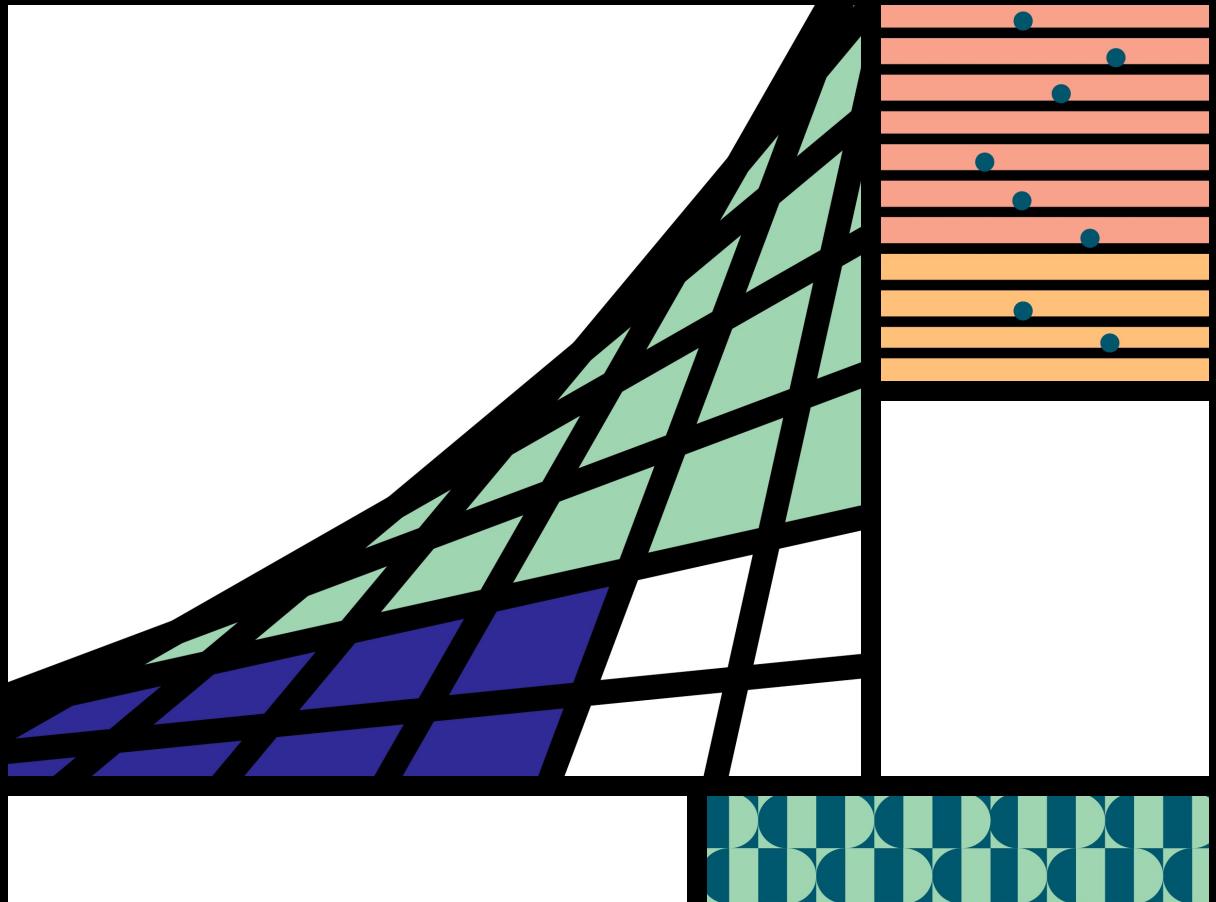
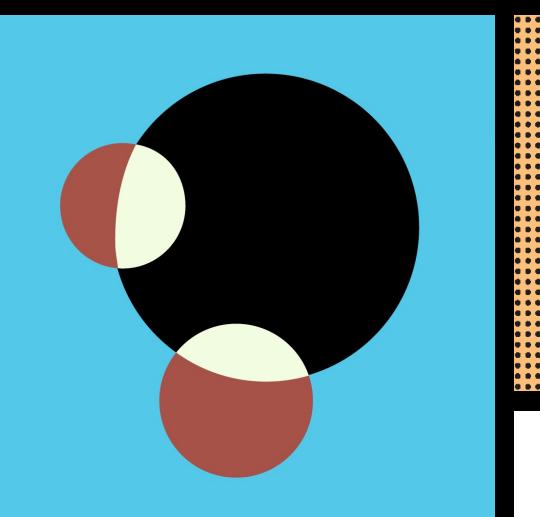
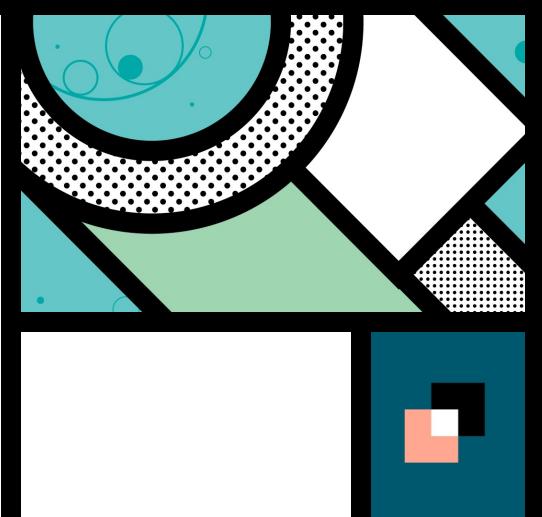


IRIS For Health Training



Guillaume Rongier

SALES ENGINEER



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Premier flux HL7v2

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Transformation HL7v2 -> SDA3

- En code
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Transformation SDA3 -> FHIR

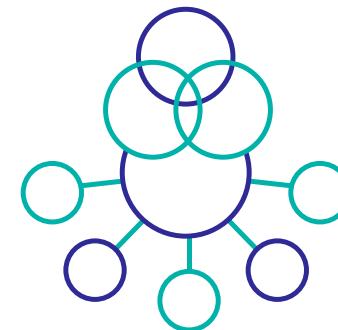
- Graphique
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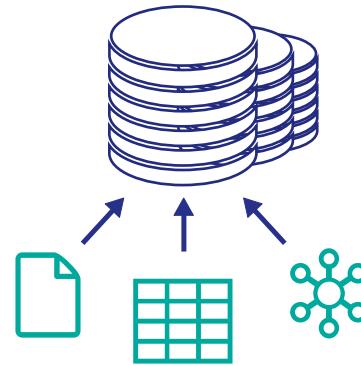
Introduction



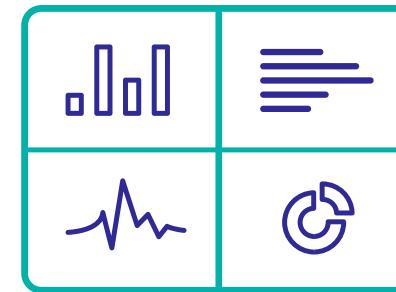
Unifier pour Simplifier



InterSystems IRIS
Interoperability



InterSystems IRIS
Multi Model Database



InterSystems IRIS
Analytics



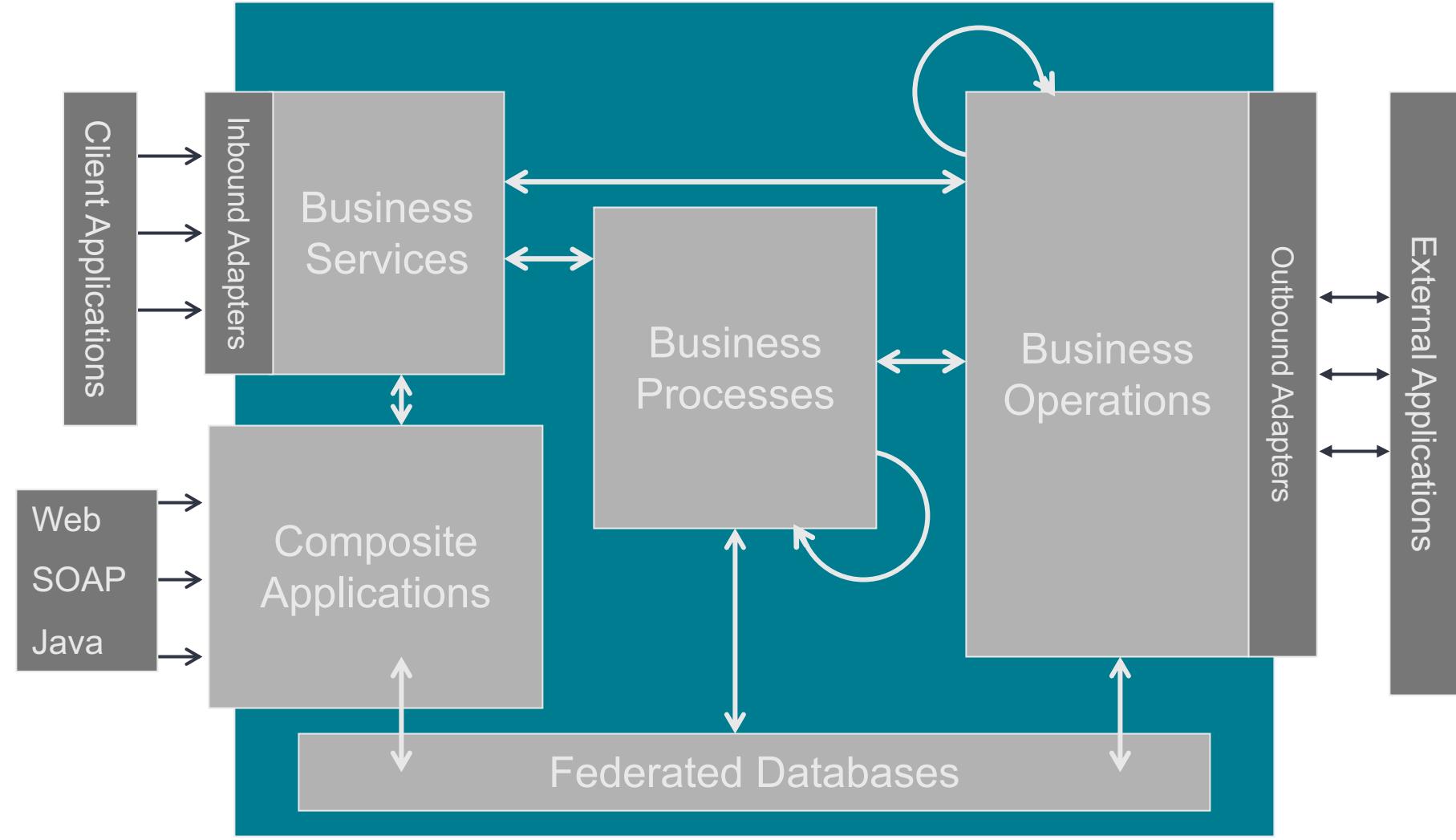
IRIS Mantra

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

InterSystems™
IRIS Data Platform

Management Portal

Home Health About Help Logout

Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Production

Production

Production Running

Services +

FHIR_Http_Service

BUSINESS SERVICE WIZARD

Add a new Business Service to this Production.

All Services **HL7 Input** X12 Input Business Metric

Input Type TCP File FTP HTTP SOAP

HL7 Service Name HL7_Tcp_Service

Display Category

Comment

Enable Now

HL7 Service Target* Create New Router Choose From List None for Now

New Rule Package

HL7 Schema Category* 2.5.1

Port Number* 22222

*Default applies if no value

Cancel OK

Sort: Name Status Number View:

Production Settings

Settings Queue Log Messages Jobs Actions

Apply Search:

Informational Settings

Basic Settings

Actor Pool Size
2

Additional Settings

Alerting Control

Development and Debugging

These are the Production settings.
To view item settings, click on a configuration item.

This screenshot illustrates the process of setting up an HL7 TCP service within an InterSystems production environment. The main window shows the 'Business Service Wizard' for creating a new service named 'HL7_Tcp_Service'. The 'Input Type' is set to 'TCP'. The 'Actor Pool Size' is configured to 2. The 'Basic Settings' section is visible on the right side of the interface.

HL7 Operation

InterSystems™ IRIS Data Platform Management Portal Home Health About Help Logout Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

BUSINESS OPERATION WIZARD
Add a new Business Operation to this Production.

All Operations **HL7 Output** X12 Output Workflow

Output Type TCP File FTP HTTP SOAP

HL7 Operation Name HL7_File_Operation

Display Category

Comment

Enable Now

File Path * /tmp/

Filename * %f_%Q%!+(_a)

*Default applies if no value

Production Settings

Sort: Name Status Number View:

Operations Local_Operation
Trace.Operations

Production Settings

Settings Queue Log Messages Jobs Actions

Apply Search:

Informational Settings

Basic Settings

Actor Pool Size: 2

Additional Settings

Alerting Control

Development and Debugging

These are the Production settings.
To view item settings, click on a configuration item.

Cancel **OK**

HL7 router

InterSystems™
IRIS Data Platform

Management Portal

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Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Production Configuration - (TRAININGPKG.FoundationProduction)

Production Configuration

Start Stop Sort: Name Status Number View:

Production Running Services Processes Operations

Category: All Legend Production Settings

Services: FHIR_Http_Service, HL7_Tcp_Service

Processes: FHIR_Router, HL7_Tcp_Service_Router

Operations: FHIR_Local_Operation, HL7_File_Operation, HS.Util.Trace.Operations

HL7_Tcp_Service_Router

Settings Queue Log Messages Jobs Actions

Apply Search:

Informational Settings

Basic Settings

Enabled:

Validation: dm-z

Business Rule Name: TRAININGPKG.HL7TcpServiceRoutingRule 

Additional Settings

Alerting Control

Development and Debugging



HL7 router

InterSystems™ IRIS Data Platform Management Portal Home Health About Help Logout Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Rule Editor - (TRAININGPKG.HL7TcpServiceRoutingRule)*

Rule Editor

New Open Save Save As Contract Expand Open new windows 100%

```
graph LR; ruleSet[ruleSet] --> name1[name]; ruleSet --> disabled[disabled]; ruleSet --> constraint[constraint]; ruleSet --- name1;
```

ruleSet: (#1) test

ruleAssistant

The selected item is a rule. This defines a set of conditions and actions for each condition. You can select the name field following it to view or edit the name. Double click on enabled/disabled field to change.

+ Click on a button below to add an item to the diagram.

assign Add an assign action.

return Add a return action.

trace Add a trace action.

debug Add a debug action.

comment Add a comment.

Test It !

1. Create an Operation

1. Name : HL7_Tcp_Operation
2. Port : 2222
3. Host : localhost



Test It !

InterSystems™
IRIS Data Platform

Management Portal

Home Health About Help Logout

Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Production Configuration - (TRAININGPKG.FoundationProduction)

Production Configuration

Start Stop Sort: Name Status Number View: List Grid Equal

Production Running Services Processes Operations

Category: All Legend Production Settings

HL7_Tcp_Operation

Settings Queue Log Messages Jobs Actions

Action buttons: Test (highlighted), Start, Stop, Restart

Legend:

- FHIR_Http_Service
- HL7_Tcp_Service
- FHIR_Router
- HL7_Service_Router
- FHIR_Local_Operation
- HL7_File_Operation
- HL7_Tcp_Operation
- HS.Util.Trace.Operations

Actions:

- Test this item
- Start this item if temporarily stopped
- Stop this item temporarily
- Restart this item

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

The screenshot shows a Microsoft Visual Studio Code (VS Code) interface with the following details:

- File Explorer:** Shows the project structure for "IRIS-HEALTH-TR...". It includes a ".vscode" folder, a "data/samples" folder containing "ADT_A01Massie.hl7", "Arturo_Delvalle_76a9851b-9015-4c1e-961c-e...", "export_rdv.hl7", and "Livia_Masson_060a6bd5-5146-4b08-a916-0..."; a "misc" folder; and a "src" folder containing ".dockerignore", ".env", ".gitattributes", ".gitignore", "dev.md", "docker-compose.yml", "dockerfile", "iris.script", "LICENSE", and "README.md".
- Editor:** The main editor window displays the file "export_rdv.hl7" with its content:

```
You, 6 days ago | author (You)
1 MSH|^~\&|XPLORE|PPR|ORBIS|ORBIS|201809121548||SIU^S14|A25335484220154822|P|2.3.1|||||8859/1
2 SCH|A25335451569|||^APT|||||^201809121548|||||4827^SMITH^JOHN|||^8712&EM Neuro Pédiatrie PPR&L|CSCHIR^|||^PPR&Hôpital Pierre-Pa
3 NTE|1||Priority: S, test|GI
4 PID|||031570943^^CNV^PI||TESTBPE^BIO||TESTBPE|20100101|M|||^
5 PV1||C|9231|||4827^SMITH^JOHN|9383^DOE^MARY||PPR|||539622843
6 RGS|1|U
7 AIS|1|U|SCANCEA^RDV_CHU^EDL^RDV_CH|201809120815|||35|MIN
```

You, 6 days ago + init commit
- Terminal:** The terminal window shows logs from an "iris_1" container:

```
04/16/21-14:17:56:852 (377) 0 [Utility.Event] Initializing Interoperability during system startup
04/16/21-14:17:56:852 (377) 0 [Utility.Event] Interoperability: Starting production 'TRAININGPKG.FoundationProduction' in namespace 'TRAINING'.
[INFO] ...started InterSystems IRIS instance IRIS
04/16/21-14:18:19:499 (549) 0 [Database.MountedRW] Mounted database /usr/irissys/mgr/TRAININGX0001R/ (SFN 11) read-write.
04/16/21-14:18:19:509 (549) 0 [Database.MountedRW] Mounted database /usr/irissys/mgr/TRAININGX0001V/ (SFN 12) read-write.
04/16/21-14:18:19:510 (549) 1 [Generic.Event] DB(/usr/irissys/mgr/zpm/) might be in use from (buildkitsandbox) sfn(5)
04/16/21-14:18:19:568 (549) 0 [Database.MountedRW] Mounted database /usr/irissys/mgr/zpm/ (SFN 13) read-write.
04/16/21-14:19:24:804 (589) 0 [Utility.Event] %SYS.Task.FeatureTracker transferred data to ats.intersystems.com
04/16/21-15:18:26:280 (536) 0 [Utility.Event] [SYSTEM MONITOR] Alert state cleared.
04/17/21-01:10:17:866 (368) 1 [Generic.Event] Warning: Alternate and primary journal directories are the same
04/17/21-01:10:17:942 (3644) 0 [Generic.Event] INTERSYSTEMS IRIS JOURNALING SYSTEM MESSAGE
iris_1 Journaling switched to: /usr/irissys/mgr/journal/20210417.001
04/17/21-01:10:18:055 (3648) 0 [Utility.Event] Purging old application errors
04/18/21-01:33:57:058 (368) 1 [Generic.Event] Warning: Alternate and primary journal directories are the same...(repeated 1 times)
04/18/21-01:33:57:114 (6127) 0 [Generic.Event] INTERSYSTEMS IRIS JOURNALING SYSTEM MESSAGE
iris_1 Journaling switched to: /usr/irissys/mgr/journal/20210418.001
04/18/21-01:33:57:278 (6134) 0 [Utility.Event] Purging old application errors
04/18/21-02:59:08:205 (6129) 1 [Utility.Event] %SYS.Task.FeatureTracker failed to transfer data
04/19/21-00:19:43:830 (368) 1 [Generic.Event] Warning: Alternate and primary journal directories are the same...(repeated 1 times)
04/19/21-00:19:43:844 (7849) 0 [Generic.Event] INTERSYSTEMS IRIS JOURNALING SYSTEM MESSAGE
iris_1 Journaling switched to: /usr/irissys/mgr/journal/20210419.001
04/19/21-02:59:57:819 (7855) 0 [Utility.Event] Purging old application errors
04/19/21-02:59:57:892 (7853) 0 [Utility.Event] DELETE: /usr/irissys/mgr/journal/20210413.001
```
- Status Bar:** The status bar at the bottom shows the current file ("main"), connection information ("Connect docker:iris:32783[TRAINING]"), HL7 schema version ("v2.3.1"), and other system details.

DTL



Laugh now,
but one day
we'll be
in charge

Server 6123464b3017

Namespace TRAINING

[Switch](#)User [SuperUser](#)

Licensed To InterSystems IRIS Community Instance IRIS

Welcome, SuperUser

View:  

Search



- [!\[\]\(79f872e62d1050e1b744e4338200a3cf_img.jpg\) Home](#)
- [!\[\]\(107f01272782fead924f4dbecd7b4054_img.jpg\) Health](#)
- [!\[\]\(1b84a179a60db761acfc15f66012d3e0_img.jpg\) Analytics](#)
- [!\[\]\(4fdbbd0b1cc777f4efe4c9726db74ccb_img.jpg\) Interoperability](#)
- [!\[\]\(07b89588dcae85905157f575bb3e5469_img.jpg\) System Operation](#)
- [!\[\]\(4548645fd5a2ecc7d9aa736d4fb901b6_img.jpg\) System Explorer](#)
- [!\[\]\(73673c61e969f345e7b85271628c53df_img.jpg\) System Administration](#)

| | |
|-----------------------------------|--|
| Configure > | Business Processes <small> ⓘ</small> |
| Build > | Data Transformations <small> ⓘ</small> |
| View > | Business Rules <small> ⓘ</small> |
| List > | Record Maps <small> ⓘ</small> |
| Monitor > | CSV Record Wizard <small> ⓘ</small> |
| Manage > | Complex Record Maps <small> ⓘ</small> |
| Interoperate > | Java Business Hosts <small> ⓘ</small> |
| Test > | |

DATA TRANSFORMATIONS

Create, View, or Edit Data Transformations

[Go](#)[Add to favorites](#)

System Resource(s)

%Ens_Code:READ
%Ens_DTL:READ

Custom Resource

-

[Assign](#)

SYSTEM INFORMATION

General details on this system

[View System Dashboard](#)

System Up Time
2d 18h 43m

PRODUCTIONS

Productions running on this system

TRAININGPKG.FoundationPkg in TRAINING

Running
[View details](#)

InterSystems™
IRIS Data Platform

Management Portal

Home Health About Help Logout

Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Data

New

source

- MSH
- SCH
- TQ1()
- NTE()
- PIDgrp()
- RGSgrp()

Actions

Action Condition

1 set

2 set

DATA TRANSFORMATION WIZARD

Create a new Data Transformation definition.

Package
Training.DTL.SIU
Class package containing this Data Transformation

Name
AIstoSCH
Name of this Data Transformation

Description

Source Type
 All Messages HL7 X12 ASTM EDIFACT XML
Source Class
EnsLib.HL7.Message

Source Document Type
2.5.1:SIU_S12

Target Type
 All Messages HL7 X12 ASTM EDIFACT XML
Target Class
EnsLib.HL7.Message

Target Document Type
2.5.1:SIU_S12

Cancel OK

Message J_S12

View:

»

Transform Action Tools

Details for the selected action

No action selected

Select an action (connecting line) within the diagram using the mouse. Alternatively, you can select an item in the Actions table beneath the diagram.

DTL

InterSystems™
IRIS Data Platform

Management Portal

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Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Data Transformation Builder - (Training.DTL.SIU.AIStoSCH)*

New Open Save Save As Compile 100% -Add Action- View:

Source
EnsLib.HL7.Message
2.5.1:SIU_S12

Target
EnsLib.HL7.Message
2.5.1:SIU_S12

Actions

| # | Action | Condition | Property | Value | Key / Transform |
|---|--------|-----------|----------|-------|-----------------|
| 1 | | | | | |

Transform Action Tools

Details for the overall data transformation

Name: Training.DTL.SIU.AIStoSCH.dtl

Create: copy

Source Class: EnsLib.HL7.Message

Source Doc Type: 2.5.1:SIU_S12

Target Class: EnsLib.HL7.Message

Target Doc Type: 2.5.1:SIU_S12

Language: objectscript

Report Errors:

Ignore missing source segments and properties:

Treat empty repeating fields as null:

DTL

InterSystems™
IRIS Data Platform

Management Portal

Home Health About Help Logout

Menu

Server 6123464b3017 Namespace TRAINING Switch User SuperUser Licensed To InterSystems IRIS Community Instance IRIS

Interoperability > Data Transformation Builder - (Training.DTL.SIU.AIStoSCH)*

New Open Save Save As Compile 100% -Add Action- View:

RGS

AISgrp()

AIS

1: SetIDAIS

2: SegmentActionCode

3: UniversalServiceIdentifier

4: StartDateTime

5: StartDateTimeOffset

6: StartDateTimeOffsetUnits

7: Duration

8: DurationUnits

9: AllowSubstitutionCode

5: ScheduledID

6: EventReason

7: AppointmentReason

8: AppointmentType

9: AppointmentDuration

10: AppointmentDurationUnits

11: AppointmentTimingQuantity()

12: PlacerContactPerson()

13: PlacerContactPhoneNumber

14: PlacerContactAddress()

15: PlacerContactLocation

16: FillerContactPerson()

Actions

Action Condition Property Value Key / Transform

1 set target.{SCH:AppointmentDuration} source.{RGSGrp().AISgrp().AIS:Duration} ""

2 set target.{SCH:AppointmentDurationUnits} source.{RGSGrp().AISgrp().AIS:DurationUnits} ""

View:

»

Transform Action Tools

Details for the selected action

assign

Set the value of a target property.

View documentation

Action

set

Property

target.{SCH:AppointmentDurationUnits}

Property whose value will be set. Double-clicking on a target property in the diagram will place that property in this field.

Value

source.{RGSGrp().AISgrp().AIS:DurationUnits}

Value to assign to the property. Double-clicking on a property in the diagram will place that property in this field.

Key

""

For collection properties, this string specifies the member of the collection that is the target of this assignment.

Disabled

Control whether this action and its children should be disabled.

Description

Test It !

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



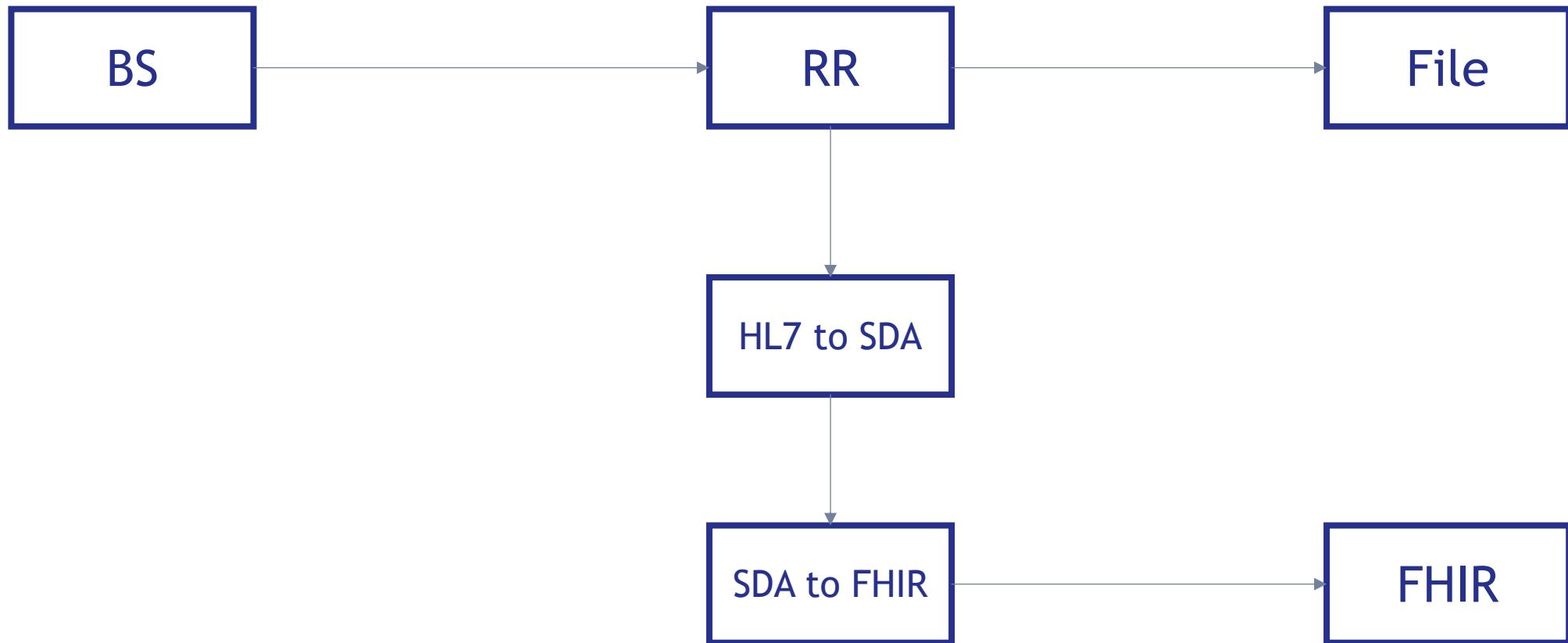
HL7v2 To FHIR
**Demographics
Only**



Overview, what we have done



Overview, what we plan to do



Instantiate the new BPs

Instantiate Training.BP.HL7ToSDA3 as HL7_To_SDA

The screenshot shows the InterSystems Management Portal interface. The top navigation bar includes Home, Health, About, Help, Logout, and a Menu button. Below the navigation, the server information is listed as Server 6123464b3017, Namespace TRAINING, User SuperUser, Licensed To InterSystems IRIS Community, and Instance IRIS. On the left sidebar, under Interoperability > Production, there is a Production section with a Production Running status and Services (FHIR_Http_Service, HL7_Tcp_Service) listed.

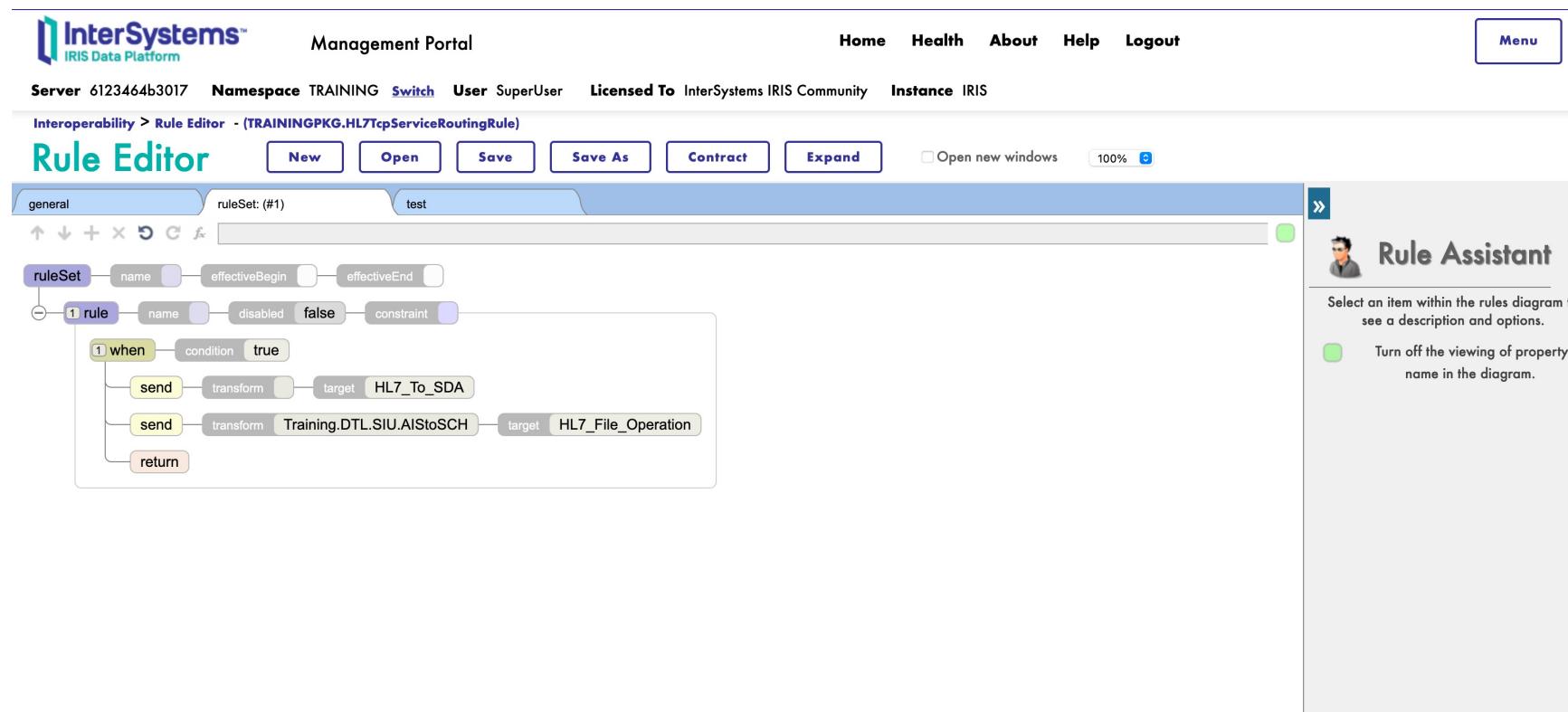
The main content area displays two overlapping dialog boxes:

- BUSINESS PROCESS WIZARD:** A modal window titled "BUSINESS PROCESS WIZARD" with the sub-instruction "Add a new Business Process to this Production." It contains fields for Business Process Class (Training.BP.HL7ToSDA3), Business Process Name (HL7_To_SDA), Display Category, Comment, Enable Now (unchecked), and Pool Size (1). Buttons at the bottom include Cancel and OK.
- Production Settings:** A larger background dialog box titled "Production Settings". It includes tabs for Settings, Queue, Log, Messages, Jobs, and Actions. It features an "Apply" button and a "Search:" input field. The "Informational Settings" section contains a "Description" field. The "Basic Settings" section includes "Actor Pool Size" set to 2. The "Additional Settings" section shows "Shutdown Timeout" at 120 and "Update Timeout" at 10. The "Alerting Control" section is partially visible.

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 ?

VISUAL TRACE

Session ID: 74 [Legend](#) [Printable Version](#) Go to items 1 - 4 Items per page 40 Show events Show internal items [Apply Filter](#) None Previous Page Next Page Previous Session Next Session

| Services | Processes | Operations |
|--|------------------------|--|
| HL7_Tcp_Service | HL7_Tcp_Service_Router | HL7_To_SDA |
| [1] 2021-04-19 12:39:37.271 HL7.Message | [2] | [3] 2021-04-19 12:39:37.275 HL7.Message |
| [4] 2021-04-19 12:39:37.276 HL7.Message | | |

» [Header](#) [Body](#) [Contents](#)

[View Full Contents](#) [View Raw Contents](#)

HL7 SIU_S14 Message - Id = 32, DocType = '[2.5.1:SIU_S12](#)', Message Type Category = '2.5.1' '[Schedule information unsolicited - Notification of appointment modification](#)', 7 Segments

| | |
|---|--|
| 1 | MSH ^~\& XPORE PPR ORBIS ORBIS 201809121548 _ SIU ^ S14 A25335484220154822 P 2.3.1 |
| 2 | SCH _ A25335451569 _ _ _ _ ^ APT _ _ _ _ _ ^ _ ^ _ ^ 201809121548 _ _ _ _ 4827 |
| 3 | NTE 1 _ Priority:S.test GI |
| 4 | PID _ _ 031570943 _ ^ CNV ^ PI _ TESTBPE ^ BIO TESTBPE 20100101 M _ _ _ ^ _ |
| 5 | PV1 _ C 9231 _ _ 4827 ^ SMITH ^ JOHN 9383 ^ DOE ^ MARY _ PPR _ _ _ _ |
| 6 | RGS 1 U |
| 7 | AIS 1 U SCANCEA ^ RDV_CHU ^ EDL ^ _ RDV_CH 201809120815 _ _ 35 MIN |

Use the helper tools in Training.BP.HL7ToSDA3

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

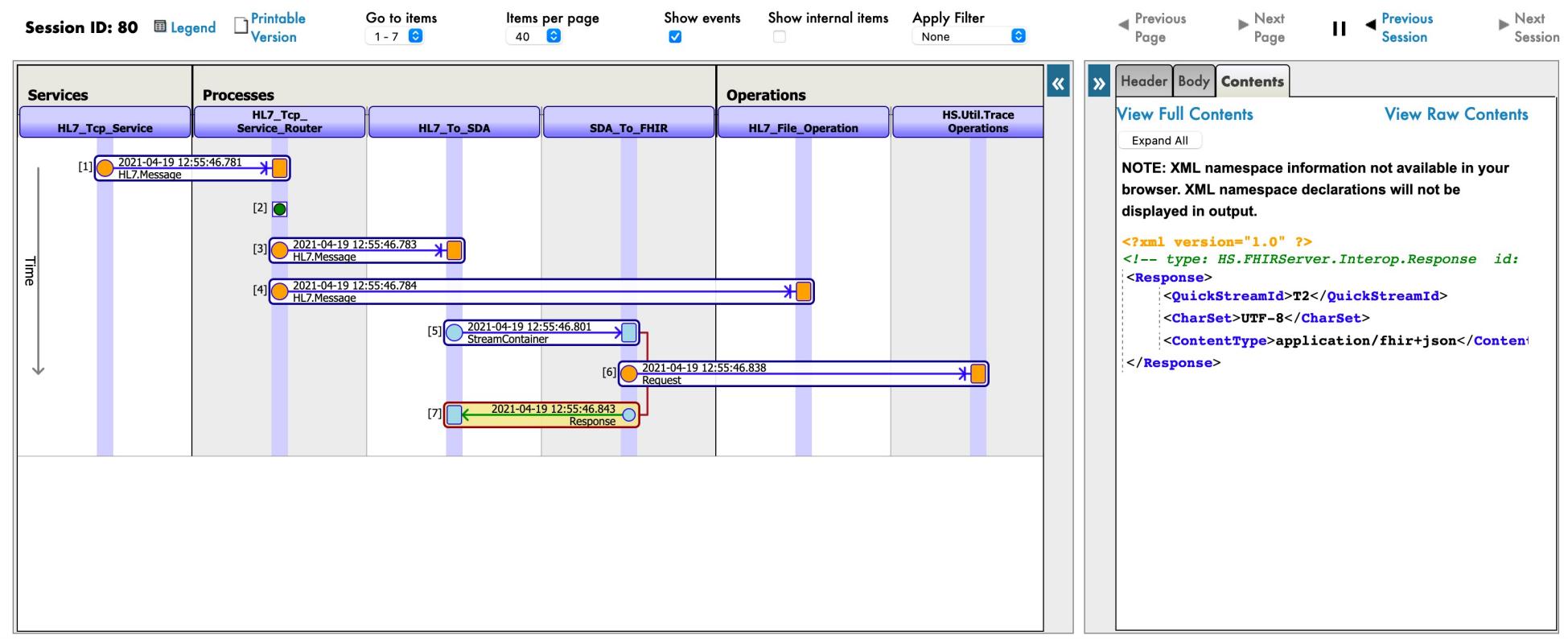
```
/// Transforms an HL7 message to SDA, an internal healthcare format for
InterSystems IRIS for Health.
Method OnRequest(pRequest As EnsLib.HL7.Message, Output pResponse As
Ens.Response) As %Status
{
set tSC = $$0K
try {
//set tSC = ##class(Training.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
//set 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 = $$0K
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 ?

VISUAL TRACE



Use custom DTLs

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

Objective :

1. Define 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)

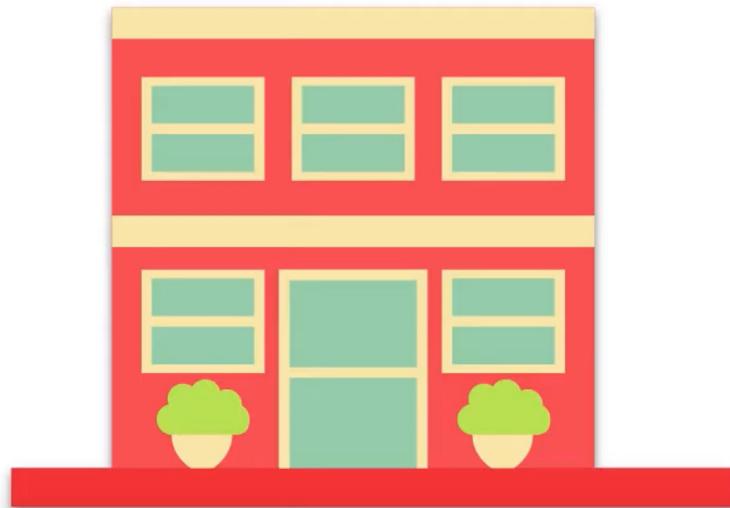
(https://docs.intersystems.com/irisforhealthlatest/csp/docbook/Doc.View.cls?KEY=RCOS_COMMANDS)



Before starting

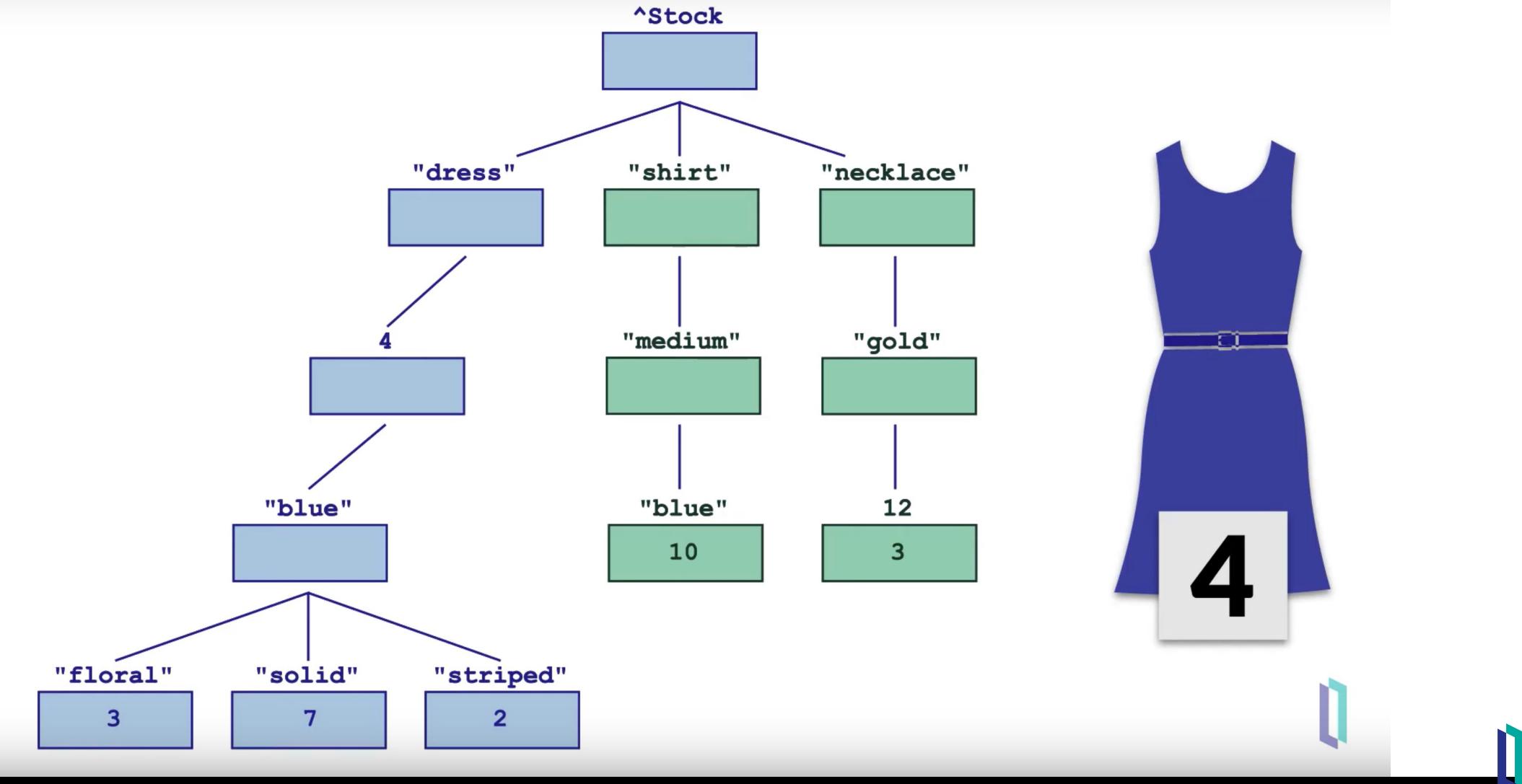
Globals

```
^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 = $$0K
try {
  //set tSC =
##class(Training.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
  set tSC=
##class(Training.Tools.HL7toSDADemographics).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 = $$0K
try {
  if ..Code {
    set tSC = ##class(HS.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
  }
  else {
    set tSC=
##class(Training.Tools.HL7toSDADemographics).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

The screenshot illustrates the integration of the InterSystems HealthShare interface with the Visual Studio Code (VS Code) debugger. On the left, the HealthShare Operations interface shows a list of processes (FHIR_Router, HL7_Tcp_Service_Router, HL7_To_SDA, SDA_To_FHIR) and their status. A specific job for the HL7_To_SDA process is highlighted, showing its status as 'OK'. On the right, the VS Code interface displays the code for the HL7toSDA3.cls class. The 'ObjectScript Attach' tab is selected in the top bar. The Variables and Watch panes are visible, with the Variables pane showing a variable named 'tSC' with a value of '\$\$OK'. Red circles highlight several key elements: the 'ObjectScript Attach' tab in the VS Code header, the 'Jobs' tab in the HealthShare interface, the 'OK' status of the selected job, and the 'tSC' variable in the VS Code Watch pane.

```
HL7toSDA3.cls — iris-health-i
```

```
src > Training > BP > HL7toSDA3.cls > Training.BP.HL7ToSDA3
```

```
Property Code As %Boolean;
Property TargetConfigName As Ens.DataType.ConfigName;
/// Transforms an HL7 message to SDA, an internal hea
Method OnRequest(pRequest As EnsLib.HL7.Message, Outp
{
  set tSC = $$OK
  try {
    if ..Code {
      set tSC = ##class(HS.Gateway.HL7.HL7ToSDA3)
```

46 | © InterSystems Corporation. All rights reserved. |

Attach process to VsCode

HL7ToSDA3.cls — iris-health-training

```
src > HS > Gateway > HL7 > HL7ToSDA3.cls > HS.Gateway.HL7.HL7ToSDA3 > sius12
399     }
400     while $$$Next("ORCRDE") {do ..ORC("rde")} do ..end("ORCRDE")
401   }
402
403   Debug this method
404   ClassMethod sius12()
405   set Action="AddOrUpdate"
406   do ..PID(),..PD1(),..end("PID")
407   if ($$$Next("PV1"))&&..StartEncounters() {
408     do ..PV1(),..PV2()
409     do ..EndEncounters()
410   }
411   while $$$Next("DG1") {do ..DG1()} do ..end("DG1")
412   while $$$Next("OBX") {do ..OBX("obs")} do ..end("OBX")
413   do ..SCH()
414 }
415
416 Debug this method
```

TERMINAL SQL CONSOLE: MESSAGES PROBLEMS OUTPUT DEBUG CONSOLE OUTLINE TIMELINE ObjectScript

```
Compilation started on 04/19/2021 16:01:56 with qualifiers 'cbuk'
Class Training.BP.HL7ToSDA3 is up-to-date.
Compilation finished successfully in 0.003s.
```

```
Compilation started on 04/19/2021 16:02:19 with qualifiers 'cbuk', using worker jobs
Compiling class Training.BP.HL7ToSDA3
Compiling table Training_BP.HL7ToSDA3_MessagesReceived
Compiling table Training_BP.HL7ToSDA3_MasterPendingResponses
Compiling table Training_BP.HL7ToSDA3_MessagesSent
Compiling table Training_BP.HL7ToSDA3
Compiling routine Training.BP.HL7ToSDA3MessagesReceived.1
Compiling routine Training.BP.HL7ToSDA3MessagesSent.1
Compiling routine Training.BP.HL7ToSDA3MasterPendingResponses.1
Compiling routine Training.BP.HL7ToSDA3.1
Compilation finished successfully in 0.445s.
export "HS.Gateway.HL7.HL7ToSDA3.cls" as "/Users/grongier/git/iris-health-training/src/HS/Gateway/HL7/HL7ToSDA3.cls" - Success
Exported items: 1
```

CALL STACK PAUSED ON BREAKPOINT

- sius12+1 HS.Gateway.HL7.HL7ToSDA3.cls 405:1
- message+51 HS.Gateway.HL7.HL7ToSDA3.cls 10:1
- GetSDA+22 HS.Gateway.HL7.HL7ToSDA3.cls 34:1
- OnRequest+4 Training.BP.HL7ToSDA3.cls 20:1
- MessageHeaderHandler+22 Training.BP.HL7ToSDA3...
- zMessageHeaderHandler+106 Unknown Source

BREAKPOINTS

- HL7toSDA3.cls src/Training/BP
- HL7ToSDA3.cls src/HS/Gateway/HL7 405

solution* 0 1 0 ▲ 0 ObjectScript Attach (iris-health-training) Connect docker:iris:32783[TRAINING] Ln 405, Col 1 Tab Size: 4 UTF-8 LF ObjectScript-class

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,pMultiLineOBXCompatibilityMode,
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=TRAINING&Namespace=TRAINING>

| Index | Value |
|-------|---------------------|
| 1: | "^HS.Data(1) |
| 2: | "^HS.Data(1,0) |
| 3: | "^HS.Data(1,2) |
| 4: | "^HS.Data(1,2,1,2) |
| 5: | "^HS.Data(1,3) |
| 6: | "^HS.Data(1,3,1) |
| 7: | "^HS.Data(1,3,1,1) |
| 8: | "^HS.Data(1,4) |
| 9: | "^HS.Data(1,4,1) |
| 10: | "^HS.Data(1,4,1,1) |
| 11: | "^HS.Data(1,5) |
| 12: | "^HS.Data(1,5,1) |
| 13: | "^HS.Data(1,5,1,1) |
| 14: | "^HS.Data(1,6) |
| 15: | "^HS.Data(1,6,1) |
| 16: | "^HS.Data(1,6,1,1) |
| 17: | "^HS.Data(1,7) |
| 18: | "^HS.Data(1,7,1) |
| 19: | "^HS.Data(1,7,1,1) |
| 20: | "^HS.Data(1,9) |
| 21: | "^HS.Data(1,9,1) |
| 22: | "^HS.Data(1,9,1,1) |
| 23: | "^HS.Data(1,9,2) |
| 24: | "^HS.Data(1,9,2,1) |
| 25: | "^HS.Data(1,10) |
| 26: | "^HS.Data(1,10,1) |
| 27: | "^HS.Data(1,10,1,1) |
| 28: | "^HS.Data(1,11) |
| 29: | "^HS.Data(1,11,1) |
| 30: | "^HS.Data(1,11,1,1) |
| 31: | "^HS.Data(1,12) |
| 32: | "^HS.Data(1,12,1) |
| 33: | "^HS.Data(1,12,1,1) |
| 34: | "^HS.Data(1,18) |

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/cad88ce78e2aa4a713cf02ee346372d2fee1507>



SDA to FHIR



Documentation

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

Mapping or Information

FHIR4 by HS.SDA3 Classes Appointment

FHIR4 by Category

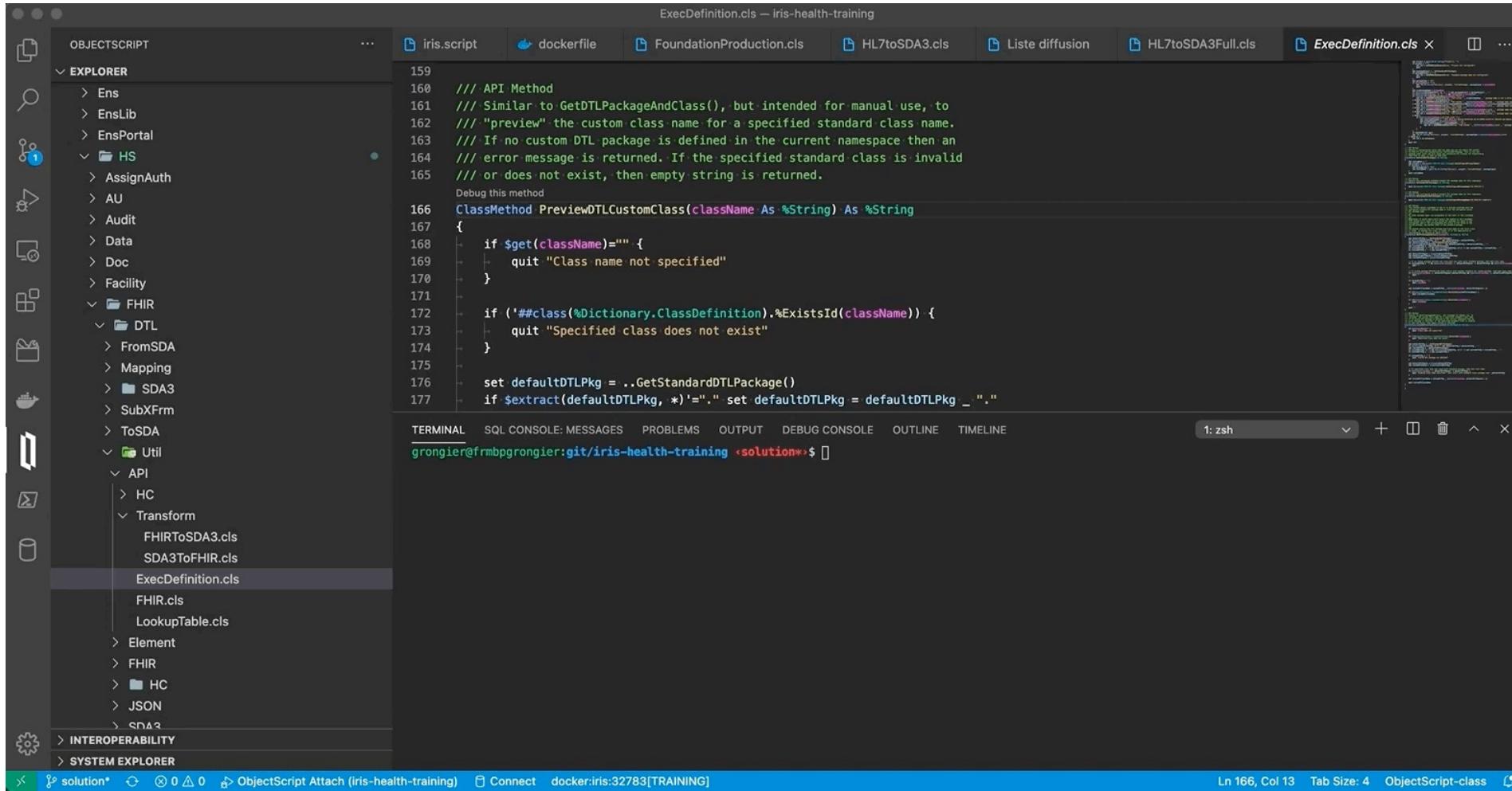
This page allows you to view mappings that generate transformations from SDA to FHIR R4.

| 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 |
| 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 :



The screenshot shows the InterSystems ObjectScript IDE interface. The left sidebar contains the Explorer view with various namespaces like Ens, EnsLib, EnsPortal, HS, FHIR, DTL, Util, API, and INTEROPERABILITY. The main editor area displays the code for ExecDefinition.cls:

```
159 // API Method
160 // Similar to GetDTLPackageAndClass(), but intended for manual use, to
161 // "preview" the custom class name for a specified standard class name.
162 // If no custom DTL package is defined in the current namespace then an
163 // error message is returned. If the specified standard class is invalid
164 // or does not exist, then empty string is returned.
165
166 ClassMethod PreviewDTLCustomClass(className As %String) As %String
167 {
168     if $get(className)="" {
169         quit "Class name not specified"
170     }
171
172     if ('#class(%Dictionary.ClassDefinition).%ExistsId(className)) {
173         quit "Specified class does not exist"
174     }
175
176     set defaultDTLPkg = ..GetStandardDTLPackage()
177     if $extract(defaultDTLPkg, *)'=". set defaultDTLPkg = defaultDTLPkg _ ".
```

The bottom status bar shows the path: solution*, the connection status: ObjectScript Attach (iris-health-training), and the terminal status: docker:iris:32783[TRAINING]. The status bar also indicates the current line (Ln 166, Col 13), tab size (Tab Size: 4), and the current class (ObjectScript-class).

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
}
```

The power behind what matters.



Thank you.

