



Cerner
**code Learning
Lab** 2019

Troubleshooting Cerner Ignite APIs for
Millennium

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Setup

Setup



http://bit.ly/chc_learning_lab

Select “Troubleshooting”

Need to download Postman or use your favorite REST Client

Dos and Don'ts

Do

- Do try to recreate (in sandbox)
- Do note the X-Request-Id (correlation id) header in the response
- Do note the error message in the response
- Do double-check the documentation
- Do use debugging tools, if available

Don't

- Do NOT compromise PHI/PII
- Do NOT compromise secrets
- Don't ignore errors
- Don't assume it was a fluke

Help

HTTP Spec

<https://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html>

10.2.1 200 OK

The request has succeeded. The information returned with the response is dependent on the method:

GET an entity corresponding to the requested resource is sent in the response;

HEAD the entity-header fields corresponding to the requested resource are sent in the response

POST an entity describing or containing the result of the action;

TRACE an entity containing the request message as received by the end server.

10.2.2 201 Created

The request has been fulfilled and resulted in a new resource being created. The newly created resource is identified by a Location header field. The response SHOULD include an entity containing a list of resources in the same format as specified by the media type given in the Content-Type header field. The origin server SHOULD respond with 202 (Accepted) response instead.

A 201 response MAY contain an ETag response header field indicating the current value of the resource.

10.2.3 202 Accepted

Beyond HTTP Spec

https://en.wikipedia.org/wiki/List_of_HTTP_status_codes

418 I'm a teapot ([RFC 2324](#))

This code was defined in 1998 as one of the traditional [IETF April Fools' jokes](#), in [RFC 2324](#), *Hyper Text Coffee Pot Control Protocol*. It was defined by the IETF to be returned by teapots requested to brew coffee.^[50] This HTTP status is used as an Entity tag.

421 Misdirected Request ([RFC 7540](#))

The request was directed at a server that is not able to produce a response.^[52] (for example because of a connection reuse)^[53]

422 Unprocessable Entity ([WebDAV](#); [RFC 4918](#))

The request was well-formed but was unable to be followed due to semantic errors.^[16]

423 Locked ([WebDAV](#); [RFC 4918](#))

The resource that is being accessed is locked.^[16]

424 Failed Dependency ([WebDAV](#); [RFC 4918](#))

The request failed due to failure of a previous request (e.g., a PROPPATCH).^[16]

426 Upgrade Required

A series of small, light-blue navigation icons typically found in web browser toolbars, including symbols for back, forward, search, and refresh.

HL7 FHIR Spec

<http://hl7.org/fhir/dstu2/http.html#summary>

Interaction	Response				
	Content-Type	Body	Location	Versioning	Status Codes
read	R	R: Resource	N/A	R: ETag , Last-Modified	200 , 404 , 410
vread	R	R: Resource	N/A	R: ETag , Last-Modified	200 , 404
update	R if body	O: Resource (Prefer)	R on create	R: ETag , Last-Modified	200 , 201 , 400 , 404 , 405 , 409 , 412 , 422
delete	R if body	O: OperationOutcome	N/A	N/A	200 , 204 , 404 , 405 , 409 , 412
create	R if body	O : Resource (Prefer)	R	R: ETag , Last-Modified	201 , 400 , 404 , 405 , 422
search	R	R: Bundle	N/A	N/A	200 , 403 ?
search-all	R	R: Bundle	N/A	N/A	200 , 403 ?
conformance	R	R: Conformance	N/A	N/A	200 , 404
transaction	R	R: Bundle	N/A	N/A	200 , 400 , 404 , 405 , 409 , 412 , 422
history	R	R: Bundle	N/A	N/A	200
history-type	R	R: Bundle	N/A	N/A	200
history-all	R	R: Bundle	N/A	N/A	200
(operation)	R	R: Parameters/Resource	N/A	N/A	200

Note: this table lists the status codes described here, but other status codes are possible as described by the HTTP specification. Additional codes that are likely are server errors and various codes associated with authentication protocols.

<http://fhir.cerner.com/millennium/dstu2/#client-errors>

Client Errors

There are seven possible types of client errors on API calls that receive request bodies:

- 1 Failing to send a required query parameter will result in a `400 Bad Request` response.

HTTP/1.1 400 Bad Request

no supported search parameters provided

- 2 Requesting the secure endpoint (non-`open`) without valid credentials will result in a `401 Unauthorized` response.

HTTP/1.1 401 Unauthorized

- 3 Requesting data from an unknown instance or an instance where the application is not authorized will result in a `403 Forbidden` response.

Ignite Documentation cont.

Or by resource...

<https://fhir.cerner.com/millennium/dstu2/scheduling/appointment/#errors-2>

Errors

The common [errors](#) and [OperationOutcomes](#) may be returned.

In addition, the following errors may be returned:

- Updating an Appointment resource without sending the `If-Match` header will result in a `412 Precondition Failed` response.
- Updating an Appointment resource which is currently being modified will result in a `423 Locked` response.
- If the Appointment resource could not be updated because of an operation that is necessary for the update (eg. encounter association), `424 Failed Dependency` response will be returned.

Operation Outcome

Operation Outcomes

- It's a resource
 - <http://hl7.org/fhir/dstu2/operationoutcome.html>
- Limited use currently, better support in R4
- Fatal, error, informational, and warning

Operation Outcome Example

```
1 {  
2   "resourceType": "OperationOutcome",  
3   "issue": [  
4     {  
5       "severity": "fatal",  
6       "code": "required",  
7       "location": [  
8         "/f:DocumentReference/f:status"  
9       ]  
10      }  
11    ]  
12 }
```

Exercise 1

Exercise 1: Question

What error results when an Allergy Intolerance is created with a modifier extension?

Exercise 1: Answer

422, and an OperationOutcome

<http://fhir.cerner.com/millennium/dstu2/#operation-outcomes>

Create/Update

HTTP Status	Cause	Severity	Code
422	Body contained unsupported fields	error	business-rule
422	Body contained modifier extensions	error	extension
422	Body contained implicit rules	error	not-supported

Connection Issues

Firewalls

- Especially during initial install at site
- Can be to your application
- Can be to OAuth, SMART, or FHIR

Narrowing it Down

- Load a URL in the browser
 - For FHIR, the metadata endpoint can be used
- ping
 - Can it connect?
 - Is it only me?
- openssl
 - More in a bit

```
PING fhir-ehr.devcerner.com (10.162.143.6): 56 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
Request timeout for icmp_seq 2
^C
```

Certificates

- These can look like connection issues
- Most important: know how to debug your stack
 - Know how to add trust
- <https://www.ssllabs.com/ssltest/>
- openssl
 - `openssl s_client -showcerts -connect mysslhost.com:443`

Google is Your Friend

SUN | Monday, November 16, 2015

Installing Trusted Certificates into a Java Keystore

By: [James Connors](#) | Principal Solutions Consultant

As software environments continue to ratchet up security requirements, it's important to understand how to deal with digital certificates in more than a superficial manner. Most modern web platforms are not only mandating the use of SSL/TLS, but also to a greater extent shunning the self-signed variety and instead insisting on certificates issued by a trusted authority. When managing certificates in the Java environment, one of the first tools you'll encounter is [keytool](#), an integral part of the Java Development Kit.

How to Trust a Certificate in IE

By John Ruiz

 Share



Internet Explorer comes with some security features that check for the legitimacy of a website so you can safely share sensitive data with trusted online sources. This is useful for activities like online shopping, and it is the browser's job to make sure that it safely transmits the data to the trusted site so others won't see it. These websites use digitally signed certificates so the browser can read them and declare these sites as safe. However, other websites may use third party Certification Authorities to identify themselves as safe sites. Internet Explorer may block these third party certificates, which automatically renders the site inaccessible. You can change this behavior in

Client Errors

400 - Bad Request

- Syntax was wrong
 - Invalid parameters
 - Missing fields

401 - Unauthorized and 403 - Forbidden

- Authorization and Authentication
- 401 - You need to authenticate
- 403 - This isn't allowed
 - or.... 404?
- Additional information usually found in the “WWW-Authenticate” response header

404 - Not Found

- Check your URL!
- Not supported
- Accessing data without permissions

406 - Not Acceptable

- Accept header
- application/json or application/json+fhir
- _format parameter

412 - Pre-Condition Failed and 409 - Conflict

- Update or Patch
- 412 - No “If-Match” header provided
- 409 - Updating the wrong (outdated) version

415 - Unsupported Media Type

- Content-Type header
- application/json or application/json+fhir

422 - Unprocessable Entity

- JSON was fine - something else wasn't
- Most common when a value can't be interpreted
 - Mappings!

Exercise 2

Exercise 2: Question

What kind of error occurs when you request this server's metadata?

Method: GET

URL: https://fhir-open.devcerner.com/dstu2/fb8067d7-e012-4703-8888-17b86d11f0f8/metadata?_format=json

Headers: None

Exercise 2: Answer

Connectivity/Firewall

Could not get any response

There was an error connecting to https://fhir-open.devcerner.com/dstu2/fb8067d7-e012-4703-8888-17b86d11f0f8/metadata?_format=json.

Why this might have happened:

- **The server couldn't send a response:** Ensure that the backend is working properly
- **Self-signed SSL certificates are being blocked:** Fix this by turning off 'SSL certificate verification' in *Settings > General*
- **Proxy configured incorrectly** Ensure that proxy is configured correctly in *Settings > Proxy*
- **Request timeout:** Change request timeout in *Settings > General*

```
PING fhir-ehr.devcerner.com (10.162.143.6): 56 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
Request timeout for icmp_seq 2
^C
```

Exercise 3

Exercise 3: Question

What's wrong?

Method: GET

URL: <https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca>AllergyIntolerance?patient=4342012>

Headers: None

Exercise 3: Answer

406 - Not Acceptable

The screenshot shows a browser developer tools Network tab with the Headers section selected. The status bar indicates "Status: 406 Not Acceptable". The Headers list includes:

- date → Mon, 09 Oct 2017 22:59:18 GMT
- expires → Mon, 01 Jan 1990 00:00:00 GMT
- keep-alive → timeout=15, max=100
- pragma → no-cache
- server-response-time → 7.247486
- status → 406 Not Acceptable
- strict-transport-security → max-age=631152000
- transfer-encoding → chunked
- vary → Origin,User-Agent,Accept-Encoding
- x-content-type-options → nosniff
- x-frame-options → SAMEORIGIN
- x-request-id → c26af6b014d420945b4ee5a107aece93** (This header is circled in red)
- x-runtime → 0.000379
- x-xss-protection → 1; mode=block

Exercise 3: Fix It

URL: https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/AllergyIntolerance?patient=4342012&_format=json

Headers: None

OR

URL: <https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/AllergyIntolerance?patient=4342012>

Headers: Accept: application/json+fhir

Exercise 4

Exercise 4: Question

What's wrong?

Method: GET

URL: <https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/MedicationStatement?status=active>

Headers:

- Accept: application/json+fhir

Exercise 4: Answer

400 - Bad Request Parameters

New key
Body Cook
Pretty Ra
1 at lea

Name	Required?	Type	Description
_id	This, or patient	token	The logical resource id associated with the resource.
patient	This, or _id	reference	The identifier of a patient to list statements for. Example: 12345
status	N	token	The status of the medication statement, may be a list separated by commas. Example: active,completed
_count	N	number	The maximum number of results to return. Defaults to 50.

us: 400 Bad Request T

Notes:

- Either the `_id`, or a combination of `patient`, `status`, or `_count` parameters must be provided.

**http://fh
medication-statement/#parameters**

cations/

Exercise 4: Fix It

URL: <https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/MedicationStatement?status=active&patient=4342012>

Headers:

- Accept: application/json+fhir

Exercise 5

Exercise 5: Question

What's wrong?

Method: GET

URL: <https://fhir-ehr.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/Observation?patient=4342012>

Headers:

- Accept: application/json+fhir

Excercise 5: Answer

401 - Unauthorized

Body	Cookies	Headers (18)	Test Results	Status: 401 Unauthorized
		<p>date → Mon, 09 Oct 2017 18:23:20 GMT</p> <p>expires → Mon, 01 Jan 1990 00:00:00 GMT</p> <p>keep-alive → timeout=15, max=100</p> <p>pragma → no-cache</p> <p>server-response-time → 8.800746</p> <p>status → 401 Unauthorized</p> <p>strict-transport-security → max-age=631152000</p> <p>vary → Origin,User-Agent,Accept-Encoding</p> <p>www-authenticate → Bearer realm="fhir-ehr.sandboxcerner.com"</p> <p>x-content-type-options → nosniff</p>		

Exercise 5: Fix It

URL: <https://fhir-ehr.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/Observation?patient=4342012>

Headers:

- Accept: application/json+fhir
- **Authorization: Bearer ...**

Exercise 6

Exercise 6: Question

What's wrong?

Method: POST

URL: <https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/MedicationStatement>

Body: ... (see wiki)

Headers:

- Accept: application/json+fhir
- Content-Type: application/json+fhir

Exercise 6: Answer

404 - Not Found

A screenshot of a REST API testing tool interface. At the top, there are tabs for "Body", "Cookies", "Headers (21)", and "Test Results". The "Status" is displayed as "Status: 404 Not Found". Below the tabs, there are buttons for "Pretty", "Raw", "Preview", and "JSON" (with a dropdown arrow). A large, empty text area is labeled "1" at the top left, indicating the number of items in the list. The JSON response is completely blank.

Wait, what?

Server Errors

5xx

- 500 Internal Server Error
- 503 Service Unavailable
- Correlation or X-Request-Id!!

Asking for Help

Google Group

- Google Group
- <https://groups.google.com/forum/#!forum/cerner-fhir-developers>

Welcome to the Cerner FHIR Developers!

This group is here to support and answer questions about the Cerner implementations of SMART and FHIR.

First, a few rules...

- *Do NOT post your OAuth Bearer token or other security credentials on this group.*
- *Do NOT post any patient data (FHIR request bodies or response bodies), outside of our open sandbox value from our server response.*
- *Do NOT post URLs that are not part of our public sandbox to this group. We can get context from them.*
- *Do NOT post recruiting requests, job seeking requests, or advertisements.*

All the guidelines above are here to protect security and sensitive patient data. It's best to get in the habit of protecting this information even if it's not explicitly mentioned. If you're not sure what data is specific to this group, they would apply to all data your application will have access to, other public groups, and

How to ask a Question

In order to enable us to help everyone, we ask that you follow these guidelines when asking a question here:

1. **RIGHT PLACE?** Make sure the question belongs in this group.
 - For more general questions about FHIR, you may want to contact the FHIR groups documented in the sidebar.
 - For more general questions about SMART, see the SMART on FHIR group here: <https://groups.google.com/forum/#!forum/smart-on-fhir>
 - **We do NOT comment on future timelines in this group.**
2. **SEARCH.** Has the question already been answered?
 - Make sure to search the existing posts to see if someone else already asked this question, and if so, provide a link to the post.
 - Please read our documentation at <http://fhir.cerner.com/> to see if the documentation answers your question. The parameters we support are documented, along with **FAQs**, **SMART**, and **Authorization** documents.
3. **TAG.** Make sure to select the tag that best applies to your question or discussion.
4. **INVESTIGATE and DOCUMENT.** For Troubleshooting requests: provide a summary of any investigation done and the results checked?
 - Link to any documentation you're referencing.
 - Link to your application in the code console, if applicable.
5. **EXAMPLE.** For Troubleshooting requests: Provide a simple example that recreates the issue
 - **Ensure the simple example is in our public sandbox, not from a client site.**
 - If you have the example of an actual failure, provide the X-Request-Id (please do not provide real patient data).

Log a Service Record

- Found a possible issue?
- In eService:
 - <https://eservice.ucern.com/>
 - For Solution Family, select “Open Development Services”
 - For Solution, select “Cerner Ignite APIs for Millennium”

OAuth

OAuth

- Display to user
- `error_uri`
- Correlation Id
- <http://fhir.cerner.com/authorization/>
 - Compare to examples
 - Watch your scopes!

Exercise 7

Exercise 7: Question

What's wrong?

Method: NA - Just use browser

URL: `https://authorization.sandboxcerner.com/tenants/a758f80e-aa74-4118-80aa-98cc75846c76/protocols/oauth2/profiles/smart-v1/personas/provider/authorize?client_id=c4093c13-1ed1-47ef-95a6-a225d3e47023&response_type=code&redirect_uri=http://localhost:8080/foo`

Exercise 7: Answer

- Authorization error



An Error has Occurred

"Authorization Demo App" was attempting to request access to healthcare data with FHIR Play Millennium; unfortunately, the application doesn't appear to be compatible. If you require further assistance, please contact support.

If possible, please bookmark this page or take a screen shot of it to expedite the technical support process. For assistance, contact support via:

- E-mail: sample@provider-example.com
- Phone: 123-456-7890

Information to provide to Technical Support

Correlation ID: e8287672-822a-48bd-b75c-8c834a00473f

Information to provide to the Authorization Demo App

The requested redirect URL does not match the one registered for "Authorization Demo App".

Error Code: urn:cerner:error:authorization-server:oauth2:grant:invalid-redirect-uri

Cerner's developer portal ([https://developer.cerner.com](#)) contains information to assist in resolving this issue.

The Errors that Weren't

No Data

- Scenario: 200 response, but no data!
- Causes:
 - No access?
 - No data?
 - No data that matches filters?
 - Data that's not mapped...

Missing Data

- Scenario: 200 Response, but I don't see everything I expect!
- Causes:
 - User permissions
 - Security
 - Some data not mapped
 - Filtered for patient access

Bad Data

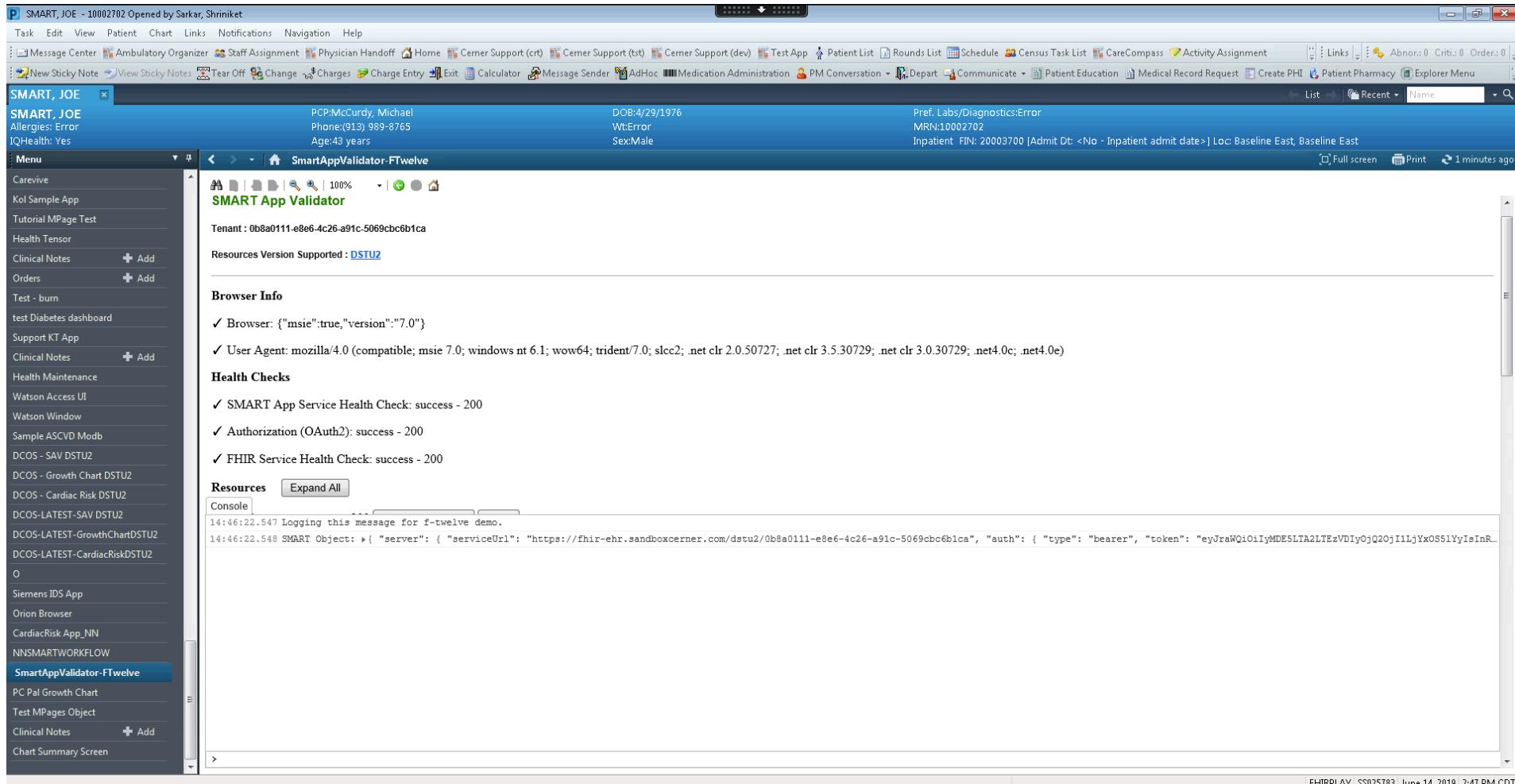
- Scenario:
 - Data is returned, but no codes
 - Data is returned, but some fields are empty
 - Data is returned, but not as expected
- Cause:
 - Most common: data is not mapped
 - Sanity check: ensure you see the data in Millennium (within Powerchart for example)

SMART TROUBLESHOOTING

Debugging / Troubleshooting

- Debugging SMART Apps in Powerchart
- TLS Issues
- Session Storage Concerns
- Debugging SMART Apps in MPages
 - SMART App loading cycle logs
 - SMART App console logs
- Domain Refresh Concerns
- Millennium Login Screen

App Debugging in Powerchart



Ref : <https://engineering.cerner.com/f-twelve/>

Ref : [Modern.IE](#)

TLS 1.0, TLS 1.1, and TLS 1.2

Error Message in Powerchart:

This page can't be displayed.

Turn on TLS 1.0, TLS 1.1, and TLS 1.2 in Advanced settings and try connecting to <https://xyz.yourapplication.com> again. If this error persists, it is possible that this site uses an unsupported protocol or cipher suite such as RC4 (link for details), which is not considered secure. Please contact your site administrator.

TLS 1.0, TLS 1.1, and TLS 1.2

Run a port query:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Windows\System32>portqry -n www.google.com -e 443
Querying target system called:
www.google.com
Attempting to resolve name to IP address...
Name resolved to 64.233.176.104
querying...
TCP port 443 (https service): LISTENING
C:\Windows\System32>
```

Session Storage - IE Powerchart

Issue:

- Limitation - Embedded IE browser
 - Does not partition off sessionStorage available to apps per tab (depends on *Cerner Millennium Powerchart* release)
- FhirClient.js : <https://github.com/cerner/fhir-client-cerner-additions>

Ref: <https://fhir.cerner.com/smart/#embedded-browser-control>

Session Storage - IE Powerchart

Recommendation:

- Use a Unique Identifier to partition off the storage for your app
 - You can use a UUID OR
 - You can use the state parameter available to your app after authorization
 - Avoid Session bleed : <https://github.com/cerner/fhir-client-cerner-additions>
- Flex apps implementation based on embedded vs stand-alone mode
- Avoid using sessionStorage

Ref: <https://fhir.cerner.com/smart/#embedded-browser-control>

SMART Apps in MPages

Possible Issues:

- Configured URL issue
- Configured URL updates do not show up in Powerchart
- Blank Screen - App does not load in an MPage
- Height Scaling - App loads without taking its full height on the screen
- iFrame Cookies Issue - P3P
- Other MPages considerations

Configuration URL Issue - Bedrock

- Correct URL:

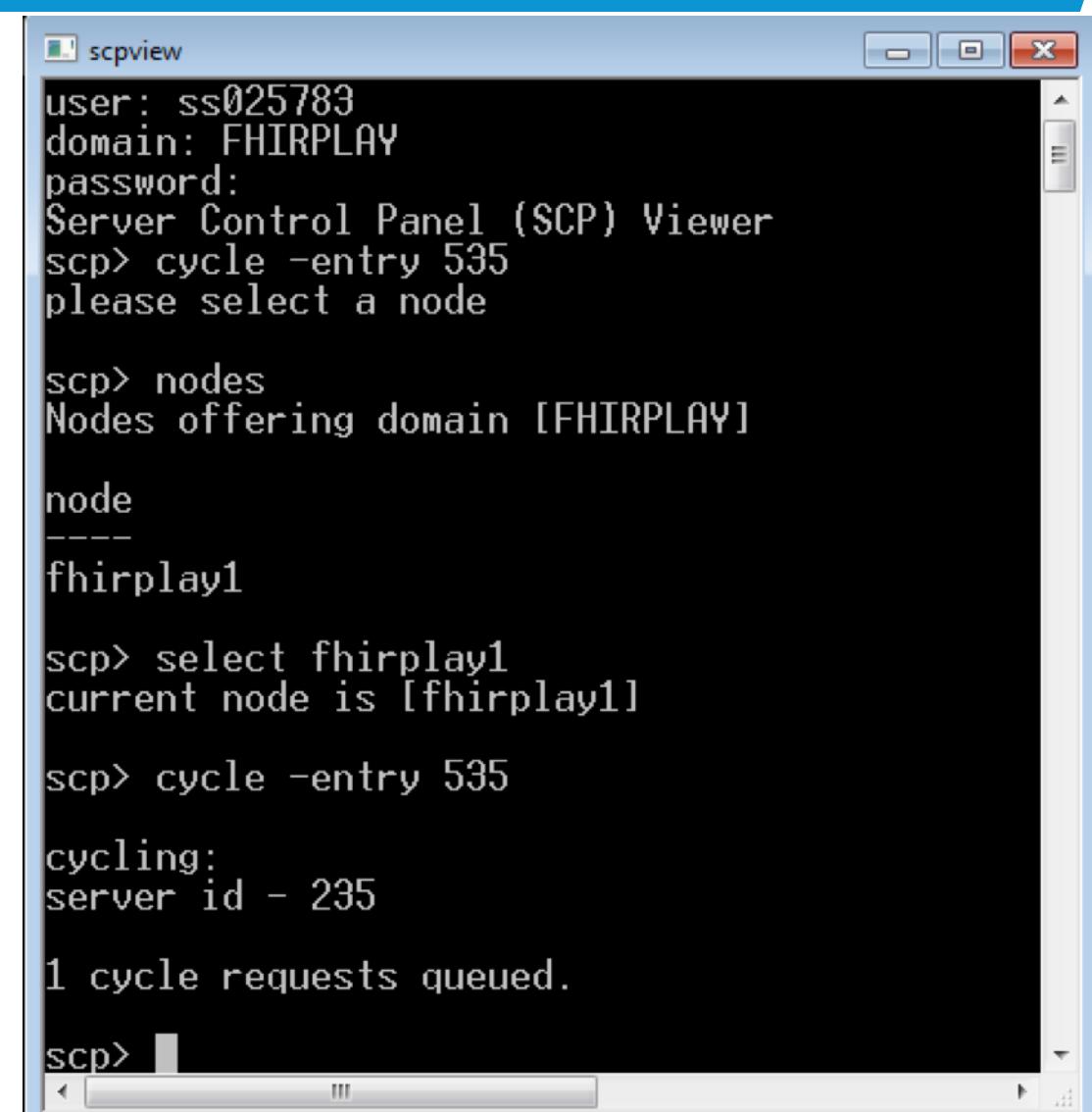
`https://smart.cerner.com/smart/{tenant_key}/apps/
[SMART_APP_ID]?PAT_PersonId={person_id}
&PAT_PPRCode={ppr_cd}&USR_PersonId={provider_id}
&username={username}`

- Incorrect URL:

`https://smart.cerner.com/smart/0b8a0111-e8e6-4c26-
a91c-5069cbc6b1ca/apps/[SMART_APP_ID]?
PAT_PersonId={person_id}&PAT_PPRCode={ppr_cd}
&USR_PersonId={provider_id}&username={username}`

SCPView Tool - Cycle Server

- Launch **scpview.exe**
- Commands:
 - nodes
 - select {node_name}
 - cycle -entry 535
 - cycle -query



The screenshot shows a Windows-style application window titled "scpview". Inside the window, a terminal-like interface displays the following text:

```
user: ss025783
domain: FHIRPLAY
password:
Server Control Panel (SCP) Viewer
scp> cycle -entry 535
please select a node

scp> nodes
Nodes offering domain [FHIRPLAY]

node
---
fhirplay1

scp> select fhirplay1
current node is [fhirplay1]

scp> cycle -entry 535

cycling:
server id - 235

1 cycle requests queued.

scp>
```

Blackbird Logger - Debugging in MPages

The screenshot shows the SMART in MPage application running on a Windows desktop. The main window displays the ASCVD Risk App, which includes fields for Sex (Male selected), Age (42), and Race (White, African American, Other). A green button labeled "See Risk Score" is visible. The top status bar indicates the patient is SMART, JOE, and the MRFN is 10002702. The Blackbird Logger window is overlaid on the right side of the screen, showing log entries related to the ASCVD Risk App's execution.

SMART in MPage

ASCVD Risk App

Sex

Male Female

Age

42

Race

White
 African American
 Other

See Risk Score

ASCVD Risk App

Total Cholesterol (mg/dL)

200

*** HDL - Cholesterol (mg/dL)**

20-100

Systolic Blood Pressure (mmHg)

110

* The following are required:
Cholesterol (mg/dL), Rad

**dyMFpIaFRmR2JwZmZ6LUkydnQ5UFVpbmZoZE9EbFpIQmQ3RlhKNnk4QUdpbHh...
dEMVpkTK5KNTNLX091dkdqJHzSHBFZDhfWxEd1ZlVQ%30%
3D&correlation_id=ffff77350-cbbb-11e8-aa61-91c4a35b83d5&relationshipId=1115**

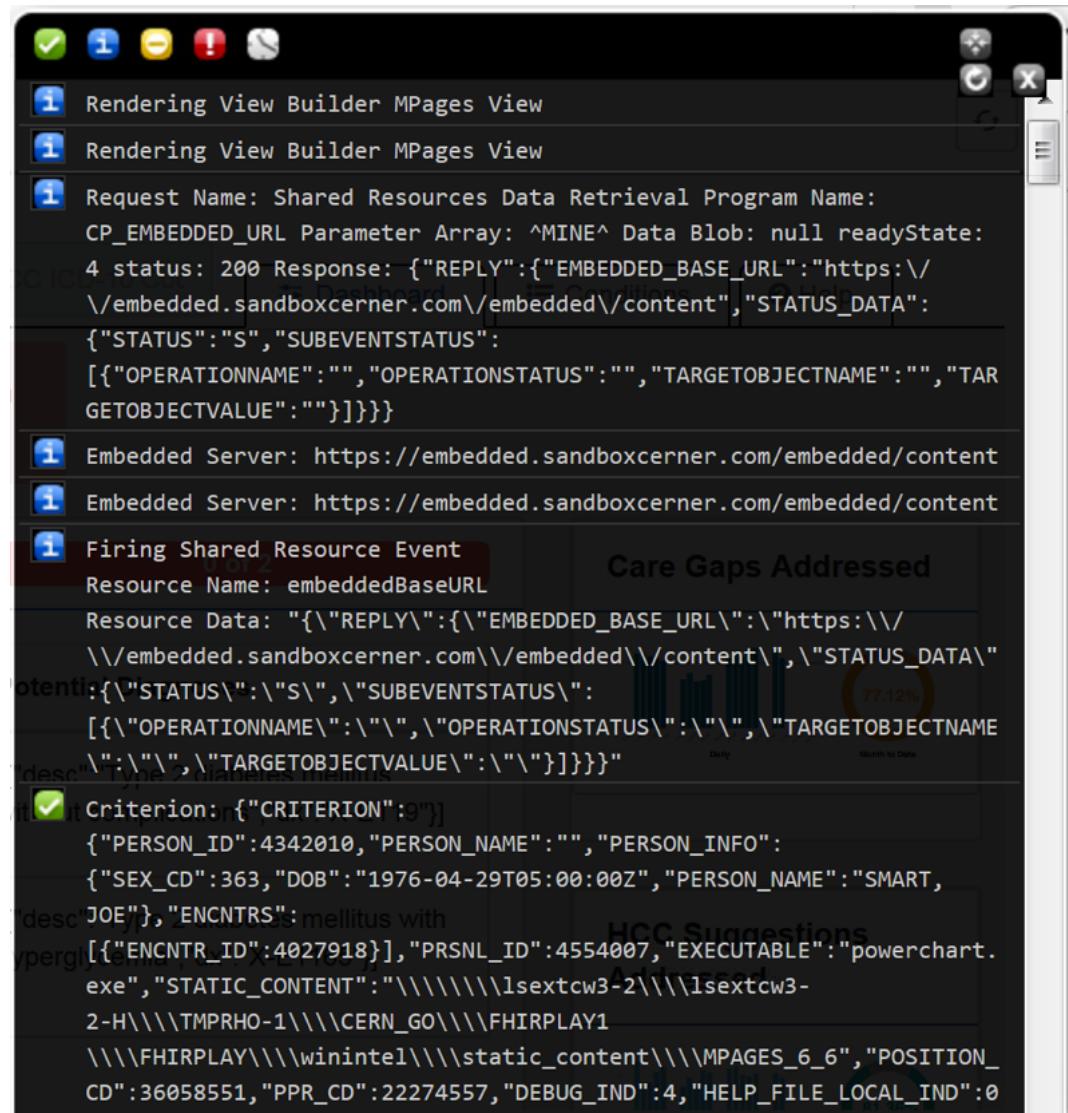
[ASCVDRiskApp] Authorized Content Provider (1607ms):
https://smart.sandboxcernerpowerchart.com/ascvd-risk-app/launch.html?iss=https%3A%2F%2Ffhir-ehr.sandboxcerner.com%2Fdstu2%2F0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca&launch=8501374-0acc-46a1-87de-bd4a7361563c&embedded-supported-version=2&tenant_key=0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca&authentication=Cerner-Identity-Token+ZX1KMGVVQ1PaUpLVjRaUxDsMh1R2hpT21kU1UwRxhYelVpTENkcmFXUW1PaUpCUVGQ1YvTjFZMmx0WhpsdFTMTNTRmQ1YUOeFuXuUxdXbXhpT1RoQk9FrkJRVUZCUVNKOS51eHpsUhbq9rTFNemt3T0Rje1UEVTRNNGdzSw1sem55STzakJpT0dFd01URXhMVIUW1RzDESHTX10aTFo1RGakxUVxd0amxqM1nM11qRmpZU01zSW5CeWpSTZjA3JtZ1qJUZRUREWd1UK5NM0xhNmIwInRTOESFa1dkSnp4Sm1NQ0sINFITUh2cVB5R1VRM3ByOTVOM1IFSjJXb0hkTntkeUxBeDNYXzbhNU1GckxzefYmpZGZV02V5sjB1WeFpt21Ks1YxUW1M0poYkdjaU9pS1NMEV4HhpVaUx0sJhV1pT21Q1FVRkNMME4xWTjsdfh6bHRBtezU0ZkNNFETnhVMF3V214aU5UeJPRUZCUVWGQ1FTsjkuzX1KbGVIQ1PakUxtXprd09EY31NRFU010Rkc01tb1pjeUK25wpca09HrRdINVE4TfdvNfpUmXROR015TmxatE9URmpWfV3TmposallttTTzakZqjWU010lu0n1iaUk25WpnemRxcG1Tb1oyU1d4N1Zua1ZVVi0Vm01Qk5XsnzjRvpUy31c01ulUjvJ00k25wOr1vNmZUVXhml1VsZ1ZFOUxSVTVmmpFaWZRLmE5QuQyZvhmMzFzC1s1ekx5NjgxYWFqb0M5ZDRfb21qcmlxdkVKc283M0dhau11cw9mN3WqQ1fbyxJGdjg2Wkjfj03FawjM02XvaT11sYjdEc01TcnB5eE

dyMFpIaFRmR2JwZmZ6LUkydnQ5UFVpbmZoZE9EbFpIQmQ3RlhKNnk4QUdpbHh...
dEMVpkTK5KNTNLX091dkdqJHzSHBFZDhfWxEd1ZlVQ%30%
3D&correlation_id=ffff77350-cbbb-11e8-aa61-91c4a35b83d5&relationshipId=1115

FHIRPLAY: S5025783, October 09, 2018, 7:09 AM CDT

Blackbird Logger - Debugging in MPages

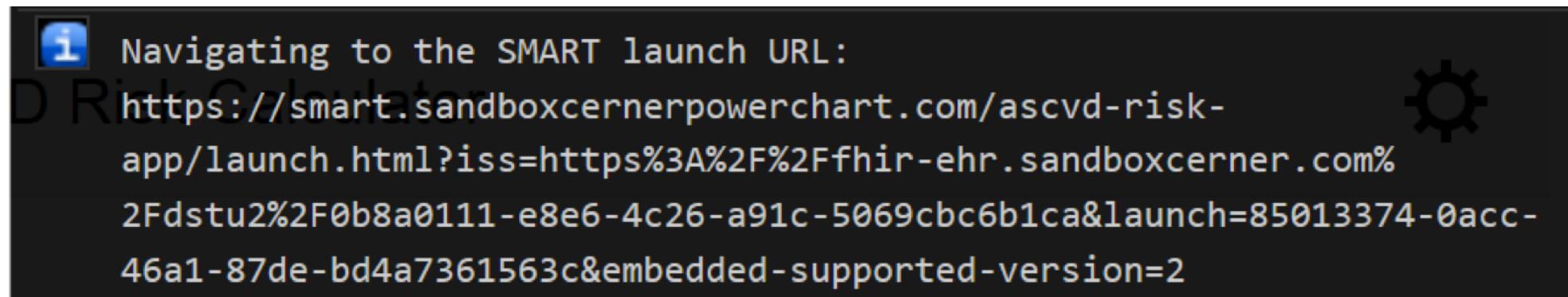
- Key Combinations:
 - Mac: Command + \
 - Windows: Control + \
 - Relocate Window: Shift + F2
- Refresh the MPages component to see the Blackbird window



Blackbird Logger - How to Debug

SMART App Launch URL :

- Copy the apps resolved launch URL:



- Access to Domain:
 - Open the URL in Internet Explorer on the Citrix session to see if the app loads
 - X-Frame-Options header

Blackbird Logger - How to Debug

Embedded App URL :

- Acces to Domain:
 - Open the URL in Internet Explorer on the Citrix session to see if the app loads
- Height resizing issues should show up with this URL

Ref : <https://github.com/cerner/cerner-smart-embeddable-lib#sizing-content>

```
[i] [ASCVD Risk App] Mounting Embedded Server:  
https://embedded.sandboxcerner.com/embedded/content?embedded-  
supported-version=2&correlation_id=fff77350-cbbb-11e8-aa61-  
91c4a35b83d5&Authorization=OAuth+oauth_token%3D%22ConsumerKey%  
253D0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca%2526Consumer.Principal%  
253D0000.0000.0015.0EAB%2526ExpiresOn%253D1539090505%  
2526HMACSecrets%253Df6cQ3rwiFyRzHd-Mclgn_dmk-  
6d1fGmUMKnW7npj7RiiBCCJhj9hjGLlr3psNpGLfWHUMAuk40_N7WmZmNKeaDn7-  
zXKRycsHqZuInRJ4SY%25253D%2526KeysVersion%253De5aa6e82-b9e5-4b36-  
9d61-f633380662f3%2526RSASHA1%253DiwM06Xyt6FRCPmukj30yyv-  
ZA2VCwZovothCa4FiRVkBzEfKkk1_8kt2GhITHzbYr34X-dUrb6pHZWMQs40aUX-  
YdRavjxBDR4M5UU17vb7zdq-  
2oiSe1wsLxjxsm2_hwYQ4piN7RCYjmigPqmYJCib3r6GZigcPOz9NePXeKObmIAcIId  
7drFvXliC6bi8ZZr_qJ-  
yg28zFI4jaSdKoOFCzoUirdhSLopEVa4JkSiVoSsmmt6kZsQCIRntDP8AKjuhmnpw1f  
1qp4FzG4L1QjqKrVQ1WhuRQAB8_PsGG8xSywTQh7uHIrnl4T0I_CcnE9XI1pBpuifisPi  
NFxh7zng%25253D%25253D%22%2Coauth_consumer_key%3D%220b8a0111-e8e6-  
4c26-a91c-5069cbc6b1ca%22%2Coauth_signature_method%3D%22PLAINTEXT%  
22%2Coauth_timestamp%3D%221539086895%22%2Coauth_nonce%3D%22831137%  
22%2Coauth_version%3D%221.0%22%2Coauth_signature%3D%22%  
2526Lcmy_exMWAZ0f9-vdPowCCL-HjvkKONu%22&url=https%3A%2F%  
2Fsmart.sandboxcernerpowerchart.com%2Fascvd-risk-app%2Flaunch.html%  
3Fiss%3Dhttps%253A%252F%252Ffhir-ehr.sandboxcerner.com%252Fdstu2%  
252F0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca%26launch%3D85013374-0acc-  
46a1-87de-bd4a7361563c%26embedded-supported-version%3D2%
```

Cookies in MPages - P3P Header

- IE rejects cookies from 3rd party contexts (Default)
- Want to use cookies in your SMART App ?
 - Add P3P Header (recommended approach)
OR
 - Add Meta Tag with the same content (less common)

Ref : <https://blogs.msdn.microsoft.com/ieinternals/2013/09/17/a-quick-look-at-p3p/>

MPages - Considerations

- **HTML5-DOCTYPE**

Ref: <https://fhir.cerner.com/smart/#html5-doctype>

- **X-UA-Compatible Tag**

Ref: <https://fhir.cerner.com/smart/#x-ua-compatible-tag>

- **Remove X-FRAME-OPTIONS**

Ref: <https://github.com/cerner/cerner-smart-embeddable-lib#additional-consideration>

- **Sizing Issues**

Ref: <https://github.com/cerner/cerner-smart-embeddable-lib#sizing-content>

Domain Refresh - MPages in Non-Production

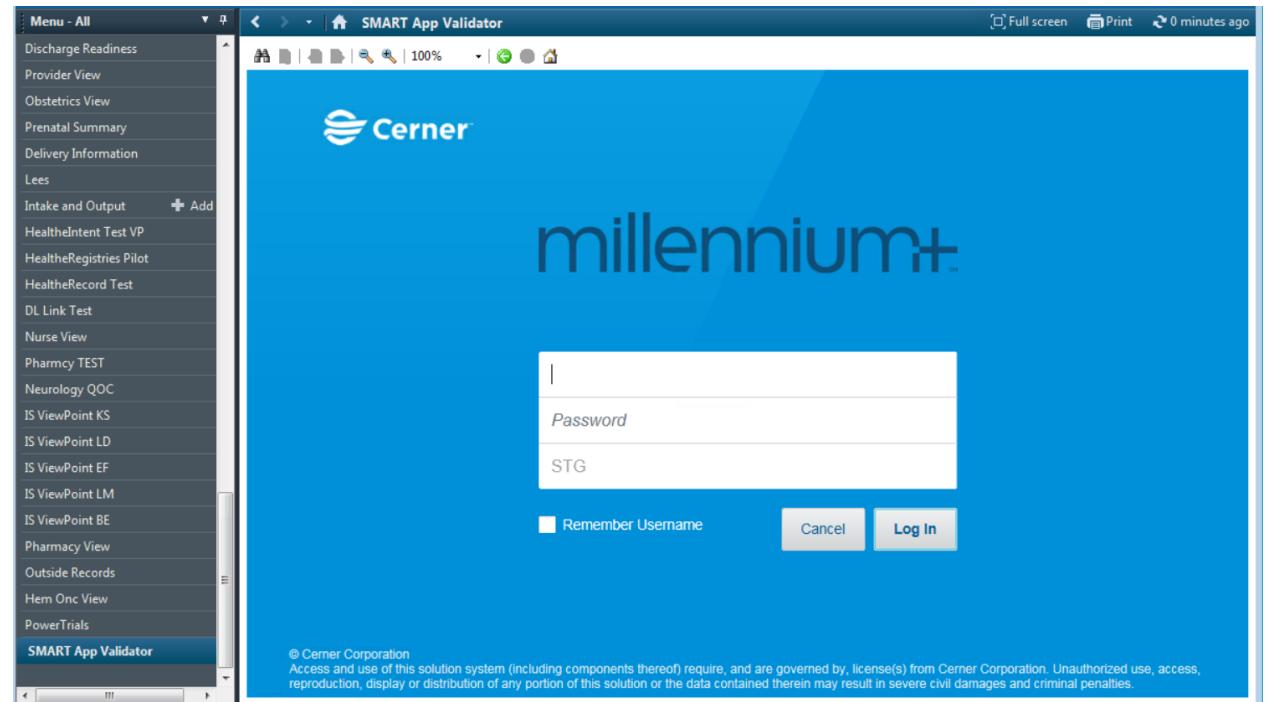
In your system's back-end node, connect to CCL and run the following command:

```
update into dm_info  
set info_char = "https://embedded.sandboxcerner.com/embedded/content"  
where info_domain = "ORION" and INFO_NAME = "EMBEDDED_BASE_URL"  
go  
commit go
```

Ref: <https://wiki.cerner.com/display/public/reference/Configure+the+Workflow+Web+Component>

Millennium Login Screen

- Whitelist Trusted sites for that endpoint to avoid this issue.
- Non-Prod :
 - https://*.sandboxcerner.com
 - https://*.sandboxcernerpowerschart.com
 - https://*.sandboxcernermillennium.com
- Prod :
 - https://*.cerner.com
 - https://*.cernerpowerschart.com
 - https://*.cernermillennium.com



Ref : <https://wiki.cerner.com/pages/releaseview.action?spaceKey=reference&title=Install+Cerner+Ignite+APIs#InstallCernerIgniteAPIs-TechnologyRequirements>

Read Up!

- <http://fhir.cerner.com/smart/>
- Know your developer tools

SMART®

i. General

- i. Introduction
- ii. SaaS Model
- iii. Authorization Model
- iv. Access Points
- v. SMART App Data Retrieval
- vi. SMART Without FHIR

ii. Technical

- i. Screen Resolution
- ii. Browser Requirement
- iii. Single Sign On (SSO)
- iv. Embedded Browser Control
- v. HTML5 DOCTYPE
- vi. X-UA-Compatible Tag
- vii. Technology and Framework for SMART Apps
- viii. Open Source FHIR Client Libraries
- ix. Tutorial
- x. code Console and Sandbox
- xi. Launch Context

iii. Testing

Questions?