Article
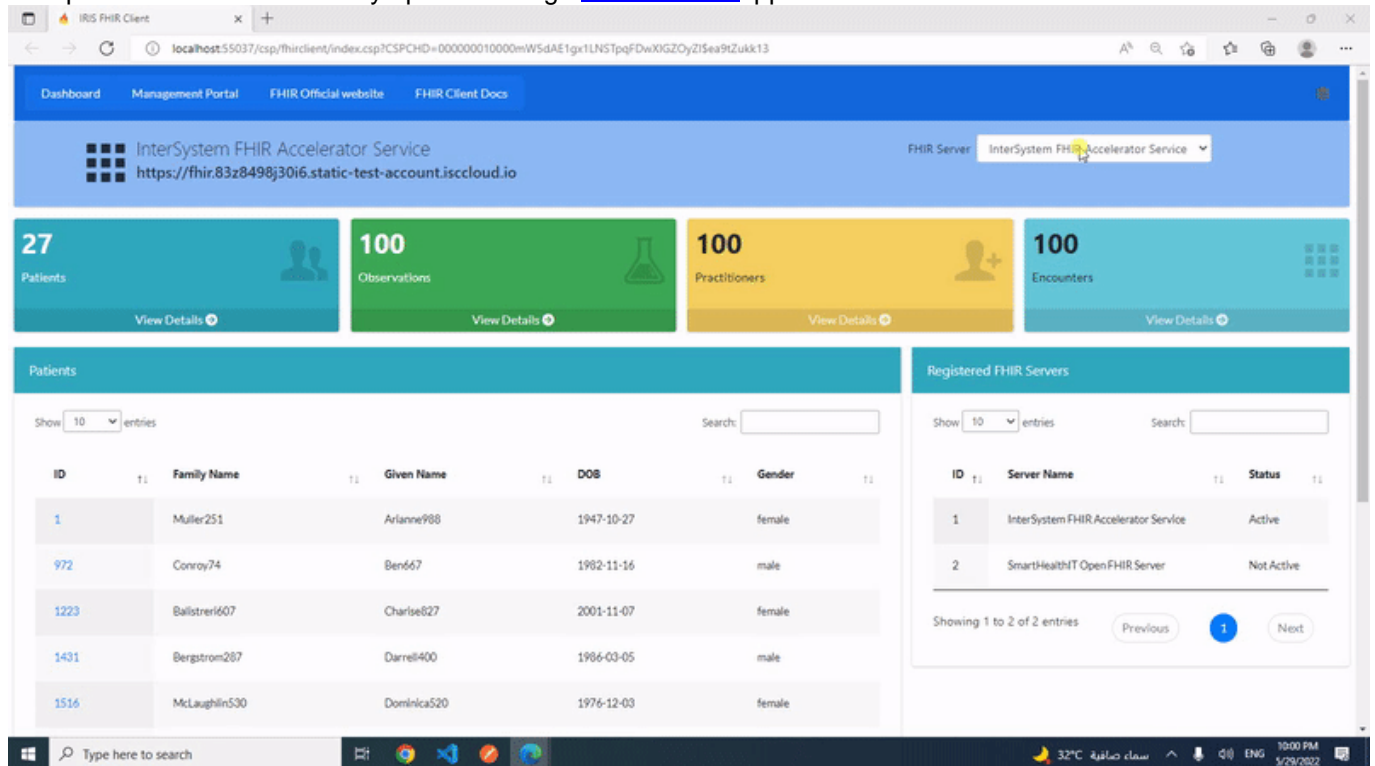[Muhammad Waseem](#) · May 30, 2022   3m read

 Open Exchange

FHIR Client to connect any open FHIR Server by using embedded python

Hi Community,

This post is a introduction of my open exchange [iris-fhir-client](#) application.

[iris-fhir-client](#) can connect to any open FHIR Server by using embedded python with the help of [fhirpy](#) Library. Get Resource information by terminal and by using CSP web application.

View and Activate Registered Servers

Connect to IRIS Terminal

```
docker-compose exec iris iris session iris
```

Application will register InterSystems FHIR Server and SmartHealthIT Open FHIR Server by default and both are ready to use.
Use below command to list down registered Severs

```
do ##class(dc.FhirClient).ServerList()
```

```
USER>do ##class(dc.FhirClient).ServerList()
-----------------------------------------------------------
Registered FHIR Servers
-----------------------------------------------------------
ID          1
Name        InterSystem FHIR Accelerator Service
EndPoint    https://fhir.83z8498j30i6.static-test-account.isccloud.io
ApiKey
EPOAuth2
ISActive    Active
-----------------------------------------------------------
ID          2
Name        SmartHealthIT Open FHIR Server
EndPoint    https://r4.smarthealthit.org
ApiKey
EPOAuth2
ISActive    Not Active
-----------------------------------------------------------
```

InterSystems FHIR Server is active. In order to select SmartHealthIT Open FHIR Server use SetFhirServer function of dc.FhirClient class by passing server ID

```
do ##class(dc.FhirClient).SetFhirServer(2)
```

Registered FHIR Servers

To Register New Server use RegisterServer() function of dc.FhirClient class
class(dc.FhirClient).RegsterServer("Server Name","Endpoint","ApiKey"[optional],"EndpointOAuth"[optional]

```
do ##class(dc.FhirClient).RegisterServer("INTERSYSTEMS FHIR Server","http://localhost
:52773/csp/healthshare/samples/fhir/r4/","","")
```

```
USER>do ##class(dc.FhirClient).RegisterServer("INTERSYSTEMS FHIR Server","http://localhost:52773/csp/healthshare/samples/fhir/r4/","","")
FHIR Server registered successfully
USER>do ##class(dc.FhirClient).ServerList()
-------------------------------------------------
Registered FHIR Servers
-------------------------------------------------
ID          1
Name        InterSystem FHIR Accelerator Service
EndPoint    https://fhir.83z8498j30i6.static-test-account.isccloud.io
ApiKey
EPOAuth2
ISActive    Active
-------------------------------------------------
ID          2
Name        SmartHealthIT Open FHIR Server
EndPoint    https://r4.smarthealthit.org
ApiKey
EPOAuth2
ISActive    Not Active
-------------------------------------------------
ID          3
Name        INTERSYSTEMS FHIR Server
EndPoint    http://localhost:52773/csp/healthshare/samples/fhir/r4/
ApiKey
EPOAuth2
ISActive    Not Active
-------------------------------------------------
```

Get Resources from the FHIR Servers

To Retrieve all the resources for the current server use ListResources() method of dc.FhirClient class

```
do ##class(dc.FhirClient).ListResources()
```

```
USER>do ##class(dc.FhirClient).ListResources()
Account                      CoverageEligibilityResponse   ImmunizationRecommendation   OperationDefinition          Substance
ActivityDefinition           DetectedIssue                 ImplementationGuide          Organization                 SubstanceSpecification
AdverseEvent                 Device                        InsurancePlan                OrganizationAffiliation      SupplyDelivery
AllergyIntolerance           DeviceDefinition              Invoice                      Patient                      SupplyRequest
Appointment                  DeviceMetric                  Library                      PaymentNotice                Task
AppointmentResponse          DeviceRequest                 Linkage                      PaymentReconciliation        TerminologyCapabilities
AuditEvent                   DeviceUseStatement            List                         Person                       TestReport
Basic                        DiagnosticReport              Location                     PlanDefinition               TestScript
Binary                       DocumentManifest              Measure                      Practitioner                 ValueSet
BodyStructure                DocumentReference             MeasureReport                PractitionerRole             VerificationResult
Bundle                       EffectEvidenceSynthesis       Media                        Procedure                    VisionPrescription
CapabilityStatement          Encounter                     Medication                   Provenance
CarePlan                     Endpoint                      MedicationAdministration     Questionnaire
CareTeam                     EnrollmentRequest             MedicationDispense           QuestionnaireResponse
ChargeItem                   EnrollmentResponse            MedicationKnowledge          RelatedPerson
ChargeItemDefinition         EpisodeOfCare                 MedicationRequest            RequestGroup
Claim                        EventDefinition               MedicationStatement          ResearchDefinition
ClaimResponse                Evidence                      MedicinalProduct             ResearchElementDefinition
ClinicalImpression           EvidenceVariable              MedicinalProductAuthorization ResearchStudy
CodeSystem                   ExampleScenario               MedicinalProductContraindication ResearchSubject
Communication                ExplanationOfBenefit          MedicinalProductIndication   RiskAssessment
CommunicationRequest         FamilyMemberHistory           MedicinalProductInteraction  RiskEvidenceSynthesis
CompartmentDefinition        Flag                          MedicinalProductPackaged     Schedule
Composition                  Goal                          MedicinalProductPharmaceutical SearchParameter
ConceptMap                   GraphDefinition               MedicinalProductUndesirableEffect ServiceRequest
Condition                    Group                         MessageDefinition            Slot
Consent                      GuidanceResponse              MessageHeader                Specimen
Contract                     HealthcareService             MolecularSequence            SpecimenDefinition
Coverage                     ImagingStudy                  NamingSystem                 StructureDefinition
CoverageEligibilityRequest   Immunization                  NutritionOrder               StructureMap
CoverageEligibilityResponse  ImmunizationEvaluation        Observation                  Subscription
```

In order to display number of records of any resources use CountResource() method by passing Resource of dc.FhirClient
Below command will get counter of Patient Resource against active FHIR Server

```
set count = ##class(dc.FhirClient).CountResource("Patient")
write count
```

To Retrieve all the created Resources along with their count just pass 1 to ListResource() function

```
do ##class(dc.FhirClient).ListResources(1)
```

```
USER>do ##class(dc.FhirClient).ListResources(1)
AllergyIntolerance:9
CarePlan:59
CareTeam:59
Claim:100
Condition:100
DiagnosticReport:100
Encounter:100
ExplanationOfBenefit:100
Goal:49
ImagingStudy:6
Immunization:100
Location:1
MedicationRequest:100
Observation:100
Organization:100
Patient:27
Practitioner:100
Procedure:100
```

To get details of the resource use GetResource() by passing Resource of dc.FhirClient class
Below command will retrieve all the Patients from the active FHIR Server

```
do ##class(dc.FhirClient).GetResource("Patient")
```

```
USER>do ##class(dc.FhirClient).GetResource("Patient")
  ID   Family Name    Given Name    DOB          Gender
 ----  ------------   -----------   ----------   --------
    1  Muller251      Arianne988    1947-10-27   female
  972  Conroy74       Ben667        1982-11-16   male
 1223  Balistreri607  Charise827    2001-11-07   female
 1431  Bergstrom287   Darrell400    1986-03-05   male
 1516  McLaughlin530  Dominica520   1976-12-03   female
 1970  Kozey370       Donnell534    2009-09-17   male
 2177  Almonte426     Elisa944      2001-01-27   female
 2395  Waelchi213     Enrique929    1970-09-30   male
 2592  Bednar518      Kenneth671    1958-06-24   male
 2871  Steuber698     Kiera822      2019-03-06   female
 3021  Schinner682    Lennie123     1947-03-04   female
 3294  Durgan499      Lindsay928    1979-02-04   male
 3432  Haley279       Logan497      1979-03-21   male
 3558  Mueller846     Magaly973     1974-10-06   female
 3963  Ratke343       Marcela739    2016-10-28   female
 4122  Dibbert990     Mario764      1986-02-07   male
 4379  FernÃ¡ndez399  Marisol435    1964-10-23   female
 4908  Mayer370       Maryland870   2013-08-02   female
 5166  Schumm995      Moises22      1962-10-17   male
 5341  Schmidt332     Numbers230    1959-03-03   male
 5637  Sanches349     RubÃ©n780     1946-06-28   male
 6201  Franecki195    Sade71        1970-07-28   female
 6591  Kuhlman484     Stevie682     2004-01-26   male
 6805  Fisher429      Takako793     1977-02-14   female
 7123  Peres371       Teodoro374    1946-06-28   male
 7786  Upton904       Winnifred2    1987-03-09   female
 8109  Donald         Duck                       male
```

Below command will retrieve all the Observations from the active FHIR Server

```
do ##class(dc.FhirClient).GetResource("Observation")
```

```
USER>do ##class(dc.FhirClient).GetResource("Observation")
  ID  Category      Code         Value   UOM      Date                      Patient
  ---- -----------  -------    ---------  -------  ------------------------  ---------
  408  vital-signs   8302-2    174.1      cm       2010-08-30T11:59:49+00:00  Patient/1
  409  vital-signs   72514-3   3          {score}  2010-08-30T11:59:49+00:00  Patient/1
  410  vital-signs   29463-7   84.3       kg       2010-08-30T11:59:49+00:00  Patient/1
  411  vital-signs   39156-5   27.81      kg/m2    2010-08-30T11:59:49+00:00  Patient/1
  412  vital-signs   85354-9              2010-08-30T11:59:49+00:00  Patient/1
  413  laboratory    2339-0    68.33      mg/dL    2010-08-30T11:59:49+00:00  Patient/1
  414  laboratory    6299-2    17.31      mg/dL    2010-08-30T11:59:49+00:00  Patient/1
  415  laboratory    38483-4   1.15       mg/dL    2010-08-30T11:59:49+00:00  Patient/1
  416  laboratory    49765-1   8.89       mg/dL    2010-08-30T11:59:49+00:00  Patient/1
  417  laboratory    2947-0    136.02     mmol/L   2010-08-30T11:59:49+00:00  Patient/1
  418  laboratory    6298-4    4.99       mmol/L   2010-08-30T11:59:49+00:00  Patient/1
  419  laboratory    2069-3    109.94     mmol/L   2010-08-30T11:59:49+00:00  Patient/1
  420  laboratory    20565-8   21.06      mmol/L   2010-08-30T11:59:49+00:00  Patient/1
  421  survey        72166-2              2010-08-30T11:59:49+00:00  Patient/1
  422  laboratory    4548-4    6.23       %        2010-08-30T11:59:49+00:00  Patient/1
  435  laboratory    2339-0    90.71      mg/dL    2011-05-11T11:59:49+00:00  Patient/1
  436  laboratory    6299-2    13.99      mg/dL    2011-05-11T11:59:49+00:00  Patient/1
  437  laboratory    38483-4   3.1234     mg/dL    2011-05-11T11:59:49+00:00  Patient/1
  438  laboratory    49765-1   9.69       mg/dL    2011-05-11T11:59:49+00:00  Patient/1
  439  laboratory    2947-0    141.28     mmol/L   2011-05-11T11:59:49+00:00  Patient/1
  440  laboratory    6298-4    4.82       mmol/L   2011-05-11T11:59:49+00:00  Patient/1
  441  laboratory    2069-3    105.23     mmol/L   2011-05-11T11:59:49+00:00  Patient/1
  442  laboratory    20565-8   25.29      mmol/L   2011-05-11T11:59:49+00:00  Patient/1
  443  laboratory    33914-3   68.715     mL/min   2011-05-11T11:59:49+00:00  Patient/1
  444  laboratory    2885-2    79.415     g/dL     2011-05-11T11:59:49+00:00  Patient/1
  445  laboratory    1751-7    5.0093     g/dL     2011-05-11T11:59:49+00:00  Patient/1
  446  laboratory    10834-0   2.8258     g/L      2011-05-11T11:59:49+00:00  Patient/1
  447  laboratory    1975-2    0.16126    mg/dL    2011-05-11T11:59:49+00:00  Patient/1
```

Get Resources for particular patient from the FHIR Servers

Below command will retrieve Observations detail against Patinet ID 1 from the active FHIR Server

```
do ##class(dc.FhirClient).GetPatientResources("Observation","1")
```

```
USER>do ##class(dc.FhirClient).GetPatientResources("Observation","1")
  ID   Category      Code         Value   UOM       Date                          Patient
 ----  -----------   --------     -------  -------   -------------------------     ---------
  408  vital-signs   8302-2       174.1    cm        2010-08-30T11:59:49+00:00     Patient/1
  409  vital-signs   72514-3      3        {score}   2010-08-30T11:59:49+00:00     Patient/1
  410  vital-signs   29463-7      84.3     kg        2010-08-30T11:59:49+00:00     Patient/1
  411  vital-signs   39156-5      27.81    kg/m2     2010-08-30T11:59:49+00:00     Patient/1
  412  vital-signs   85354-9                         2010-08-30T11:59:49+00:00     Patient/1
  413  laboratory    2339-0       68.33    mg/dL     2010-08-30T11:59:49+00:00     Patient/1
  414  laboratory    6299-2       17.31    mg/dL     2010-08-30T11:59:49+00:00     Patient/1
  415  laboratory    38483-4      1.15     mg/dL     2010-08-30T11:59:49+00:00     Patient/1
  416  laboratory    49765-1      8.89     mg/dL     2010-08-30T11:59:49+00:00     Patient/1
  417  laboratory    2947-0       136.02   mmol/L    2010-08-30T11:59:49+00:00     Patient/1
  418  laboratory    6298-4       4.99     mmol/L    2010-08-30T11:59:49+00:00     Patient/1
  419  laboratory    2069-3       109.94   mmol/L    2010-08-30T11:59:49+00:00     Patient/1
  420  laboratory    20565-8      21.06    mmol/L    2010-08-30T11:59:49+00:00     Patient/1
  421  survey        72166-2                         2010-08-30T11:59:49+00:00     Patient/1
  422  laboratory    4548-4       6.23     %         2010-08-30T11:59:49+00:00     Patient/1
  435  laboratory    2339-0       90.71    mg/dL     2011-05-11T11:59:49+00:00     Patient/1
  436  laboratory    6299-2       13.99    mg/dL     2011-05-11T11:59:49+00:00     Patient/1
  437  laboratory    38483-4      3.1234   mg/dL     2011-05-11T11:59:49+00:00     Patient/1
  438  laboratory    49765-1      9.69     mg/dL     2011-05-11T11:59:49+00:00     Patient/1
  439  laboratory    2947-0       141.28   mmol/L    2011-05-11T11:59:49+00:00     Patient/1
  440  laboratory    6298-4       4.82     mmol/L    2011-05-11T11:59:49+00:00     Patient/1
  441  laboratory    2069-3       105.23   mmol/L    2011-05-11T11:59:49+00:00     Patient/1
  442  laboratory    20565-8      25.29    mmol/L    2011-05-11T11:59:49+00:00     Patient/1
  443  laboratory    33914-3      68.715   mL/min    2011-05-11T11:59:49+00:00     Patient/1
  444  laboratory    2885-2       79.415   g/dL      2011-05-11T11:59:49+00:00     Patient/1
```

View FHIR Server information from CSP Web application

Navigate to http://localhost:55037/csp/fhirclient/index.csp
Index Page will show active server Patients,Observations,Practitioners and Encounters count along with Patient and Registered Servers details

Index page will display FHIR Server List with active server selected. Select other server from the list to view details of selected server

Hover to Patient ID and select to get details of Patient Resources

This page will display count of some of Patient Resources along with Patient Observations details

| Dashboard | Management Portal | FHIR Official website | FHIR Client Docs |

Conroy74 Ben667
ID = 972

Patient Resources

Resource	Count
Observations	94
Procedure	7
Immunization	7
Encounter	25
Condition	4
Practitioner	101
Organization	101

Patient Observations

Copy Excel CSV PDF

Search:

ID	Category	Codes	Value	UOM	Date
1049	vital-signs	8302-2	167.7	cm	2011-03-08T02:53:04+00:00
1050	vital-signs	72514-3	1	{score}	2011-03-08T02:53:04+00:00
1051	vital-signs	29463-7	64	kg	2011-03-08T02:53:04+00:00
1052	vital-signs	39156-5	22.76	kg/m2	2011-03-08T02:53:04+00:00
1053	vital-signs	85354-9	None	None	2011-03-08T02:53:04+00:00
1054	survey	72166-2	None	None	2011-03-08T02:53:04+00:00
1061	vital-signs	8302-2	167.7	cm	2012-03-13T02:53:04+00:00
1062	vital-signs	72514-3	0	{score}	2012-03-13T02:53:04+00:00

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Thanks

#Contest #CSP #Dashboards #Embedded Python #FHIR #InterSystems Package Manager (IPM) #ObjectScript #REST API #InterSystems IRIS for Health #Open Exchange
Check the related application on InterSystems Open Exchange