

MMI API Interoperability

MMI provides access to several APIs for various purposes. This documentation is specific to the Certified FHIR API. For information on MMI's Proprietary API, please see <https://www.modmed.com/synapsys-api>.

By using or accessing any API services or materials, you agree to be bound by the API Terms of Use available at: <https://www.modmed.com/api-terms-of-use/>

The main difference between the two APIs relates to use cases and access. The Certified FHIR API Supports two types of API-enabled services:

- Services for which a single patient's data is the focus
 - A Patient, using their Patient Portal credentials, can authenticate to the API in order to retrieve, access, exchange, or visualize their data.
 - A Provider, using their login credentials, can authenticate to the API in order to retrieve, access, exchange, or visualize a single patient's data.
- Services for which multiple patients' data are the focus
 - A Provider, using their login credentials, can authenticate to the API in order to retrieve, access, exchange, or visualize multiple patient's data (or a subset of their patient population's data) for population health purposes or insights.
 - Bulk Data Export - a Provider, using their login credentials, can authenticate to the API in order to export (in a standard format - ndjson) multiple patient's data (or a subset of their patient population's data).

As of now, this Certified FHIR API supports only Read, Search, and Bulk operations.

Introduction to MMI

MMI has several Clinical and Practice Management applications and systems. This API is here to support the ModMed GI platform, gGastro, as well as the ModMed EMA platform.

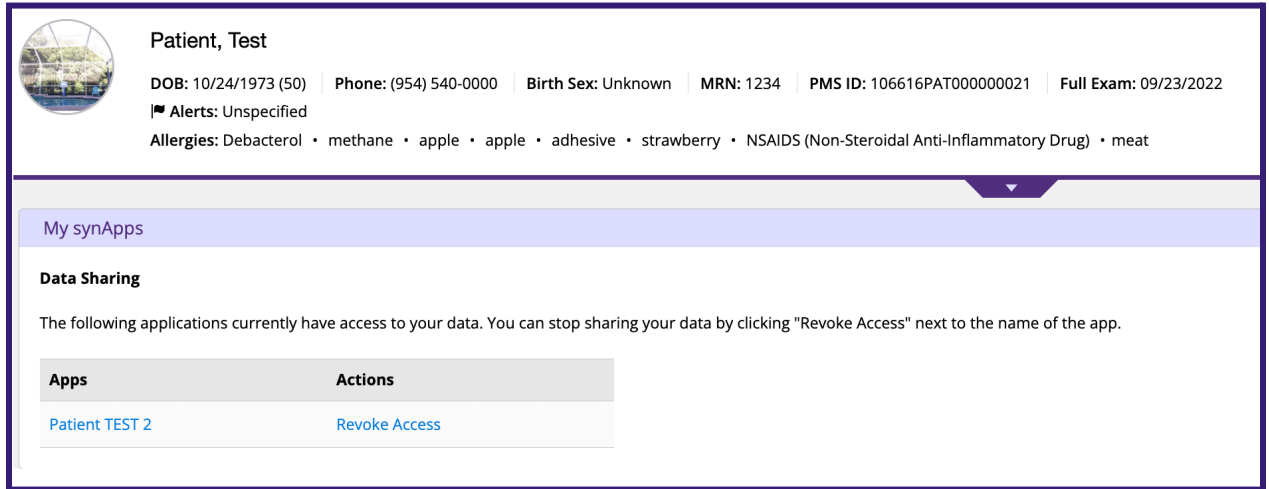
You can find the endpoints for our customers here:

<https://mm-fhir-endpoint-display.prod.fhir.ema-api.com/>

If you have issues finding the right endpoint for your customer, you can send an email to synapsys@modmed.com.

Apps built upon this platform can be built as the following types of applications:

1. **Patient App** - This means that in order to use this app, a Patient, who is a registered user in one of MMI's Customers' Patient Portal, will need to authenticate with the same credentials they use to login to the Patient Portal, to use your application. Once authenticated, Patients will have a mechanism to Manage their apps (Revoke access) and launch their apps from inside the Patient Portal:



Patient, Test

DOB: 10/24/1973 (50) | Phone: (954) 540-0000 | Birth Sex: Unknown | MRN: 1234 | PMS ID: 106616PAT000000021 | Full Exam: 09/23/2022

Alerts: Unspecified

Allergies: Debacterol • methane • apple • apple • adhesive • strawberry • NSAIDS (Non-Steroidal Anti-Inflammatory Drug) • meat

My synApps

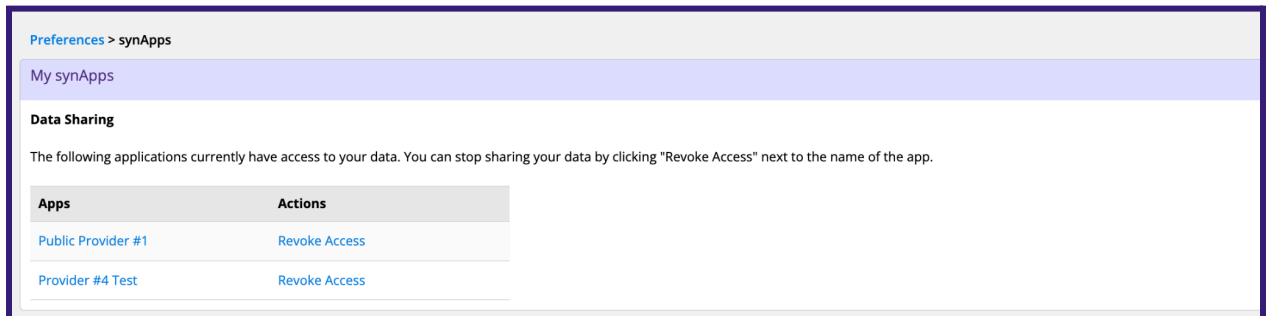
Data Sharing

The following applications currently have access to your data. You can stop sharing your data by clicking "Revoke Access" next to the name of the app.

Apps	Actions
Patient TEST 2	Revoke Access

2. **Provider App** - This means that in order to use this app, a Provider, who is a registered provider in one of MMI's gGastro or EMA systems, will need to authenticate with the same credentials they use to login to their EMR, to use your application. Once authenticated, Providers will have a mechanism to Manage their apps (Revoke access) or Launch their apps - depending on the type of app:

Pop health (ie. no Patient context):



Preferences > synApps

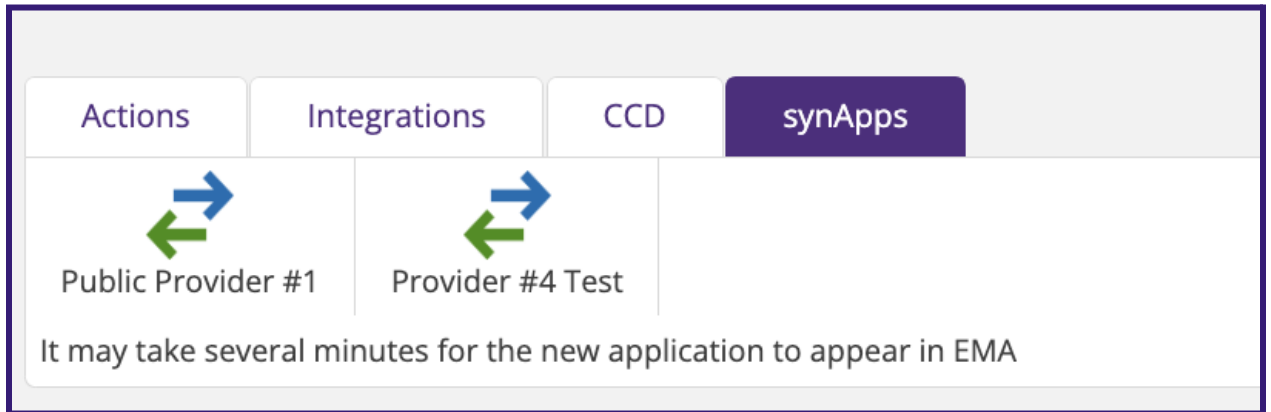
My synApps

Data Sharing

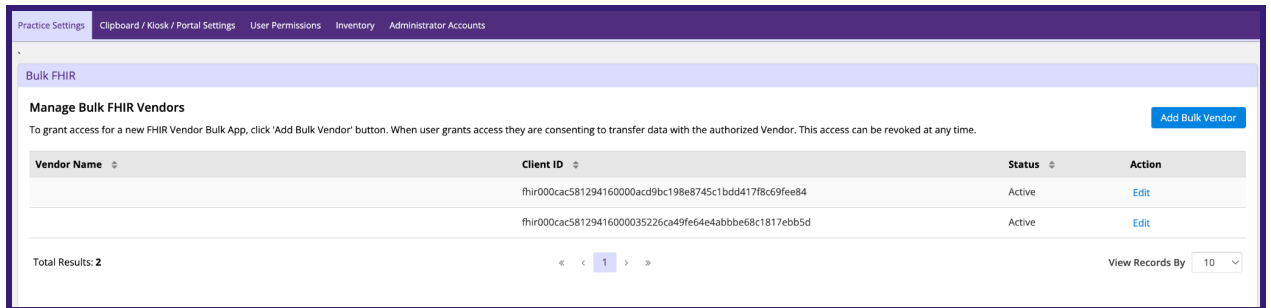
The following applications currently have access to your data. You can stop sharing your data by clicking "Revoke Access" next to the name of the app.

Apps	Actions
Public Provider #1	Revoke Access
Provider #4 Test	Revoke Access

Patient Context (inside of a patient’s chart):



- Bulk App** - This type of app will require consent from the practice. A Practice can provide your app consent by adding your app’s ClientID to their ‘Manage Bulk FHIR’ section in their Admin section:



The general process for apps built upon the Certified FHIR API is as follows:

- Register with MMI: <https://fhir-vendor-dashboard.kube.prod.mmicse.com/>

2. Create an application:

New SMART on FHIR App Registration

Please note that in the initial stages there may be a time lag before all data in our product data set is available to the Application. In general, not all data will be available in real time and there may be a time lag between the time data is created and when it populates to our product data set.

Application Name

Application Name is required

Description

Access Type <input type="button" value="Public"/>	PKCE <input type="button" value="None"/>	App Type <input type="button" value="Patient and Provider"/>	FHIR Version <input type="button" value="v4.0.1"/>
---	--	--	--

Launch Url <input type="text" value="Launch Url"/>	Redirect Url <input type="text" value="Redirect Url"/> Redirect Url is required.
Logo Url <input type="text" value="Logo Url"/>	Policy Url <input type="text" value="Policy Url"/>
Terms of Service Url <input type="text" value="TOS Url"/>	

Standard Scopes ⊕

At least one Standard Scope is required.

- online_access ⓘ
- launch/patient ⓘ
- openid
- launch

Patient Scopes ⊕

- patient/AllergyIntolerance.rs
- patient/CarePlan.rs
- patient/CareTeam.rs
- patient/Condition.rs
- patient/Coverage.rs
- patient/Device.rs
- patient/DiagnosticReport.rs
- patient/DocumentReference.rs
- patient/Encounter.rs
- patient/Goal.rs
- patient/Immunization.rs
- patient/Location.rs
- patient/Medication.rs
- patient/MedicationRequest.rs
- patient/Observation.rs
- patient/Organization.rs
- patient/Patient.rs
- patient/Practitioner.rs
- patient/PractitionerRole.rs
- patient/Procedure.rs
- patient/Provenance.rs
- patient/RelatedPerson.rs
- patient/ServiceRequest.rs

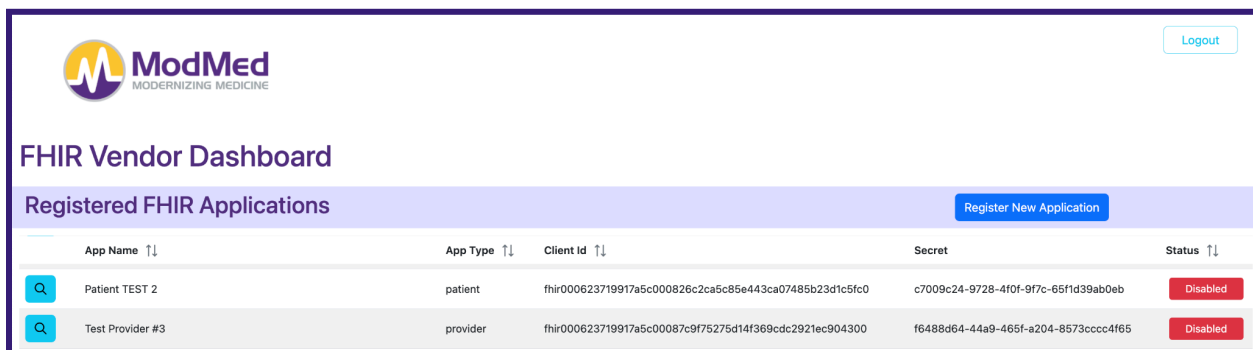
Optional Standard Scopes ⊕

- fhirUser ⓘ
- offline_access ⓘ
- profile ⓘ

User Scopes ⊕

- user/AllergyIntolerance.rs ⓘ
- user/CarePlan.rs
- user/CareTeam.rs
- user/Condition.rs
- user/Coverage.rs
- user/Device.rs
- user/DiagnosticReport.rs
- user/DocumentReference.rs
- user/Encounter.rs
- user/Goal.rs
- user/Immunization.rs
- user/Location.rs
- user/Medication.rs
- user/MedicationRequest.rs
- user/Observation.rs
- user/Organization.rs
- user/Patient.rs
- user/Practitioner.rs
- user/PractitionerRole.rs
- user/Procedure.rs
- user/Provenance.rs
- user/RelatedPerson.rs
- user/ServiceRequest.rs

- Your app will be created in a 'Disabled' state:



The screenshot shows the 'FHIR Vendor Dashboard' with a table of 'Registered FHIR Applications'. Both applications are in a 'Disabled' state, indicated by red buttons.

App Name	App Type	Client Id	Secret	Status
Patient TEST 2	patient	fhir000623719917a5c000826c2ca5c85e443ca07485b23d1c5fc0	c7009c24-9728-4f0f-9f7c-65f1d39ab0eb	Disabled
Test Provider #3	provider	fhir000623719917a5c00087c9f75275d14f369cdc2921ec904300	f6488d64-44a9-465f-a204-8573cccc4f65	Disabled

- MMI will review new apps daily and Enable apps that are configured correctly. Once your app is enabled, it will look like this:



The screenshot shows the 'FHIR Vendor Dashboard' with the same two applications, but now they are in an 'Enabled' state, indicated by green buttons.

App Name	App Type	Client Id	Secret	Status
Patient TEST 2	patient	fhir000623719917a5c000826c2ca5c85e443ca07485b23d1c5fc0	c7009c24-9728-4f0f-9f7c-65f1d39ab0eb	Enabled
Test Provider #3	provider	fhir000623719917a5c00087c9f75275d14f369cdc2921ec904300	f6488d64-44a9-465f-a204-8573cccc4f65	Enabled

- For any Non-Bulk application, your customers should be able to use it. You will need to provide the user (either a patient or a provider) with a mechanism (a link) to authenticate.
- For Bulk applications, please refer to the Bulk App section above which explains the process for a practice to consent to allowing your app to query for Bulk data.

Introduction to FHIR

ModMed implements the R4 Version of the HL7® FHIR® standard. It is recommended that you become familiar with the standard by checking out the wealth of information provided by the HL7 organization. [Here](#) is a good starting point.

The MMI Certified FHIR API supports both the EMA/MMPM Platform as well as the gGastro Platform. The MMI Certified FHIR API is intended to be used for the purpose of the exchange of health information included in the [U.S. Core Data for Interoperability](#).

Overview of Bulk FHIR Bulk

ModMed supports a Bulk FHIR API implementation so that authorized vendors can access data from practices in a bulk manner. This could be data for all patients in a practice; data for groups of patients in a practice or all data from a practice. The purpose of this could be for research or analyzing the population data to help practices serve their patients better.

The individual API calls would need a large number of calls to access the same amount of data that could be retrieved in a single bulk API call. Initially, the Bulk data client will kick off the request for data to the server. Once the request is made, a response will be returned which will allow the client to know how to get the status of the request. Bulk requests will take time depending on the amount of data being prepared for return.

The Bulk client will need to poll the status URL periodically to check on the status of the request. Once the bulk processing is done by the server, a manifest file will be created which will have all the ndjson files that have the FHIR bulk data.

General Process

The general process for apps built upon the Certified FHIR API is as follows:

1. Register with MMI: <https://fhir-vendor-dashboard.kube.prod.mmicse.com/>

2. Create a Bulk FHIR application:

New SMART on FHIR App Registration

Please note that in the initial stages there may be a time lag before all data in our product data set is available to the Application. In general, not all data will be available in real time and there may be a time lag between the time data is created and when it populates to our product data set.

Application Name

Application Name is required

Description

Access Type **PKCE**
Public None

App Type **FHIR Version**
Patient and Provider v4.0.1

Launch Url **Redirect Url**

Redirect Url is required.

Logo Url **Policy Url**

Terms of Service Url

Standard Scopes ⊕

At least one Standard Scope is required.

- online_access ⊕
- launch/patient ⊕
- openid
- launch

Patient Scopes ⊕

- patient/AllergyIntolerance.rs
- patient/CarePlan.rs
- patient/CareTeam.rs
- patient/Condition.rs
- patient/Coverage.rs
- patient/Device.rs
- patient/DiagnosticReport.rs
- patient/DocumentReference.rs
- patient/Encounter.rs
- patient/Goal.rs
- patient/Immunization.rs
- patient/Location.rs
- patient/Medication.rs
- patient/MedicationRequest.rs
- patient/Observation.rs
- patient/Organization.rs
- patient/Patient.rs
- patient/Practitioner.rs
- patient/PractitionerRole.rs
- patient/Procedure.rs
- patient/Provenance.rs
- patient/RelatedPerson.rs
- patient/ServiceRequest.rs

Optional Standard Scopes ⊕

- fhirUser ⊕
- offline_access ⊕
- profile ⊕

User Scopes ⊕

- user/AllergyIntolerance.rs ⊕
- user/CarePlan.rs
- user/CareTeam.rs
- user/Condition.rs
- user/Coverage.rs
- user/Device.rs
- user/DiagnosticReport.rs
- user/DocumentReference.rs
- user/Encounter.rs
- user/Goal.rs
- user/Immunization.rs
- user/Location.rs
- user/Medication.rs
- user/MedicationRequest.rs
- user/Observation.rs
- user/Organization.rs
- user/Patient.rs
- user/Practitioner.rs
- user/PractitionerRole.rs
- user/Procedure.rs
- user/Provenance.rs
- user/RelatedPerson.rs
- user/ServiceRequest.rs

- Your app will be created in a 'Disabled' state:

ModMed MODERNIZING MEDICINE Logout

FHIR Vendor Dashboard

Registered FHIR Applications Register New Application

App Name	App Type	Client Id	Secret	Status
Patient TEST 2	patient	fhir000623719917a5c000826c2ca5c85e443ca07485b23d1c5fc0	c7009c24-9728-4f0f-9f7c-65f1d39ab0eb	Disabled
Test Provider #3	provider	fhir000623719917a5c00087c9f75275d14f369cdc2921ec904300	f6488d64-44a9-465f-a204-8573cccc4f65	Disabled

- For Bulk applications, This type of app will require consent from the practice. A Practice can provide your app consent by adding your app's ClientID to their 'Manage Bulk FHIR' section in their Admin section:

Practice Settings | Clipboard / Kiosk / Portal Settings | User Permissions | Inventory | Administrator Accounts

Bulk FHIR

Manage Bulk FHIR Vendors Add Bulk Vendor

To grant access for a new FHIR Vendor Bulk App, click 'Add Bulk Vendor' button. When user grants access they are consenting to transfer data with the authorized Vendor. This access can be revoked at any time.

Vendor Name	Client ID	Status	Action
	fhir000cac581294160000acd9bc198e8745c1bdd417f8c69fee84	Active	Edit
	fhir000cac58129416000035226ca49fe64e4abbb68c1817ebb5d	Active	Edit

Total Results: 2 View Records By 10

- Once a customer has added you, your app will become 'Enabled':

ModMed MODERNIZING MEDICINE Logout

FHIR Vendor Dashboard

Registered FHIR Applications Register New Application

App Name	App Type	Client Id	Secret	Status
Patient TEST 2	patient	fhir000623719917a5c000826c2ca5c85e443ca07485b23d1c5fc0	c7009c24-9728-4f0f-9f7c-65f1d39ab0eb	Enabled
Test Provider #3	provider	fhir000623719917a5c00087c9f75275d14f369cdc2921ec904300	f6488d64-44a9-465f-a204-8573cccc4f65	Enabled

Authentication

The vendor needs to authenticate with something similar to the following. For assistance, [this](#) has a good tutorial about how to connect.

POST: <https://sso.ema.md/auth/realms/fhir/protocol/openid-connect/token>

client_id (here you would have your client ID but here is a sample one)	fhir000623719917a5c0008fa3b07182314 edeb0cfc804639cfa5e
scope	system/AllergyIntolerance.rs system/CarePlan.rs system/CarePlan.rs system/CareTeam.rs system/DocumentReference.rs system/DiagnosticReport.rs system/Goal.rs system/Condition.rs system/Immunization.rs system/Observation.rs system/Medication.rs system/MedicationRequest.rs system/Patient.rs system/Procedure.rs system/Provenance.rs system/Device.rs system/Encounter.rs system/Organization.rs system/Practitioner.rs system/PractitionerRole.rs system/Location.rs
encryption_method	ES384
client_assertion	eyJ0eXAiOiJKV1QiLCJhbGciOiJFUzM4NCIsImtpZCI6IjRiNDIhNzE5OTZDFiYjExNWlzMjIzZjRjZjliZWl2ZDFiIn0.eyJpc3MiOiJmaGlyMDAwNjIzNzE5OTZDFiYjExNWlzMjIzZjRjZjliZWl2ZDFiIn0.eyJpc3MiOiJmaGlyMDAwNjIzNzE5OTZDFiYjExNWlzMjIzZjRjZjliZWl2ZDFiIn0.eyJpc3MiOiJmaGlyMDAwNjIzNzE5OTZDFiYjExNWlzMjIzZjRjZjliZWl2ZDFiIn0.dWQiOiJodHRwczovL3Nzby5lbWEubWQvYXV0aC9yZWZsbXMvZmhpci9wcm90b2NvbC9vcGVuaWQtY29ubmVjdC90b2tlbilsImV4cCI6MTY4MTI0Mjg5NSwianR

	<p>pljoiZTkyYWNiNDk5NTFlNjdiMjRhYTlk MTYwNjM0YzU3ODlkYWNlMTgyMjAz NzC0OTlxZmMxMzA3MDE3NjViZDc4 NyJ9.KKKnqeIWCpJ-OlfSqe--YPCzIlkQ 6l8skQW_9CEgksprosJUfK7huxhagi NeuJX_5fem_OBfFW5mMmuD9sGX- OSZ8cU-pk5vWmi2Osg3lOs2gqWFP- 6Olh0O68HLDQ4z</p>
--	---

Unset

```
curl --location
'https://sso.ema.md/auth/realms/fhir/protocol/openid-connect/tok
e_n' \
--header 'client_assertion:
eyJ0eXAiOiJKV1QiLCJhbGciOiJIJFZlIHNzZDF1YjExN
WIzMjI1ZjRjZjliZWl2ZDFiIn0.eyJpc3MiOiJmaGlyMDAwNjIzNzE50TE3YTUjMD
AwOGZhM2IwNzE4MjMxNGVkdWl2Zj0DA0NjM5Y2ZHNWUiLCJzdWIiOiJmaGlyMDA
wNjIzNzE50TE3YTUjMDAwOGZhM2IwNzE4MjMxNGVkdWl2Zj0DA0NjM5Y2ZHNWUi
LCJhdWQiOiJodHRwczovL3Nzby5lbnEubWQvYXV0aC9yZWZsbXMvZmhpci9wcm90b
2NvbC9vcGVua...4MTI0MjgzNSwianRpIjoizTkyYWNiNDk5NTFlNjdiMjRhYTlkM
TYwNjM0YzU3ODlkYWNlMTgyMjAzNzC0OTlxZmMxMzA3MDE3NjViZDc4NyJ9.KKKnqe
IWCpJ-OlfSqe--YPCzIlkQ6l8skQW_9CEgksprosJUfK7huxhagiNeuJX_5fem_0
BfFW5mMmuD9sGX-OSZ8cU-pk5vWmi2Osg3lOs2gqWFP-6Olh0O68HLDQ4z&client
_assertion_type=urn%3Aietf%3Aparams%3Aoauth%3Aclient-assertion-ty
pe%3Ajwt-bearer&grant_type=client_credentials&scope=system%2FAlle
rgyIntolerance.rs%20system%2FCarePlan.rs%20system%2FCarePlan.rs%2
0system%2FCareTeam.rs%20system%2FDocumentReference.rs%20system%2F
DiagnosticReport.rs%20system%2FGoal.rs%20system%2FCondition.rs%20
system%2FImmunization.rs%20system%2FObservation.rs%20system%2FMed
ication.rs%20system%2FMedicationRequest.rs%20system%2FPatient.rs%
20system%2FProcedure.rs%20system%2FProvenance.rs%20system%2FDevic
e.rs%20system%2FEncounter.rs%20system%2FOrganization.rs%20system%
2FPractitioner.rs%20system%2FPractitionerRole.rs%20system%2FLocat
ion.rs' \
--header 'Content-Type: application/x-www-form-urlencoded' \
```

```
--header 'Cookie:
AWSALB=unoyjfhN+Xj8hm4ZvELsYGL4LaPYUMc1DJ3GnN0jy+N7iwFWQNxXLkWDsP
c1cbmicAvYjLXi8EdxCc+NT6qyy0u/0190Ky1LvES0TCpyp0DLHP2L+0tuagumn6p
T;
AWSALBCORS=unoyjfhN+Xj8hm4ZvELsYGL4LaPYUMc1DJ3GnN0jy+N7iwFWQNxXLk
WDsPc1cbmicAvYjLXi8EdxCc+NT6qyy0u/0190Ky1LvES0TCpyp0DLHP2L+0tuagu
mn6pT' \
--data-urlencode
'client_id=fhir000623719917a5c0008fa3b07182314edeb0cfc804639cfa5e
' \
--data-urlencode 'scope=system/AllergyIntolerance.rs
system/CarePlan.rs system/CarePlan.rs system/CareTeam.rs
system/DocumentReference.rs system/DiagnosticReport.rs
system/Goal.rs system/Condition.rs system/Immunization.rs
system/Observation.rs system/Medication.rs
system/MedicationRequest.rs system/Patient.rs system/Procedure.rs
system/Provenance.rs system/Device.rs system/Encounter.rs
system/Organization.rs system/Practitioner.rs
system/PractitionerRole.rs system/Location.rs' \
--data-urlencode 'encryption_method=ES384' \
--data-urlencode 'grant_type=client_credentials' \
--data-urlencode
'client_assertion=eyJ0eXAiOiJKV1QiLCJhbGciOiJIJFZlIHR5cGU6ImVudC54aW50
iNDIhNzE5OTUyZjYjMDAwOGZmM2IwNzE4MjMxNGVhZWIwY2ZjODAwNjM5Y2ZlbnVl
CjZzdWUiOiJmaGlyMDAwNjIzNzE5OTUyZjYjMDAwOGZmM2IwNzE4MjMxNGVhZWIwY2
ZjODAwNjM5Y2ZlbnVlLCJhdWQiOiJodHRwczovL3Nzby5lbWEubWVvYXV0aC9yZW
sbXMvZmhpci9wcm90b2NvbC9vcGVuaWQtY29ubmVjdC90b2t1biIsImV4cCI6MTY4
MTI0MjgzNSwianRpIjoizTKyYWNiNDk5NTF1NjdiMjRhYTlkMTYwNjM0YzU3ODlkY
WNlMTgyMjAzNzE5OTUyZjYjMDAwOGZmM2IwNzE4MjMxNGVhZWIwY2ZjODAwNjM5Y2
ZlbnVlQ6l8skQW_9CEgksprosJUfK7huxhagiNeuJX_5fem_OBFFW5mMmuD9sGX-0
SZ8cU-pk5vWmi20sg3l0s2gqWFP-60lh0068HLDQ4z' \
--data-urlencode
'client_assertion_type=urn:ietf:params:oauth:client-assertion-type:jwt-bearer'
```



```
"scope": "launch system/Encounter.rs
system/AllergyIntolerance.rs system/Organization.rs
system/Practitioner.rs system/Condition.rs system/CareTeam.rs
system/Immunization.rs system/Patient.rs system/Provenance.rs
system/Goal.rs system/PractitionerRole.rs
system/MedicationRequest.rs system/CarePlan.rs online_access
system/DocumentReference.rs system/Location.rs
system/Procedure.rs system/Observation.rs launch/patient
system/Device.rs system/Medication.rs system/DiagnosticReport.rs
openid",
  "allowedFhirUrl":
  "https://pod21test.mmi.prod.fhir.ema-api.com/fhir/r4"
}
```

Start the Bulk FHIR Data Request

Examples:

- {base_url}/Patient/\$export
- {base_url}/\$export?_since=2022-10-01T00:00:00&_outputFormat=ndjson
- {base_url}/Group/1.105681.22.0.1/\$export

The Patient export returns FHIR resources in the USCDI data set.

Vendors will first need to know the base url of the practice they want to integrate with.

When making an export call, parameters of `_since` and `_outputFormat` are supported.

Only 'ndjson' format is supported for the Output.

The parameters supported in the various data sets are shown in the metadata section. The same data available through the USCDI single API calls are supported in the Bulk calls.

If you require a group or cohort of patients, the Patient IDs must be defined and then someone at MMI can create a group. Please reach out to synapsys@modmed.com for any help with this.

Check Status of the Bulk Request

After making the Bulk API call, the Content-Location will return how to check the status of the Bulk call. Depending on the size of the customer patient database, the calls will take time to return the data, hence checking the status would be necessary.

Below is an example of how to check the status of a Bulk request that was made

```
{base_url}/fhir-services/$export-status/d60cbaa19d337fbfb8ba2677d4dc30a4
```

After this request is completed, the status API returns the URL for the resource files.

For example :-

```
url:"https://modmed-fhir-batch.s3.us-east-2.amazonaws.com/ema/100491/141be1b64458efc  
c0d7aa3b0154be48a/encounter_1.ndjson....."
```

Viewing the Resource Files

Once the Bulk process is done, separate files get generated for each resource. The format of each of the files in 'ndjson'. Each file contains a maximum of 1000 resources.

Here is a sample of a file for the 'Medication Request' Resource.

```
{"resourceType":"MedicationRequest","id":"1.100491.15.42308","meta":{"lastUpdated":"2022-10-21T08:4  
{"resourceType":"MedicationRequest","id":"1.100491.15.42313","meta":{"lastUpdated":"2022-10-25T07:5  
{"resourceType":"MedicationRequest","id":"1.100491.15.42333","meta":{"lastUpdated":"2022-10-27T11:2  
{"resourceType":"MedicationRequest","id":"1.100491.15.42334","meta":{"lastUpdated":"2022-10-27T11:2
```

Deleting the Bulk Request

If a vendor started a bulk request and then decides to delete the request, we can support that using a delete CALL on the Bulk Request.

```
{base_url}/fhir-services/$export-status/d60cbaa19d337fbfb8ba2677d4dc30a4
```

Error Cases

If vendors try to access files in a different format, for example 'csv', then we will throw a '400 Bad Request' error as this format is not supported. The error message would state 'Invalid Tenant'.

```
{base_url}/$export?_since=2022-10-01T00:00:00&_outputFormat=csv
```

USCDI v1

MMI has implemented the US Core Implementation Guide - 4.0.0 - STU4 Release - Links below will point to that version of the IG, and unless otherwise noted, the API will conform to the requirements in the IG.

USCDI	US Core Profile	FHIR Resource
Allergies and Intolerances:		
Substance (Medication)	US Core Allergies Profile	AllergyIntolerance
Substance (Drug Class)	US Core Allergies Profile	AllergyIntolerance
Reaction	US Core Allergies Profile	AllergyIntolerance
Assessment and Plan of Treatment	US Core CarePlan Profile	CarePlan
Care Team Members	US Core CareTeam Profile	CareTeam
Clinical Notes:		
Consultation Note	US Core DocumentReference Profile	DocumentReference
Discharge Summary Note	US Core DocumentReference Profile	DocumentReference
History & Physical	US Core DocumentReference Profile	DocumentReference
Imaging Narrative	US Core DocumentReference Profile.US Core DiagnosticReport Profile for Report and Note exchange	DocumentReference,DiagnosticReport
Laboratory Report Narrative	US Core DocumentReference Profile.US Core DiagnosticReport Profile for	DocumentReference,DiagnosticReport

	<u>Report and Note exchange</u>	
Pathology Report Narrative	<u>US Core DocumentReference Profile, US Core DiagnosticReport Profile for Report and Note exchange</u>	DocumentReference, DiagnosticReport
Procedure Note	<u>US Core DocumentReference Profile, US Core DiagnosticReport Profile for Report and Note exchange</u>	DocumentReference, DiagnosticReport
Progress Note	<u>US Core DocumentReference Profile</u>	DocumentReference
Goals:		
Patient Goals	<u>US Core Goal Profile</u>	Goal
Health Concerns	<u>US Core Condition Profile</u>	Condition
Immunizations	<u>US Core Immunization Profile</u>	Immunization
Laboratory:		
Tests	<u>US Core Laboratory Result Observation Profile, US Core DiagnosticReport Profile for Laboratory Results Reporting</u>	Observation, DiagnosticReport
Values/Results	<u>US Core Laboratory Result Observation Profile, US Core DiagnosticReport Profile for Laboratory Results Reporting</u>	Observation, DiagnosticReport
Medications:		
Medications	<u>US Core Medication Profile, US Core Medication Request Profile</u>	Medication, MedicationRequest
Medication Allergies	<u>US Core Allergies Profile</u>	AllergyIntolerance
Patient Demographics:		
First Name	<u>US Core Patient Profile</u>	<u>Patient.name.given</u>

Last Name	US Core Patient Profile	Patient.name.family
Previous Name	US Core Patient Profile	Patient.name
Middle Name (including middle initial)	US Core Patient Profile	Patient.name.given
Suffix	US Core Patient Profile	Patient.name.suffix
Birth Sex	US Core Patient Profile	US Core Birth Sex Extension
Date of Birth	US Core Patient Profile	Patient.birthDate
Race	US Core Patient Profile	US Core Race Extension
Ethnicity	US Core Patient Profile	US Core Ethnicity Extension
Preferred Language	US Core Patient Profile	Patient.communication
Address	US Core Patient Profile	Patient.address
Phone Number	US Core Patient Profile	Patient.telecom
Problems	US Core Condition Profile	Condition
Procedures	US Core Procedure Profile	Procedure
Provenance:	US Core Provenance Profile	Provenance
Author Time Stamp	US Core Provenance Profile	Provenance.recorded
Author Organization	US Core Provenance Profile	Provenance.agent
Smoking Status	US Core Smoking Status Observation Profile	Observation
Unique Device Identifier(s) for a Patient's Implantable Device(s)	US Core Implantable Device Profile	Device
Vital Signs:		
Diastolic blood pressure	US Core Blood Pressure Profile (Builds on Us Core Vital Signs Profile)	Observation
Systolic blood pressure	US Core Blood Pressure Profile (Builds on Us Core Vital Signs Profile)	Observation

Body height	<u>US Core Body Height Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Body weight	<u>US Core Body Weight Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Heart rate	<u>US Core Heart Rate Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Respiratory rate	<u>US Core Respiratory Rate Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Body temperature	<u>US Core Body Temperature Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Pulse oximetry	<u>US Core Pulse Oximetry Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Inhaled oxygen concentration	<u>US Core Pulse Oximetry Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
BMI Percentile (2-20 years old)	<u>US Core Pediatric BMI for Age Observation Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Weight-for-length Percentile (Birth - 36 months)	<u>US Core Pediatric Weight for Height Observation Profile (Builds on Us Core Vital Signs Profile)</u>	Observation
Occipital-frontal Head Circumference Percentile (Birth - 36 months)	<u>US Core Pediatric Head Occipital Frontal Circumference Observation Profile (Builds on Us Core Vital Signs Profile)</u>	Observation

API Syntax and Functions

AllergyIntolerance

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/AllergyIntolerance/{id}
SEARCH	GET	https://{base_url}/fhir/r4/AllergyIntolerance?{search_parameters}

Supported Search Parameters:

Name	Type	Description
clinical-status	token	active inactive resolved
patient	reference	Who the sensitivity is for

CarePlan

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/CarePlan/{id}
SEARCH	GET	https://{base_url}/fhir/r4/CarePlan?{search_parameters}

Supported Search Parameters:

Name	Type	Description
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category	token	Type of plan
intent	string	proposal plan order option
patient	reference	Who the care plan is for
status	string	draft active on-hold revoked completed entered-in-error unknown

CareTeam

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/CareTeam/{id}
SEARCH	GET	https://{base_url}/fhir/r4/CareTeam?{search_parameters}

Supported Search Parameters:

Name	Type	Description
patient	reference	Who care team is for
status	string	proposed active suspended inactive entered-in-error

Condition

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Condition/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Condition?{search_parameters}

Supported Search Parameters:

Name	Type	Description
patient	reference	Who has the condition?
clinical-status	token	The clinical status of the condition
category	token	The category of the condition
code	token	Code for the condition
onset-date	date	Date related onsets (dateTime and Period)

Device

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Device/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Device?{search_parameters}

Supported Search Parameters:

Name	Type	Description
patient	reference	Patient information, if the resource is affixed to a person
type	token	The type of the device

DiagnosticReport

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/DiagnosticReport/{id}
SEARCH	GET	https://{base_url}/fhir/r4/DiagnosticReport?{search_parameters}

Supported Search Parameters:

Name	Type	Description
category	reference	Which diagnostic discipline/department created the report
code	token	The code for the report, as opposed to codes for the atomic results, which are the names on the observation resource referred to from the result
date	date	The clinically relevant time of the report
patient	reference	The subject of the report if a patient
status	string	The status of the report

DocumentReference

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/DocumentReference/{id}
SEARCH	GET	https://{base_url}/fhir/r4/DocumentReference?{search_parameters}

Supported Search Parameters:

Name	Type	Description
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_id	token	The ID of the resource
category	token	Categorization of document
date	date	When this document reference was created
patient	reference	Who/what is the subject of the document
period	date	Time of service that is being documented
status	token	current superseded entered-in-error
type	token	Kind of document (LOINC if possible)

Encounter

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Encounter/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Encounter?{search_parameters}

Supported Search Parameters:

Name	Type	Description
_id	token	The ID of the resource
class	token	Classification of patient encounter
date	date	A date within the period the Encounter lasted
identifier	token	Identifier(s) by which this encounter is known
patient	reference	The patient or group present at the encounter
status	string	planned arrived triaged in-progress onleave finished cancelled +

type	token	Specific type of encounter
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Endpoint

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Endpoint/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Endpoint?{search_parameters}

Supported Search Parameters:

Name	Type	Description
connection-type	token	Protocol/Profile/Standard to be used with this endpoint connection
name	string	A name that this endpoint can be identified by
organization	reference	The organization that is managing the endpoint
status	string	The current status of the Endpoint (usually expected to be active)

Goal

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Goal/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Goal?{search_parameters}

Supported Search Parameters:

Name	Type	Description
lifecycle-status	token	proposed planned accepted active on-hold completed cancelled entered-in-error rejected
patient	reference	Who this goal is intended for
target-date	date	Reach goal on or before

Group

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Group/{id}

Immunization

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Immunization/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Immunization?{search_parameters}

Supported Search Parameters:

Name	Type	Description
date	date	Vaccination (non)-Administration Date
patient	reference	The patient for the vaccination record

status	string	Immunization event status
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Location

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Location/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Location?{search_parameters}

Supported Search Parameters:

Name	Type	Description
address	string	A (part of the) address of the location
address-city	string	A city specified in an address
address-country	string	A country specified in an address
address-postalcode	string	A postal code specified in an address
address-state	string	A state specified in an address
address-use	string	A use code specified in an address
identifier	token	An identifier for the location
name	string	A portion of the location's name or alias
status	token	Searches for locations with a specific kind of status

Medication

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Medication/{id}

MedicationRequest

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/MedicationRequest/{id}
SEARCH	GET	https://{base_url}/fhir/r4/MedicationRequest?{search_parameters}

Supported Search Parameters:

Name	Type	Description
authoredon	date	Return prescriptions written on this date
encounter	reference	Return prescriptions with this encounter identifier
intent	string	Returns prescriptions with different intents
patient	reference	Returns prescriptions for a specific patient
status	string	Status of the prescription

Observation

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Observation/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Observation?{search_parameters}

Supported Search Parameters:

Name	Type	Description
category	token	The classification of the type of observation
code	token	The code of the observation type
date	date	Obtained date/time. If the obtained element is a period, a date that falls in the period
patient	reference	The subject that the observation is about (if patient)
status	string	The status of the observation

OperationDefinition

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/OperationDefinition/{id}

Organization

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Organization/{id}

SEARCH	GET	https://{base_url}/fhir/r4/Organization?{search_parameters}
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Supported Search Parameters:

Name	Type	Description
_id	token	The ID of the resource
address	string	A server defined search that may match any of the string fields in the Address, including line, city, district, state, country, postalCode, and/or text
identifier	token	Any identifier for the organization (not the accreditation issuer's identifier)
name	string	A portion of the organization's name or alias

Patient

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Patient/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Patient?{search_parameters}

Supported Search Parameters:

Name	Type	Description
_id	token	The ID of the resource
active	token	Whether the patient record is active

address	string	A server defined search that may match any of the string fields in the Address, including line, city, district, state, country, postalCode, and/or text
address-city	string	A city specified in an address
address-country	string	A country specified in an address
address-postalcode	string	A postalCode specified in an address
address-state	token	A state specified in an address
address-use	token	A use code specified in an address
birthdate	date	The patient's date of birth
deceased	token	This patient has been marked as deceased, or as a death date entered
email	token	A value in an email contact
family	string	A portion of the family name of the patient
gender	token	Gender of the patient
general-practitioner	reference	Patient's nominated general practitioner, not the organization that manages the record
given	string	A portion of the given name of the patient
identifier	token	A patient identifier
language	token	Language code (irrespective of use value)
name	string	A server defined search that may match any of the string fields in the HumanName, including family, give, prefix, suffix, suffix, and/or text
phone	token	A value in a phone contact

telecom	token	The value in any kind of telecom details of the patient
operation	export	http://hl7.org/fhir/uv/bulkdata/OperationDefinition/patient-export

Practitioner

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Practitioner/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Practitioner?{search_parameters}

Supported Search Parameters:

Name	Type	Description
active	token	Whether the practitioner record is active
email	token	A value in an email contact
family	string	A portion of the family name
given	string	A portion of the given name
identifier	token	A practitioner's Identifier
name	string	A server defined search that may match any of the string fields in the HumanName, including family, give, prefix, suffix, suffix, and/or text
phone	token	A value in a phone contact
telecom	token	The value in any kind of contact

PractitionerRole

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/PractitionerRole/{id}
SEARCH	GET	https://{base_url}/fhir/r4/PractitionerRole?{search_parameters}

Supported Search Parameters:

Name	Type	Description
active	token	Whether this practitioner role record is in active use
email	token	A value in an email contact
location	reference	One of the locations at which this practitioner provides care
organization	reference	The identity of the organization the practitioner represents / acts on behalf of
phone	token	A value in a phone contact
practitioner	reference	The practitioner can perform this role at for the organization
role	token	A value in a phone contact
specialty	token	The practitioner has this specialty at an organization
telecom	token	The value in any kind of contact

Procedure

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Procedure/{id}

SEARCH	GET	https://{base_url}/fhir/r4/Procedure?{search_parameters}
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Supported Search Parameters:

Name	Type	Description
code	token	A code to identify a procedure
date	date	When the procedure was performed
patient	reference	Search by subject - a patient
status	string	preparation in-progress not-done on-hold stopped completed entered-in-error unknown

Provenance

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/Provenance/{id}
SEARCH	GET	https://{base_url}/fhir/r4/Provenance?{search_parameters}

Supported Search Parameters:

Name	Type	Description
target	reference	Target Reference(s) (usually version specific)

ValueSet

Supported Operations:

Operations	Method	Description
READ	GET	https://{base_url}/fhir/r4/ValueSet/{id}
SEARCH	GET	https://{base_url}/fhir/r4/ValueSet?{search_parameters}

Supported Search Parameters:

Name	Type	Description
code	token	This special parameter searches for codes in the value set. See additional notes on the ValueSet resource
name	string	Computationally friendly name of the value set
publisher	string	Name of the publisher of the value set
title	string	The human-friendly name of the value set

Errors

Code	Error
304	HTTP_304_NOT_MODIFIED
400	HTTP_400_BAD_REQUEST
401	HTTP_401_CLIENT_UNAUTHORIZED
403	HTTP_403_FORBIDDEN
404	UnclassifiedServerFailureException
405	HTTP_405_METHOD_NOT_ALLOWED
409	HTTP_409_CONFLICT
410	HTTP_410_GONE

412	HTTP_412_PAYLOAD_TOO_LARGE
412	HTTP_412_PRECONDITION_FAILED
412	HTTP_412_PRECONDITION_FAILED
422	HTTP_422_UNPROCESSABLE_ENTITY
500	HTTP_500_INTERNAL_ERROR
501	HTTP_501_NOT_IMPLEMENTED

Mandatory Software Components and Configurations

As MMI is a mostly cloud-hosted multi-tenant SaaS EHR, there are very few special requirements to be able to take advantage of the Certified FHIR functionality.

For MMI EMA systems, the version of the software required is version 7.0 or higher.

For MMI gGastro systems, the version of the software required is version xxxxx or higher.

Apps should support securing, sending, or receiving data secured with the TLS 1.2 or higher encryption protocol.

Authentication and Authorization

ModMed utilizes OAuth2.0 as its authentication and authorization mechanism in order to ensure the security and privacy of our customers and their patient data.

SMART on FHIR

ModMed utilizes SVAP Version Approved: [SMART App Launch 2.0](#) and supports:

- EHR-Launch
- Standalone-Launch
- “Both” (“EHR-Launch” and “Standalone-Launch”)

Includes the ability to initiate a “launch sequence” using the “launch-ehr” “SMART on FHIR® Core Capability” SMART EHR Launch mode as well as to launch using the “launch-standalone” “SMART on FHIR® Core Capability” SMART Standalone Launch mode.

Includes the ability to support SMART’s public client profile.

Includes the ability to support a “.well-known/smart-configuration.json” path including support for:

- “authorization_endpoint”;
- “token_endpoint”;
- “capabilities” including support for “launch-ehr”, “launch-standalone”, “client-public”, “client-confidential-symmetric”, “sso-openid-connect”, “context-banner”, “context-style”, “context-ehr-patient”, “context-standalone-patient”, “permission-offline”, “permission-patient”, “permission-user”, “authorize-post”, “permission-v2”;
- “grant_types_supported” with support for “authorization_code” and “client_credentials”; and
- “code_challenge_methods_supported” with support for “S256” and shall not include support for “plain”

Includes the ability to the ability to receive an authorization request including support for the following parameters:

- “response_type”;
- “client_id”;
- “redirect_uri”;
- “launch” (for EHR-Launch mode only);
- “scope”;
- “state”;
- “aud”;
- “code_challenge”; and
- “code_challenge_method”

Includes the ability to support the receipt of the following scopes and capabilities:

- “openid” (to support “sso-openid-connect” “SMART on FHIR® Capability”);
- “FHIR®User” (to support “sso-openid-connect” “SMART on FHIR® Capability”);
- “need_patient_banner” (to support “context-banner” “SMART on FHIR® Capability” for EHR-Launch mode only);
- “smart_style_url” (to support “context-style” “SMART on FHIR® Capability” for EHR-Launch mode only);
- “launch/patient” (to support “context-standalone-patient” “SMART on FHIR® Capability” for Standalone-Launch mode only);
- “launch” (for EHR-Launch mode only);
- “offline_access” (to support “permission-offline” “SMART on FHIR® Capability”);

- Patient-level scopes (to support “permission-patient” and “SMART on FHIR® Capability”);
- User-level scopes (to support “permission-user” “SMART on FHIR® Capability”); and
- SMARTv2 scope syntax for patient-level and user-level scopes (to support “permission-v2” “SMART on FHIR® Capability”)

Vendor/App Registration

Before registering an App, the vendor will need to know and select from the options below as to the type of app and required configurations required.

Application Name

Description

Access Type

- Public
- Client-Confidential

PKCE

- None
- PKCE s256

App Type

- Patient
- Provider
- Patient and Provider
- Bulk

FHIR Version

- v4.0.1

Launch Url

Redirect Url

Logo Url

Policy Url

Terms of Service Url

Standard Scopes

- openid
- launch
- launch/patient
- online_access

Optional Standard Scopes

- fhirUser
- offline_access
- Patient Scopes
- patient/AllergyIntolerance.rs
- patient/CarePlan.rs
- patient/CareTeam.rs
- patient/Condition.rs
- patient/Device.rs
- patient/DocumentReference.rs
- patient/DiagnosticReport.rs
- patient/Encounter.rs
- patient/Goal.rs
- patient/Immunization.rs
- patient/Location.rs
- patient/Medication.rs
- patient/MedicationRequest.rs
- patient/Observation.rs
- patient/Organization.rs
- patient/Patient.rs
- patient/Practitioner.rs
- patient/PractitionerRole.rs
- patient/Procedure.rs
- patient/Provenance.rs
- User Scopes
- user/AllergyIntolerance.rs
- user/CarePlan.rs
- user/CareTeam.rs
- user/Condition.rs
- user/Device.rs

- user/DocumentReference.rs
- user/DiagnosticReport.rs
- user/Encounter.rs
- user/Goal.rs
- user/Immunization.rs
- user/Location.rs
- user/Medication.rs
- user/MedicationRequest.rs
- user/Observation.rs
- user/Organization.rs
- user/Patient.rs
- user/Practitioner.rs
- user/PractitionerRole.rs
- user/Procedure.rs
- user/Provenance.rs

[Click here](#) to register as a new vendor or app.

FHIR Endpoints

[Click here](#) for the published list of publicly available endpoints for MMI customers.