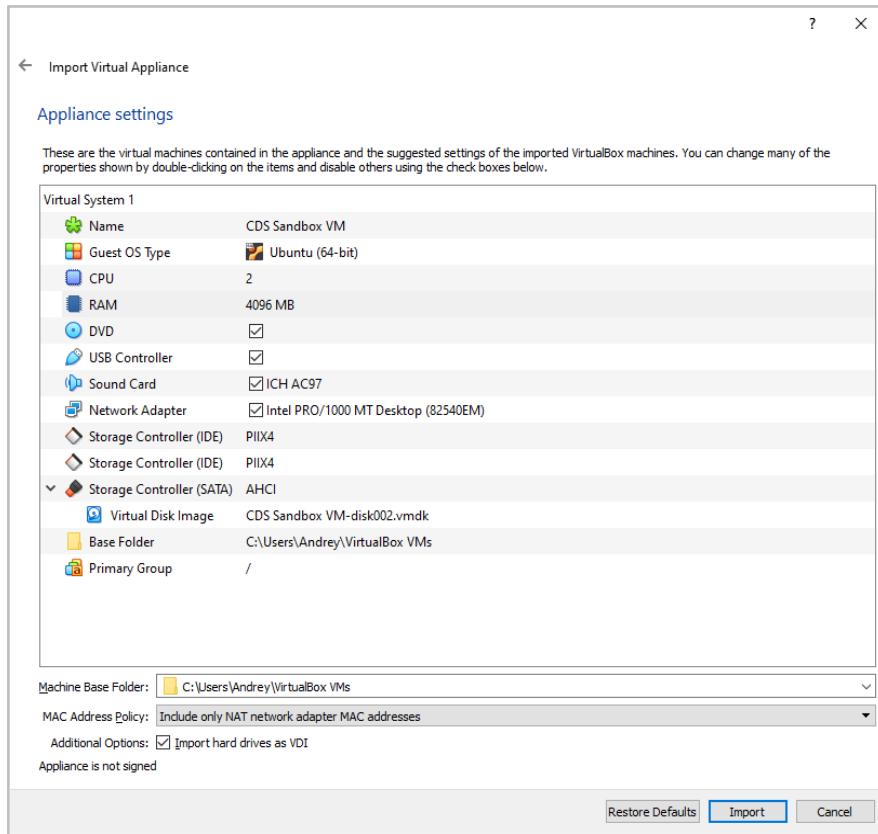
1. Download the CDS Sandbox VM using the link listed on the workshop GitHub page:
<https://github.com/CUD2V/amia2020-cds-workshop>
2. Open the Oracle Virtual Box installed on your computer.
3. Select the menu **File** and sub menu **Import Appliance**



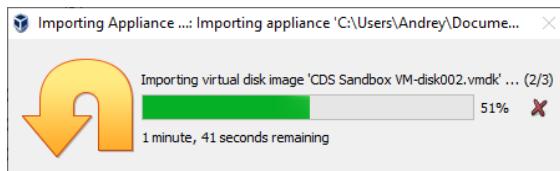
4. In the Appliance to Import screen, select the VM File. Click on the button to choose a virtual appliance to import. Then click the button **Next**.



5. In the Appliance Settings, you may choose to adjust the CPU and Memory used (if your computer has more resources available). Otherwise, click the button **Import**.
The VM is configured with 2 CPUs and 4GB RAM. To change the configuration, double click on the CPU or RAM and type the new value. For example, change the RAM to 8192 MB (8GB), if you have enough RAM on your computer.



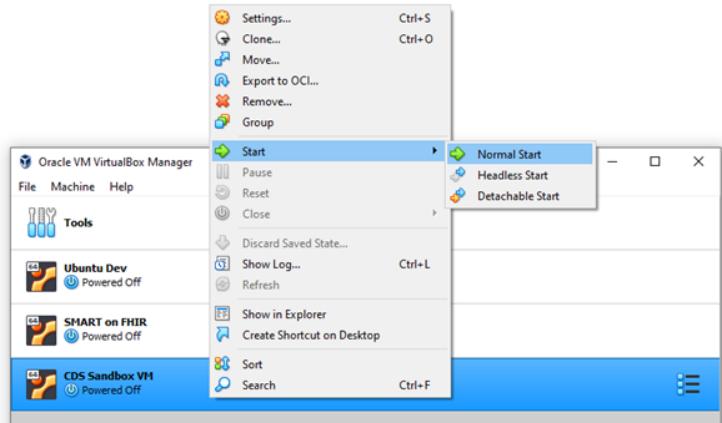
6. The import process will start and might take several minutes



The VM file has 11.7GB and after installation it will use ~34GB of space on your computer.

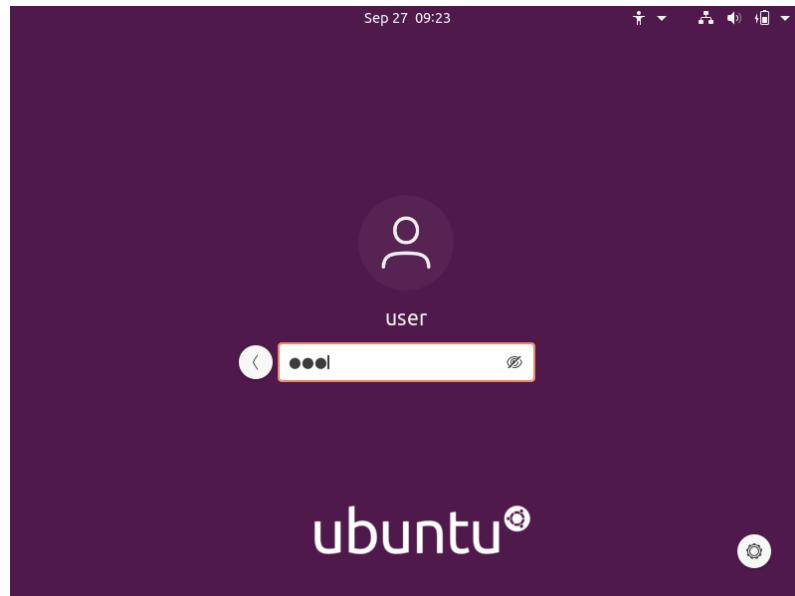
START THE VM AND CHECK SERVICES (PREREQUISITE)

1. Select the CDS Sandbox VM on the Oracle VM VirtualBox Manager screen
2. Right-click and select the menu **Start** and sub menu **Normal Start**.

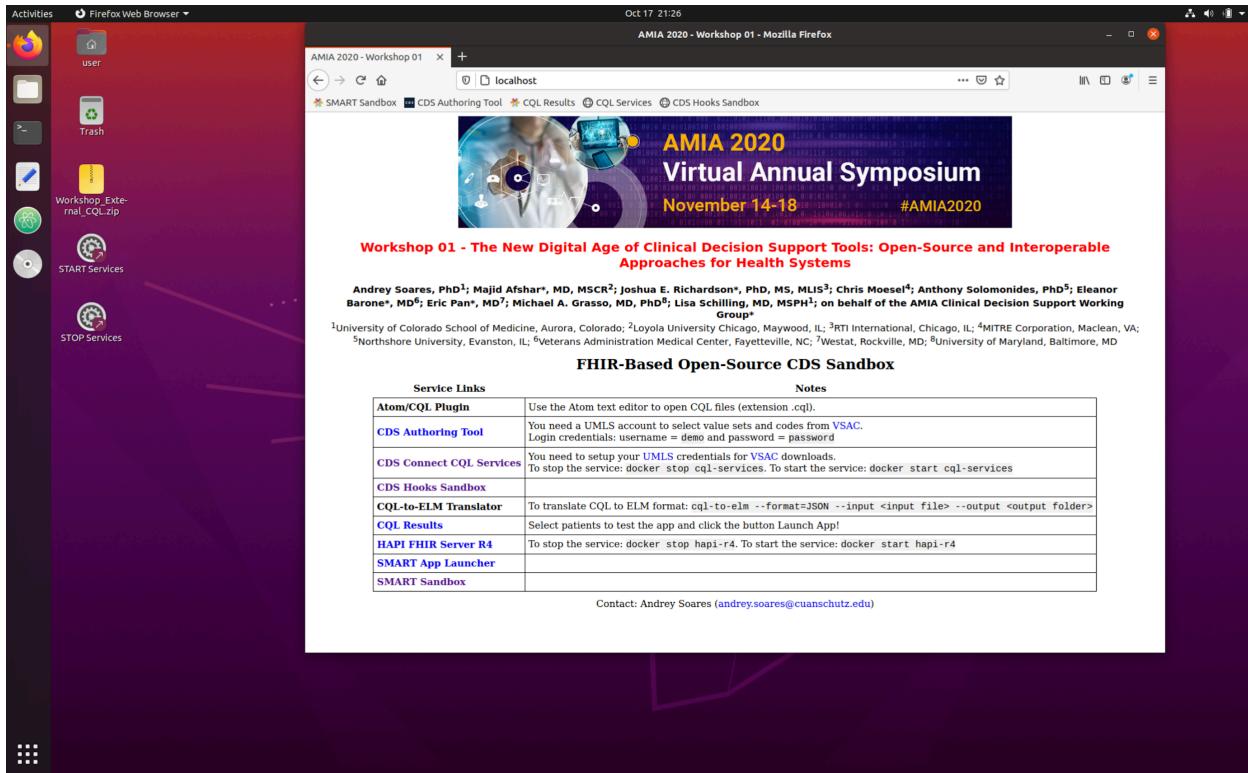


3. After loading the VM, log in with

- username = **user**
- password = **cds**



4. After completing the login, the system will start the services and will automatically open the internet browser.



If the screen resolution is too small, follow the instructions in the Troubleshooting section of this tutorial to change the resolution.

The VM was created using VirtualBox version 6.1.14. If you have a different version installed on your computer, you will need to install the appropriate version of the VirtualBox Guest Additions (VBox_GAs).

To turn off the VM, click on the upside-down triangle (last icon on top right of the screen) and select the sub menu **Power Off/Log Out**

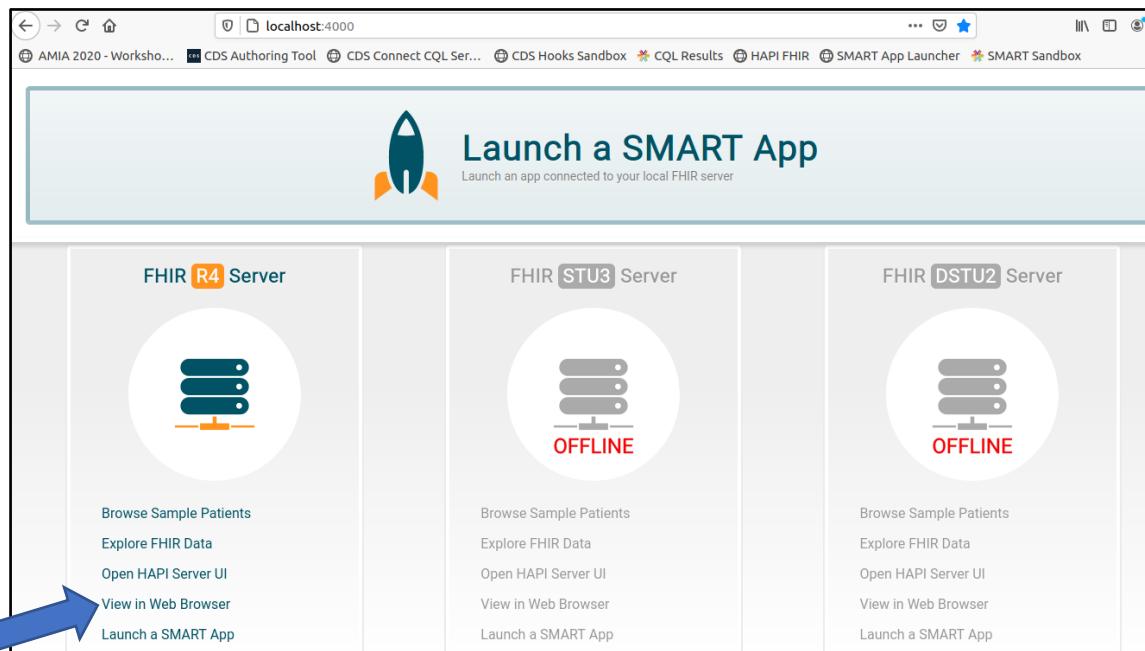
5. Use the links on the VM Home Page or the **Bookmark** links below the URL bar to navigate to and check the services available.



Other services are dependent on the FHIR server. Please make sure that the FHIR Server is working properly using the steps 6 and 7 below before moving on to check/use other services.

If a service is not loading, you can try STOP and START the services by clicking the respective buttons on the desktop.

6. To check if the FHIR Server is working, click the **SMART Sandbox** bookmark link below the URL bar on the browser and in the FHIR R4 Server box, select the option **View in Web Browser**. Note that only FHIR R4 Server (left box) is enabled.



7. It will show a page with metadata about the server and the message **HTTP 200 OK**. It might take up to 1 minute to load the FHIR Server so be patient. The window will be blank during loading.

Note: If the FHIR server returns a 404 error (Not Found), the database might have a problem. Visit the Troubleshooting section at the end of this document to learn how to fix this problem.

```

HTTP 200 OK
Response Headers
X-Powered-By: HAPI FHIR 5.0.2 REST Server (FHIR Server; FHIR 4.0.1/R4)
X-Request-ID: yyNc6hChsrFw70

Response Body
1  {
2    "resourceType": "CapabilityStatement",
3    "status": "active",
4    "date": "2020-09-27T15:55:34+00:00",
5    "publisher": "Not provided",
6    "kind": "instance",
7    "software": {
8      "name": "HAPI FHIR Server",
9      "version": "5.0.2"
10    },
11   "implementation": {
12     "description": "HAPI FHIR R4 Server",
13     "url": "http://localhost:4004/hapi-fhir-jpaserver/fhir/"
14   },
15   "fhirVersion": "4.0.1",
16   "format": [ "application/fhir+xml", "application/fhir+json" ],
17   "rest": [ {
18     "mode": "server",
19     "resource": [ {
20       "type": "Account",
21       "profile": "http://hl7.org/fhir/StructureDefinition/Account",
22       "interaction": [ {
23         "code": "read"
24       },
25         "code": "vread"
26       ],
27       "code": "update"
28     },
29     {
30       "code": "patch"
31     },
32     {
33       "code": "delete"
34     },
35     {
36       "code": "history-instance"
37     },
38     {
39       "code": "history-type"
40     },
41     {
42       "code": "create"
43     },
44     {
45       "code": "search-type"
46     }
47   ]
48 }

```

SETUP THE UMLS ACCOUNT (PREREQUISITE)

A UMLS account is required to successfully complete this tutorial. You will use the UMLS credentials for accessing the NLM's Value Set Authority Center (VSAC) downloads. The UMLS credentials configured in this section will be used by the CQL Results app to retrieve value sets from VSAC and the CQL Services to check value sets defined in the artifact. The UMLS credentials will also be used by the CDS Authoring Tool but the user will be prompted to enter the UMLS username and password.

1. We have setup the UMLS credentials (UMLS_USER_NAME and UMLS_PASSWORD) as environment variables but you will need to replace them with your own UMLS credentials
2. Click the Terminal icon () on the left bar.

```
gedit ~/.bashrc
```

3. Scroll down to the end of the file (near lines 124 and 125) and replace "your-username" and "your-password" with your UMLS credentials.

```
export UMLS_USER_NAME=your-username  
export UMLS_PASSWORD=your-password
```

For example:

```
alias cql-to-elm="~/clinical_quality_language-1.3.19/Src/java/cql-to-elm/-  
build/install/cql-to-elm/bin/cql-to-elm"  
  
alias updateValueset="node ~/cql-results/src/utils/updateValueSetDB.js"  
  
export UMLS_USER_NAME=your-username  
export UMLS_PASSWORD=your-password
```

4. Press the button **Save** at the top of the session window and close the gedit windows (click the button  on the top right)
5. In the terminal enter the following command to make the UMLS credentials available in the user's shell session. **Note that the command starts with a dot, and there is a space between the first dot (.) and the tilde (~).**

```
. ~/.bashrc
```

6. After executing the .bashrc command, type the following command into the terminal to check that your UMLS credentials were correctly entered:

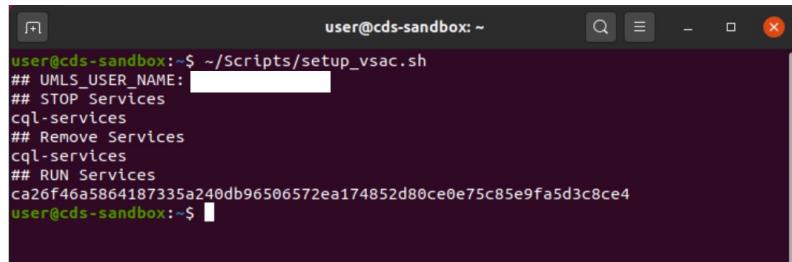
```
printenv | grep UMLS
```

You should see your UMLS username and password. If there was an error in entering either value, go back to Step 2.

7. Now, we need to pass the new credentials to the CQL Services. In the terminal enter the following command. It will stop and recreate the containers with the new UMLS credentials.

```
~/Scripts/setup_vsac.sh
```

8. If successful you should see a screen like the following.



```
user@cds-sandbox:~$ ~/Scripts/setup_vsac.sh
## UMLS_USER_NAME: [REDACTED]
## STOP Services
cql-services
## Remove Services
cql-services
## RUN Services
ca26f46a5864187335a240db96506572ea174852d80ce0e75c85e9fa5d3c8ce4
user@cds-sandbox:~$
```

9. Close the Terminal window (click the button  on the top right). Success! You have now set up your UMLS account.



This ends the prerequisite setup steps for the tutorial.