

OHIF Office Hours Notes 2022-12-22

Q & A

Q: I was wondering if it's possible to add libraries that we want to use in our extension folder because for now it's not working and it tries to import only from the OHIF dependencies. The solution I found was to add manually this line into the webpack.base and now it sees the libraries I added.

A: The solution is to release a version of your extension with the correct dependencies, and then add the released version to your OHIF version. That will get the right dependencies, then you yarn link the local source code. It does require having all the libraries locally.

Q: An issue where we get black slices in acquisition plane for volume viewport `getSliceRange` relies on `getVolumeActorCorners`, but `getVolumeActorCorners` doesn't return the actual 3d corners, it returns a set of values which are min/max x,y,z coordinates, and not the actual bounds.

A: `getSliceBounds` can get the actual image corners using `imageData.imageToWorld` by using the width/height/depth Using slicer - coordinates are RAS not LPS, so negate first two coordinates to switch between systems

Mobile use case - if I scale down (downsample) 4x, on each slice that the user sees we replace to full resolution

Is it possible to use WebGL mipmap level textures to decrease the GPU memory? So the CPU memory will keep the original resolution (2048 x 2048). However, when the texture is loaded into the GPU is it possible to set the mipmap level setting so the effective memory use is (1024 x 1024)?

OHIF Office Hours Notes 2023-10-12

Q & A

Attendees: 15

Q: I'm currently utilizing the length tool, but when attempting to create a line on Ultrasound, it consistently provides measurements in 'px' rather than 'mm'. What might be the underlying issue here?

A: Look at `StackViewport.getImageDataGPU` and check if `hasPixelSpacing` is set. At OHIF, there is custom logic for Ultrasound in `platform/core/src/utis/`

`metadataProvider/getPixelSpacingInformation.js`. However, support for Ultrasound regions is currently limited.

Q: I'm getting the following error (image attached). Is creating multiple RenderingEngine a good approach or not? Is there any way out from this error?

A: Most likely some of the metadata for volumes are missing. You can look in `packages/streaming-image-volume-loader/src/helpers/makeVolumeMetadata.ts` for more details.

Q: Want to know more about Position aware cache? Say my cache size is 100 MB and & have a single series containing 500 images, each with a size of 1 MB.

A: You got it almost to the point. The cache will dynamically update based on where you're scrolling, loading nearby images into the cache as needed.

Q: I am facing the RAM issue while rendering unit8 data as well.

A: Seems like a lot of RAM is used for webworkers, and when we terminate them, the RAM usage drops significantly.

Q: We're working on creating a multi-volume viewer using Cornerstone3D. How should we approach this?

A: Have a look at the cornerstone3D examples, particularly the PET/CT live examples. OHIF is an example of a React app using cornerstone3D.

OHIF Office Hours Notes 2023-10-26

Q & A

Attendees: 15

Q & A

Q: Why is browser memory usage proportional to volume size in Cornerstone3D?

Why is it proportional to volume size? A: Because the volume is held in the cache and holds every pixel, so size is 649 slices * 512 width * 512 height * 4 bytes per pixel (for float32) GPU memory and CPU memory are both taken up with the data Images are written to Volume Cache, not Image Cache, which is contiguous data.

Q: Why does Stack Image Sync behave differently across priors and series within the same study?

A: stack image sync will sync by position (uses relative distance after user has lined up series of different studies) or by frame of reference UID (uses absolute position)

Q: Issue with the new stable version 3.7.0 of OHIF; segmentations aren't placed correctly.

A: Please provide anonymized data and create a new OHIF issue to report this.

Q: What strategy to use when the Rendering Engine fails or throws an error?

A: Probably an app bug. Submit a mini-app to demonstrate the issue or replicate it using standard CS3D examples. Consider using just 1 rendering engine and setting it up in a `setTimeout` to see if it's a race condition on loading.

Q: Is summing up the `loadTimeinMS` of all image objects a good way to estimate total image loading time in a series?

A: No, because the sum might exceed the actual elapsed time due to parallel processing. Consider using `stackprefetch.ts` to log times.

Q: Difference in size/zoom when switching between stack and volume in OHIF.

A: Stacks and volumes use different pan/zoom representations. They should default to the same values, but if not, please file a bug report.

OHIF Office Hours Notes 2022-10-6

Hanging Protocol Support for Priors

Salim asked about the ability of Hanging protocols to match prior studies.

So, currently there is no prior matching since we use active display sets for the hanging protocol, and we don't have a way to match prior studies. In the meantime, one can write a custom init for the mode, to perform matching on the prior studies displaysets as well. Follow-up by Celian and Salim on Slack

Loading of SR created in OHIF v1, v2

Bill asked about the loading of SR created in OHIF v1, v2, does it load in OHIF v3?

They are supposed to get displayed and be able to hydrate the SR. If not, there has been a bug introduced a couple of months ago.

Volume Viewport Annotations

Bill asked, should viewport show an annotation that has been drawn on a non-axis slice? or some part of it?

We tried 3D Slicer, it shows the length tool (at least the start and beginning), but not the middle part. 3D Slicer annotations are based on VTK widgets so they are in 3D space, as opposed to Cornerstone3D which are not (although one can draw an annotation in any plane, I mean, for rendering). I'm not sure if it makes sense to calculate the projection of each annotation on each slice. I think VTK widgets are GPU accelerated, so it is not a problem for them. I think it is a good idea to have a discussion about this.

Building Image Viewer, OHIF or Cornerstone

Luke, asked about building an image viewer. Should he use OHIF or Cornerstone?

OHIF provides a lot of out of the box functionality, and is a good starting point for such things as loading, measurements, panels, etc. Cornerstone is a library that provides the rendering and interaction, and is a good starting point, but nothing more. You need to create your own UI, and implement all the functionality yourself. OHIF is a good starting point.

Static Files Hosting Docs

You can use Static WADO to serve your files, and you can use the OHIF Viewer to view them.

<https://github.com/RadicalImaging/static-DICOMWeb>

<https://v3-docs.ohif.org/configuration/dataSources/static-files>

OHIF Office Hours Notes 2023-03-30

Q & A

Mitigation of the security concerns for the dynamic config

A: The regex might be useful to add another layer of protection. The concerns right now are such that if STOW, QIDO and WADO are different, then the attacker can just download or post into a malicious backend. The regex can say it should only allow local configurations (no http).

So a default regex of something like: `[a-zA-Z.0-9]+(/[a-zA-Z.0-9])` Could allow for your case (above regex) | ([https://mysafehost.hospital.com/config/\[a-zA-Z0-9.\]*](https://mysafehost.hospital.com/config/[a-zA-Z0-9.]*))

We need regex to avoid easy exploit Set same-origin to avoid potential harder exploit Use a descriptive name (longer the better, similar to `dangerouslySetInnerHTML`)

Orthanc server slow with OHIF

A: You can ping the database to see what is the response time

Create an issue with anonymized data if you can here <https://github.com/cornerstonejs/cornerstone3D-beta>

Consider using static-dicomweb as a cache layer. It has been a while since I configured that. Check what the internal format is, and see if you can request the original type?

If the data is stored on disk already gzipped and octet-stream, then it should be fast, but if your data is not gzipped then the server should gzip it, this should be configured in the server side on client side though. You can also use other content-types like jpeg. Some servers have known issues for compression and decompression for the US for LEI.

Also you can consider adding a http3 cache proxy or configure nginx to support http2/3.

<https://varnish-cache.org/> might be another way to speed things up.

Matching relative to displaySets

A: There is a custom attribute called `sameAs` which uses the configuration of the block, and it matches the given attribute.

Multiframe volume support for NM open PRs

<https://github.com/OHIF/Viewers/pull/3164>

StateSyncService may be causing this error?

Here [https://v3-demo.ohif.org/viewer?](https://v3-demo.ohif.org/viewer?StudyInstanceUIDs=1.3.6.1.4.1.25403.345050719074.3824.20170125095722.1)

StudyInstanceUIDs=1.3.6.1.4.1.25403.345050719074.3824.20170125095722.1

Click on second series (which is MPRable) Click on third series Go MPR Can't render

- Sean discussing the draft PR for the SR
 - adding CONTAINS as a new relationship type for 1410 SR
 - Not supports 3D SR but 2D part of the 1410
 - Chris on image loading
 - turn string into object for imageId
 - putting information inside string and parsing out seems inconvenient compared to object stringify: e.g., imageReferenceObject ??

```
jsx { loaderId: ... loaderOptions: ... data: ...  
  cacheKey: ... }
```
 - As soon as there is an object we can use a property of the object (cacheKey)
 - There is a good case for Cornerstone3D to do so (volume to image cache)
 - Other benefits might be performance gains
 - server that is storing data and cors issues and batch requests
 - By minimizing cors request for images by requesting them all → one cors request
 - extending CS to retrieve batch of images instead of single image, bundle up into one request
 - Selim wants to discuss on RAM usage of the library
 - Only using Cornerstone3D
 - load a volume consisting on +300 slices
 - Profiling based on two baselines with oneVolume example and the code for oneVolume and the local data
 - Let's double check if the fetched array buffer is not being garbage collected
 - Ritesh doing POC on OHIF
 - Mobile use case (iphone etc)
 - Issue on MIP MPR giving out of memory on mobile (web works fine)
 - OHIF-v2 engine is getting deprecated for the volume rendering and OHIF-v3 is the future of OHIF
-

OHIF Office Hours Notes 2022-09-22

Attendees:

Erik, Bill, Doug, Salim, Kunjesh, Shiva Wen, Alireza

Disable/re-enable

Chris brought up that if you disable and then enable OHIF elements, they don't work as expected afterwards - not clear how/what they are supposed to do.

Funding for 4D datasets

Not a huge amount, but very targeted for pre-clinical workflows. 4d pet, tracer uptake over time
Some experimental stuff to write to disk to manage memory Maybe use a service worker for caching?

Firefox - offscreen canvas

- not being used right now
- copy from one canvas to another very slow in Firefox
- could switch to offscreen canvas API

CINE Clip playback in OHIF

Doug demonstrated auto-play in OHIF v2 Bill demonstrated auto-play in OHIF v3, confirmed that multiframe works with cine now <https://github.com/OHIF/Viewers/pull/2883> for v2 (Doug)

Moving v3-stable to master

Waiting for segmentation

Reference lines

v2: <https://github.com/mieweb/OHIF-Viewers/pull/9> shows reference lines, with a video

Wen is starting reference lines in CS3D, showed a demo of display Need a listener/synchronizer that listens for viewport, and then update the line on the other images

Server side rendering

Initial display is somewhat slow Chris - replied: * Cornerstone is designed for client side rendering * Server side is useful for very large server side rendering * Client rendering gives better interaction capabilities

Annotations in Volume

Mostly annotations work in volumes Crosshairs are only enabled on volume because the crosshair deals with rotation/thickness for MIP etc, which doesn't exist on stack.

Segmentation

In v3, segmentation works like an SR Still private WIP, to be delivered to a client first before releasing to OSS, should be about 1-2 weeks before release. Agreed verbally to OSS it, but need formal document

Is there any interest in recording?

Yes, there is some interest. They are public, so should be ok to publish. Will talk internally about that.

OHIF Office Hours Notes 2023-05-25

Q & A

PubSub in OHIF

OHIF's services are built on top of PubSub. You can take a look at the following example to see how it works: <https://v3-docs.ohif.org/platform/services/pubsub/>

But generally you can subscribe to any event that the service emits and run your callbacks.

Drag and drop for prior studies

Looks like the issue is that the hanging protocol is matching the incorrect displaySet. These functions should be debugged. `onDropHandler` (in `viewportGrid`), and `setVolumes` inside the `cornerstone3D`

OHIF Office Hours Notes 2023-05-11

Q & A

How to add a custom tool icon in the toolbar

- In ToolbarButton.js, how to have more configurable toolbarIcon
 - Add your own tool with a custom type.
 - Best to have your own extension
 - In getToolbarModule add the custom type mapping to a component
 - OHIF UI components can be included in the custom component (e.g. InputRange is a slider type component)
 - You can do any initialization from the onModeEnter hook for the extension
-

Automatic segmentation algorithms

This is a very complex topic. You can take a look at the following links for more information: <https://www.youtube.com/watch?v=xmvVyftgNjY> <https://segment-anything.com/demo#> How can I implement this? Any guiding direction <https://www.cornerstonejs.org/live-examples/labelmapsegmentationtools> <https://ai.facebook.com/blog/segment-anything-foundation-model-image-segmentation/>

Segmentation vs Measurement

It totally depends on the end user really.

Similar to SAM demo when hovering over image, it shows which masks will it create maybe you can initially show the results with free hand tool and then once the user is happy convert that to a Segmentation

How to use DICOM SR via DICOM JSON datasource

I guess if all the metadata that you get from a dicomWeb server you put in the JSON file it should work. I have not tried it though.

OHIF Office Hours Notes 2023-11-02

Q & A

Attendees: 13

Q & A

Q: Is it possible to download dataset from the OHIF demo? We are testing OHIF v3.7, and trying to isolate and troubleshoot issues.

A: Not unfortunately, but let us know which one you are interested in and we can try to help you with that.

Q: I want to be able to load studies locally in the viewer while still referencing all the metadata from our backend.

A: Since the metadata is already contained in the DICOM files that are being loaded from local, you don't need to query the metadata from the DICOMweb service. Your metadata that you mentioned is other types of metadata, which you can load separately from the local metadata, and add it to the view.

Q: Is StackContextPrefetch always cache images from a specific window? If my window is more than cache size then will it stop caching?

A: There are two phases, phase 1 nearby images, then phase 2 up to memory limit. Phase 1 does not check whether there is sufficient memory to download. This is not well documented, and probably needs to be looked at to describe it, and maybe a couple of fixes to ensure that phase 1 doesn't overrun the memory limits.

Q: Are there any updates regarding the Segmentations are misplaced in v3.7.0, it worked fine in v3.6.0 issue?

A: We will try to look this week. Trying in Slicer, doesn't seem to want to display it. Please update the issue with what is normal and reverse order. Orientation code was added in 3.7, and that code is required.

Q: Currently in Niger, we are experiencing a somewhat exceptional situation. Is it possible for us to use an OHIF Viewer directly inside our existing NextJS 13 APP router?

A: Yes, it is possible to embed OHIF as an iframe, and then the iframe is in your front-end app. The Next.js app router can address the authentication, and then the iframe doesn't need to deal with authentication. [OHIF Iframe Documentation](#).

Q: Can we render segmentations in the renderAnnotations method overriding AnnotationTool?

A: This is being worked on in the next couple of months, including a spline tool with interpolation and polygon tools. Will try to get a roadmap for CS3D. Use the pointInShape function to figure out which pixels are within the freeform. Mark all of those sections as being in

the segmentation. You will likely need to implement that function for the freeform. [Geometry Article](#).

Q: When I want to change slice (Slab) thickness, for example from 1mm to 6mm, what is the best way to sync mouse scroll in OHIF?

A: Should be done automatically. Check if you are on an old version. OHIF seems to do something slightly different - goes slice by slice instead of going by slab. Crosshairs seems to be doing it right. Look at how that is done to see what is relevant. Jason prefers slice by slice for MIP mode with different thicknesses. Would like it configurable. Jumps by half a slab right now.

Q: Need some pointer or help on cornerstone issue on Apple M2.

A: Try Chromium Canary - latest release, about 2 months ahead. Try on other client systems (e.g., Windows or Linux). Report to Chromium forum. Seems to go away on garbage collection. Heap snapshot is around 400 MB, which is roughly the size expected. This is really an issue in the browser. Alireza will try because he is also on M2.

Q: Slow time to first image when loading study. My datasource is OHIF.

A: There are two related searches for studies. One is for study data for the current study, the other is for priors.

OHIF Office Hours Notes 2023-07-20

Q & A

ReferenceLinesTool is not working on certain series. One series has instances in 3 different orientations. Including images in different orientations cause this issue? I can share my screen during the meeting.

It might be possible it is an edge case that is not handled. We can take a look at it.

OHIF Office Hours Notes 2023-09-07

Q & A

Q: I am loading mri datasets using the streaming volume image loader and then rendering the 2D images in the correct orientation. The problem is that when scrolling up and down, the closer I get to the first/last slices, it looks like data is missing and the slices are being cut off.

A: Removing the orientation will fallback to calculating the camera based on the acquisition. Grab the ImageOrientationPatient, take the cross product of those, and set the camera direction to that cross product. Look at volumeapi example, the view plane normal is the cross-product and view up is the negative of one of the orientation metadata. You can also set `renderingEngine.setViewports([...])`.

Q: I'm migrating the OHIFv2 plugin for MONAI Label to the latest OHIF. However, after building the OHIF, I'm having an issue with the Cross-Origin-Resource-Policy.

A: Whatever is serving OHIF it should set the cross origin policies of COOP and COEP. See [OHIF documentation on CORS](#).

Q: Using Cornerstone3D, Is it possible to load not all volume images at once, but to load them progressively?

A: There is a PR in OHIF that kind of does what you are saying [PR Link](#) but it is in OHIF.

Q: Also, is it possible to load not the image as a whole, but to load it in tiles based on the zoom level?

A: Not yet; we would like to have it in CS3D. OHIF right now uses [dicom-microscopy-viewer](#) for tile rendering which only is possible in Whole Slide Imaging SOP class.

Q: I'm trying to link my local instance of the OHIF viewer to AWS HealthImaging per docs.

A: [Issue Link](#).

Q: What's the best practice to store segmentation data on the database?

A: RLE encode might be one way to go, also DICOM compressed deflate transfer syntax might be a way to go. DICOM working group 4 is working on new transfer syntaxes for 1 bit images. For reading nrrd js, look at [monai label pr](#).

Q: Just to make the community aware, Orthanc solved the /metadata performance in DicomWeb API using caching of the response. <https://discourse.orthanc-server.org/t/dicom-web-studies-uid-metadata-and-series-uid-metadata/3610>)

A: The problem was about the storage backend, and it was going to each dicom instance one by one. To solve that, Orthanc pre-built the response and stored them as a single json file, so when you call /metadata data is available. Bill: additional optimization is when you store metadata it is already gzipped.

OHIF Office Hours Notes 2023-05-04

Q & A

A tool to overlay a mask on the image with opacity

Try the Labelmap tools. <https://www.cornerstonejs.org/live-examples/labelmapsegmentationtools>

You could fuse two DICOM files/images. Create DICOM file from png and copy/import metadata from source

Or use a custom tool. Grab the cornerstone viewport and overlay a canvas on the viewport and render the image.

External dependencies gives error for external extensions

Want to import some OHIF-based files(e.g, extension-default or extension-cornerstone) directly into custom built extension(my extension)

```
import getActiveViewportEnabledElement from '@ohif/extension-cornerstone/src/utis/getActiveViewportEnabledElement';
```

This line causes an error

<https://github.com/OHIF/Viewers/pull/3364>

OHIF Healthcare adapter needs documentation

<https://github.com/RadicalImaging/ohif-healthlake>

Custom Data source creation

There is an interface to satisfy for the data source implementation. For initialize, the (route) params and query params are passed in to set up the data source. Then implement the `retrieve.series`. Ultimately data needs to be added to the `DicomMetadataStore`.

Prior matching for studies in Hanging Protocols

In `HPService` why studies shown isn't updated on expanding in "all studies" list. The `run` method on the `HPService` is run on the initial load, and that decides the initial set of studies to show. This is only provided the studies listed in the URL initially, so for the initial `decide` method, that is all that is considered for the initial view. On expanding the list, I think that should add the expanded study to the list of available studies. It might also set the "active" study UID - and if not, then it could be made to do so, but we will have to discuss what that means/implies. Assuming it sets the active study, then applying a hanging protocol after that would apply the hanging protocol to the selected study. Alternatively, it would be possible to add a command to re-run the hanging protocol "run" method on the new study selection, which would then apply the combined selection.

As part of the hanging protocols, there are a few concepts to consider: Active study - this is a single study that the hanging protocol considers the one to apply a default HP to. Primary studies - these are studies that the user is actively reporting on. Prior studies - these are studies that the user is using to support the interpretation of the primary. These are the ones listed in the middle tab. Other patient studies - these are just other studies that aren't being actively used as comparisons for the primary - think of them as potential priors. Note that active and primary are related but there is one active, and it can be a prior study, while there can be multiple primaries. There needs to be a way in a hanging protocol to specifically select a primary or a prior, separately from other types.

This is unfortunately a very complex area, and figuring out when and how to apply hanging protocols isn't easy.

OHIF Office Hours Notes 2023-01-05

Q & A

Q: Conflicts after cs-legacy -> cs3d. What is the deal with `pluginImoprt.js`? Is it automatically created?

A: We changed to typescript so anything `jsx` should have changed to `tsx`. Also `pluginImport.js` should not be touched. You should run `yarn run dev` for the `pluginImport.js`.

`pluginConfig` can be auto generated using the `ohif-cli` but if you have already created the extension and modes you should update it manually. OHIF Command Line Interface

Q: Tried to install new OHIF fresh (not merging), yarn install builds fresh packages failed.

A: This is a node version problem, one solution is to use version manager like <https://github.com/nvm-sh/nvm>

Q: Directory in server error regarding cross origin isolation

A: You should set headers. For nginx it would be similar to our config here [.docker/Viewer-v3.x/default.conf.template](#) -----

Q: Experimenting with Segmentation, text box label for each segment. How to do that.

A: You can create a tool that has toolData as an array of {center, text} and then in the render loop you can orchestrate which direction they appear so that they don't collide with each other. Also segment center should be calculated manually.

Q: Instead of SharedArrayBuffer use ArrayBuffer for the volume loader

A: A branch would help debugging

Q: The viewport layout is preserved when HP changes, as opposed to creating a new one. If there are two different stages

A: This is interesting and apparently radiologists prefer it as well. Let's meet and discuss it.

OHIF Office Hours Notes 2022-10-13

Issues with upgrade to OHIF v3 with some radiology studies Is there any regression on rendering between OHIF v2 and v3?

A: There shouldn't be much regression in rendering between OHIF v2 and v3 <https://www.cornerstonejs.org/live-examples/local.html>

Trying to package OHIF v3 with Electron and React Native and enable local desktop based app Can i use local storage for caching?

A: Old branch of OHIF v2 with Electron <https://github.com/OHIF/Viewers/commits/feat/electron> with couchDB dicom server <https://github.com/dcmjs-org/dicomweb-server> Limitations are study list search not working

Static DICOM Web is also another option for the server <https://github.com/RadicalImaging/Static-DICOMWeb/tree/master/packages/static-wado-webserver>

OHIF v3 e2e tests are using the static DICOM Web It fetches the data from our data repo yarn test:data Follow here <https://v3-docs.ohif.org/development/testing/#end-to-end-test>

vtk.js api on implementation of the look up table

A: the sortAndUpdate is the bottleneck in updating (<https://github.com/Kitware/vtk-js/blob/master/Sources/Rendering/Core/ColorTransferFunction/index.js>)

Interest in moving over touch event listener for Cornerstone3D What the structure would look like

A: Touch event listener should be ported here <https://github.com/cornerstonejs/cornerstoneTools/blob/master/src/eventListeners/mouseEventListeners.js>

It uses Hammer.js to augment the touch events. We should do a research what can we use instead of Hammer.js since it seems to be not maintained anymore

OHIF Office Hours Notes 2022-10-27

How to optimize the viewer for mobile? OHIF WebView goes out of memory if go back and force between

A: it was a known issue before, but is fixed now (hopefully) by <https://github.com/cornerstonejs/cornerstone3D-beta/pull/253>

When creating docker compose for orthanc and OHIF, is there a way to automatically login to Orthanc server. How to make Orthanc docker compose up doesn't show the username and password upon start

A: <https://v3-docs.ohif.org/configuration/datasources/dicom-web/#running-orthanc>

<https://book.orthanc-server.com/faq/authentication.html#:~:text=To%20configure%20user%20authentication%20for,password%20to%20all%20yo>

Probably some combination of

```
"RemoteAccessAllowed": true, "SslEnabled": false,
"SslCertificate": "certificate.pem", "AuthenticationEnabled":
false, "RegisteredUsers": { "test": "test" },
```

Will turn that off

Some use cases don't want to show the annotations on every volume that are in the same frame of reference or another use case for prior study measurements, do we want to show up on others? Probably not. Or in the 4D case, it doesn't make sense to have it appear on all frames

A: We have viewportSpecificAnnotationManager, one solution can be to generate a different manager for each viewport, but in the 4D case it is the same viewport so that might not work.

We discussed adding a config for cornerstoneTools to maybe in addition to checking if the volume slice is in the same slice span of the annotation, it also checks if the imageURIs match (similar to stack viewport), however, what about the reconstructed views? Maybe we add the imageURI of one of the handles of the annotation since basically we need to just check if the volume contains that imageURI volumeViewport.hasImageURI()

Depending on the system running OHIF, Cornerstone3D crashes on 750 slices for volume viewport.

A: cornerstone cache can be increased to increase its max

Since in vtk.js everything will eventually need to get converted to uint8 or float32, we do it automatically when loading and scaling the data ourselves and convert the data to float32, so there might be some extra memory footprint while technically not needed.

At the shader level, we added support of halfFloat implementation usage of the texture. <https://github.com/Kitware/vtk-js/pull/2046> but since halfFloat is approximation (11 bit instead of 16 bit) a flag should be set on the mapper via setPreferSizeOverAccuracy(true) to enable halfFloat

In another PR we experimented (<https://github.com/Kitware/vtk-js/pull/2058>) with 16 bit textures via EXTtexturenorm16 extension of WebGL but that is not guaranteed to be supported in all devices

Eventually with the WebGPU becoming mainstream we will have much better memory management since WebGPU supports 16 bit texture natively.

How to learn vtk.js

A: There are some good tutorials here <https://kitware.github.io/vtk-js/docs/tutorial.html>

WebAssembly debugging

A: <https://developer.chrome.com/blog/wasm-debugging-2020/>

OpenJPEG problem with data becoming blurry

A: probably since our openjpeg codec is a two years old fork (<https://github.com/PrecisionMetrics/openjpeg/tree/69e8e479cc3aed087d7fffc89b050452ad6d8ae8>) of the official open jpeg (<https://github.com/uclouvain/openjpeg>) maybe if we try the upstream openjpeg everything is just solved

OHIF Office Hours Notes 2023-06-15

Q & A

How to use `postMessage` to pass parameters from parent app to OHIF?

iframe has well documented api to listen and `postMessage` <https://developer.mozilla.org/en-US/docs/Web/API/Window/postMessage>

Listen for post messages in the OHIF window (e.g. in an extension) (e.g. `window.addEventListener("message", handleMessage);`). Be mindful of security... maybe have an allowed set of origins to post messages.

Post messages from the parent using the iframe (e.g. `iframeElem.contentWindow.postMessage(msg, "http://localhost:3000");`)

What are the sources of CORS errors when hosting from an nginx container? I encountered this when trying to use OHIF in combination with a dcm4che archive and I am unsure how to proceed.

see the orthanc `nginx.conf`; set headers 'Access-Control-Allow-Origin' and 'Cross-Origin-Resource-Policy'

Other References: <https://developer.chrome.com/blog/coep-credentialless-origin-trial/>

What is the offline support for OHIF

It is doable through service workers

Colormap fusion seems incorrect regarding opacity (0.9 is visually 0.5)

Seems like the composite blend mode in vtk has a nonlinear signature for opacity

read more here <https://github.com/Kitware/vtk-js/pull/2093>

we probably should define another blend mode so that we can have a linear behavior

With DICOM datasets, the coordinates generated by the `measurementservice` return as `[x,y,z]`. In the 2D space, sometimes the `z` is 0, other times the `x` is 0. E.g. points: `[[0, 1.03, 4.06], [0, 1.05, 4.09]...]` vs `[[128.01, 132.01, 0], [129.37, 138.67, 0]...]`. Is there a way we can programmatically detect the coordinate system the DICOM dataset is using?

`worldToImageCoords` utility function or `VolumeViewport.getImageData` - it has convert world to index

<https://www.slicer.org/wiki/>

`Coordinate_systems#::~text=The%20image%20coordinate%20system%20describes,and%20the%20k%20axis`

<https://kitware.github.io/vtk-js/api/CommonDataModel/ImageData.html>

Language question, is there a difference between “annotation” (term used in cornerstone) and “measurement” (used in OHIF)

In theory a measurement is a group of annotations. However, in OHIF it is just a one-to-one mapping currently.

How do I enable simultaneous synchronized scrolling of two viewports in a hanging protocol of the same series? Like you have in TMTV in the first column.

`extensions/tmtv/src/getHangingProtocolModule.js`

tool question: just trying to create a new tool that can cut a region of the dicom image and do some manipulations (drag/move/rotate/scale, just as the ohif annotations). any tool(freehandROI??) I can refer to? background: it is a request from my friend who want to use ohif viewer to do orthopedic preoperative surgery planning for pets.

use a binary mask; look into ITK wasm; or do it server side

Update to Hanging Protocols in OHIF v3

Hanging Protocol engine is now getting applied on the displaySets instead of series (<https://github.com/OHIF/Viewers/pull/2837>)

- Series to displaySets are not always 1-to-1 relationship
- The pros include now you can hang displayset instead of series
- There is a little bit of initial wait time until metadata arrives, but deduplication of metadata for study metadata (factor of 10 reduction) is an idea that we are planning to work with DICOM working group
- The new standard can be built on the existing standards
- Bill is working on a new loader to work with deduplicated data
 - Reconstitute data from deduplicated format instead of DICOM Web
 - Speed improvement is roughly 10 times faster than regular -The data is already stored in dcmjs-normalized format and it doesn't need normalizer again, so we don't need the `dcmjs.naturalizeDataSet`

Cornerstone3D Reference Lines

Reference lines implementation in Cornerstone3D not done yet

- Clinically there is no thin slice sent to the pacs
- Usually there is thicker slices so reference lines helps

- We have grant that we might be able to mentor the implementation of the reference lines by community

DICOMWeb

Clinical systems often don't have access to dicom web interface, DIMSE to move images to dicomweb in Orthanc then OHIF, best practices for transferring studies, or is there a better way at all? Ideally click on study and be able to open it OHIF as quickly as possible

- Static-dicomweb (<https://github.com/RadicalImaging/Static-DICOMWeb>) has some pieces to do series level proxy
- Unless you have Hanging Protocol that matches just with Series level query it is hard to lay something on screen
- Usually Study and series level query -> metadata fetch -> image fetch
 - If it is part10, then you can store image data at the same time

HotKeys Bugs

Series switching by hotkeys in master branch is now fixed thanks to Doug Horner

- V3 does not have this feature yet
- Would it makes sense so that next series would be based on the matching score
- <https://github.com/OHIF/Viewers/blob/v3-stable/extensions/tmtv/src/getHangingProtocolModule.js#L118-L162>
- Yes it makes sense

Matching on Prior Studies

A feature to match priors for hanging protocols is important in clinical settings

- Currently not supported in V3

Custom Data

Custom data to be added to OHIF

- <https://github.com/OHIF/viewer-testdata>
 - Ultrasound data <https://github.com/horner/dicomexamples>
-

OHIF Office Hours Notes 2023-09-28

Q & A

Q: What is the proper way to link in a private extension to OHIF?

A: You can link a private extension using the [OHIF CLI documentation](#). However, in future we will look into making private/local extensions faster with approaches similar to `npx create-ohif-extension@master`

Q: We're building a viewer based on Cornerstone3D, where we have 3 views: axial, sagittal, coronal. How can we swap the viewports without reloading the page?

A: You can swap the viewports by using Cornerstone's rendering engine. You can get the viewport by using the command `vp = cornerstone.getRenderingEngines()[0].viewports.get('CTVIEWPORT')`. Then you can set the camera settings by using `vp.setCamera({viewUp: views.viewUp, viewPlaneNormal: views.viewPlaneNormal})`. Finally, you'll likely need to reset and render the camera using `vp.resetCamera()` and `vp.render()`. For further reference, you can see Cornerstone live examples.

Q: Is OHIF required for minimum system configuration? Does a better configuration result in faster performance?

A: like loading speed and downloading DICOM data on the client side and volume creation Some servers might have to decode and re-encoding based on requests.

If server stores all data in DICOM p10 using jpeg-lossless, but the client request in jpeg2k, the server has to open p10 and find location of the image, and read it an decode (jpeg lossless decoder) and re-encode it.

If the client does not specify any transfer syntax, it will transmit it regularly which requires a decoding step. Which means any of the Implicit VR Endian: Default Transfer Syntax for DICOM OR Explicit VR Little Endian & Deflated Explicit VR Little Endian & Explicit VR Big Endian Which for image data they are equivalent.

`requestTransferSyntaxUID`

The value of the Transfer Syntax parameter may be either a Transfer Syntax UID or the token "*" which means it is stored in the backend.

https://dicom.nema.org/medical/dicom/current/output/chtml/part18/sect_8.7.3.5.2.html

Q: I am building a viewer using cornerstone 3d. I am using Amazon Health Imaging as a back end. I have created a custom image loader and custom metadata provider to handle the AHI formats, and I am using the cornerstone streaming image volume loader. But when I try to load a volume, I get blank viewports. I don't really have a specific question, but if you have any guidance, it would be appreciated.

A: You should grab the imageData from the viewport and check if it is empty, you can also put logs inside the decodeImageFrame inside the dicomImageLoader so that you can see decoded pixelData, run the webpack with `> yarn run webpack:dynamic-import:debug` to be able to build for development so that logs stays

OHIF Office Hours Notes 2023-11-02

Q & A

Attendees: 15

Q: Can I show an annotation's coordinates captured on a 1000x1000 image at the same positions when viewed in a different viewer?

A: OHIF works in the world coordinate system Read about that: <https://slicer.readthedocs.io/en/latest/userguide/coordinatesystems.html>

Convert your coordinates to world coordinates. ITK has tools for conversion.
`TransformIndexToPhysicalPoint`

`extensions/cornerstone-dicom-sr/src/utis/addMeasurement.ts` Does some conversion that you can use as a base.

Q: Are there any limitations to using cornerstone 3d on mobile browsers?

A: There should not be any limitations as we know regarding tools, for rendering you might experience some memory limitations based on the OS

Q: Can we centralize the decode dispatch logic in the codecs library?

<https://github.com/cornerstonejs/codecs/issues/36>

A: Yes, that has already been done in `@cornerstonejs/dicom-codec`

Consider using this in `dicomImageLoader` - but this would need lazy loading and ensure the loading works in the web worker context.

Q: Can OHIF be built without the dicomimageloader for backends that aren't DICOM?

A: How about you register your custom image loader inside the imageLoaders?

Q: How to share a study link when using the google healthcare api without requiring Google authentication?

A: Document was probably written for private data. Probably undo the parts that deal with OAuth and remove the OAuth server authentication to make it fully open without signing in. Then, remove the OAuth configuration from the client configuration.

Q: Is a separate button the best approach for TMTV mode with PET/MR?

A: No, probably the right approach is to modify the mode to be able to launch on PT with either CT or MR isValid to allow either (CT or MR) Then, copy the tmtv hanging protocol to a second one that matches MR instead of CT ProtocolMatchingRules will need to be updated in the protocol

hangingProtocol: [tmtv.hangingProtocol, tmtv.hangingProtocolPTMR],

isValidMode should also be edited to allow for PT MR

Q: Is adding stages the right method to display different views in HP?

A: Yes, that's the correct way. Refer to mNGrid for multi-stage examples or the tmtv mode. Use keys like '.' and ',' to navigate between stages.

Q: Hello! We're building our own viewer based on Cornerstone3D. Initially, we've integrated Cornerstone3D as explained in /examples. But I've noticed that in OHIF there was a migration from "cornerstone-wado-image-loader" to "@cornerstonejs/dicom-image-loader": <https://github.com/OHIF/Viewers/pull/3339> When migrating, I noticed that there's a TS error: TS7016: Could not find a declaration file for module. This TS error is present in OHIF codebase as well (line 1 in extensions/cornerstone/src/utils/DicomFileUploader.ts, for example).

A: You can ignore that error. It's a known issue. It's a problem with the way the package is built. It's not a problem with the package itself.

Q: We are using a volume viewer with streaming volume loader in a hybrid mobile app, the problem is it has a bigger memory footprint on iOS, than required. As there is GPU rendering, any ideas what's the best way to minimize memory footprint ?

The initial memory is for allocating the 0 empty volume. A: Really need to allocate that to inject the pixel data at the right position.

Q: Why is image loading interrupted in the volume viewport?

A: Yes, this issue has been observed before. A reproducible step causing this is being looked into.

Q: Are there plans to upgrade OHIF to react 18?

A: React 18 introduces a new rendering model (concurrent mode) that can cause slowdowns and breakages. This needs careful consideration before an upgrade.

Q: Question about fixing Viewport.ts for resetting the camera clipping plane?

A: This seems logical, and further investigation will be done to incorporate the view up.

OHIF Office Hours Notes 2022-12-08

Announcements

- We have a fix for JPEG2K bug for pixelated images ([here](#))
 - vtk.js fix for orthogonal camera for volume + poly data actors ([here](#))
-

Q & A

Q: UI Viewport Dialog does not show notification when called .show

A: This seemed to be a bug related to using TrackedCornerstoneViewport, we debugged and fixed it [here](#)

Q: Measurement updates when textBox moves

A: It seems like there is a PR for it [here](#), but we should have another event (separated from the ANNOTATION_MODIFIED event) that is triggered when the textbox is moved.

Q: How segmentation rendering happening in OHIF v2 (Labelmap3D)

A: It is using CornerstoneTool legacy to render. If you can switch to [@cornerstonejs/tools](#) it will support native 3D rendering when loading DICOM Segmentation objects.

Q: Can we edit segmentations in OHIF v3 (loaded DICOM SEG) with tools

A: We are planning to add that, and certainly on the near future roadmap. It will probably be a Segmentation mode with a set of tools that can be used to edit the segmentation.

Q: Problem with rotation with VolumeRotateMouse wheel tool. In some series it changes the slice index as well

A: The configuration of the tool (currently Z axis) should be optional which should act on acquisition plane instead of Z axis if not specified.

Q: CSWIL error handling inside webworker

A: Apparently if a decode task fails, the webworker will throw the error, but then the webworker manager will not catch it and will not make the webworker available again. We should fix that. PR is [here](#).

OHIF Office Hours Notes 2023-06-01

Q & A

How to configure dataSets to use explicit transfer syntax

There is a open PR here that you can take a look we are experimenting with this feature:

<https://github.com/OHIF/Viewers/pull/3406/files>

This will enable you to define what transfer syntax will the data source use.

How to get slab thickness

Viewport.getSlabThickness has the information

OHIF Office Hours Notes 2022-09-29

Custom Tool

Willy asked how to display AI/automated generation of generated results - rest API response with key points. Like JSON file generated that has coordinates of key points Discussed arrow tool, or else custom probe tool for that use case

DICOM Tree

Bill discussed a proposal to the DICOM working group for faster JSON format using DICOM Tree, 1000 images 600ms at parse time, for 4700 images 1 seconds. Static dicom web now supports uploading one study, but not automatically regenerating the index. It is WIP prob next week and also SCP for transmitting to static dicom web.

OHIF V3 and Segmentation

Alireza - working on segmentation, demoing it Can select different segmentation objects as well as specific segmentations in it Automatically highlight new specific segmentation when selected, then fade away so more visible Panels are now all in one tab and they can be switched between

PR for Thumbnails

Celian has a PR to have a minimum size on the thumbnails when there are multiple studies in the thumbnail tray. Needs to use OHIF scrollbar style

-Dan suggested that having two scrollbars wasn't a good idea

Double Scrollbar not ideal <https://deploy-preview-2878--ohif-platform-viewer.netlify.app/viewer?StudyInstanceUIDs=1.3.6.1.4.1.14519.5.2.1.7009.2403.334240657131972136850343327463>

Fuzzy image bug

There is a bug which makes the image fuzzy when loaded, the dicom is j2k compressed, and the image is not displayed correctly.

Suggested to try git bisect between the two versions to figure out when the image became fuzzy dcm2dcm to generate LEI then drag and drop to view Using dcm2dcm to LEI or JPLL results in a valid image Using dcm2dcm twice to LEI and then to J2K results in a good image. You need the toolkit, and Java, then run dcm2dcm -jls fuzzy.dcm notFuzzy.dcm

PolyLine display

Alireza will look into the polyline display, and see if it can be added

FreeHand ROI in Legacy

Discussed the freehand ROI in legacy, and how it is different than the Cornerstone3D in which in legacy statistics were calculated on the fly, and in Cornerstone3D it is not.

You can certainly port the logic from legacy to Cornerstone3D, but it is not priority at our end.

OHIF Office Hours Notes 2022-11-03

How to render contours that are drawn with FreeROIHandTool in v2 (cstool-legacy) how to render it in V3.

A: you need to convert each planar contour to the annotation data model that freehandROI accepts in the CS3D. Main point is that each contour point should be converted to the world coordinates.

How to force CPU rendering in OHIF v3 as a method to debug system dependant issues.

A: you can use `cornerstone.setUseCPURendering(true)`

wadors metadata provider does not provide the voi look up table but the waduri does

A: Yes, since wadouri has the entrie p10, we can pull that information from there., but most of the time servers don't send the voi lut binary data, but send a bulkDataURI that points to the binary data. There is right now a method to fetch that in OHIF which might makes sense to move down to the Cornerstone3D

(v3-stable branch): `platform/core/src/utis/metadataProvider/fetchPaletteColorLookupTableData.js`

In cs3d, scale is not similar to cs-legacy, in cs3d we use `parallelScale` for zoom.

A: Yes, the definition of parallel scale is the half of the distance that the canvas covers in the vertical direction in the world coordinates. So you can calculate the scale that way, by calculating how much the image spans in the vertical direction and then dividing that by the `parallelScale` to get the scale.

How can I get the imageData IJK when clicking on the canvas

A: You can use the canvas coordinates, and use `viewport.canvasToWorld` and then using the utility function `imageToWorld` you can get the image coordinates.

VTK Widget support in Cornerstone3D

A: We have on roadmap to add support for vtk actors, hardware picking etc. but not the full vtk widget manager As an instance, for RTStruct, we want to use vtk.js actor for contours.

OHIF Office Hours Notes 2023-04-20

Q & A

How to set the new viewport to a volume

A: There is a defaultViewport that specifies what happens when a new viewport is asked to be hung change that to volume and also under stages.viewports change viewportType to volume.

viewportType can be also a custom attribute, it needs to be a named function that you register with HangingProtocolService

How to use crosshairs to rotate the volume

Perhaps best to add a separate tool for (volume) rotation.

Similar tool

src/VTKViewport/vtkInteractorStyleMPRRotate.js <https://github.dev/OHIF/react-vtkjs-viewport>

PanelStudyBrowser seem to not react to the new study

Apparently the imageViewerProvider and Mode.tsx does not update and it is a bug

What is the metadata for Segmentation schema

https://dicom.nema.org/medical/dicom/current/output/html/part03.html#sect_A.51

OHIF Office Hours Notes 2023-08-03

Q & A

When to create a new datasource type vs configuration parameters for an existing one? I have a datastore which requires configuration stored in browser local storage. If this configuration is not present, my datasource fails to initialize (createDataSource throws Error) and the “Something went wrong” page is displayed. How can I display my own configuration page when this happens?

There are various ways to configure and re-initialize a datasource. You can see the PR

<https://github.com/OHIF/Viewers/pull/3543>

To learn more about new additions.

An alternative would be using the customization service <https://docs.ohif.org/platform/services/ui/customization-service>

Also you can use onConfiguration for the data source

We have configured the OHIF viewer to use a locally hosted Orthanc as a datasource. When we try saving measurements from a basic viewer, the SR gets saved as a separate study as mentioned in this github issue, which makes both the SR and the original DICOM studies inaccessible. Where could this issue be originating from, and any pointers to possible solutions would be greatly appreciated!

Seems like your base is an old OHIF

<https://docs.ohif.org/development/getting-started#branches>

Any plan to release V3 as NPM package? I see the current npm package is for V2.

You should use @ohif/app npm package and NOT the @ohif/viewer

How does one go about troubleshooting issues with the google.js configuration? I'm having issues with the data not being shown on the study list because I assume it can't find the datastore or isn't being allowed access to it. And are there any plans to create a UI view for Google Healthcare in V3 similar to the one in

Take a look into credentials page in the GCP and make use the URI and callbacks are set correctly

Authorized JavaScript origins

E.g., <http://localhost:3000>

And

Authorized redirect URIs

<http://localhost:3000/callback>

What is the recommended way to integrate only the viewer portion of OHIF in another web app that wraps additional features around the viewer (for example, custom dashboards, authentication and access-controlled studylists)?

You should use an iframe

<https://docs.ohif.org/deployment/iframe>

routerBasename: '/dashboard/viewer', and PUBLIC_URL let you serve the viewer from different route

Take a look here <https://docs.ohif.org/deployment/iframe/#static-build>

What is the recommended way to create our own stackPrefetch method? We are trying to prefetch(load and cache stack images) in background for all series with some priorities(e.g, the series in active hanging protocol, active study, and so on)

There was studyPrefetcher in OHIF v2 which had many bugs. We should rework it and bring it to the OHIF. Also we should take into account the position (currentImageIdIndex) of viewports when cache wants to overwrite old images.

<https://github.com/OHIF/Viewers/issues/3578>

OHIF Office Hours Notes 2023-08-17

Q & A

What could be the root cause of the difference in color of dicom when rendered with cornerstone and with horos?

A: seems like the local dicom drag and drop works so it might be a server problem. Try another server and see if it works.

Is there any way/config to change the decode(dicom decompression) part alone with another decoder in OHIF ?

A: needs a fork

@cornerstonejs/dicom-image-loader —> @cornerstonejs/codecs

You can add your own codecs which requires fork List of all transfer syntax UUIDs are in the documentation HTJ2K is already added with transfer syntax UID of 3.2.840.10008.1.2.4.96

packages/dicomImageLoader/src/shared/decodeImageFrame.ts

<https://chafey.github.io/openjphjs/test/browser/index.html>

How does the cornerstone annotation tool determine the units ? Can we change it?

A: it is based on the calibration data.

For US calibrated regions you need to go through a calibrated regions list for the US and determine if the set of points that are provided are contained in that list and if all points are contained in the same region you can return units from that region otherwise you should return something else.

Are the codecs in an OHIF extension or are they hard linked in? For AHI, we only need HTJ2K so would like to reduce the footprint by only including HTJ2K support. Also - might even want to get rid of the WADOImageLoader entirely and use an AHIImageLoader which just has HTJ2K support loaded via extension.

A: they are dynamically loaded by demand.

I think I noticed that the web workers are destroyed when you return to the study list - is that correct? Starting web workers has a cost and it would be good to keep them around if possible. This is especially true when you run lots of web workers (the default is 3, I want to run 8 or more)

A: seems like you are right, we have a cleanup in the `onModeExit` which we should investigate to remove

```
onModeExit: (): void => { // Empty out the image load and retrieval pools to prevent memory
leaks // on the mode exits Object.values(cs3DEnums.RequestType).forEach(type => {
imageLoadPoolManager.clearRequestStack(type);
imageRetrievalPoolManager.clearRequestStack(type); });

csWADOImageLoader.destroy(); enabledElementReset(); },
```

OHIF Office Hours Notes 2023-10-19

Q & A

Attendees: 12

Q: I have already asked in the channel about htj2k adoption and wanted to get more clarity on what steps I need to take to show a quick demo to my peers since the adoption pr will take some time to get merged.

A: You can use the following two demos. We have a PR in progress to add HTJ2K progressive loading support very soon in Cornerstone3D

<https://github.com/cornerstonejs/cornerstone3D/pull/779> <https://chafey.github.io/openjphjs/test/browser/index.html>

Q: Facing some W/L issue for some dataset. PixelPaddingValue is not getting accommodate in the pixel manipulation.

A: Seems like the data have -2000 pixelPaddingValue, and we currently don't support that. We can add support for it in the future.

Q: OHIF viewer is in an endless redirect loop. It gets Keycloak credentials, but never gets to the Study List. Error in console talks about null access token. What am I missing?

A: This might be useful link <https://docs.ohif.org/deployment/user-account-control>

Other resources

`platform/ui/src/contextProviders/UserAuthenticationProvider.tsx extensions/default/src/DicomWebDataSource/index.js`

Q: Can we control OHIF segmentations at series-level? Can we show different segmentations on different series on grid viewports?

A: You should create different toolGroups and add segmentation too each toolGroup separately

`cornerstoneTools.segmentation.state.getDefaultSegmentationStateManager()`

<https://www.cornerstonejs.org/live-examples/labelmaptoolgroupspecificconfiguration>

Q: How does one debug the karma tests in CS3D?

A: [In karma.conf.js set browsers to \['Chrome'\]](#). If there are specific tests to debug, change their description to `fit`(from `it`).

Q: One more question, 😊, How do you detect the outline of segmentation from the mask data(UInt8Array)?

A: The outline determination happens in the GPU in `vtk.js Sources/Rendering/OpenGL/glsl/vtkVolumeFS.glsl`

We have a converter that you can extract contours (in world coordinates) from the segmentation mask and is called `generateContourSetsFromLabelmap`

OHIF Office Hours Notes 2022-11-17

Segmentation view

Needs to reduce the number of web workers Issue with displaying some studies as MPR, despite them being mprable Segmentation can be used for running new AI models to detect findings/issues Segmentation can be used for sub-selecting the available findings for manual reporting models There are various models to generate segmentations such as structure/atlas based along with intensity of the area, quite hard to do generically Segmentation can also be generated manually

Funding to connect OHIF to various back ends such as Monai Don't have funding yet for exporting of segmentations

Wen - PR feat: trigger annotation modified event on textbox moving by m00n620 · Pull Request #296 · cornerstonejs/cornerstone3D-beta (github.com)

Jason - cornerstone3D beta, trying to get a sample working for upgrading pacsbin

Bill - HealthLake - aws service - on behalf of Chris Hafey Deduplicated metadata so that its smaller HTJ2K images - take about 1/4 of the time that JLS takes to decode

Any interest in doing a code walkthrough on OHIF? - basic checkout, build, what are the subsystems. Record it? SIIM presentation? Could be done over Zoom and then recorded. Eg like CEPH: <https://m.youtube.com/playlist?list=PLrBUGiINAakN87iSX3gXOXSU3EB8Y1JLd>

Also any good DICOM presentations (SIIM has one)?

RSNA Are people interested in meeting up at RSNA? Bill (@ Radical Imaging booth), Doug, OHIF is presenting a poster is 13243

DICOMweb working group is meeting: WG-27 will hold a hybrid in-person & virtual meeting during RSNA this year. The meeting will take place on Monday, November 28th from 1:00-5:00pm US Central at McCormick Place in the South Building in Room S104A. We hope to see you there, or on the GotoMeeting: <https://global.gotomeeting.com/join/649543085>

Please let me know if you have any questions:
sknazik@dicomstandard.org sknazik@dicomstandard.org

OHIF Office Hours Notes 2023-08-10

Q & A

Q: For the volume loader, how does the pixel data from the image loader get added to the volume, and where would be the correct place to overwrite an image frame within the volume? See: BaseStreamingImageVolume.ts --> handleArrayBufferLoad vs. updateTextureAndTriggerEvents

Answer: updateTextureAndTriggerEvents is used when the sharedArrayBuffer is being used for volumes and the handleArrayBufferLoad is for the non sharedArrayBuffer load

When playing CINE, it currently can get beyond the cached images and change images faster than they are available so goes black. What is the desired behaviour:

Play every image for the required length of time Try to play at the desired frame rate, but skip images as required

Answer: Seems like both scenarios are encountered using the clinical viewers depending on CINE or stack scroll tool.

Multi-study hanging protocols were just fixed, but it ends up that it is hard to distinguish which study they come from. Also, it is hard to launch. Would like some feedback on both of these.

use coloured border to distinguish studies Configure mode based hanging protocols launchable from “priors” thumbnails study list (eg launch as active study, run HP comparison hanging protocol etc)

Answer: We need to rework the study browser having following features in mind Pick studies to run a HP Some indicator (red circle) for which study is which

Active study -> the one for which you have selected the viewport Current -> the one that you are making report on Prior -> using to enhance interpretation of current, but we are not reporting on prior

Relevant priors -> usually same body part (not necessarily modality) we think are related to the current study, they might have the same department, or might have been done on the same hospital visit or

All -> all

I'd like to know how I can know that all viewports are enabled and the stacks are being loaded on OHIF Viewer load. I know there is an event that is fired on NEWSTACKVIEWPORT, but this is not enough when we have multiple viewports on the grid layout.

Answer: You can use element_enabled event and using viewportgridservice state and count the number of viewports it is enabled to do the trick

OHIF Office Hours Notes 2023-08-24

Q & A

Q: I am trying to build a simple web service using cornerstone3D and orthanc. The orthanc server requires authentication to protect the data and in the frontend I'm loading images using the volume loader with the @cornerstonejs/streaming-image-volume-loader. The webImageLoader allows for custom headers but the volume loader and the dicom-image-loader look like they don't. Are there ways to add custom headers to support something like JWT auth or does anyone have a recommendation on how to add auth to the system in any other way?

A: Look at OHIF source code, see `initWADOImageLoader`, when configuring `dicomImageLoader` add the various headers - in particular authorization header. Streaming-image-volume-loader is used for streaming volumes and the requests go through `dicomImageLoader`. Who: Wen

Q: How to create a custom segmentation type? We have image data as dataURL and want to connect this data to OHIF/cornerstonejs segmentation store, so that it can be easily managed in OHIF viewer like other segmentations like Labelmap.

Understands which canvas coordinates are in your overlay Use the api `viewport.canvasToWorld` to convert those points to the world

then use `createSegmentationForDisplaySet` which requires `displaySetUID` -> reference (e.g., CT), This will grab the metadata from the reference. It creates an empty volume with `segmentationId` in the cache

Now the task is to grab those `worldCoordinates` and get the `scalarIndex` (`worldToIndexVec3`) for the empty volume and fill it in `worldCoordinates` and get the `scalarIndex` Trigger `segmentationdata_modified` event

In `cornerstone.js`

`createAndCacheDerivedVolume` to create empty volume Then fill it in Use segmentation api to create segmentation out of a volume and add it `segmentation.addSegmentations`

Finally add the segmentation representation

`await segmentation.addSegmentationRepresentations`

Q: BW: Image quality is quite poor at 1:1 (1 image pixel to 1 screen pixel) view with contrasting pixel values. Wondering if it is known why? Wondering if we need to set the focal point properly and/or arrange to have integer pixel values specified

The following code seem to do some manipulation to make it 1 to 1

```
function scale(v = 1) { const canvas = document.getElementsByClassName('cornerstone-canvas')[0]; const height = Number(canvas.height); const width = Number(canvas.width); const viewport
```

```
= window.cornerstone.getEnabledElements()[0].viewport; viewport.setCamera({ parallelScale: height/v }); viewport.viewportStatue = 'preRender'; window.cornerstone.getRenderingEngines()[0].render(); }
```

```
canvas = document.getElementsByClassName('cornerstone-canvas')[0]; viewport = window.cornerstone.getEnabledElements()[0].viewport;
```

```
scale();
```

But seems like not always that is the case, to achieve 1:1 sometimes the parallel scale should be set to height, sometimes to height/2 and sometimes to 2*height

OHIF Office Hours Notes 2023-02-02

Q & A

Docker file issue for OHIF-v3

A: Dockerfile should be following our Dockerfile setup. The error was

```
RUN APP_CONFIG=config/default.js yarn run build
```

Another thing to note is that the config file should be under the public folder in the platform/viewer

How to get 3d segmentation information for a segment index.

A: segmentationModule.getLabelMap3D in legacy code

What is the difference between StackViewport and VolumeViewport in general and related to Segmentation? Is MRI a Stack or a Volume?

A: segmentation works on VolumeViewport. There might be StackViewport support in the future. StackViewport images can be any size and any orientation within a stack.

StackViewport is the default. StackViewport can be converted to a VolumeViewport (client-side) (can go back-and-forth between them). Look at `_hydrateSEG.ts` for conversion.

Look at TMTV hp module for example to create/hang a volume viewport.

<https://v3-docs.ohif.org/platform/extensions/modules/hpModule>

OHIF Office Hours Notes 2022-11-10

Out of memory issue in Safari & mobile PR <https://github.com/cornerstonejs/cornerstoneWADOImageLoader/pull/480/files#diff-a3c5532acf392f88ed205576c65f5b48a9369f2e625ac6cf3440cb18699f5a6e>

Apparently Safari has a problem with big images (larger than 1000 pixels) and it crashes in all mobile devices. This PR resizes the image to 1000 pixels if it is larger than that.

A: Interesting to know Safari has a problem with big images. I wonder if this is the right approach, or at least should be configurable via an option.

Brain MRI image not working in CPU, only few pixels and image is distorted

A: will debug the image and see what is going on

vtk.js offsetScreenRender regarding the displayArea feature, seems like the canvasToWorld returning back NaN when called early on.

A: maybe we call the canvasToWorld at the end of the resetCamera to make sure it has already invoked the reset camera event. Other possibilities are to run the code after addActors.

Cornerstone3D does not emit ANNOTATION_UPDATED on textBox manipulation

A: that is by design, maybe we can add a ANNOTATIONTEXTBOX_UPDATED event, happy to review a PR

Can you show textBox for PlanarFreehandROI

A: This is a very computationally expensive operation, we should not do it by default. We can add a flag to do it on the mouseUp callback, happy to review a PR

StackViewport rotation tool

A: You can use `viewport.setProperties({rotation: rotationAmount})`

OHIF Office Hours Notes 2023-02-16

Q & A

How to switch to servers. (how to switch configurations specifically)

A: Look at the sample config/multiple.js configuration file. Working on being able to change data sources in the UI. This is only in v3. V2 does not have data sources at all.

<https://v3-docs.ohif.org/configuration/url>

Look at how google cloud/authentication DICOM store projects are served.

You can run following command to see how we handle Google oidc in OHIF

```
METEORPACKAGEDIRS="../Packages" NODE_TLS_REJECT_UNAUTHORIZED=0 meteor --settings ../config/oidc-googleCloud.json
```

Why there are more files for the build in v3-stable

A: Lots of stuff chunked into various files and we have wasm codecs etc. The most important file is index.html

When we do yarn:build-package-all it fails. Why? Is there a related PR? (Gabriel's PR)

<https://github.com/OHIF/Viewers/issues/3172>

A: This will be fixed when v3 is merged to master, but you don't need to build all packages. Run yarn build in the root

Is the build taking too long? 10 minutes if building all extensions, modes.

A: You might need to cache your yarn install in the server

Is there any support for handling ultrasound measurements (might have different partitions: Ultrasound Regions Attribute). If it has two regions it can't (but one region it can).

A: PixelValues in Ultrasound can be measured in different units. For a probe tool we need to figure out which region it is and use the pixel value + region information to figure out what type of units it is. If you click on flow in the heart -> m/s, and there is a way to convert pixel value to measurement value. Conversion is quite straightforward. It is not too hard.

NM multiframe files seem to be missing image position patient in the sequence.

A: NM seems to not follow dicom standard, we can use slice thickness for the non-projected NM

Volume swapping (cache api), memory allocation. There seems to be a lag when (large) volume is allocated

A: Large volume takes time to allocate. Replacing slices using texSubImage3D probably has no problem. We can do some partial volume rendering which moves the volume origin and replace data after certain position in the slices.

OHIF Office Hours Notes 2023-04-13

Q & A

Validator.js is not getting maintained anymore

A: maybe we should consider seeing if more popular libraries like Zod can do the job for us

Difference between cornerstone legacy and cornerstone 3D crosshairs, in v3 seems like it is limited to MPR

A: nothing is shared from legacy; crosshairs works in TMTV; crosshairs does not work for stack viewports

Versioning of the OHIF Viewer, and the status of v3

A: v3 finalized by end of month. Adding RT and pathology viewer. Cornerstone wado image loader to new library. And then push to master.

Need to get better at versioning. Do not rely on version in package.json. Master branch is v2. v3-stable branch is v3 (and will soon be merged to master). V3 is built on top of cornerstone 3D. If starting fresh, start from v3.

New Segment Anything Demo (SAM) in OHIF

Kunjesh showed a prototype of using SAM by Meta in OHIF

- NIFTI loader
 - Development of the nifti loader for cornerstone3D is done internally (it is based on <https://github.com/rii-mango/NIFTI-Reader-JS>), and it will hopefully be available to public in the next few months

- legacy loader, request nifti gzip decoded, and if you give it parameters it will give back the slice itself without any web workers
 - The idea of using webworkers for
 - sigmoid VOI LUTs
 - it should be done vtk.js with actor transfer function
 - set/apply the sigmoid function
 - legacy cornerstone has non linear look up table (<https://github.com/cornerstonejs/cornerstone/blob/master/src/internal/getVOILut.js#L40>)
 - Initial implementation can be on setProperties <https://github.com/cornerstonejs/cornerstone3D-beta/blob/main/packages/core/src/RenderingEngine/StackViewport.ts#L544-L552>
 - SUV is showing up for the PT even if not scaled
 - this is a bug and needs to be fixed
 - Removing the MO from the annotations details
 - Per Salim's comment we will remove the MO since the we don't know the unit if it does not exist
 - Extension and modes and how to create them
 - OHIF cli <https://v3-docs.ohif.org/development/ohif-cli/>
-

OHIF Office Hours Notes 2023-04-27

Q & A

The only way to call a callback on a HP is to use it through setHangingProtocol via commandsModule

Commands running do not belong in HPService. But Protocol has a callback which can store onProtocolExit and onProtocolEnter.

What is the difference between the setProtocol and run

Run chooses the best protocol to apply. It is used on mode enter setProtocol sets a protocol/stage explicitly (e.g., MPR)

Follow up on the dynamic config PR

Final comments and we can merge

Creating automatic Segmentation in OHIF

This is a very complex topic. You can take a look at the following links for more information:

<https://www.youtube.com/watch?v=xmvVyftgNjY> <https://segment-anything.com/demo#> <https://www.cornerstonejs.org/live-examples/labelmapsegmentationtools>

Pixilib has a proposal for validation rules for hanging protocols

https://docs.google.com/document/d/16JzYi6E_cjhrZer3OJuBu--uyLKuvGDels7SxgRJ-4M/edit

OHIF Office Hours Notes 2023-06-22

Q & A

How can an extension override the existing datasource config in OHIF?

You might need the following PR to be merged first which allows for re-initializing the datasource:

<https://github.com/OHIF/Viewers/pull/3427>

besides that PR you may need to expose/add a method to update the config for a datasource and then reinitialize it

if I bind to my host in Docker can I modify it real-time (might require a page refresh or 2, or turning off caching), but it seems that is where it maps to ?

You can take a look at the docker docs, which lets you to run the docker container with a volume mounted to your host machine. This way you can modify the code on your host machine and it will be reflected in the docker container, we are also working on an environment variable method to do this, stay tuned.

What are the window.config extensions and modes

They provide a method to run ohif with specific modes (the extension field is not ready yet), but you can't use it at run time, you basically need to set it before running the app.

What are the minimum hardware requirements to run a basic setup and some that might be somewhat larger than that ?

Our rendering pipeline primarily relies on GPU acceleration, so having a capable GPU, preferably of tier 1 or higher (as mentioned at <https://pmndrs.github.io/detect-gpu/>), is beneficial. In cases where a GPU is unavailable or lacks sufficient power for advanced visualizations, we will fallback to CPU rendering for basic 2D rendering. However, it's important to note that CPU rendering does not support MPR or advanced visualizations.

OHIF Office Hours Notes 2023-03-09

Q & A

Dynamic Configuration for OHIF v3

Right now there are an open PR that let you configure the OHIF Viewer with a JSON file given a URL to the JSON file. However, we have not yet finalized it because of security concerns.

We also plan to add editable fields in the /debug route for the viewer to be able to change the configuration on the fly.

<https://github.com/OHIF/Viewers/pull/2925> <https://github.com/OHIF/Viewers/issues/3137>

DICOM Segmentation and Reference Image Explanation

DiCOM seg does not have image embedded; it references the image; export dicom seg not yet in cornerstone3d; Alireza can help (with PR) for generating segmentation label map

Optimize the performance of the PlanarFreehand ROI stats calculations

Seems like the code for finding out whether a point is inside a polygon is not optimized. We should look into it and see if we can improve it. There are some algorithms to be used for this.

Cornerstone3D threshold Preview tool

Configuration of threshold should go into a tool (eg. `setBrushThresholdForToolGroup`) which changes the configuration; need a render loop which takes new configurations and calculates new thresholds – maybe stick to `renderAnnotation`

Indicator to save to the same SR series or not

Maybe we use a split button with options

Difference in behaviour with `seriesInstanceUID` in URL between v2 and v3

Yes, there are some differences. We should look into it and see if we can improve it. We think we should show all the study thumbnails and only activate and render the specific series that is in the URL.

OHIF Office Hours Notes 2023-02-23

Q & A

How to download to local file system a DICOM segmentation

A:

<https://github.com/dcmjs-org/dcmjs>

You can use this tool to export DICOM segmentation... look at the dcmjs examples for a download example

- it is based on cornerstone legacy, so look at the code for an example of how it was/is being done
- how to get segblob? Uses cornerstone generate segmentation; cornerstone 3D does not have it yet; perhaps you can start a PR for adding/adapting it to cornerstone 3D?; look at Segmentation_4x.js (in legacy)
- write a function that fills in segmentation from label map - slice by slice ; segmentation.addSegmentFromLabelmap - adds in pixel data

https://github.com/dcmjs-org/dcmjs/blob/b4732d7b677b8cbb7ae12276019e18371a4864a6/src/adapters/Cornerstone/Segmentation_4X.js

Using cornerstone-legacy in OHIF v3, loading using s3 bucket, each url has an expiry time, when it expires. Once the displaySet is created, it stores imageIds in the stack, but let's say after 10 minutes that url expires. How to force refresh.

A: look at ohifcornerstoneviewport - there is invalidation on cache service; perhaps need to update DisplaysetService - might need to add something there; Perhaps invalidate/update DicomMetaStore. Perhaps remove the DisplaySet and metadata. After adding instances, things might fall into place?

Bill might have a draft PR that might help.

The goal of the changes to displays set is that you end up with the SAME display set data whether you throw away every display set and re-create all the display sets, OR you update the display sets. Thus, changing the display sets should only occur on changes to underlying metadata where the result of reparsing that metadata would result in the updated display sets.

Some examples: If a single frame image is added to a series, then the single frame image is added to the existing single frame display set If a multi frame image is added to a series, a new display set is created for the multi frame (because a new display set would be created by reparsing the metadata) If a DICOM SR is added to an existing series, then the SR DisplaySet should have the DICOM SR added to it as an update. This preserves the display set UID's which may be stored/ cached.

Some examples of new display sets: When a filter is applied to images in a display set, to choose only “HEAD” images instead of neck/shoulders, then a NEW display set is created containing just the HEAD images. When the DICOM SR viewport wants to show all images with annotations on it, then the images are added to a new display set which is “madeInClient”

One particular example that is an update, that looks like the second case is if the underlying DICOM metadata is filtered at load time, then the display sets should be updated to match (possibly removing some). This is treated as modifying the underlying study, and not as a special view, as the DICOM metadata isn’t even present any longer.

Should the longitudinal mode use save to same series?

There is PR <https://github.com/OHIF/Viewers/pull/3140> that changed saving to DICOM SR to re-use the series with the same series description. This is only applied to non-longitudinal mode. Should it be applied to longitudinal mode as well? The reasoning is that it reduces the number of series with the same description, which prevents confusion as to what instance to look at. However, it also does not add functionality to view older saved instances when in the same series. That functionality COULD be added, but has not currently been added.

How to implement a threshold preview tool using cornerstone-3d. A tool that apply a threshold on the whole image and bounces the opacity

A: Look at fillSphere or fillRectangle or fillCircle (maybe write a fillCube) - each fill has constraints and threshold parameters. Look at SegmentationService.highlightSegment for animation.

Install Viewer is not in OHIF v3, is it coming?

A: Probably won’t do this - there are lots it likely cannot handle (e.g. webworker, codecs, etc.) Perhaps have a look and see what might need to be done?

In OHIF v2, there is an upload functionality, is it coming to OHIF v3.

A: Yes. Soon. Look at code in v2, if you need it sooner rather than later.

OHIF Cornerstone SR viewport, what is the desired behavior for images getting shown. The design doc says it should only show the images that have markup, we are not doing that.

A: Will ask project manager... for workflow change

OHIF Office Hours Notes 2023-08-31

Q & A

Q: Just wanted to know how things are going to support segmentations on stack viewports. Will there be big changes for segmentation structure? It would be great if you can share the draft PR so that I can get an idea.

A: Stack segmentation is tricky since there can be various arbitrary images in the stack and we need to make sure that the relevant segmentations are shown to the user for the current displayed image. There is a draft PR here [Draft PR Link](#).

Q: How can I create a stripped down / simplified cornerstone UI? Could modes and extensions be explained with respect to this?

A: Support for mobile is on the roadmap, but not yet. If segmentation is needed, then you might need OHIF. Perhaps start with the longitudinal mode and strip it down to what you want/need. Use the segmentation hanging protocol. [View PR](#).

Q: Bug while viewing a multiframe MRI scan in OHIF, but rendering properly in Weasis and Horos viewer.

A: Appears fixed in the most recent code; some exceptions in the console.

Q: When requesting HTJ2K subresolutions via imageId fsiz param, should the decode level be sent via a custom header or computed by the client?

A: Doing it with a header probably makes sense. X-decode-level. [Learn more](#).

Q: For running the hanging protocol, should we add a more complex prerequisite for running the hanging protocol instead of just counts of the series loaded. e.g., the MG most likely requires ALL series.

A: Probably should be similar to addCustomAttribute that we implement a "count".

- [Salim Kanoun](#) discussed the potential availability of funding for adding the following features
 - RTSS Import
 - RTSS Visualization
 - TMTV on MIP - Shader modification to allow segmentation on MIP
 - ROI Threshold for secondary volume - Threshold tool to work both on CT and PT

- Multiframe support (should be prioritized)
 - Discussed support for SPECT-CT using krypton-81m (Kr-81m) and technetium-99m-labeled macroaggregated albumin (Tc-99m MAA)
 - Talked about CornerstoneWADOImageLoader (CSWIL) WebWorker
 - Eventually fetch should also be moved to a worker
 - Long term plan is to move the CSWIL to the Cornerstone3D monorepo and type it with typescript
-

OHIF Office Hours Notes 2023-04-06

Q & A

How to get the cornerstone viewport (not OHIF viewport) maybe by the position and index for viewports?

Why the viewportId inside the HP protocol is not used as initial viewportId even when we don't change layout or don't change stage

ViewportId should be removed it is internal

If I need to grab the imageData from a viewport which I was previously able to do so by asking the RenderingEngine about the viewport by its id and then grab the imageData, I can't now since viewportIds are basically random. How to achieve that? If it is the case that we can grab it by its index, it means the code should know about the positioning of the viewports at any time at any stage which is not ideal at all, since I want to grab the CT in stage1 which can be in position 1-1 but in stage 2 it can be in position 2-1, previously I was able to say just give the cs3d viewport with id of 'ct'.

Maybe we need to change the viewportId on the HP to id and the internal viewportId to internalId

JWT in OHIF v3:

- It works in OHIF v2 in the url
- It does not work in v3, is there any hack to make it work in v3?

Answer:

- OHIF v3 has the OAuth flow
- More notes on Auth from Danny Brown [below](#)

Status of the GSPS

- rendering For the ML results, secondary capture, SR, and GSPS Segmentation, volume calculation, midline shift
- GSPS polylines, toggle them on and off

Answer :

- DICOM SEG coming to OHIF v3 soon and focus is SR and SEG
- GSPS on the roadmap but unfunded

PR in the v2 branch for CINE on ultrasound

- Issues with the frame rate
- Multiframe frame rate read in v2 -Authentication is hard on v3 -<https://github.com/cornerstonejs/react-cornerstone-viewport/pull/145> -<https://github.com/cornerstonejs/react-cornerstone-viewport/issues/144>

Migrating from v2 - main

- What is the best solution and best practice to rebase
- So many changes so rebase does not work, manually?

Answer:

- Separate extension and mode is generally a good idea
- You can duplicate just to have a temple (ohif-cli) <https://v3-docs.ohif.org/development/ohif-cli/#cli-installation>

Initial change for the sigmoid voi lookup table function in Cornerstone3D

- <https://github.com/cornerstonejs/cornerstone3D-beta/pull/187>
- Pulled the TMTV, playing with freehandROI tool in v3 with SR

Answer: - SR support for planar annotations with freehand tool is already there in dcmjs <https://github.com/dcmjs-org/dcmjs/blob/master/src/adapters/Cornerstone3D/PlanarFreehandROI.js> - If you create the mapper from Cornerstone to OHIF state, then it should work

Extra notes on Auth by Danny Brown

[UserAuthenticationService](#)

[viewer/src/appInit](#)

The service supports a `setServiceImplementation` method, that can take an object with a `getAuthorizationHeader` property to set it's implementation. Probably need to:

- Verify that this method is called at the expected time/place If it is not, make sure we add it
- Provide guidance on the best place(s) to set this implementation

Some examples might be:

- Update viewers/src/appInit to update the initial implementation to include the expected logic
- OR call setServiceImplementation in a mode or extension lifecycle hook

That implementation could be as simple as Check a cookie or localStorage for a valid JWT In general, it's not great to have it in a URL, but you could also grab it from a URL Or as complicated as If the value isn't set, call a promise that shows UI prompting for UI creds, and then issuing a request to a defined WebAPI endpoint to attempt to provision a valid token If going the simple route, some guidance would need to be provided around how/where/when to present UI to end users to set a token LMK if you have any questions.

OHIF Office Hours Notes 2023-01-19

Q & A

Q: Get the image from the viewport. What is the best format for the AI for segmentation?

A: OHIF has support for DICOM seg; so if AI outputs that, then it should just load in OHIF. There are tools like dcmqi, High DICOM to help conversion/creation

<https://highdicom.readthedocs.io/en/latest/>

Another option is the NIfTI format waiting; waiting on an open source project and then OHIF will have support for NIfTI. Some edge cases might not be solved (e.g. two studies with same study instance UID might not be merged)

Get image from viewport: in extension: fetch CornerstoneViewportService from ServicesManager that has getCornerStoneViewport (ViewportGridService has index to pass to method). Viewport has getImageData which has a scalarData property.

Q: Crosshair center doesn't move the camera. Camera changes center but the center move doesn't change the camera.

A: Change focalPoint and position of camera calculated from previous values (similar to _applyDeltaShiftToViewportCamera).

When camera moves crosshair (tool) center moves. The question is vice versa does not happen.

Maybe CrosshairsTools._jump might work?

Rotation angle can be calculated from rotationPoints relative to base/standard/axis-aligned axes (i.e. angle between two vectors). Go to other viewports and rotate those???

Discussion: dcmjs breaking changes

We are moving adapters from dcmjs to cs3d monorepo for SR and SEG So there will be a breaking change for dcmjs Some discussion for any other breaking changes? While we are doing this Change the single item accessor? Rather than same .patientName[0] we say .patientName
Currently based on the Proxy which is slower (a little bit) Based on the value multiplicity What if the VM is wrong? It says 1 but it is 2 Then we add the accessor regardless, because then you can still access it the 0 version, and you can access other ones Other breaking changes we might want to explore? Maybe the naming convention? But it is the same exact naming in the DICOM standard

Q: Touch events inheritance convention

A: For PR in (<https://github.com/cornerstonejs/cornerstone3D-beta/pull/247>) Having interactionEventType is more consistent and we can have a one listener. -----

Q: Dynamic image/volume sizing (related to progressive loading + cache). Starting from a smaller volume. For instance one stack viewport volume, the memory on device only allow for 400 devices. One thing we can do is sample axially, when we build the volume, we can just sample nth to create a volume and place it in the devices memory space. On the other hand In progressive loading, we can load downsampled images, we start with 128x128, when the user wants the higher resolution (either click or continue on progressive loading milestone), then we just update the image in vtk (it is different size, 512x512), but from viewport stand point, since vtk is stretching

A: probably we should add a flag to cache to says force replace the image in the cache with the new one.

OHIF Office Hours Notes 2022-11-25

Nifti support for OHIF

A: Development is done, need approval to open source from our industry collaborator

Volume viewport in acquisition view is wrong for non-axis aligned datasets

A: This is a bug, and should get fixed

Announcements by Bill:

Now there is an ability to query a single backend from multiple data sources / ?
datasource=datasoucenam

Bill showed flexView.ai viewer which loads HTJ2K images by default, and deduplication metadata format which is quite smaller than normal dicomweb format.

Before GZIP it is around 20x smaller metadata format for a large study. After GZIP (compared to dicomweb without Gzip) is around 100x smaller. Compressing to GZIP is usually slower than the transfer time, but if stored in GZip it is fast.

OHIF Office Hours Notes 2023-05-18

Q & A

How to use Hanging Protocol to append a new viewport on the existing one

The logic should be probably similar to how we do the `toggleOneUp`, so you can take a look at that. You can use the `viewportOptions` to change the viewport type to say volume.

How to request specific transfer syntax from servers

You can edit the `extensions/cornerstone/src/initWADOImageLoader.js` but there is an open PR to make it configurable [here](#)

Is there any way to switch between stack and volume viewport

Take a look at this example <https://www.cornerstonejs.org/live-examples/stacktovolumewithannotations>

OHIF Office Hours Notes 2023-01-12

Q & A

Q: A feature to generate PDF reports. A custom PDF report?

A: CS3D supports DICOM PDF. Create a display set from DICOM PDF. Look at `dicom-pdf` extension in OHIF as an example.

DICOM PDF modality can be PDF, SR, DOC

Hanging protocols originally does not support mounting the PDF, you might need to change that

Q: Crosshairs sync (refactored), how to give back to the community.

A: sync in world coordinates (the centers); disregard camera; for rotation: perhaps use the handles to calc rotation and sync with other viewport

Q: Tailwind does not work in custom extensions Also how to include a CSS framework in extension development. How to use Sass CSS. There is something strange in the build.

A: there might be a PR that fixes/helps the problem? Ordering matters for webpack - perhaps have the sass-loader last? The suggestion is to stick with tailwinds. Maybe OHIF cli should insert a path to custom extension into the tailwind.config.js file (someone tried and this works)

Q: Hanging protocol module: is there a way to filter/organize/rearrange images individually inside a series.

A: related to PR#3058 Adapt what is in 3058 and create new display sets with the custom ordering/filtering; leave the unfiltered display sets

Q: How to change the color of segmentation in OHIF v2. Is there any global config to change color & segment_label used by HighDICOM, how to use/render it in the SEG panel in OHIF v3

A: color is encoded in DICOM SEG metadata (i.e. in tags); near future can be changed in UI via a colour picker

Q: How to load a SEG automatically in OHIF v3

A: expected behaviour is it will not work; try editing the HP to match the SEG (UID) in the series matching rule; criteria modality=SEG; custom attributes have to be registered

Q: Load a lossy series, and then replace it with a lossless file

A: possible with htj2k progressive rendering; Currently not possible with JPEG lossless. Caching in CS3D does not support bypassing if image is cached - alternatively perhaps need another loader to fetch higher res image and replace cached image;

Another option is to change the imageid in the display set (e.g. id-lossless)

Enhance loader to be a progressive/streaming loader; single request; after a certain size loaded, automatically deliver lossless at a later time (after 100k). This might be better because there is an overhead for each request and this option is a single request (per image).

OHIF Office Hours Notes 2023-01-26

Q & A

If I want to split a displaySet into separate portions and show them inside the study panel, how can I do that?

A: create your own thumbnail panel study browser. May need a custom study browser to handle double click and the drag and drop. Perhaps in HP service or custom service, to get image ids for unique (display set/thumbnail) id and then go to cornerstone viewport and set the image id index

Chest CT nodules, each nodule spans multiple slices, and each nodule has a separate labelmap.

A: We already have support to show polyData actors in cornerstone viewport (<https://www.cornerstonejs.org/live-examples/polydataactormanipulationtools>) you can use marching cubes from vtk.js to generate closed surfaces and render them in out volume_3d viewport

<https://kitware.github.io/vtk-js/examples/VolumeContour.html>

What does segmentation data look like in OHIF.

A: OHIF reads DICOM seg (modality) There is a limitation that segmentations cannot overlap. If there are overlaps, create separate segmentations making them mutually exclusive. OHIF shows warning when segments overlap. We are looking into solving the overlap problem. Segments within the SAME segmentation cannot overlap.

Perhaps encode the segmentations as binary RLE??? for performance improvement over DICOM.

Create segmentation using createAndCacheDerivedVolume right after sending the request for one slice. When the backend responds, insert data in 3D segmentation volume. This makes the data ready for the service in the cornerstone cache. Look at segmentation rendering example in cornerstone: <https://www.cornerstonejs.org/live-examples/segmentationrendering>. OHIF is listening to CS seg events, and adds it to the segmentation service.

If using DICOM use makeDisplaySets and the rest is handled by OHIF - might need to add the display set.

OHIF Office Hours Notes 2023-09-14

Q & A

Q: Can I change the opacity of the overlaid dicom? Can I get the information of the slice where a particular annotation is drawn?

A: Look at hanging protocol the `ptDisplaySet`. Ultimately it is the `ColorMap` that is set. Already implemented in OHIF (`jumpToSlice`) inside `OHIFCornerstoneViewport`. There is a utility in `CS3d`.

Q: I think we found 2 bugs in OHIF that can be tested here

A: The double click issue might be related to PR 3591. Likely in the `toggleOneUp` command. Please log a bug for the second issue.

Q: I want to load tailwind config files via extension. My goal is without modifying OHIF code to update the changes, that way i can maintain the UI changes in extension. Share your thoughts/Ideas.

A: Feel free to update the core tailwind config file.

Q: Is there any config/option to check study/series/image loading time.

No there is not. `cornerstone.cache._imageCache (loadTimeInMS)` Maybe look at adding a stack prefetch event.

Q: ReferenceLines are moving when we use other tools like Zoom or Pan. Can we make the reference lines full width to canvas, and not moving with other tool interactions?

A: It is intended to work as it is to give an idea of the slice location in the other view(s). Look at `referenceLinesTool` - look at `renderAnnotation`. Consider adding a configuration option.

Q: Why is the release branch not named with the version (e.g. 3.0.0)? Current strategy makes it hard to reference a specific version - need to use hash.

A: Perhaps use tags instead

Q: Can I load the input files in chunks? I am trying to run OHIF viewer as a desktop application. I have a local dicom web server which starts as part of the desktop app which loads binary dicom files from a folder. This data can be as big as 8000 instances.

A: Maybe do a couple of passes? 1. Javascript dicom-parser has a 'until tag' so you can just read the metadata (and not the metadata) maybe?

Q: A follow-up question to <https://github.com/OHIF/OHIF-Office-Hours/blob/main/notes/2023-09-07.md#q-also-is-it-possible-to-load-not-the-image-as-a-whole-but-to-load-it-in-tiles-based-on-the-zoom-level>

A: Probably we need a script for it. But certainly, the WSI does not. In addition you might want to check if your system can render 16 bit textures which cs3d supports, (PR for OHIF not merged yet, but I will create one soon) [Link to WebGL Report](#) to check if you have support for EXTtexturenorm16

Related PRs <https://github.com/Kitware/vtk-js/pull/2058> and <https://github.com/OHIF/Viewers/pull/3292/files>

Q: We are trying to migrate from OHIFv2 to v3. We are following the ohif-json approach for data sources. What I want to know is – is it backward compatible?

A: In v2 there are not these 4 tags: BitsAllocated, PixelRepresentation, PhotometricInterpretation, Rows, Columns might not be needed in v2.

Q: Hey, will you be looking to add support for other files like trk (stream file) or vtk in the future?

A: Not in the roadmap but you can add it as an extension.

OHIF Office Hours Notes 2022-10-20

How to visualization Segmentation on OHIF v3

A: DICOM SEG is being added very soon, and will be available in the next release. We are doing QA testing on it now. There are certain libraries you can use to convert your formats to DICOM SEG such as <https://github.com/herrmannlab/highdicom> <https://qiicr.gitbook.io> <https://github.com/razorx89/pydicom-seg>

Interaction issue with Thumbnail List

A: Dan needs to design the thumbnail panel, since right now if you have a study that has a lot of priors, it brings a double scroll bar. We need a better design.

Idea of adding Material UI to OHIF

A: Not on the roadmap currently, but extensions can still use it if they install it.

Mobile support for OHIF v3

A: Known issue, but no funding is secured for it currently. We are happy to accept PRs for it.

OHIF Office Hours Notes 2023-03-16

Q & A

Clicking on volume viewport3d and change the other viewports based

Maybe look at MIP Jump To Click example? <https://www.cornerstonejs.org/live-examples/mipjumptoclick>

Is there any plan to Delete Study from the server

Not in the immediate future.

Hosting from a sub-directory for the OHIF v3

routerBasename in the config and PUBLIC_URL should be set correctly

DICOM Segmentation object editing

Cornerstone3D developments are done <https://www.cornerstonejs.org/docs/examples> we are working on the OHIF integration - will be added as new mode that lets you create the segmentation.

Can isNegative flag be decided based on the scaling params

We can change to min and max calculation on the worker

How to perform MIP on viewports that are not full MPR

See example <https://www.cornerstonejs.org/live-examples/volumeapi>

Server-side rendered via Next.js can OHIF be part of it

Perhaps use the 'use client' flag in the Next.js?

<https://beta.nextjs.org/docs/rendering/server-and-client-components>

Any way to suppress the “cross origin isolation is not enabled” popup in the demo app?

showWarningMessageForCrossOrigin flag in the config

Should we preserve camera information when changing layout

- How is the positioning/wl stored?
 - Currently stored by display set UID plus viewport initial information
 - Proposal to store the information in two pieces:
 - Positioning - based on the display set UID + initial hanging protocol positioning specified
 - Window Level - based on the display set UID + initial hanging protocol window level specified
 - General consensus is definite yes - the information should be displayed consistently/stored between views but not when a new series is getting dragged and dropped into the viewport
-

OHIF Office Hours Notes 2023-03-02

Q & A

For some reason the installViewer does not update the ohifViewerConfig. Even flushing session storage cache does not help. However, something is reusing the old config.

See issues 1374, 2615 and 2245.

A: Perhaps try embedding as an iframe? Maybe just change the data source?Alireza to create an issue describing how to proceed.

In cornerstone-legacy, nifti loader. Can we use itk wasm for decoding?

A: itk wasm is on the roadmap, but not immediate. We use nifti loader js which seems to be fine for loading speed.

In cornerstone-legacy, Can we control the sequence of images? Suppose I want to load middle first, and to the top

A: There is a stack prefetch tool (in cornerstone tools) - stackprefetch.js - logic is there. Perhaps need to configure it not to sort and just feed the data in as per your liking. Perhaps just set the initial image?

When will HTJ2K come to OHIF v3?

A: It will, but not immediately.

Should DICOM SR show full series or just images that have annotations?

A: ICU doc maybe just wants to see images that have findings. For a radiologist, maybe it is not a problem, but then they have the series

<https://www.cornerstonejs.org/live-examples/stacktovolumewithannotations>

HighDICOM generated DICOM SR is not hydratable inside OHIF

A: Look at MeasurementService to determine why measurements in SR are not hydrated. measurementServiceMappings (folder) might give further clues. We can only hydrate SRs tagged with “cornerstone” tags for the tracking identifier. However, look at cornerstonejs adapters to map (maybe write an OHIF extension that adds the adapter(s)) from SR to OHIF/cornerstone’s measurement state. Will need to change isRehydratable too.

OHIF Office Hours Notes 2023-07-27

Q & A

Q: We have a US dataset that we are trying to use DICOM SEG approach along with an instance segmentation model. We face a lot of issues with reading the generated SEGs with OHIF (masks not superposed on the image). We tried to generate the SEGs using both highdicom and dcmqi but the problem persists.

Stack viewport segmentation is not supported but we are working on it.

Which features in OHIF use which datastore apis? I am working on the OHIF-AWS-HEALTHIMAGING adapter and it works for the study list and launching the viewer, but I only have 2-3 apis implemented. I want to know which features might break because of this.

we just added documentation on which end points are necessary for a custom data source

<https://docs.ohif.org/platform/extensions/modules/data-source#custom-datasource>

For V3, certain browsers/graphic card setups seem to have issues rendering V3 viewport. I'm on Chrome Mac M1, and it only works if I have hardware acceleration on. Have seen some windows setup using chrome, where hardware acceleration doesn't make a difference, on or off

<https://github.com/OHIF/Viewers/issues/3207>

Cornerstone3D Annotations are not removed when we make Crosshairs tool passive. It seems that there might be some bugs with measurements.

Passive state does not make a tool disappear.

<https://www.cornerstonejs.org/docs/concepts/cornerstone-tools/tools#tool-modes>

Window Level auto computation uses the first image in the series. Is there a way to use the middle image instead? It is creating a problem with series that has air in the first images

Window level in Stack Viewport is per slice and gets fixed once the user changes it.

OHIF Office Hours Notes 2023-06-29

Q & A

What's the easiest way to display an image mask in the viewport?

Context: Have an image being displayed in a viewport, have a boolean mask? Suggestion: Display like a DICOM overlay by adding the right tool annotation instance to the object.

<https://github.com/OHIF/Viewers/pull/3163> is the PR that includes this.

When are we going to support measurement in microscopy?

It is already supported

OHIF Office Hours Notes 2023-07-13

Q & A

cornerstoneDICOMImageLoader.wadors.metadataManager.get('generalSeriesModule', imageId) is giving undefined metaData for some of the dicom files. I'm using the same file i.e. 'createImageIdsAndCacheMetaData.js' from the helper folder. Is there any particular reason of giving undefined. Because of this I'm unable to render the image in the viewport.

<https://rawgit.com/cornerstonejs/dicomParser/master/examples/dumpWithDataDictionary/index.html>

We might also not have the module you are requesting for the metadata

Some DICOM images are not being rendered correctly on OHIF Viewer when we use Google Data Source, however it's working fine if we use local data source(uploading the DCM file at /local) I think @cornerstonejs/dicom-image-loader is used for parsing DICOM files on local data source, and dicomweb-client is used to retrieve metadata on web data source(AWS, Google, ...). This can be the reason for this issue? I want to figure out why some DICOM files are blurry on the viewer

Try it in Orthanc and dcm4chee

- Download the Orthanc docker compose from here <https://ohif-assets.s3.us-east-2.amazonaws.com/orthanc/Archive.zip>
- Run docker-compose up
- Upload to orthanc via <http://localhost/app/explorer.html#upload>
 - Or use the ohif ui
- `APPCONFIG=config/localorthanc.js yarn dev`
- See if it works

Also... Check the google transfer syntax Go to the orthanc data source configuration, set `requestTransferSyntaxUID` to the one seen from google. Check/compare the images Check that you are running an updated OHIF version with updated Image IO libraries.

Is there an easy way to convert from number of pixels into area (mm²)? For example, let's say we have a mask/segmentation (array of true/false values) on the underlying viewport image and we want to calculate the mask area

count the number of pixels _ row pixelSpacing (mm) _ column pixelSpacing (mm)

When using OHIF in combination with DCM4CHEE secured with keycloak, I am running into an error: "Uncaught (in promise) TypeError: user is null" in reference to this code:

```
const userManager = initUserManager(oidc, routerBasename); const getAuthorizationHeader = () => { const user = userAuthenticationService.getUser(); return { Authorization: Bearer $ {user.access_token} }
```

Do you know how to correctly get the user and subsequently the token?

Answer:

A new PR for replacing the library can be found here <https://github.com/OHIF/Viewers/pull/3041>
You might be able to just use the newer library

We can move the oidc stuff to an extension I guess

I've hit this same issue, you can add `if (!user) { return; }` for now, and the second time the function is called the user will be present. I think even with a new library you will have the same issue, it's just a bug. - Erik

OHIF Office Hours Notes 2022-12-15

Q & A

Q: Performance issues with request pool manager (not 100% sure if it is the pool)

There are certain priorities and within each there are orders

Sometimes the user will interact (assume there are a lot of prefetch requests), interaction is fired but the bandwidth is full.

Maybe we should cancel ongoing requests of less priority?

A: In Canceling client needs to send cancel request to server, and by that time server has buffered the response. So basically, canceling/suspend might not be ideal

Gigabit bandwidth helps a lot for sure for client side rendering.

HTj2K can encode with TLM markers so that later during decode you can say give me 128x128, then to 256x256

Progressive loading might be the solution <https://chafey.github.io/openjphjs/test/browser/index.html>

Q: Idea of Slab viewport for StackScroll for extremely large volumes that don't fit into WebGL Is it worth to treat volume as stack (like 32 slices),

512x512x1300 Slice that doesn't fit in memory

A: We added PRs `vtk.js` for `norm16` and half float recently that might help. But the idea seems interesting.

<https://webglreport.com/?v=2>

OHIF and Firebase:

Firebase app credentials to get transferred to OHIF and OHIF only gives access to those who have credentials. Currently, we are doing accounts created in Google SDK and Firebase using OpenID Connect. DICOM images are stored in Google Healthcare API.

Answer:

- [Google Config for OHIF v3](#)

- You can setup your OAuth Client in the Firebase by
 - Firebase, authentication -> providers -> Add New Provider -> Google -> Web SDK Configuration
 - Open the same project in Google Cloud Console Credentials
 - Make sure they have the right origin for OHIF and It should supports redirect urls, and deploy url
 - Get the client ID and client secret from the top right and put it in the firebase
 - Emails can get added to the firebase

CORS issues in firebase can get resolved by putting a firebase.json file in the root of OHIF, see below

CORS in TMTV

Why the TMTV needs CORS but not others

Answer:

- TMTV uses Volume viewports which use SharedArrayBuffer and it has security requirements
- <https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/GlobalObjects/SharedArrayBuffer#securityrequirements>

Hanging Protocol Matching

TMTV hanging protocol has loose criteria for the matching which works on the study level metadata

Answer:

- The reason for this is the lazy loading of the series metadata which returns high level metadata
- CorrectedImage tag ideally can be used to accurately find the attenuated and unattenuated displaySets
- We can turn off the lazy loading to get access to instance level metadata but that will be a huge bottleneck for the large studies
- Middle ground (which is not implemented) is to fetch one instance from each series and from that we can have richer metadata

Extra notes on CORS for Firebase

```
js "hosting": { "public": "platform/viewer/dist", "ignore":
["firebase.json", "**/.*", "**/node_modules/**"], "rewrites": [
{ "source": "**", "destination": "/index.html" } ], "headers": [
{ "source": "**/*", "headers": [ { "key": "Cross-Origin-Embedder-
Policy", "value": "require-corp" }, { "key": "Cross-Origin-
Opener-Policy", "value": "same-origin" } ] } ] }
```

OHIF Office Hours Notes 2023-10-05

Q & A

Attendees: 15

Q: I am trying to execute a block of code in the endcallback of an annotation tool like LengthTool. Is there a simple way to do this for multiple tools?

A: Listen to the ANNOTATION_COMPLETED event. You can use `eventTarget.addEventListener` from the `@cornerstonejs/core` package.

Q: Is the volume rendering (specifically WebGL context lost) problem in ios17 resolved?

A: Half_float seems to work for some reason, but seems like there are other reported issues from unity and threejs communities if you search google.

Q: Are there any concerns with using Composite vs. Average_Intensity in getCornerstoneBlendMode for PET Images?

A: See [GitHub PR 2093](#) for related discussion. But the proper way to handle this is to add a new blend mode that does linear opacity change.

Q: Are there any tools for controls of a volume for Window/Level, Opacity, Threshold?

A: Check out [OHIF Viewers PR 3664](#) and [OHIF Viewers PR 3522](#).

Q: The Probe tool currently operates on the current CT Volume, how can it be used to show values for all fusion volumes?

A: Seems like our configuration is not set up to handle this. We need to add a new configuration option (volumeIds) to handle calculating the statistics for all volumes.

Q: Crosshairs tool with combo of volume and stack viewports. How to restore the camera for volume viewport?

A: You can store the previous camera and set it afterwards. See `extensions/cornerstone-dicom-seg/src/commandsModule.ts` and `extensions/cornerstone-dicom-seg/src/utils/hydrationUtils.ts`.

Q: How can we enable half float (Int16) in OHIF/Cornerstone 3D examples?

A: In the OHIF configuration, set `use16BitDataType: true`. Also, refer to the `init.js` file in cornerstone for further settings.

OHIF Office Hours Notes 2023-02-09

Q & A

Cannot set colormap for stack viewport via setColormap

A: The manual way of applying a colormap works, so please go ahead with implementation and creating of a PR.

Brush tools in OHIF is missing

A: We understand that. It requires some development at our side to integrate the segmentations fully inside OHIF. Right now segmentations require volumeViewport, so upon click of the button we should switch the stack to volume viewport.

Multiframe measurement drawing, has a bug for jumping measurements drawn not on the first slice. It requires two steps

A: That is a bug, and we will investigate

isViewportPrescaled cause error on the first time, but not on the second time

A: race condition since the imagedata is not available when the series is loading and the annotation is being added.

How is the structure of the wado static dicom loader laid out, what happens if the metadata is not deduplicated, or the bulkdata is not extracted.

A:

Three directories, 1) instances 2) deduplicated 3) studies

Studies -> standard dicom web directory, main thing different is path are file path. /studies -> returns /studies/index.json.gz. It also contains all dicom web queries: series level metadata files, bulkdata and pixelData and thumbnails (single file part image jpeg).

Deduplicated -> number of json files that are hash codes that end in json.gz. Hash code and timestamp in the file is used to detect changes.

It depends on the deduplication of the data to detect changes -> it won't work

Crosshairs synchronization

A: The crosshairs probably should fire a `annotation_modified` which can be used to handle synchronization between crosshairs

DisplayArea changes on the stack viewport

A: The PR is almost ready, and we agreed on the surface API.

Working with extension and modes outside of OHIF

Better separation of custom extensions, previously embedded in the same OHIF repo, but I want to leave it out. There are some link/dev issues

- Dev webpack is missing in the templates
- There were some issues with the CLI which is fixed, so maybe this fix it <https://github.com/OHIF/Viewers/pull/2892>

Integrate OHIF v2 on mobile devices

react-vtkjs-viewport library seems to have problem on Safari.

- Chrome works fine

Compression of DICOM files

What is the current status of compression of DICOM files support?

- All compression transfer syntaxes are supported
- New compression via HTJ2K will eventually be supported in CornerstoneWADOImageLoader, some initial work has been done in <https://github.com/cornerstonejs/cornerstoneWADOImageLoader/pull/451>

ID vs URI

Cornerstone3D Volume Image Loader is not the same as CornerstoneWADOImageLoader image loader, for the reason of performance optimization. In the Volume Image Loader, we skip the image creation step and directly use the image data from the DICOM file and insert it into the volume. This is a big performance improvement for large volumes. However, it might introduce some difficulties regarding caching API and features.

OHIF Office Hours Notes 2023-09-21

Q & A

Q: I am experiencing slowness when I load multiframe BTO studies. How can I measure image download/cache time, decompression time, and rendering time?

A: You might find Pull Request 667 to be helpful for tackling this issue.

Q: How can I change the UI theme without altering the OHIF core code, preferably via an extension?

A: Modifying Tailwind via extensions is not straightforward. Your best option might be to directly update the `tailwind.config.js` file. You can find more information [here](#).

Q: How can I use OHIF's existing annotations through an extension?

A: You should check out the DICOM SR restore code, as it takes DICOM Structured Reporting objects and converts them back into Cornerstone 3D or OHIF annotations, which are then rendered on the display.

Q: If I alter the source code of Cornerstone 3D, how can I build it and integrate it with OHIF?

A: The documentation on OHIF development, specifically the [link section](#), could guide you on how to go about this.

Q: How can I use a custom backend that supplies DICOM instances compatible with OHIF?

A: You should follow the DICOM JSON data source documentation. When initializing the mode, you should set your own implementation of the user authentication service.

Q: What exactly is a displaySet in OHIF?

A: A displaySet is a generalized collection of entities that includes links to various objects that can be displayed, such as images. The concept is mostly used in the context of hanging protocols, where users might want to view different series in a particular arrangement.

Q: How can I run OHIF in development with different routerBaseName than /?

A: To accomplish this, you should look into the devServer configuration within the webpack.pwa.js file. For more details, visit [Webpack Dev Server](#).

Q: I'm embedding OHIF in an iFrame and am encountering issues with custom configurations not taking effect.

A: The problem might be that the onLoad event fires before OHIF is fully loaded and capable of accepting new configurations. A potential solution is to have the iFrame inform the parent window when it is ready to receive the new configuration. Additionally, you can use the onConfiguration hook in the app's configuration file to solve this issue.

OHIF Office Hours Notes 2023-06-08

Q & A

How to integrate with Google Healthcare API

You can take a look at the config/google.js for the example

Similar UI will be available in the next release.

Is there an existing touch events for mobile for OHIF

The development in the cornerstonejs is done

<https://www.cornerstonejs.org/live-examples/stackmanipulationtoolstouch>

However, we need to integrate this into OHIF.

What is the offline support for OHIF

It is doable through service workers

CORS issues for MPR and MIP which use SAB, and why Image loading from different origin works but not MPR SAB

https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/SharedArrayBuffer

cross origin isolation just means that the client page has some policies defined for cross origin requests

One is opener policy:

COOP will process-isolate your document and potential attackers can't access your global object if they were to open it in a popup, preventing a set of cross-origin attacks dubbed XS-Leaks. so If a cross-origin document with COOP is opened in a new window, the opening document will not have a reference to it, and the window.opener property of the new window will be null

The other policy is Cross-Origin-Embedder-Policy which we are setting it in the header as require-corp. This means that A document can only load resources from the same origin, or resources explicitly marked as loadable from another origin.

If a cross origin resource supports CORS, the crossorigin attribute or the Cross-Origin-Resource-Policy header must be used to load it without being blocked by COEP.

The important part is resources explicitly marked as loadable from another origin

rendering ECG

We have an experimental ECG Viewer here <https://ohif.org/modes/radical-imaging-ecg-mode> and there is another effort here <https://github.com/PantelisGeorgiadis/dcmjs-ecg>

How to debug dicom image loader

You can run it with `yarn run webpack:dynamic-import:debug`

OHIF Office Hours Notes 2023-07-06

Q & A

Update Datasource with new configs

PR 3427 enables re-configuring the datasource with the new configs. It should be also noted that the ExtensionManager should also be updated with the new configs.

How can I construct a 3d model and render it in the viewport?

You can use `vtkimageMarchingCubes` which is available in the `vtk.js` library. Also there is a new isocontouring tool that was recently announced but most likely not available in the web yet. See here <https://www.kitware.com/really-fast-isocontouring/>

cornerstone3D and vue.js

There shouldn't be any problem in using, you can search vue in the cornerstone3D repo to see if similar issues were reported.

How to know when a volume is fully loaded with pixelData

VOLUME_LOADED event is basically saying the empty volume has loaded in the cache and does not mean the volume is fully loaded with pixelData. There is no event for that, but we should add it, it should go inside the updateTexture in BaseStreamingImageVolume class. (I will add it)

OHIF Office Hours Notes 2023-03-23

Q & A

Mitigation of the security concerns for the dynamic config

The proper way to handle CORS is to set the same origin. The regex might not be safe either, if redirects happen as part of the attack.

Segmentation Export Adapter

The original adapter was written for cornerstoneLegacy, and we need to write the new logic for the cornerstone3D. Meanwhile you can use png exports if that will help you

See

extensions/cornerstone/src/utils/CornerstoneViewportDownloadForm.tsx platform/ui/src/components/ViewportDownloadForm/ViewportDownloadForm.tsx

Authentication

You can take a look into one of our oidc configs here

platform/viewer/public/config/google.js

You can take the token and use the following code to inject it

```
js UserAuthenticationService.setServiceImplementation({
  getAuthorizationHeader: () => ({ Authorization: "Bearer " + token
  }), })
```

OHIF Office Hours Notes 2022-12-01

Quire.ai has a free app available on both Mobile (iOS/Android) and Desktop platforms. It is currently implemented on cs-legacy since cs3d does not have touch support yet, but we are in the process of adding touch events here <https://github.com/cornerstonejs/cornerstone3D-beta/pull/247>.

A tool that takes a seed point that does region growing in 3D An example is here for 2D <https://openlayers.org/en/latest/examples/region-growing.html>

A: This is a fairly computationally expensive operation, and we would need to do some profiling to see if it is feasible. It would be a good candidate for a web worker. and GPU acceleration.

You could use another segmentation tool, grow cut <https://github.com/JamesAPetts/ohif-step>

<https://github.com/OHIF/ohif-cornerstone-spherical-growcut-extension>

ITK might have region growing that could be compiled for web <https://github.com/InsightSoftwareConsortium/itk-wasm>

FreeHandROI metrics statistics, how to understand a point is inside a polygon

A: here are various methods available, such as the ones described here

https://en.wikipedia.org/wiki/Point_in_polygon#:~:text=One%20simple%20way%20of%20finding,an%20even%20number%20of%20times.

FreeRotateTool as was in Cornerstone legacy, how to implement it in Cornerstone 3D

A: It should use viewUp from the camera

<https://tools.cornerstonejs.org/examples/tools/rotate.html>