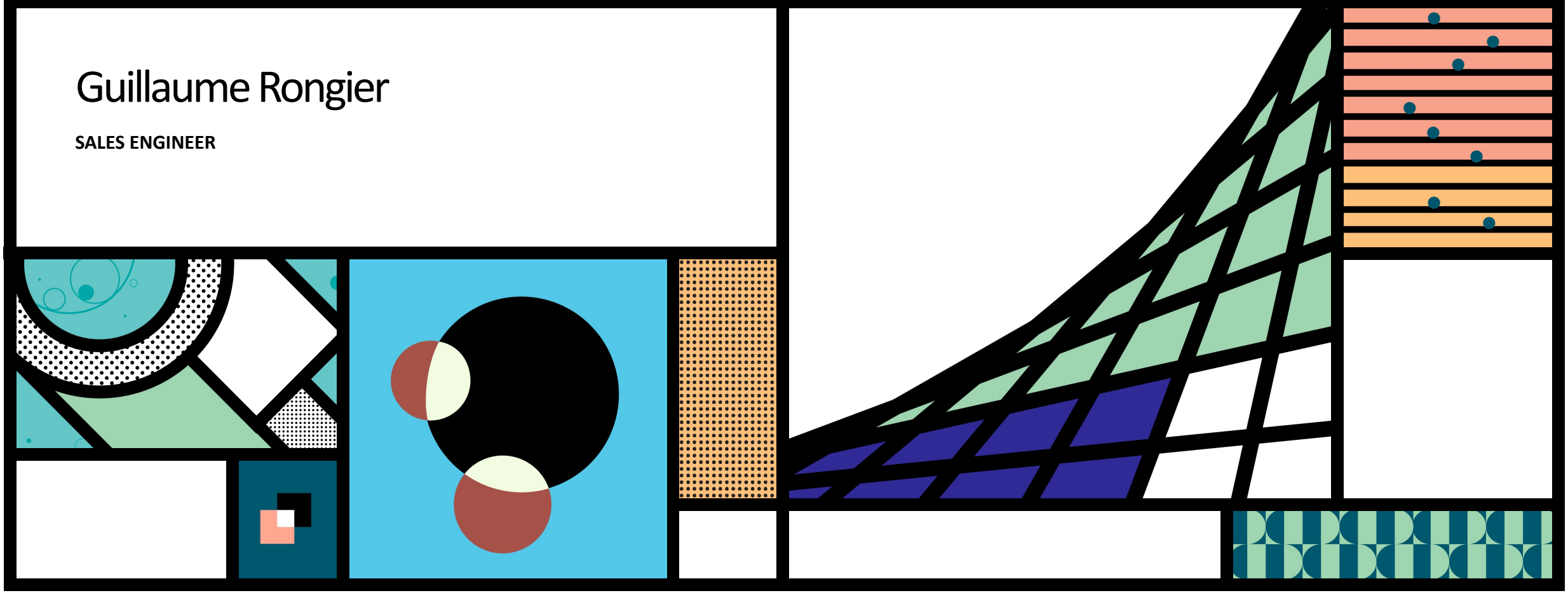
IRIS For Health Training

InterSystems®
Health | Business | Government

Guillaume Rongier

SALES ENGINEER



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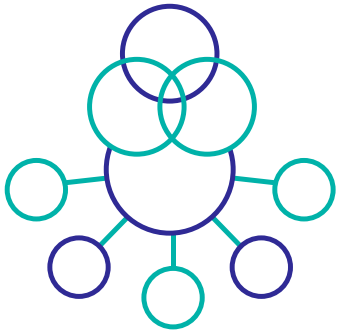
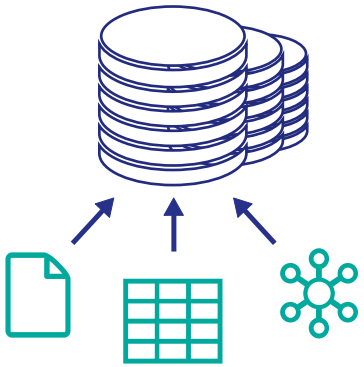
Introduction

IRIS For Health

Unifier pour Simplifier



InterSystems IRIS
Interoperability



InterSystems IRIS
Multi Model Database

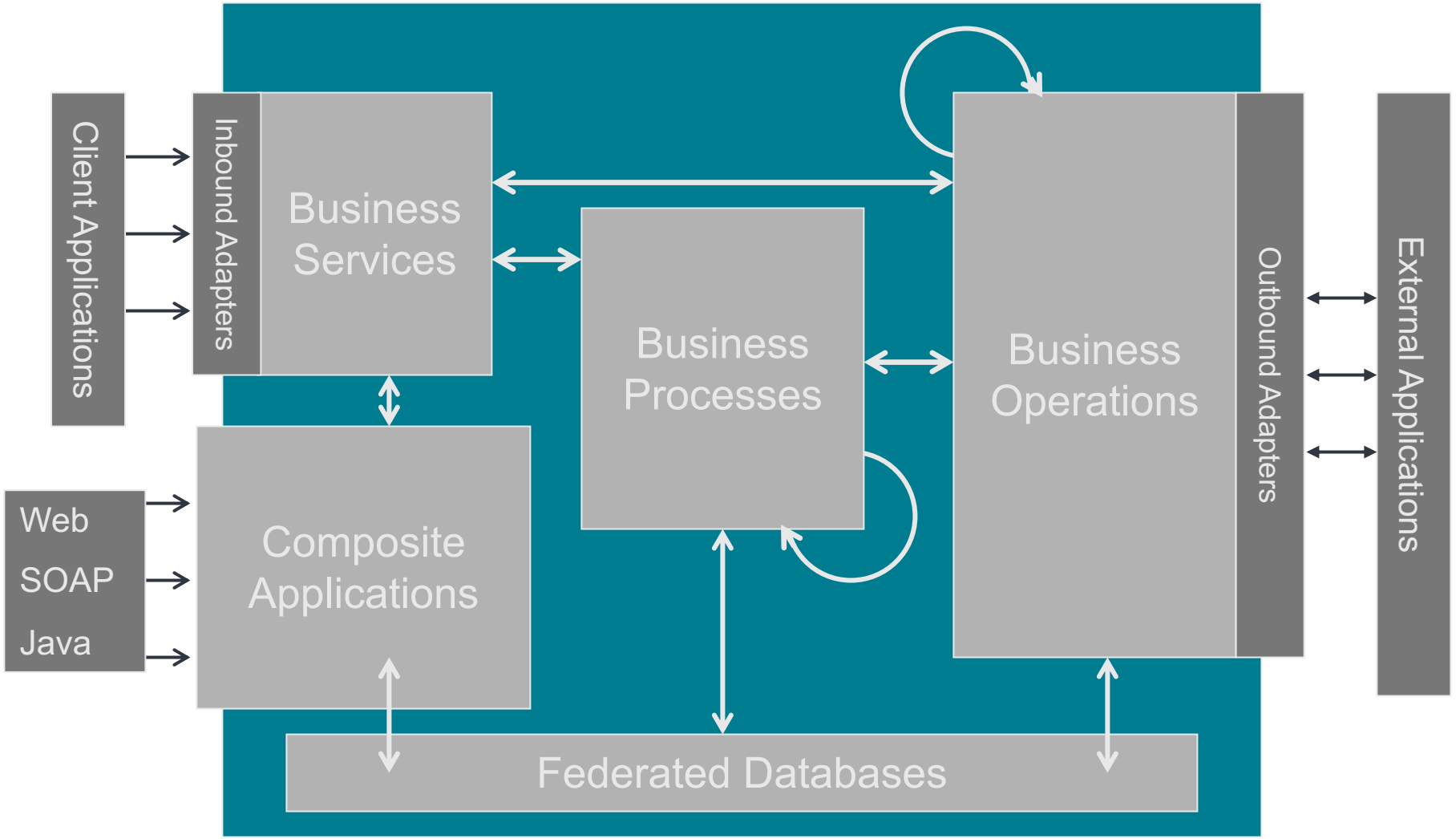
InterSystems IRIS
Analytics

IRIS Mantra

Bring code to data

Not data to code

Interoperability Framework



 | |

Installation

Dockerfile

```
ARG IMAGE=intersystemsdc/irishealth-community:2020.4.0.547.0-zpm
FROM $IMAGE

ARG IRIS_PASSWORD

USER root
WORKDIR /opt/irisapp
RUN chown ${ISC_PACKAGE_MGRUSER}:${ISC_PACKAGE_IRISGROUP} /opt/irisapp
USER ${ISC_PACKAGE_MGRUSER}

COPY . /opt/irisapp
COPY iris.script /tmp/iris.script


# run iris and initial
RUN iris start IRIS \
&& iris session IRIS < /tmp/iris.script \
&& iris stop IRIS quietly
```


Iris.script

```
zn "%SYS"
Do ##class(Security.Users).UnExpireUserPasswords("*")
zn "HSLIB"
// Install a Foundation namespace and change to it
Do ##class(HS.HC.Util.Installer).InstallFoundation("TRAINING")
zn "TRAINING"

// Install FHIR repo
Set appKey = "/api/fhir"
Set strategyClass = "HS.FHIRServer.Storage.Json.InteractionsStrategy"
Set metadataConfigKey = "HL7v40"
```


Docker-compose

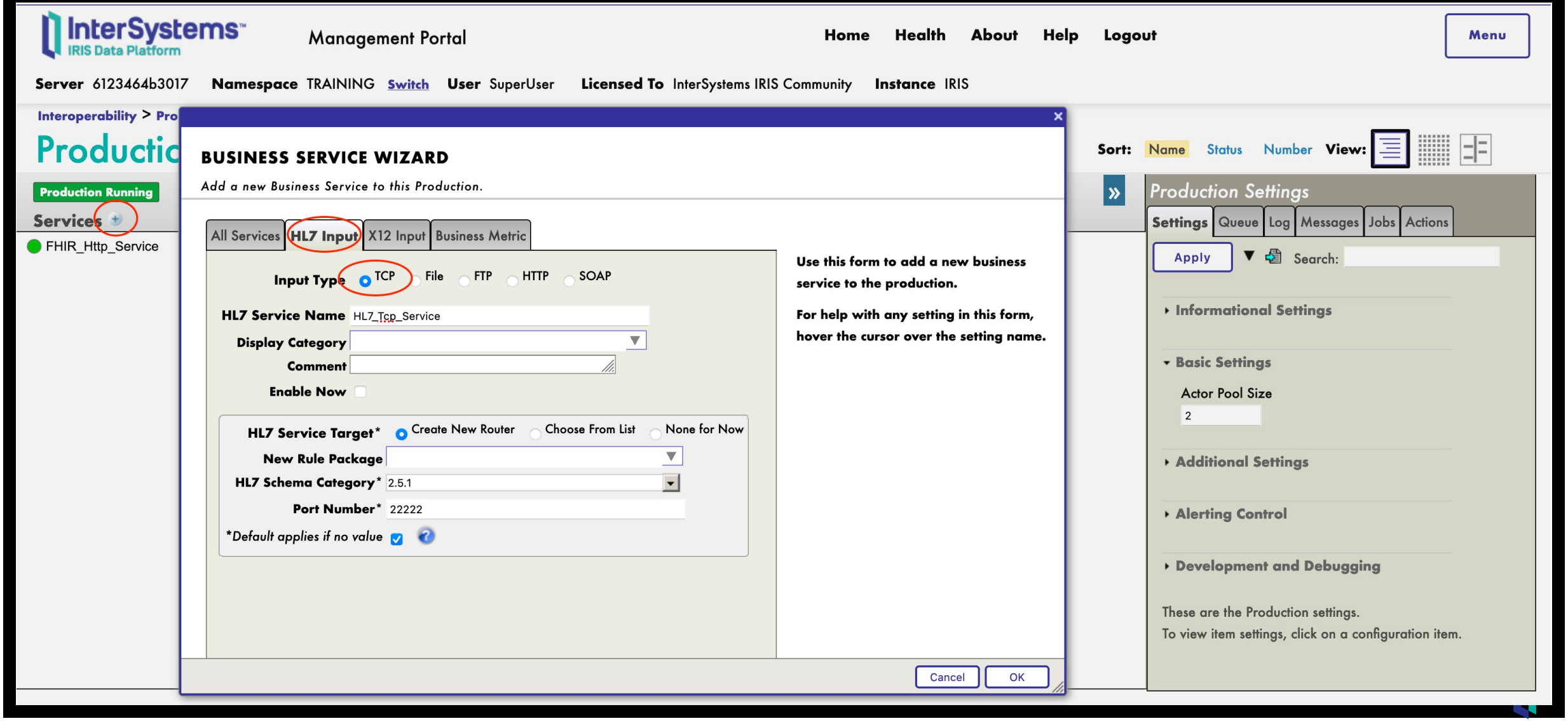
```
version: '3.6'

services:
 iris:
   build:
     context: .
     dockerfile: dockerfile
    args:
      - IRIS_PASSWORD=$IRIS_PASSWORD

  restart: always

  env_file:

   - .env

  ports:
    - 32782:1972
    - 32783:52773
    - 32784:53773
  volumes:
    - ./:/irisdev/app
```


Launch it !

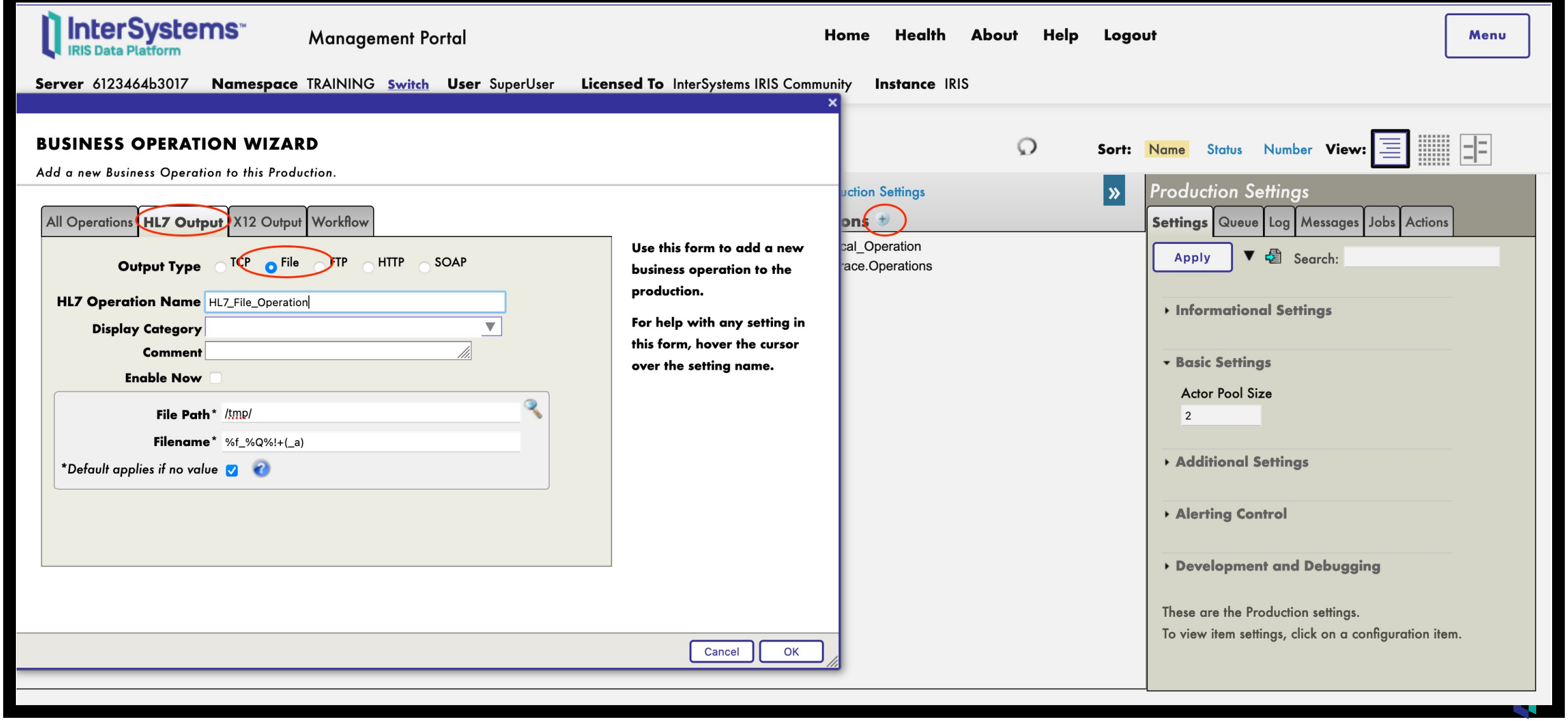
Docker compose up

Premier flux HL7v2

First HL7 TCP Service

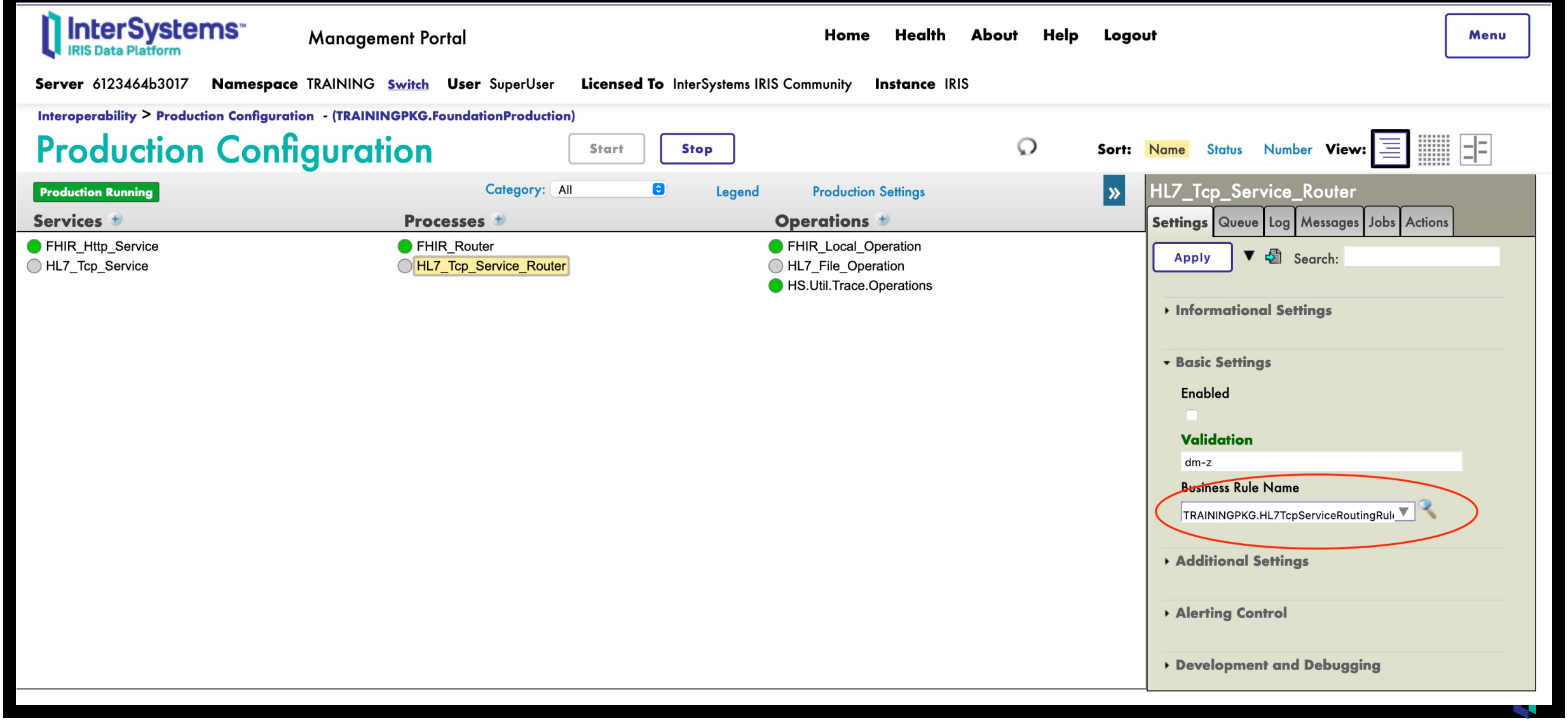


HL7 Operation

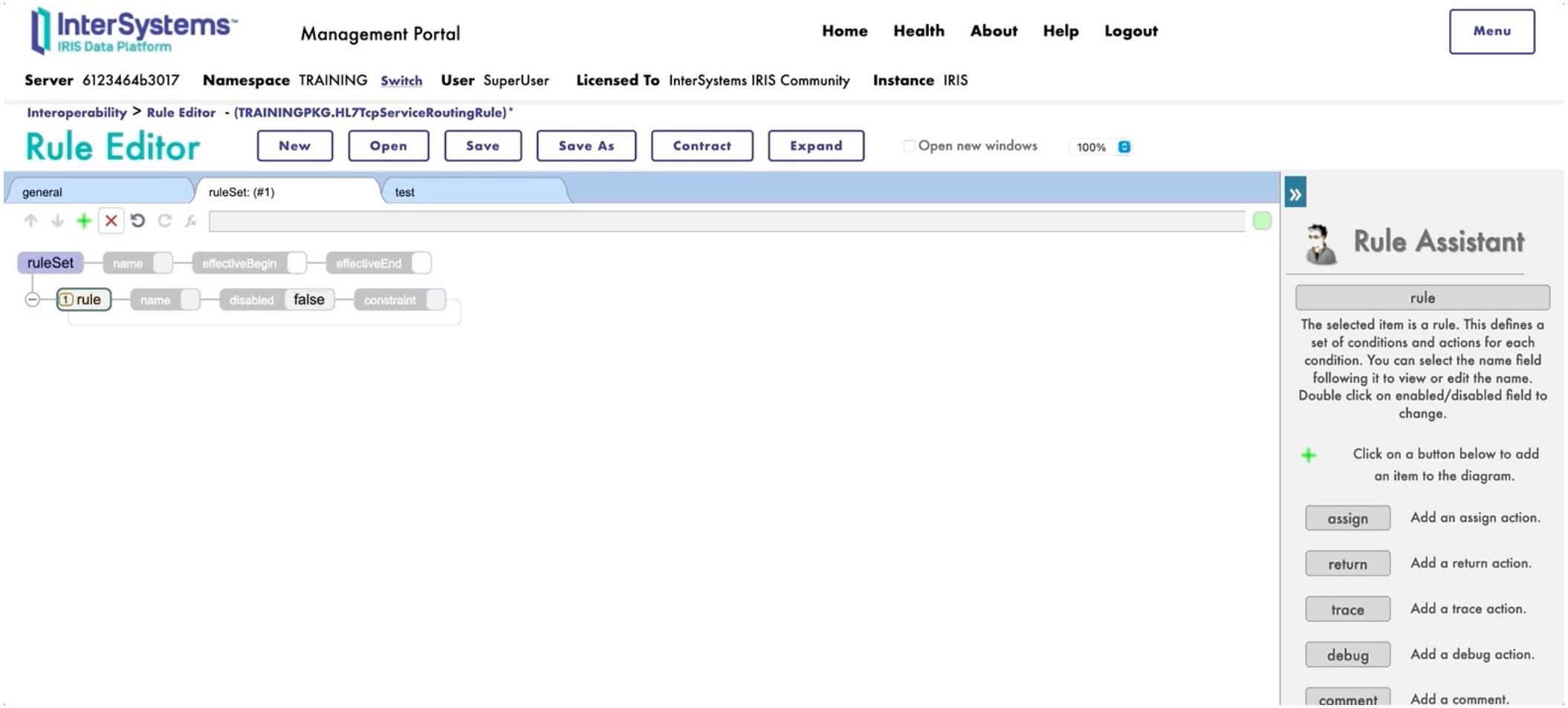


 | |

HL7 router



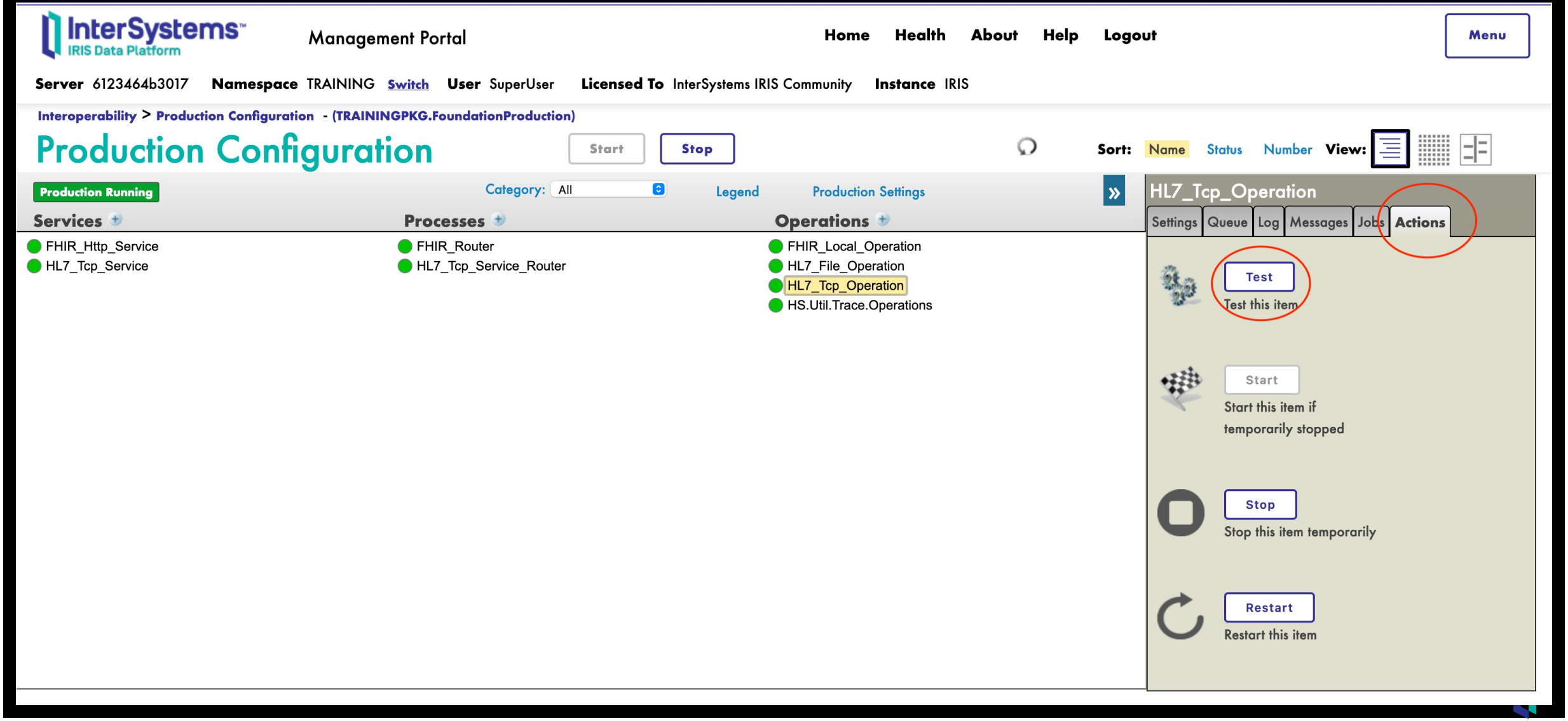
HL7 router



Test It !

1. Create an Operation
    1. Name : HL7_Tcp_Operation
    2. Port : 2222
    3. Host : localhost

Test It !



Client/Server

Client / Server

Save you work in git.

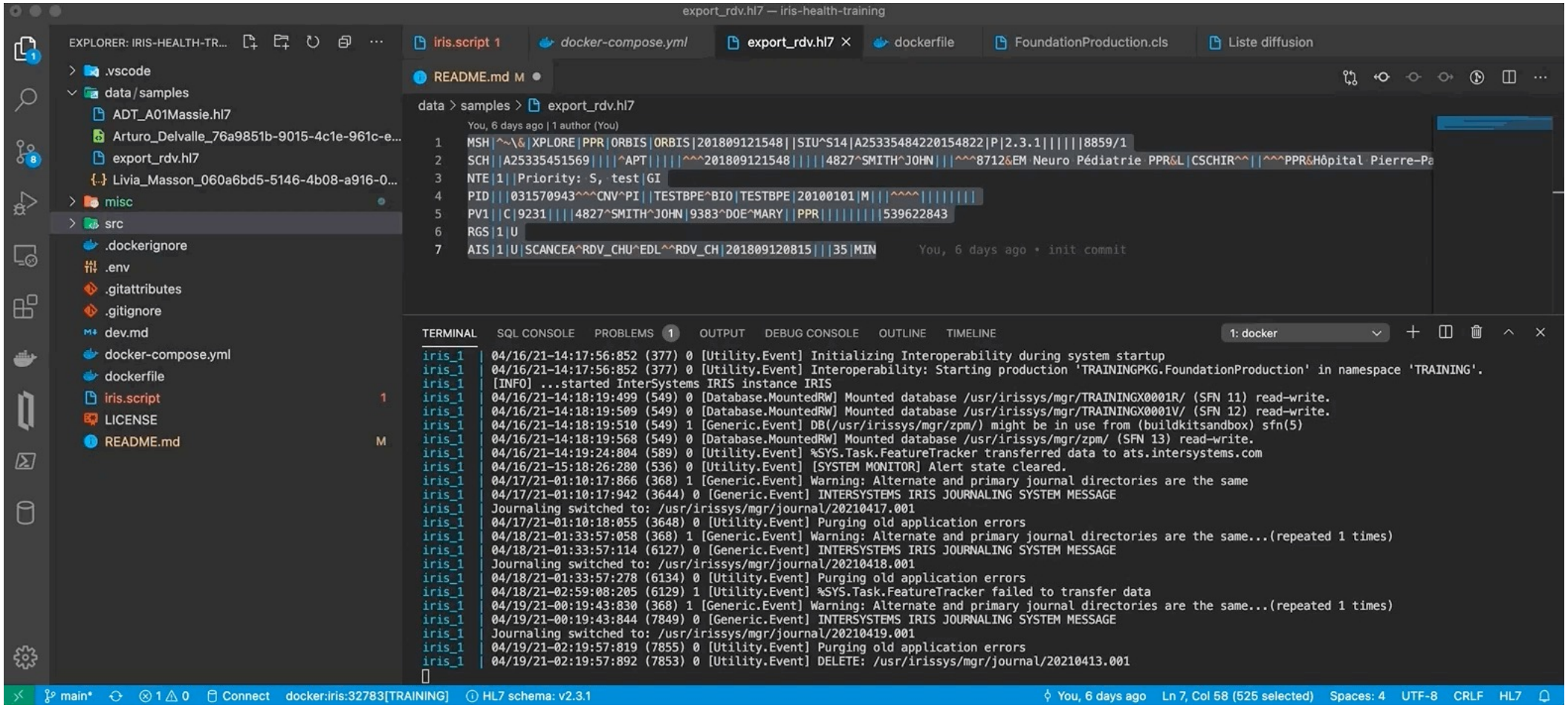
First remember the mantra :

- Bring code to data
- Not data to code

Second :

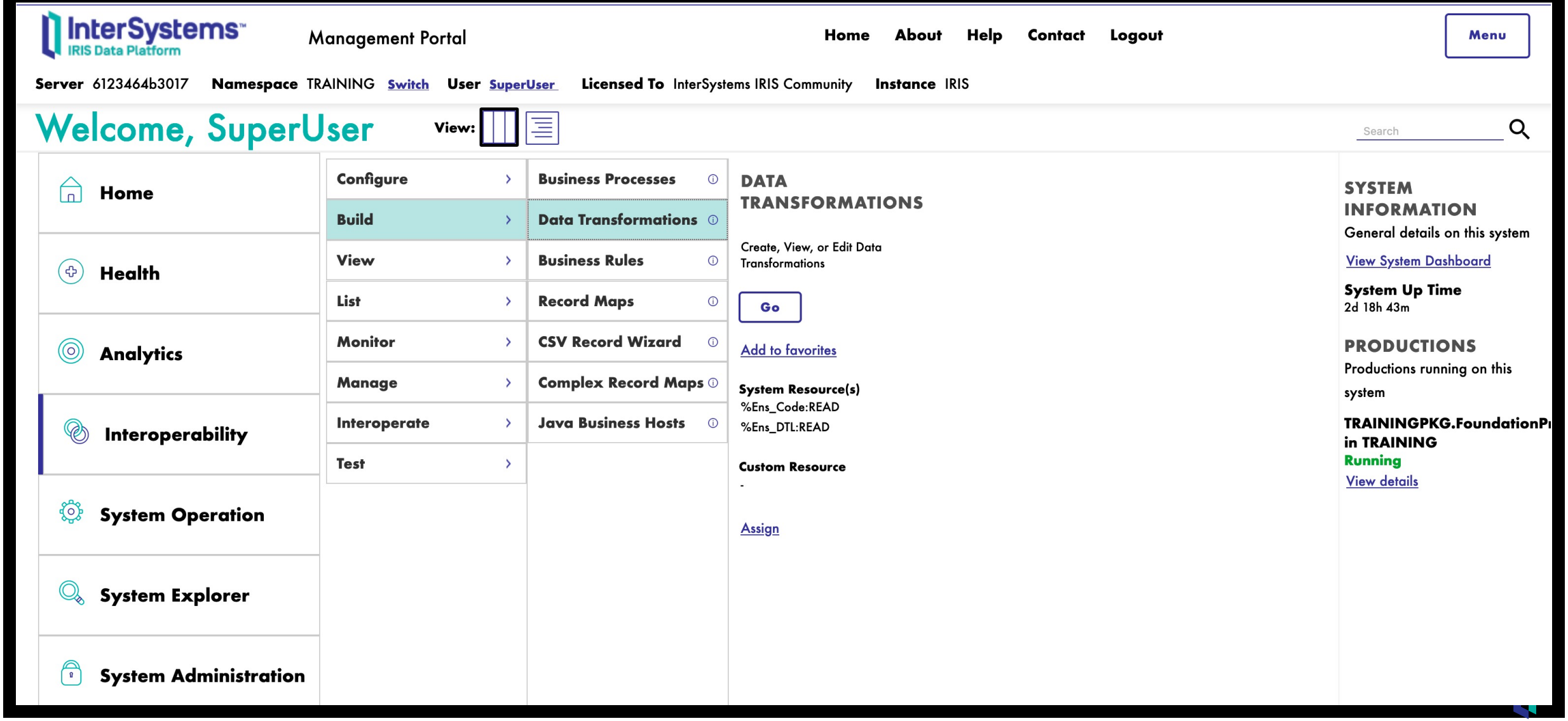
- Its a database

Client / Server



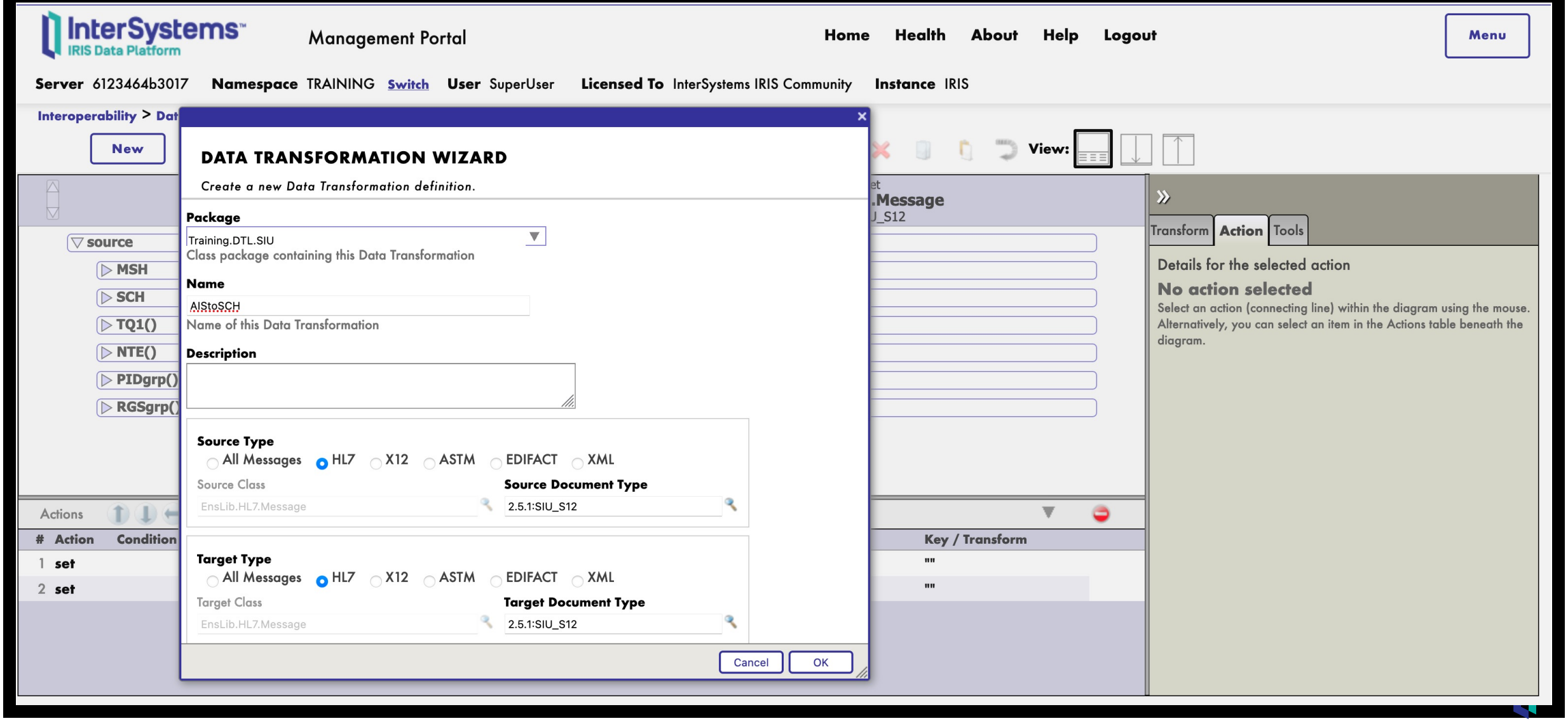
DTL

DTL

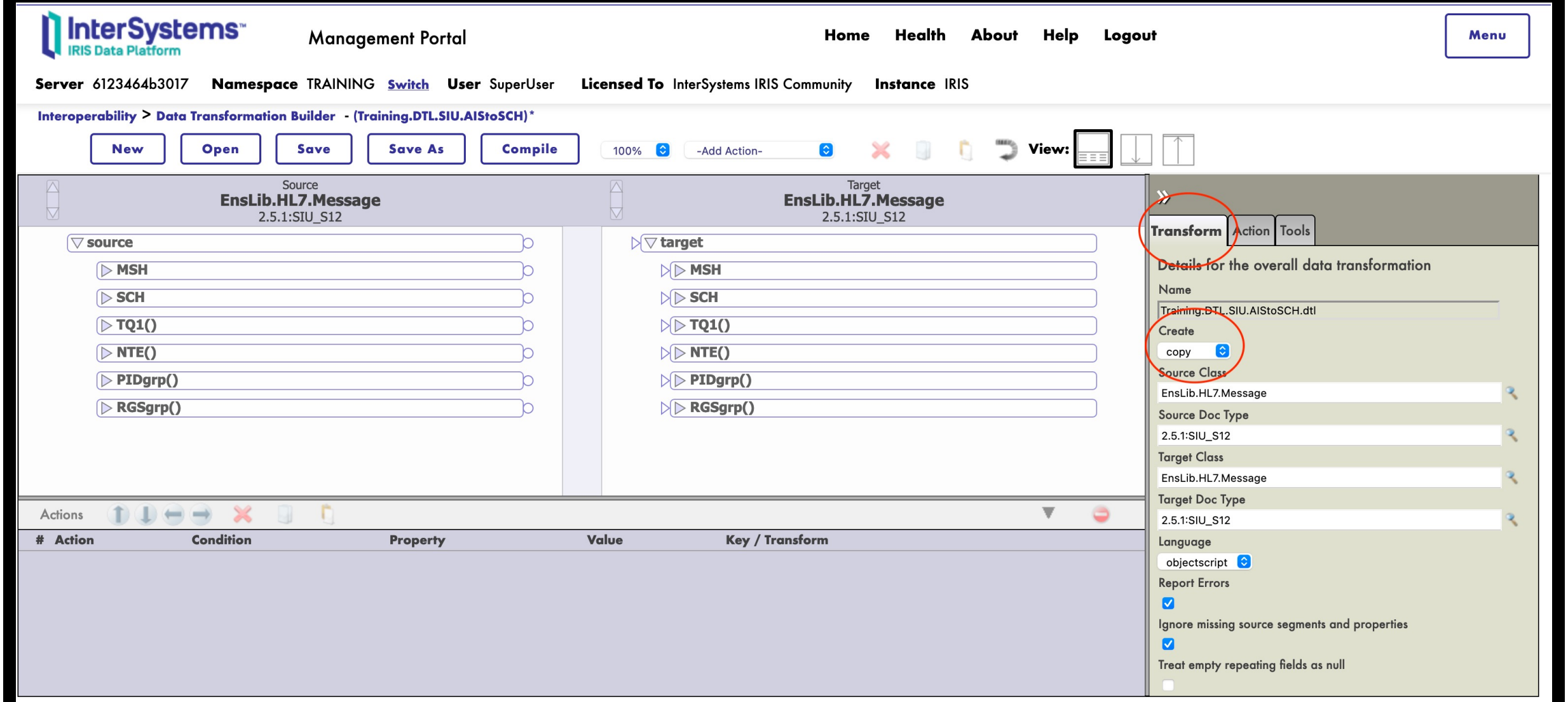


 | |

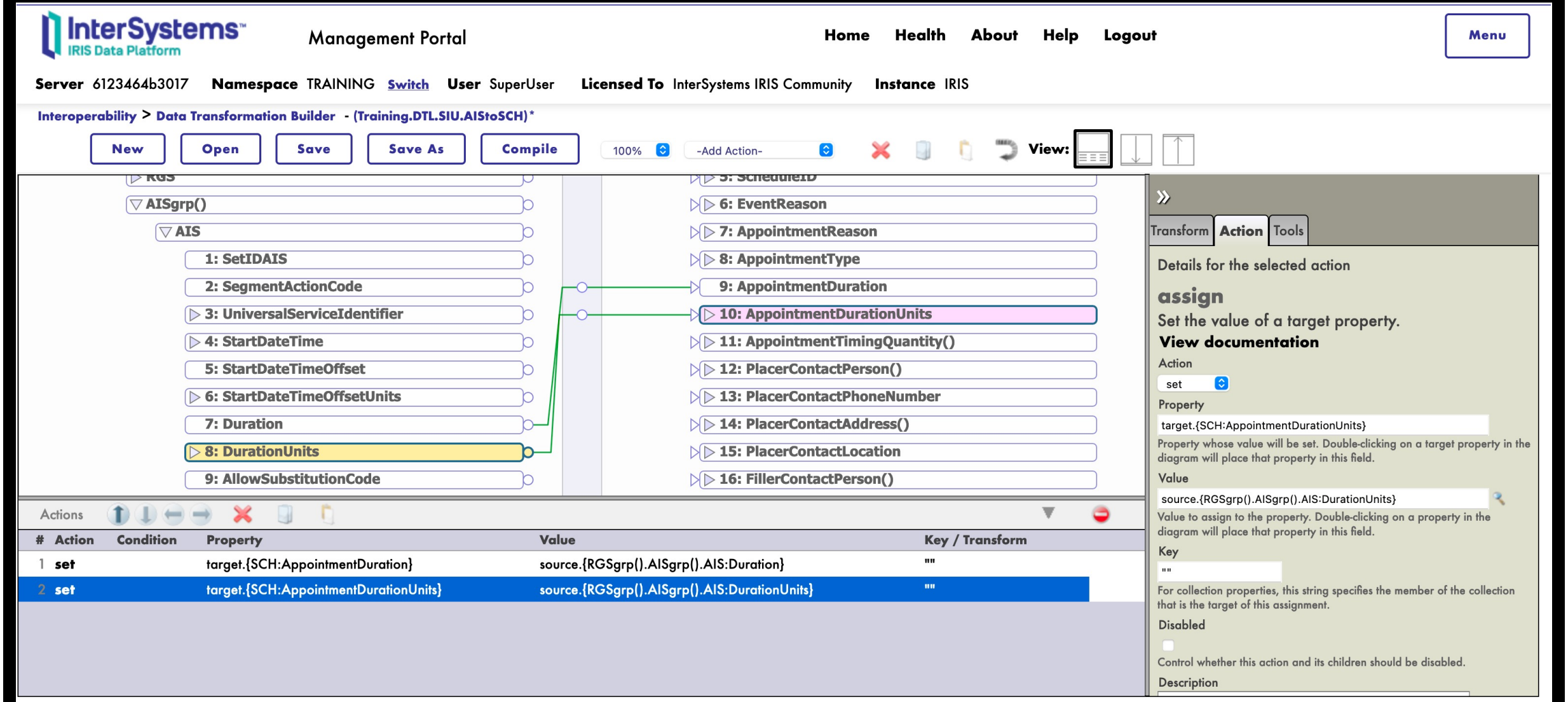
DTL



DTL



DTL



 | |

Test It !

1. Compile
2. Test It !
    1. Tools Tab
        1. Test
3. Add DTL to router
    1. Test It !

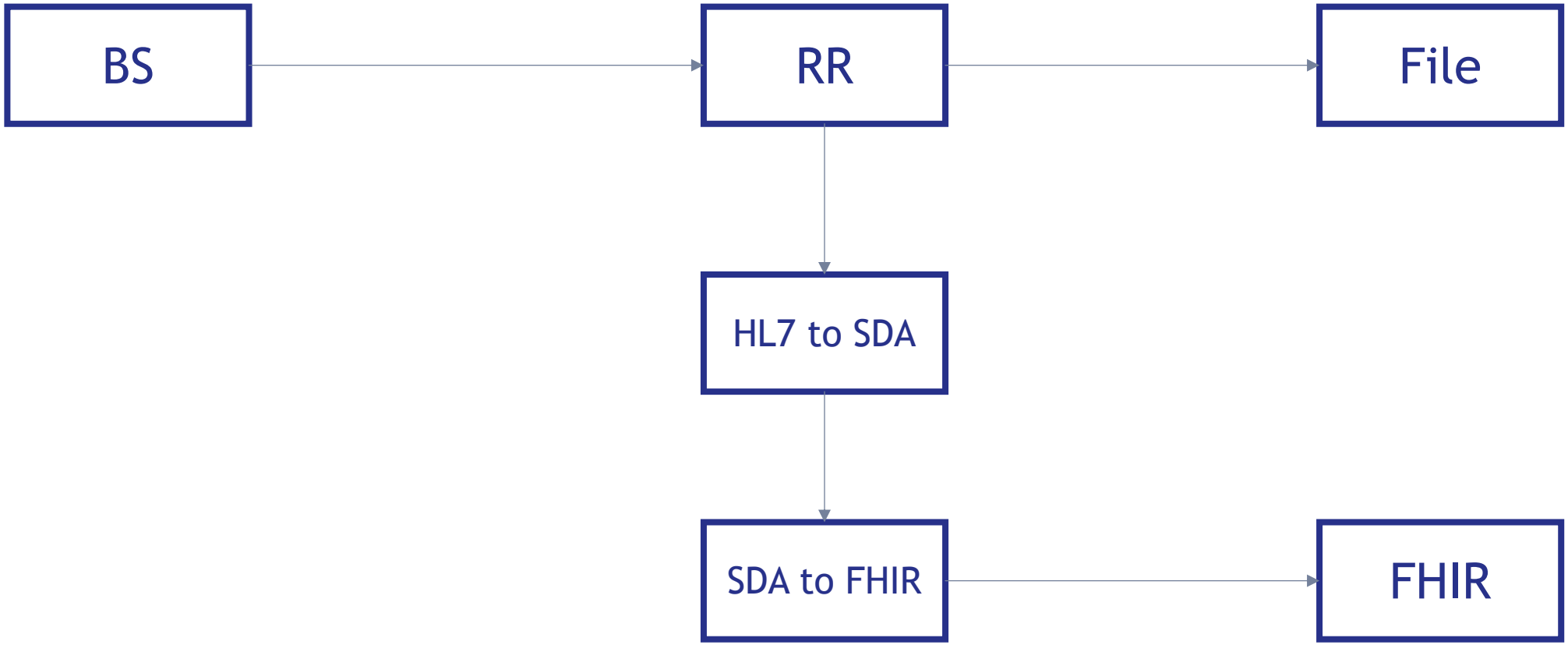
 | |

HL7v2 To FHIR

Demographics Only

Overview, what we have done

Overview, what we plan to do



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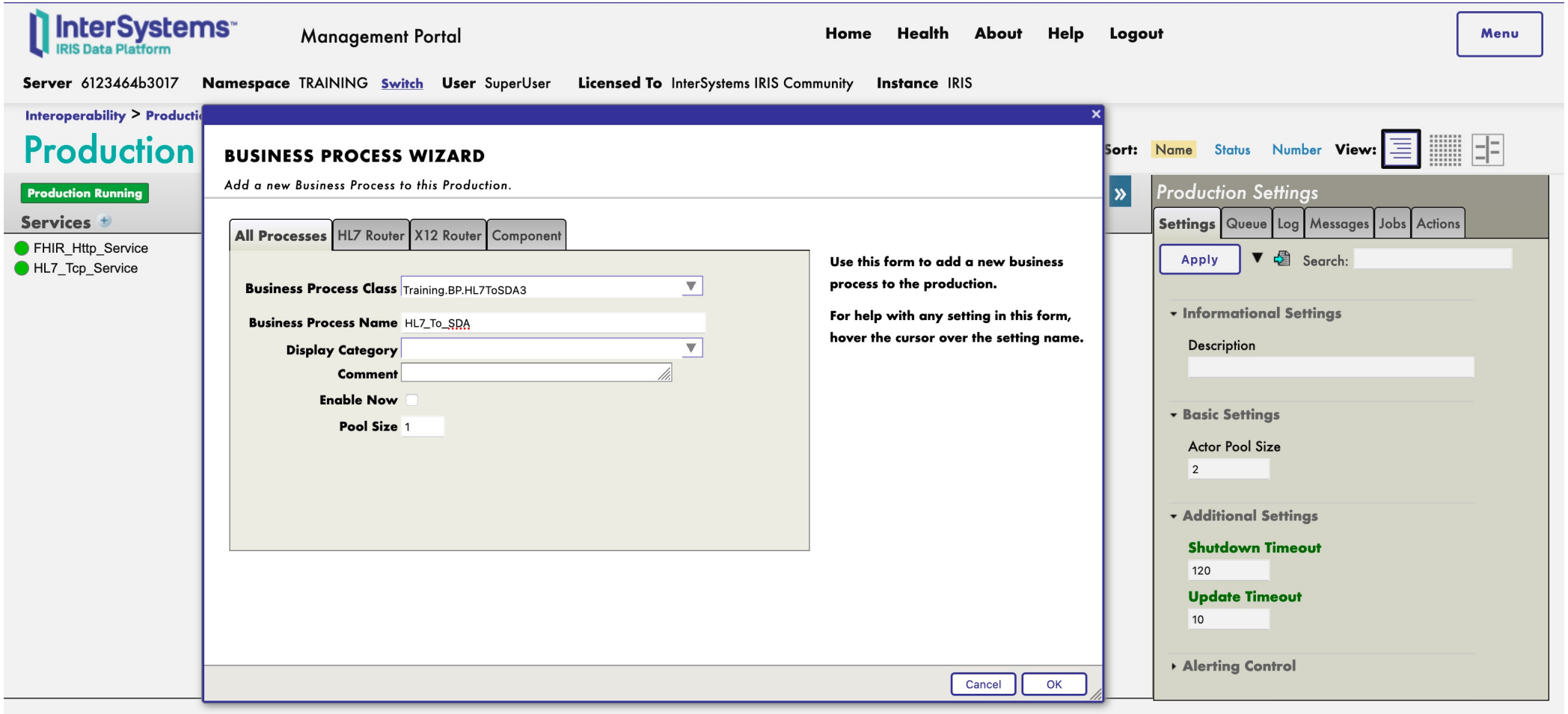
Instantiate the new BPs

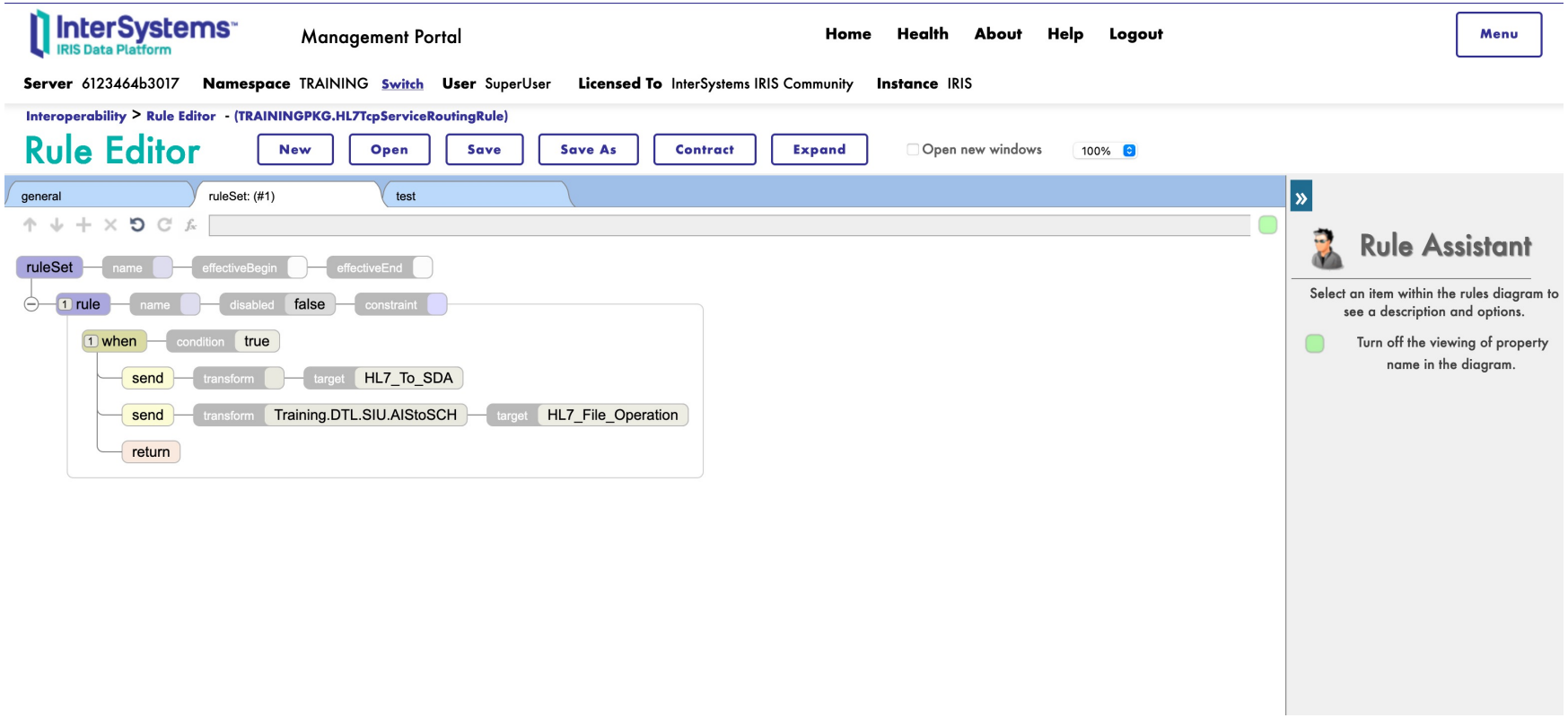
Instantiate **Training.BP.HL7ToSDA3** as **HL7_To_SDA**



Instantiate the new BPs

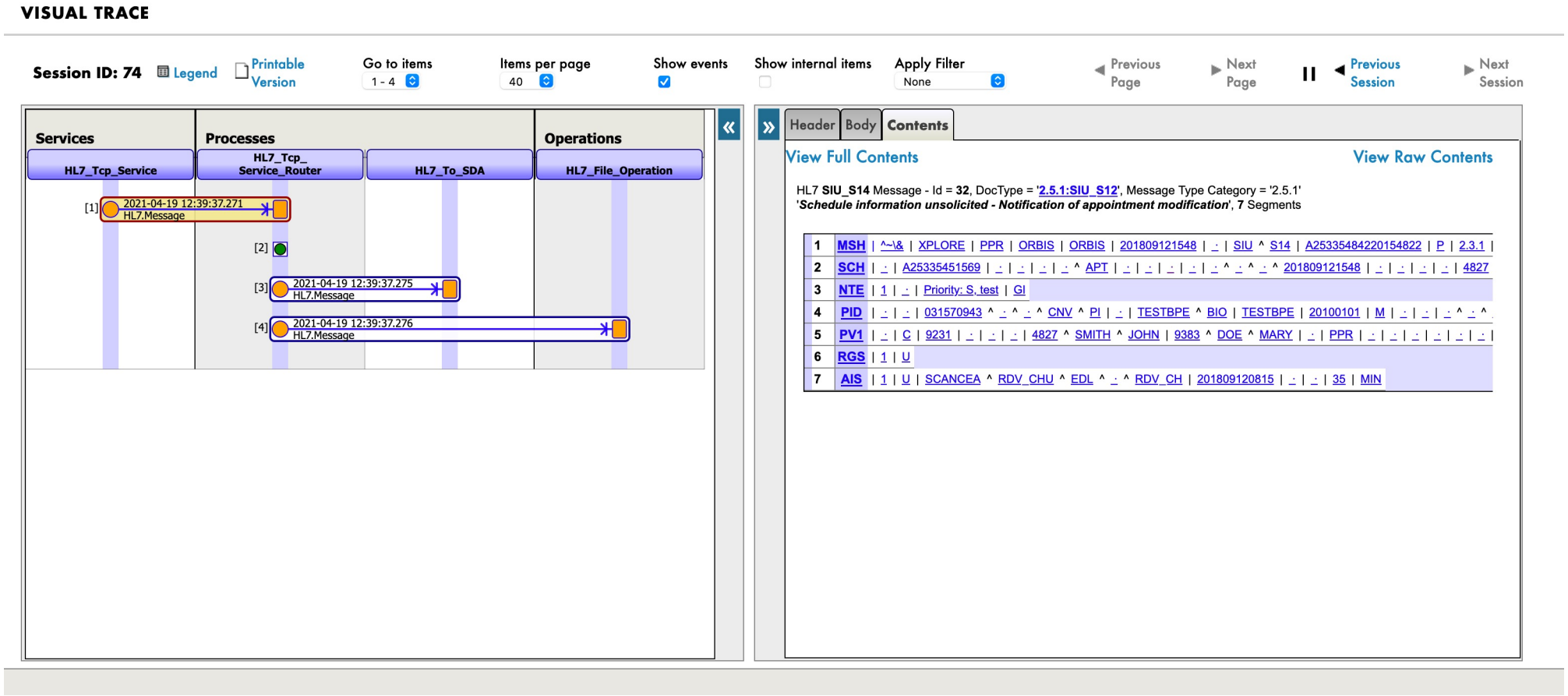
Instantiate **HS.FHIR.DTL.Util.HC.SDA3.FHIR.Process** as **SDA_To_FHIR**

Add route to **HL7_To_SDA to TRAININGPKG.HL7TcpServiceRoutingRule**



Test It !

What happen ?



Use the helper tools in Training.BP.HL7ToSDA3

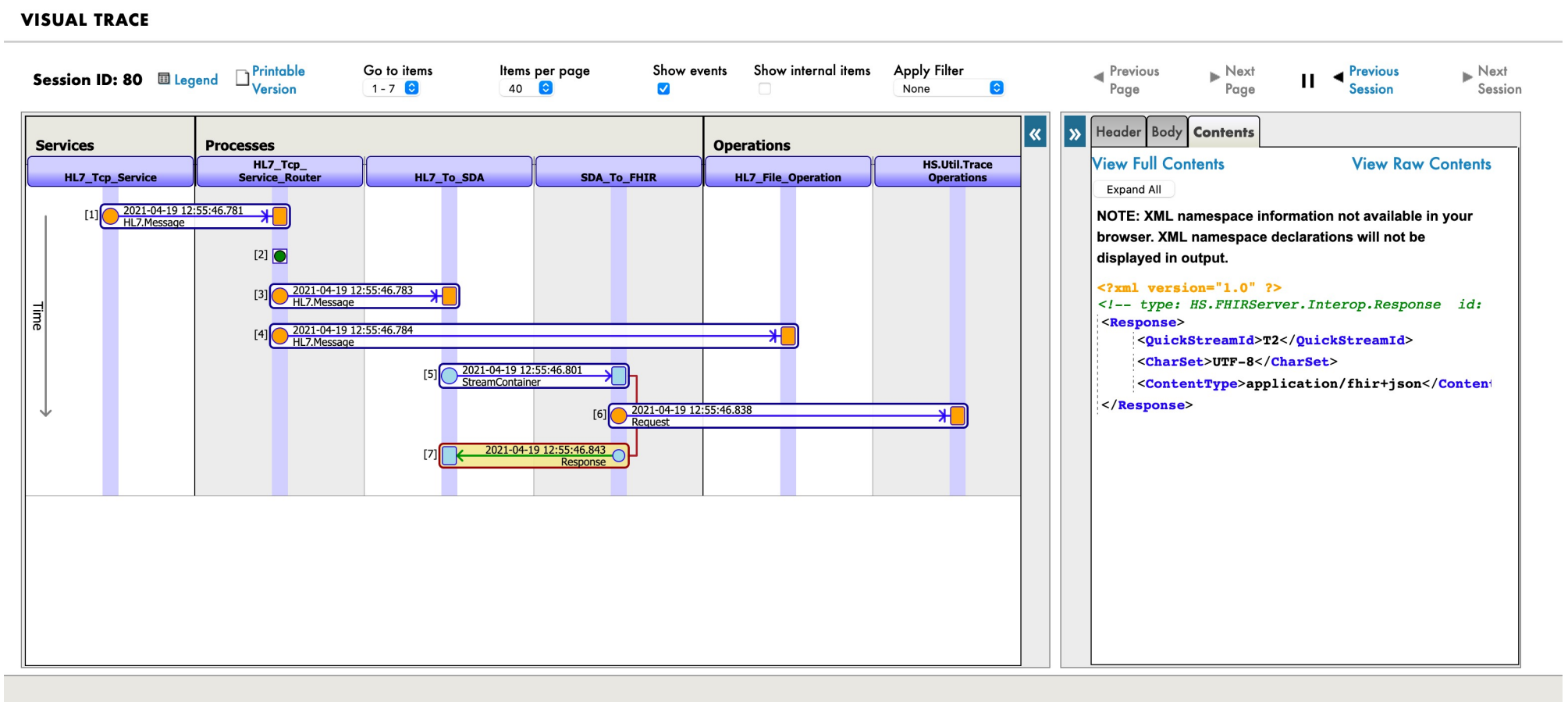
The helper is **Training.Tools.HL7toSDA3Demographics** who extends **HS.Hub.Standalone.HL7.HL7ToSDA3**

```
/// Transforms an HL7 message to SDA, an internal healthcare format for
InterSystems IRIS for Health.
Method OnRequest(pRequest As EnsLib.HL7.Message, Output pResponse As
Ens.Response) As %Status
{
set tSC = $$$OK
try {
//set tSC = ##class(Training.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
//set tSC=
##class(Training.Hub.Standalone.HL7.HL7ToSDA3).GetSDAContainer(pRequest,.t
Container)
//set tSC = tContainer.ToQuickXMLStream(.tSDA)
//set tSC =
..SendRequestSync(..TargetConfigName,##class(Ens.StreamContainer).%New(tSD
A),.pResponse)
} catch ex {
set tSC = ex.AsStatus()
}
quit tSC
}
```

```
/// Transforms an HL7 message to SDA, an internal healthcare format for
InterSystems IRIS for Health.
Method OnRequest(pRequest As EnsLib.HL7.Message, Output pResponse As
Ens.Response) As %Status
{
set tSC = $$$OK
try {
//set tSC =
##class(Training.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
set tSC=
##class(Training.Tools.HL7toSDA3Demographics).GetSDAContainer(pRequest,.t
Container)
set tSC = tContainer.ToQuickXMLStream(.tSDA)
set tSC =
..SendRequestSync(..TargetConfigName,##class(Ens.StreamContainer).%New(tS
DA),.pResponse)
} catch ex {
set tSC = ex.AsStatus()
}
quit tSC
}
```


Test It !

What happen ?



Use custom DTLs

1. Overload method **GetTransformClass** from **Training.Tools.HL7toSDA3Demographics**

Objective :

1. Definie new package of custom DTL
2. If no custom
    1. Use stand DTLs

 | |

Example

```
set tTransformPackage =
"HS.Hub.Standalone.HL7.DTL"

set pTransformClass =
tTransformPackage_"."_pTransformClass
```

```
set tTransformPackage =
"Training.Tools.DTL"

set tTransformClass =
tTransformPackage_"."_pTransformClass


if '$$$comClassDefined(tTransformClass)

{

set tTransformPackage =
"HS.Hub.Standalone.HL7.DTL"

set tTransformClass =
tTransformPackage_"."_pTransformClass

}


set pTransformClass = tTransformClass
```


Import DTLs to our custom package

Go to InterSystems explorer -> **HS.Hub.Standalone.HL7.DTL**

Export classes and save the one you want overload in **Training.Tools.DTL**

 | |

HL7v2 To FHIR

Full Experience

Before starting

ObjectScript Commands

- Set (a variable)
- Do (do an action, execute a static method)
- Write (standard output, like a print(“”) in python)
- Kill (unload a variable)
- Quit (exit a block, method, loop, …)
- Merge (merge two globals, like set but for multi dimensional variable)

(https://docs.intersystems.com/irisforhealthlatest/csp/docbook/Doc.View.cls?KEY=RCOS_COMMANDS)

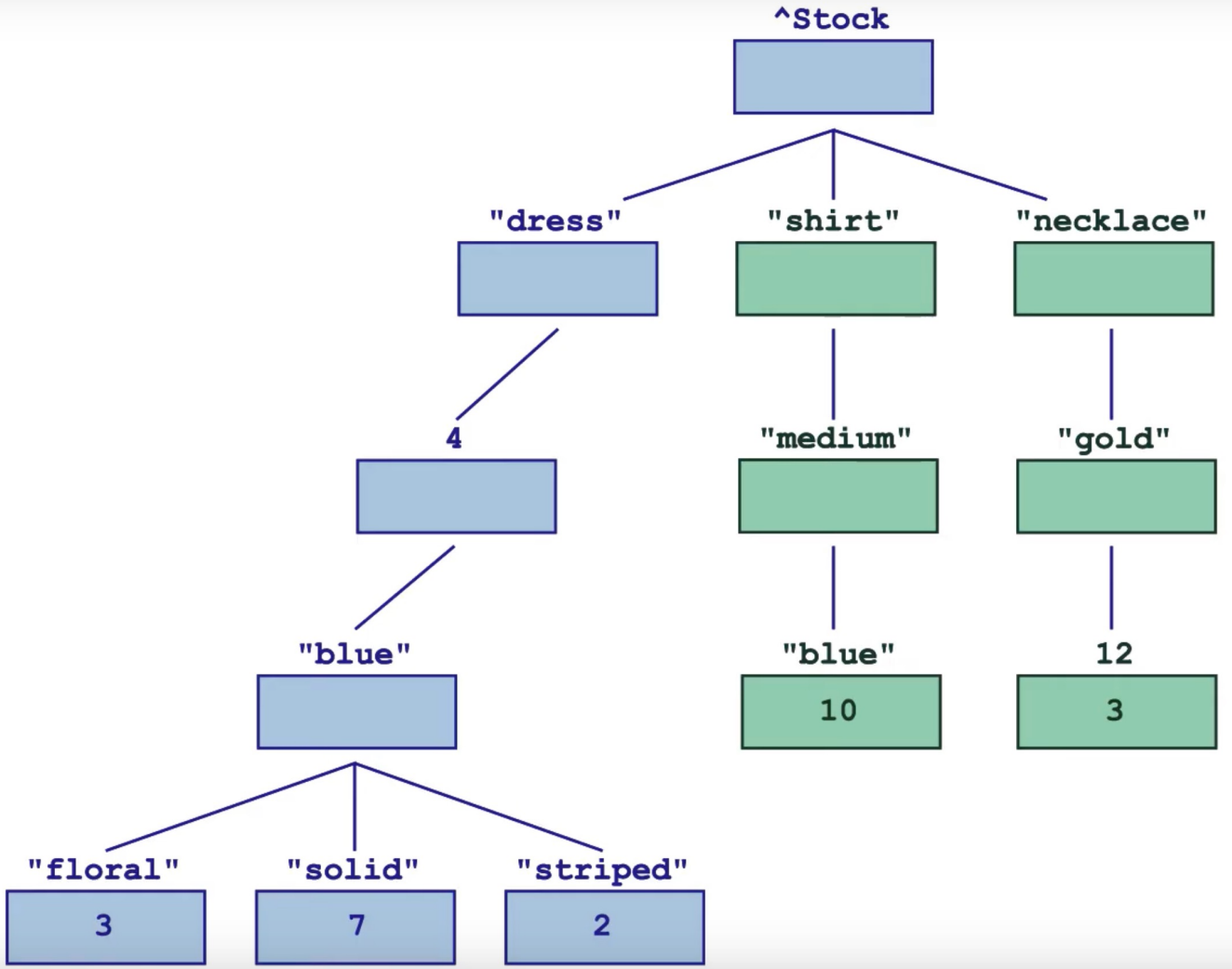
Before starting

Globals

```
^Stock("dress", 4, "blue", "floral") = 3
^Stock("dress", 4, "blue", "solid") = 7
^Stock("dress", 4, "blue", "striped") = 2
^Stock("shirt", "M", "blue") = 10
^Stock("necklace", "gold", 12) = 3
```

Before starting

Globals



 | |

Let’s Go !

Have a look at **HS.Gateway.HL7.HL7ToSDA3**

Objective of this helper class :

- Be fast
- Write the SDA XML Object
- Parse HL7 Message as a Global

Docs :

http://localhost:32783/csp/healthshare/TRAINING/HS.UI.HL7.cls

Let’s Debug It !

Edit **Training.BP.HL7ToSDA3**

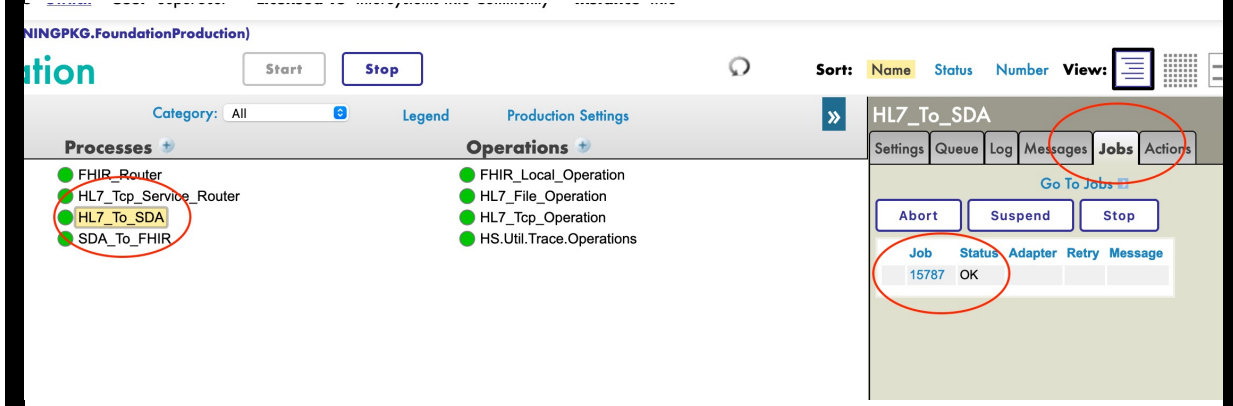
Add a switch for selecting the right helper (don’t forget the property and setting)

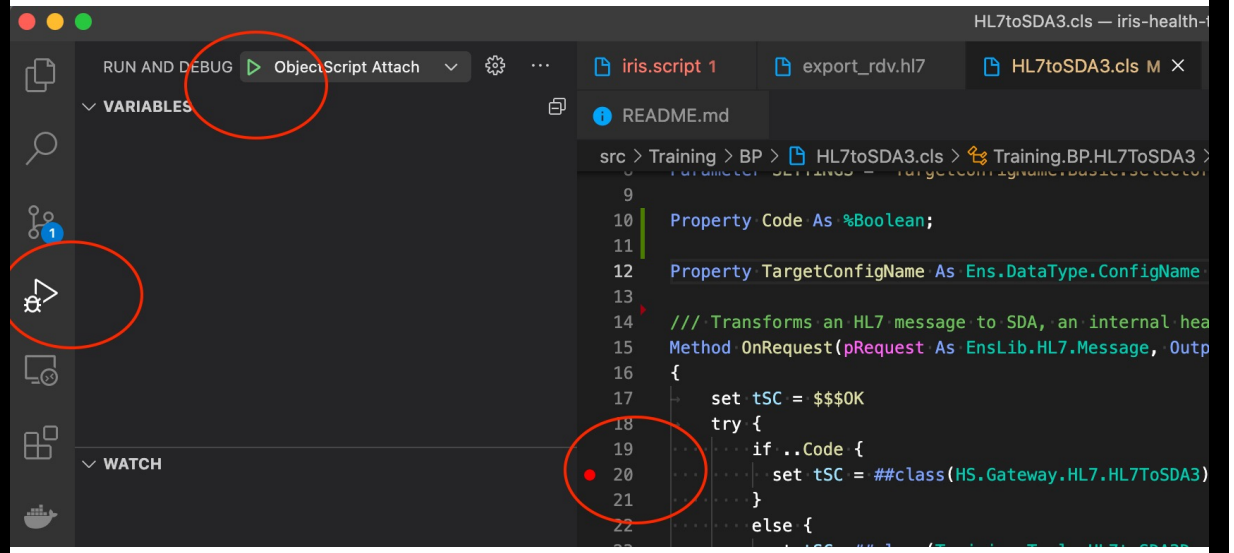
```
/// Transforms an HL7 message to SDA, an internal healthcare format for
InterSystems IRIS for Health.
Method OnRequest(pRequest As EnsLib.HL7.Message, Output pResponse As
Ens.Response) As %Status
{
set tSC = $$$OK
try {
  //set tSC =
##class(Training.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
  set tSC=
##class(Training.Tools.HL7toSDA3Demographics).GetSDAContainer(pRequest,.t
Container)
  set tSC = tContainer.ToQuickXMLStream(.tSDA)
  set tSC =
..SendRequestSync(..TargetConfigName,##class(Ens.StreamContainer).%New(tS
DA),.pResponse)
} catch ex {
  set tSC = ex.AsStatus()
}
quit tSC
}
```

```
/// Transforms an HL7 message to SDA, an internal healthcare format for
InterSystems IRIS for Health.
Method OnRequest(pRequest As EnsLib.HL7.Message, Output pResponse As
Ens.Response) As %Status
{
set tSC = $$$OK
try {
  if ..Code {
    set tSC = ##class(HS.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
  }
  else {
    set tSC=
##class(Training.Tools.HL7toSDA3Demographics).GetSDAContainer(pRequest,.tC
ontainer)
    set tSC = tContainer.ToQuickXMLStream(.tSDA)
}

set tSC =
..SendRequestSync(..TargetConfigName,##class(Ens.StreamContainer).%New(tSD
A),.pResponse)

} catch ex {
  set tSC = ex.AsStatus()
}
quit tSC
}
```

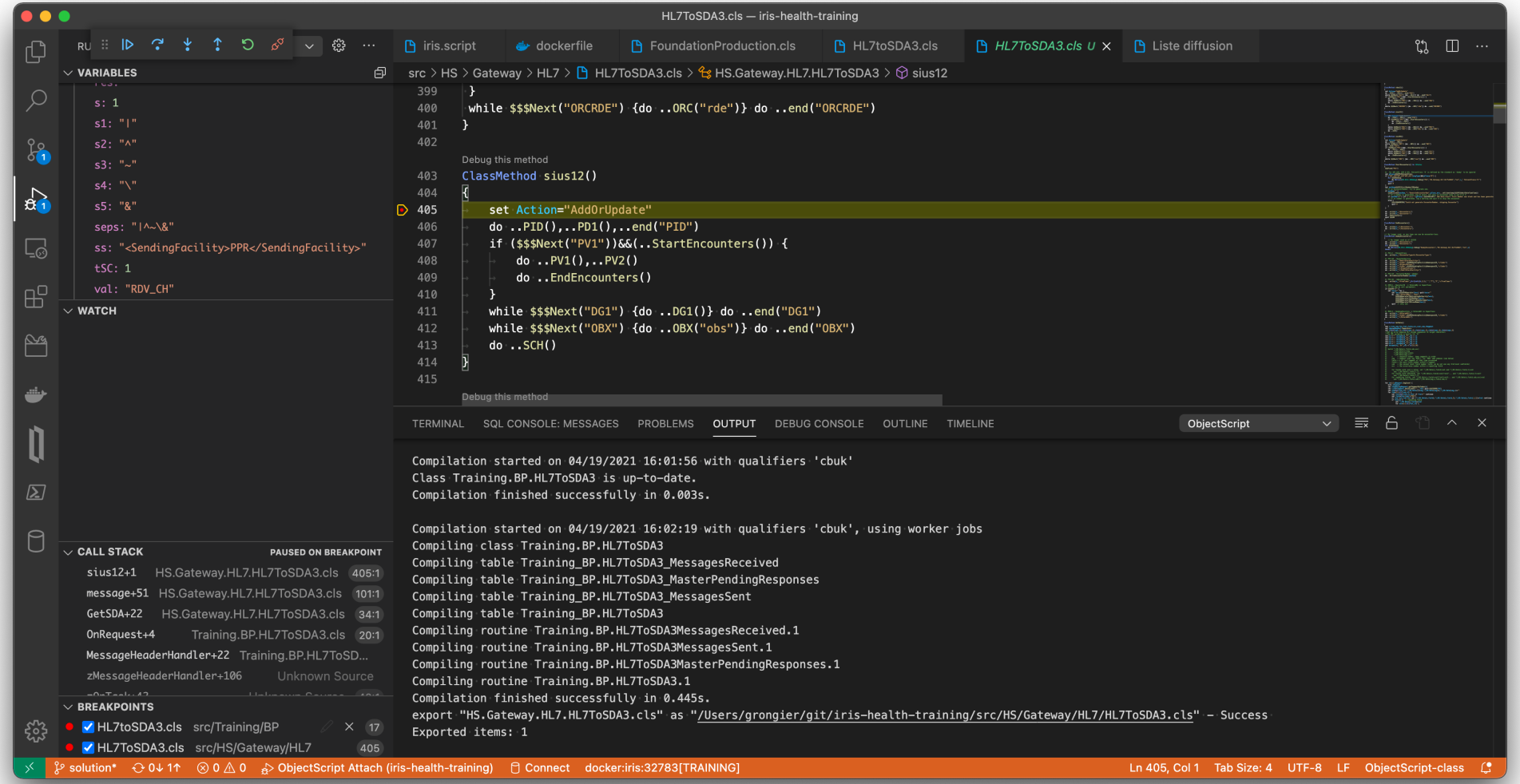
 | |

Attach process to VsCode





Attach process to VsCode



Now overload this class

Let’s create a class **Training.Tools.HL7toSDA3Full** who extends **HS.Gateway.HL7.HL7ToSDA3**

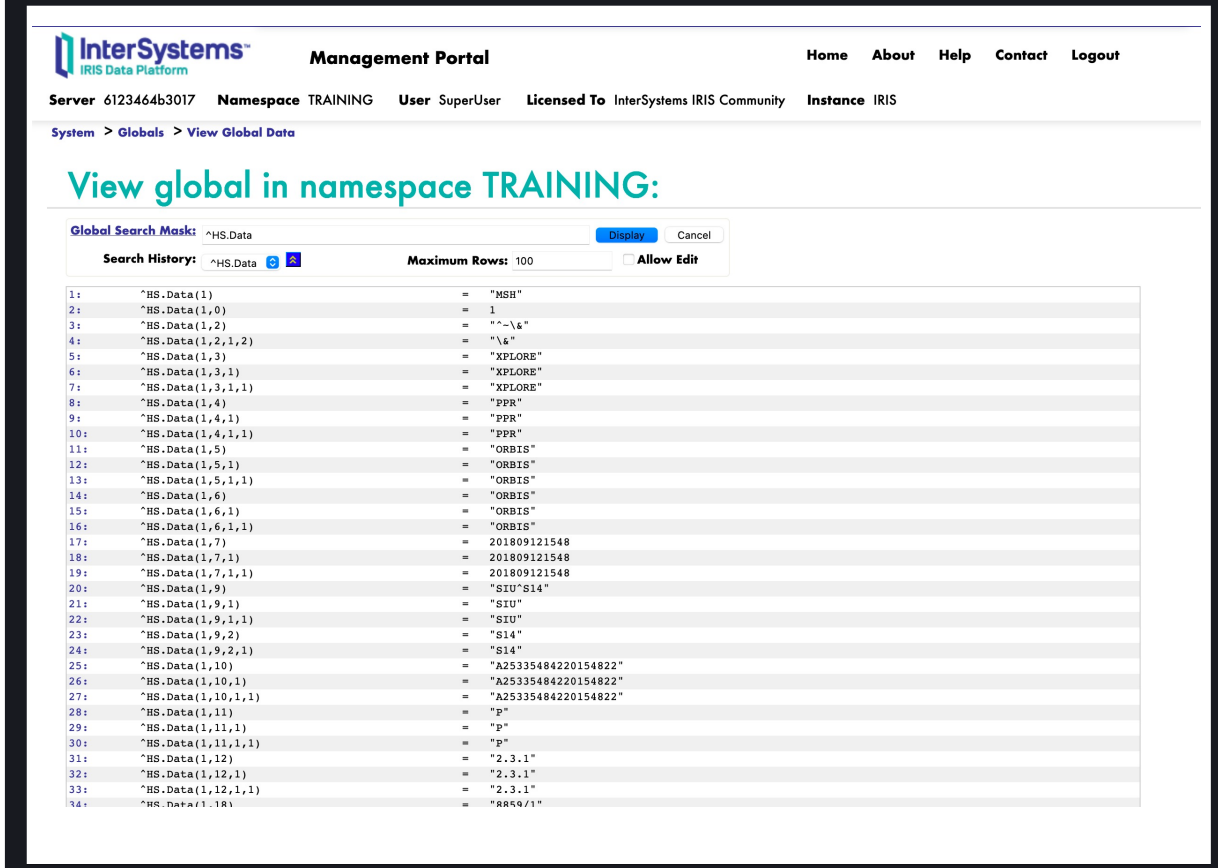
Then overload **GetSDA**

```
Class Training.Tools.HL7toSDA3Full Extends HS.Gateway.HL7.HL7ToSDA3
{

}
```

```
ClassMethod GetSDA(pRequest As EnsLib.HL7.Message, Output pXML As
%Stream.GlobalCharacter, pLogAlerts As %Boolean = 1, pObservationMode As
%Boolean = 0, pMultiLineOBXCompatibilityMode As %Boolean = 0,
pKeepDuplicateOBXIdentifiers As %Boolean = 0) As %Status
{
  set sc =
##super(pRequest,.pXML,pLogAlerts,pObservationMode,pMultiLineOBXCompatibil
ityMode,pKeepDuplicateOBXIdentifiers)
  kill ^HS.Data
  merge ^HS.Data=^||HS.Data
  quit sc
}
```


See the global ^HS.Data

http://localhost:32783/csp/sys/exp/UtilExpGlobalView.csp?$ID2=HS.Data&$NAMESPACE=TRAININ G&$NAMESPACE=TRAINING



What do we see here ?

We see the HL7 message put in a global.

Every field is now in a key value pair.

Example :

```
^HS.Data(2)      =      "SCH"
^HS.Data(2,0)    =      1
^HS.Data(2,2)    =      "A25335451569"
```

Segment 2 is an SCH

In field 0 we have 1

In field 2 we have "A25335451569"

 | |

Exercice

We have an SIU^S14

In SCH we don’t have the duration, it’s in the segment AIS.

Overload **HS.Gateway.HL7.HL7ToSDA3** to take in account the duration from AIS segment even if it’s not present in SCH.

Solution :

https://github.com/grongierisc/iris-health-training/commit/016bc05b5ab60904504f66c0e50279136ac6a492

https://github.com/grongierisc/iris-health-training/commit/cad88ce78e2aa4a713cfd02ee346372d2fee1507

SDA to FHIR

Documentation

http://localhost:32783/csp/healthshare/TRAINING/SchemaMap.Tool.UI.View.zen

Mapping or Information SDA3 → FHIR4 | List SDA3 → FHIR4 Transformed | View SDA3 → FHIR4 Lookup Tables | Help | FAQ | Syntax | SDA3 Code Tables

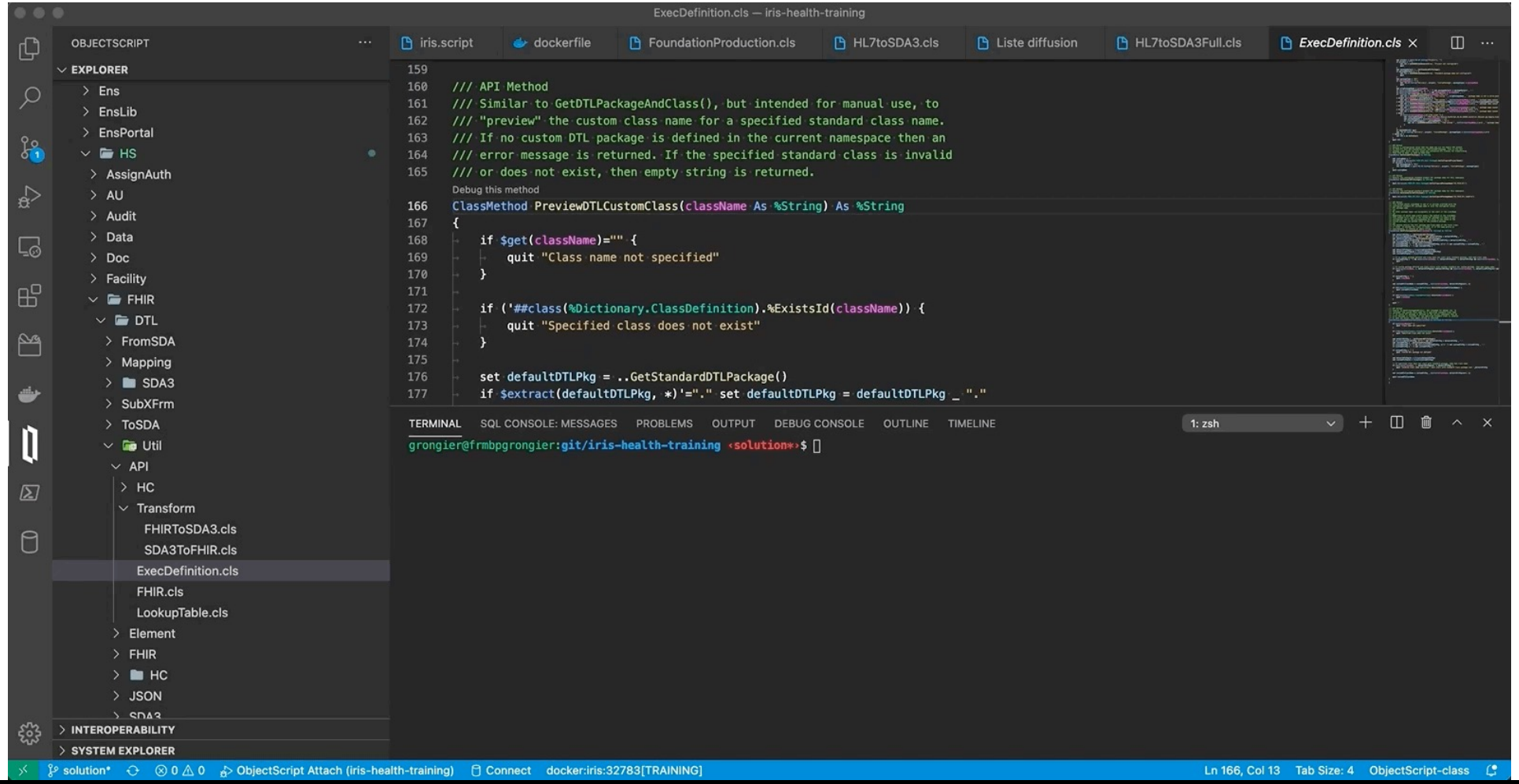
FHIR4 by Name **FHIR4 by Category** **HS.SDA3 Classes** Appointment

This page allows you to view mappings that generate transformations from SDA to FHIR R4.

SDA3 → FHIR4 SDA3 Source	SDA3 Data Type	SDA3 Card.	Actions	Map Issues	FHIR4 Target	Notes
HS.SDA3.Appointment	HS.SDA3.SuperClass				Appointment:extension	SDA3 Specification
					Appointment:participant	
HS.SDA3.Appointment:CareProvider	HS.SDA3.CodeTableDetail.CareProvider	0..1			Appointment:participant	default participant status will be "accepted"
HS.SDA3.Appointment:CustomPairs	HS.SDA3.NVPair	0..*				
HS.SDA3.Appointment:EncounterNumber	%String (MAXLEN=220)	0..1			Appointment:extension	
HS.SDA3.Appointment:EnteredAt	HS.SDA3.CodeTableDetail.Organization	0..1			Appointment:extension	
HS.SDA3.Appointment:EnteredBy	HS.SDA3.CodeTableDetail.User	0..1			Appointment:extension	
HS.SDA3.Appointment:EnteredOn	HS.SDA3.TimeStamp	0..1			Appointment:created	
HS.SDA3.Appointment:ExternalId	%String (MAXLEN=220)	0..1			Appointment:identifier	
HS.SDA3.Appointment:FillerApptId	%String	0..1			Appointment:identifier	
HS.SDA3.Appointment:FillerOrderId	%String	0..1			Appointment:extension	
HS.SDA3.Appointment:FromTime	HS.SDA3.TimeStamp	0..1			Appointment:start	
					Appointment:end	
HS.SDA3.Appointment:Location	HS.SDA3.CodeTableDetail.HealthCareFacility	0..1			Appointment:participant	
HS.SDA3.Appointment:NoShow	HS.SDA3.Boolean	0..1			Appointment:extension	
HS.SDA3.Appointment:Notes	%String (MAXLEN="")	0..1			Appointment:comment	

Implementing Custom DTLs

1. Go in terminal mode :



Implementing Custom DTLs

1. https://docs.intersystems.com/irisforhealthlatest/csp/docbook/Doc.View.cls?KEY=HXFHIR_transforms#HXFHIR_transforms_customize_dtl_package

2. check if a custom DTL package already exists, enter:

Write ##class(HS.FHIR.DTL.Util.API.ExecDefinition).GetCustomDTLPackage()

3. If the custom DTL package does not already exist, enter the following command, replacing HS.Local.FHIR.DTL with the name of your custom DTL package:

zw ##class(HS.FHIR.DTL.Util.API.ExecDefinition).SetCustomDTLPackage("Training.Tools.DTL")

4. Get the new name of HS.FHIR.DTL.SDA3.vR4.Appointment.Appointment

Write ##class(HS.FHIR.DTL.Util.API.ExecDefinition).PreviewDTLCustomClass("HS.FHIR.DTL.SDA3.vR4.Appointment.Appointment")

Implementing Custom DTLs

Open DTL **HS.FHIR.DTL.SDA3.vR4.Appointment.Appointment** and save as **Training.Tools.DTL.SDA3.vR4.Appointment.Appointment**

Test a DTL

Add this code at the beginning of the transformation :

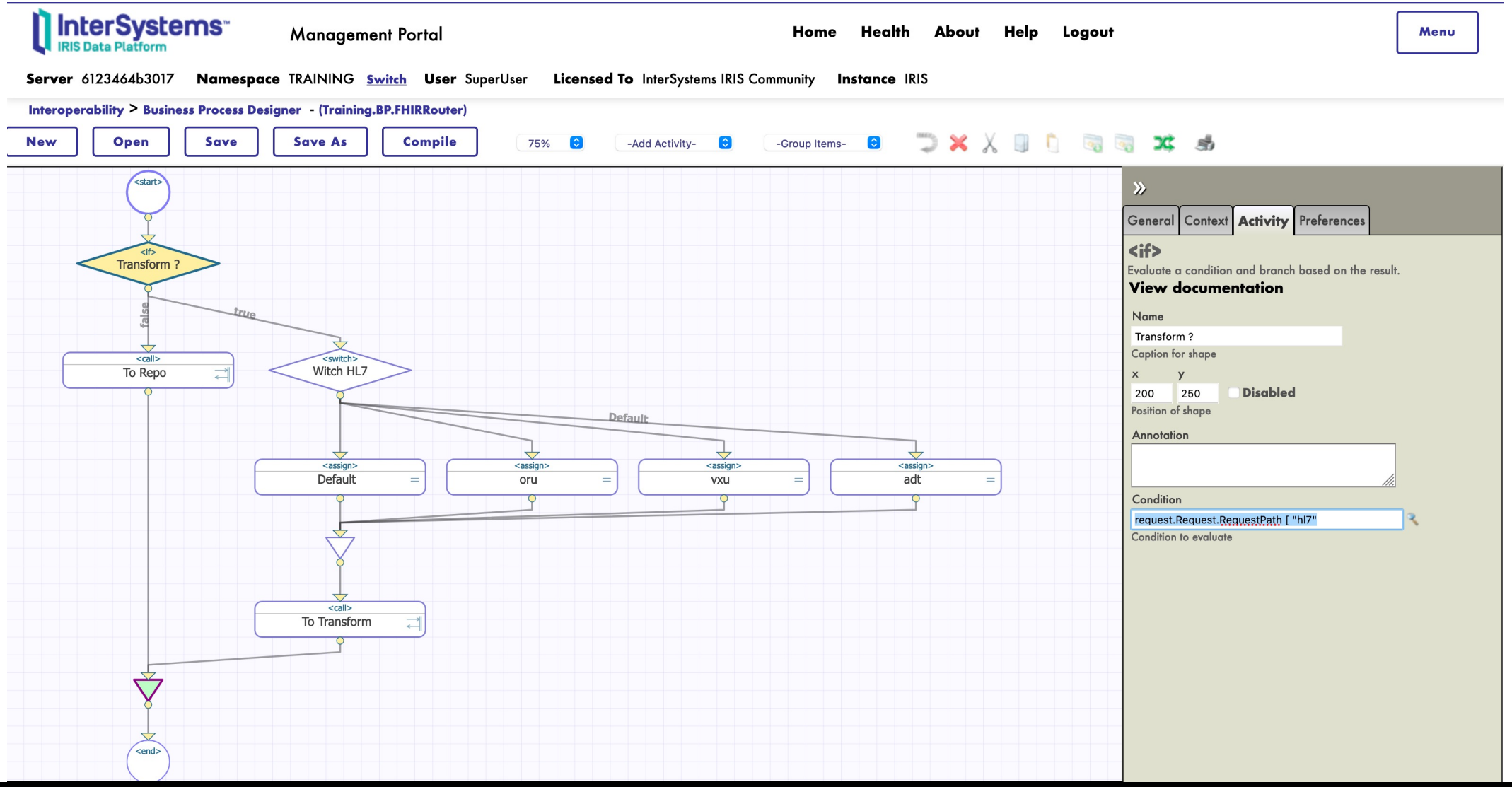
```
set schema = ##class(HS.FHIRServer.Schema).LoadSchema("R4")

set aux("transformer") = ##class(HS.FHIR.DTL.Util.API.Transform.SDA3ToFHIR).%New(schema)
```

 | |

BONUS !

FHIR -> SDA

Have a look at FHIR_Router



 | |

Instantiate the new BPs

Instantiate **HS.FHIR.DTL.Util.HC.FHIR.SDA3.Process** as **FHIR_To_SDA**

Create a new Business process to transform SDA to HL7

Training.BP.SDA3toHL7 Extends Ens.BusinessProcess

Overload Method OnRequest(pRequest As Ens.Request, Output pResponse As Ens.Response) As %Status

Training.BP.SDA3toHL7

```
Class Training.BP.SDA3toHL7 Extends Ens.BusinessProcess
{

Method OnRequest(pRequest As Ens.Request, Output pResponse As
Ens.Response) As %Status
{
  set sc = $$$OK

  Quit sc
}
```


Exercice

Complete it, base on :

https://github.com/grongierisc/iris-healthtoolkit-service

 | |

Training.BP.SDA3toHL7

```
Method OnRequest(pRequest As Ens.Request, Output pResponse As Ens.Response) As %Status

{

set sc = $$$OK


Try {

//Cast the SDA Stream as an XML Document

set tVDoc= ##class(EnsLib.EDI.XML.Document).ImportFromString(pRequest.ContentStream, .sc)

//Transform it as un ADT

do ##class(HS.Gateway.SDA3.SDA3ToHL7.ADTA0N).Transform(tVDoc,.tHL7)

//Send the tHL7 Message

set sc = ..SendRequestSync("HL7_File_Operation",tHL7,.pResponse)

if '$ISOBJECT(pResponse){

set pResponse = ##class(HS.FHIRServer.Interop.Response).%New()

}

}

Catch ex {

Set sc=ex.AsStatus()

}


Quit sc

}
```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Thank you.