Troubleshooting Cerner Ignite APIs for Millennium

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Setup

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Setup

Code Learning
password: CLL2018

http://bit.ly/chc_learning_lab

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Dos and Don’ts

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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

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Don’t

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

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Help

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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 met

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 r
given by a Location header field. The response SHOULD include an entity containing a list of r
format is 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

10.2.3 202 Accepted

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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 Proto*
servers. The RFC specifies this code should be returned by teapots requested to brew coffee.[50] This HTTP status is used as an E

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

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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.

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Ignite Documentation

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.

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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.

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Operation Outcome

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Operation Outcomes

- It’s a resource
  - http://hl7.org/fhir/dstu2/operationoutcome.html
- Limited use currently
- Fatal, error, informational, and warning

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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 }
```

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Exercise 1

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Exercise 1: Question

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

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Exercise 1: Answer

422, and an OperationOutcome

http://fhir.cerner.com/millennium/dstu2/general-clinical/allergy-intolerance/#errors-2

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

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Connection Issues

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Firewalls

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

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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?

```
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
```

- openssl
  - More in a bit

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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

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Google is Your Friend

SUN | Monday, November 16, 2015

Installing Trusted Ce
a Java Keystore

By: James Connors | Principal Solutions Consultant

As software environments continue to ratchet up securit
deal with digital certificates in more than a superficial m
Furthermore, platforms are not only mandating the use
extent shunning the self-signed variety and instead insis
trusted authority. When managing certificates in the Jav
to encounter is `keytool`, an integral part of the Java Dev

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

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Client Errors

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400 - Bad Request

- Syntax was wrong
  - Invalid parameters
  - Missing fields

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401 - Unauthorized and 403 - Forbidden

- Authorization and Authentication
- 401 - You need to authenticate
- 403: This isn’t allowed
  - or…. 404?

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404 - Not Found

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

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406 - Not Acceptable

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

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409 - Conflict

- Update or Patch
- Updating the wrong version

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415 - Unsupported Media Type

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

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422 - Unprocessable Entity

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

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Exercise 2

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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

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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
```

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Exercise 3

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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

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Exercise 3: Answer

406 - Not Acceptable

Body Cookies Headers (17) Test Results

Status: 406 Not Acceptable Tim

Pretty Raw Preview Text

1 The Accept type is invalid. See the ... osite for acceptable format values for the resource you are attempting to ac

Body Cookies Headers (17) Test Results

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 → [illegible]

x-request-id → c26af6b014d420945b4ee5a107aece93

x-runtime → [illegible]

x-xss-protection → 1; mode=block

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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

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Exercise 4

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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

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Exercise 4: Answer

400 - Bad Request

New Key

Body Cook

Pretty Ra

1 at lea

us: 400 Bad Request T

Parameters

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.

http:// cations/

Notes:

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

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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

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Exercise 5

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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

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Excercise 5: Answer

401 - Unauthorized

Body | Cookies | Headers (18) | Test Results | Status: 401 Unauthorized

date → Mon, 09 Oct 2017 18:23:20 GMT

expires → Mon, 01 Jan 1990 00:00:00 GMT

keep-alive → timeout=15, max=100

pragma → no-cache

server-response-time → 8.800746

status → 401 Unauthorized

strict-transport-security → max-age=631152000

vary → Origin,User-Agent,Accept-Encoding

www-authenticate → Bearer realm="fhir-ehr.sandboxcerner.com"

x-content-type-options → nosniff

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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 …**

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Exercise 6

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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

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Exercise 6: Answer

404 - Not Found

Body Cookies Headers (21) Test Results Status: 404 Not Found

Pretty Raw Preview JSON

1

Wait, what?

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Server Errors

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5xx

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

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Asking for Help

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Google Group

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

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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 th
- 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 pr specific to this group, they would apply to all data your application will have access to, other public groups, anc

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
    - For more general questions about SMART, see the SMART on FHIR group here: https://groups.g
    - **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 r
    - Please read our documentation at http://fhir.cerner.com/ to see if the documentation answers you parameters we support are documented, along with FAQs, SMART, and Authorization document
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 investigatic 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 rec

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Log a Service Record

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

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OAuth

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OAuth

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

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Exercise 7

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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

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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 doesnt 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 Demo App

The requested redirect URI does not match the one registered for

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

Cerner's developer portal may provide additional information to assist in resolving this issue.

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The Errors that Weren’t

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No Data

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

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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

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Bad Data

- Scenario:
  - Data is returned, but no codes
  - Data is returned, but some fields are empty
  - Data is returned, but not as expected

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Bad Data cont.

- Cause:
  - Most common: data is not mapped
  - Sanity check: ensure you see the data in Millennium (within Powerchart for example)

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SMART

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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.

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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>_
```

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SMART Apps in MPages

- Possible Issues:
  - Configured URL is incorrect
  - App does not load in an MPage - blank screen
  - App loads without taking its full height on the screen
  - Configuration URL updates do not show up

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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}

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SCPView Tool - Cycle Server

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

scpview

```
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>
```

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Blackbird Logger - Debugging in MPages

SMART, JOE - 10002702 Opened by Sarkar, Shriniket

Task Edit View Patient Chart Links Notifications Navigation Help

SMART, JOE
Allergies: Error
IQHealth: Yes
PCP:McCurdy, Michael
Phone:(913) 989-8765
Age:42 years
DOB:4/29/1976
Wt:Error
Sex:Male
Pref. Labs/Diagnostics:Error
MRN:10002702
Inpatient FIN: 20003700 [Admit Dt: <No - Inpatient admit date>] Loc: Baseline East, Baseline East

SMART in MPage

MPages View

ASCVD Risk App

Sex: Male | Female

Age: 42

* Race
- White
- African American
- Other

Total Cholesterol: 200

* HDL - Cholesterol: 20-100

Systolic Blood Pressure: 110

See Risk Score

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

```
dyMFpIaFRmR2JwZmZ6LUkydnQ5UFZMOFVpbmZoZE9EbFpIQmQ3RlhKNnk4QUdpbHhY1
dEMVpKTk5KNTNLX091dkdqUHZhSHBFZDhfYWxEd1ZlVQ%3D%
3D&correlation_id=fff77350-cbbb-11e8-aa61-
91c4a35b83d5&relationshipId=1115
[ASCVD Risk App] 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=85013374-0acc-
46a1-87de-bd4a7361563c&embedded-supported-
version=2&tenant_key=0b8a0111-e8e6-4c26-a91c-
5069cbc6b1ca&authentication=Cerner-Identity-
Token+ZXlKMGVYQWlPaUpLVjFRaUxDSmhiR2NpT2lKU1UwRXhYelVpTENKcmFXUWlPaU
pCUVVGQ1YwTjFZMmx0WHpsdFFtMTNTRmQ1YUROeFUxUXdXbXhpTlRoQk9FRkJRVUZCUV
NKOS5leUpsZUhBaU9qRTFNemt3T0RjeU1EVTRNVGdzSW1semN5STZJakJpT0dFd01URX
hMV1U0WlRZdE5HTXlOaTFoT1RGakxUVXdOamxqWW1NMllqRmpZU0lzSW5CeWJpSTZJa3
RuUVVkdU1sVkJUVUZuT0dGTWNXTkNNbXBmZWsxNmFUWjBOQ0lzSW5SNWNDSTZJa05GVW
s1ZlRVeGZTVVJmVkU5TFJVNWZWakVpZlEuZEZlVzdPYTdoMnZGeWplcHRUbGdpUENaVj
N6SEc1STFPV3N2OEhXQWp3TG1wZGx5dExQSGE1bHphYkE1SlNUaDBJdDVJa0JsNnJ6Vj
JtZi1qUUZRUUREWVdLUk5NM0xhWmlnWnRTOE5FaTdkSnp4Sm1NQ0s1NFFTUUh2cVB5Rl
VRM3ByOTVONW1FSjJXb0hkTWtkeUxBeDNYXzBhWU1GckxzeWFrYmxPZGZVO2V5SjB1WE
FpT21KS1YxUWlMQ0poYkdjaU9pSlNVMEV4WHpVaUxDSnJhV1FpT21KQlFVRkNWME4xWT
JsdFh6bHRRbTEzU0ZkNWFETnhVMVF3V214aU5UaEJPRUZCUVVGQlFTSjkuZXlKbGVIQW
lPakUxTXprd09EY3lNRFU0T0Rrc0ltbHpjeUk2SWpCaU9HRXdNVEV4TFdVNFpUWXROR0
15TmkxaE9URmpMVFV3TmpsalltTTJZakZqWVNJc0luQnliaUk2SWpnemRXcGlTbloyUl
d4NlZuaG1ZVVJoVm01Qk5XSnZjRVpUY3lJc0luUjVjQ0k2SWtORlVrNWZUVXhmU1VSZl
ZFOUxSVTVmVmpFaWZRLmE5QUQyZVhmMzFZcS1sekx5NjgxYWFqb0M5ZDRfb2lqcmxFdk
VKc283M0dhaUl1cW9mN3VqQlFybXJGdjg2WjFjQ3FaWjM0ZXVaT1lSYjdEc0lTcnB5eE
dyMFpIaFRmR2JwZmZ6LUkydnQ5UFZMOFVpbmZoZE9EbFpIQmQ3RlhKNnk4QUdpbHhhY1
dEMVpKTk5KNTNLX091dkdqUHZhSHBFZDhfYWxEd1ZlVQ%3D%
3D&correlation_id=fff77350-cbbb-11e8-aa61-
91c4a35b83d5&relationshipId=1115
```

FHIRPLAY SS025783 October 09, 2018 7:09 AM CDT

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Blackbird Logger - Debugging in MPages

- Key Combination:
  - Mac: Command + \
  - Windows: Control + \
- Refresh the MPages component to see the Blackbird window

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Blackbird Logger - How to Debug

- Copy the apps resolved launch URL:

```
Navigating to the SMART launch URL:
https://smart.sandboxcernerpowerchart.com/ascvd-risk-
app/launch.html?iss=https%3A%2F%2Ffhir-ehr.sandboxcerner.com%
2Fdstu2%2F0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca&launch=85013374-0acc-
46a1-87de-bd4a7361563c&embedded-supported-version=2
```

- Open your local browser and try the URL
  - Millennium login screen is displayed
  - Use Millennium credentials to check if the app loads successfully
- Acces to Domain:
  - Open the URL in Internet Explorer on the Citrix session to see if its only an issue on Citrix

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Blackbird Logger - How to Debug

- Open your local browser and try the URL
  - Millennium login screen is displayed
  - Use Millennium credentials to check if the app loads successfully
- Acces to Domain:
  - Open the URL in Internet Explorer on the Citrix session to see if its only an issue on Citrix


```
[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-
6DlfGmUMKnW7npj7RiiBCCJhj9hjGLLr3psNpGLfWHUMAuk4O_N7WmZmNKeaDn7-
zXKRycsHqZuInRJ4SY%25253D%2526KeysVersion%253De5aa6e82-b9e5-4b36-
9d61-f633380662f3%2526RSASHA1%253DiwMO6Xyt6FRCPmukj3Oyv-
ZA2VCwZovothCa4FiRVkBzEfKkk1_8kt2GhITHzbYr34X-dUrb6pHZWMQs4OaUX-
YdRavjxBDR4M5UU17vb7zdq-
2oiSe1wsLxjxsm2_hwYQ4piN7RCYjmigPqmYJCib3r6GZigcPOz9NePXeKObmIAYciId
7drFvXliC6bi8ZZr_qJ-
yG28zFI4jaSdkOoFCzoUirdhSLopEVa4JkSiVoSsmmzt6kZsQCIrntDP8AKjuhmnpw1f
1qp4FzG4L1QjqKrVQ1WhuRQAB8_PsGG8xSywTQh7uHIrnl4T0I_CcnE9XI1pBpufisPi
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%
```


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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

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Session Storage / Cookies - IE Powerchart

Issue:

- Limitation - Embedded IE browser
  - Does not partition off sessionStorage available to apps per tab
  - Does not share browser cookies between the embedded browser and popped-up browser windows

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

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Session Storage / Cookies - 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
- Flex apps implementation based on embedded vs stand-alone mode
- Avoid using sessionStorage and shared Cookies

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

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MPages - Must Have

- HTML5-DOCTYPE

  Ref: https://fhir.cerner.com/smart/#html5-doctype
- X-UA-Compatible Tag

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

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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

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Questions?

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