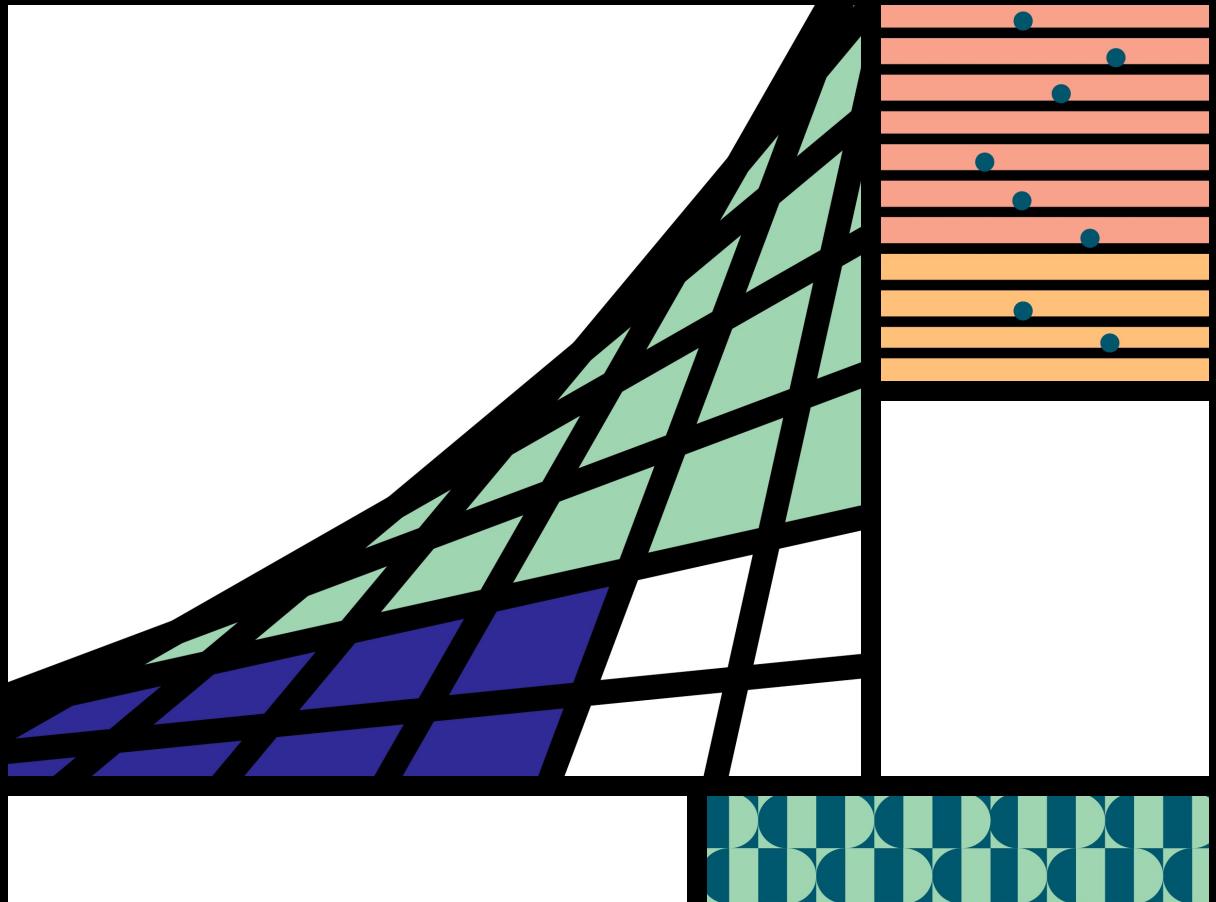
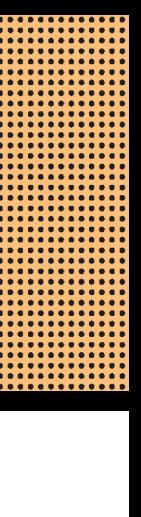
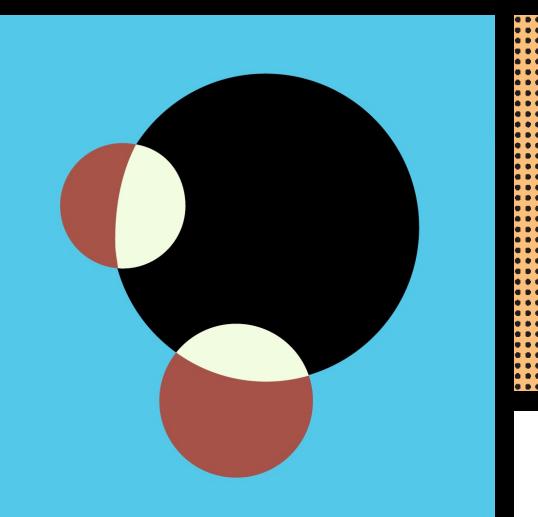
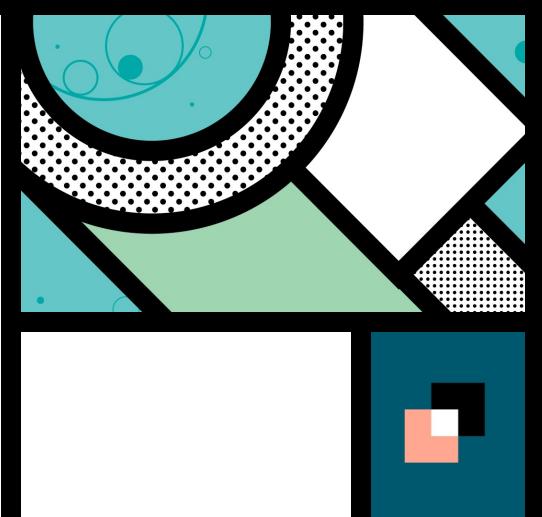


IRIS For Health Training



Guillaume Rongier

SALES ENGINEER



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Transformation HL7v2 -> SDA3

- En code
 - Globals
 - ObjectScript
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 - DTL

Transformation SDA3 -> FHIR

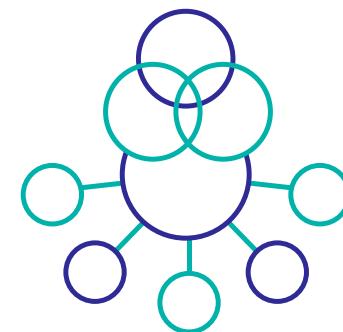
- Graphique
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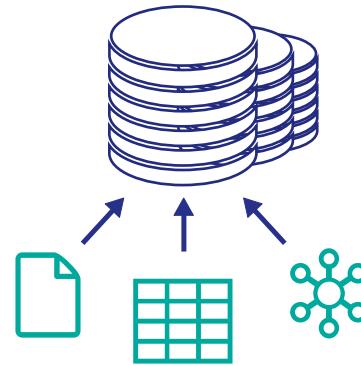
Introduction



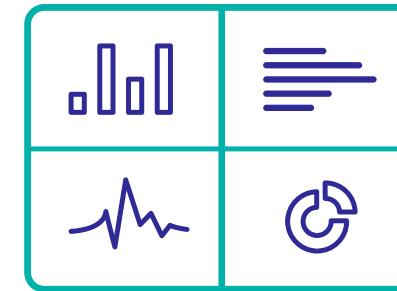
Unifier pour Simplifier



InterSystems IRIS
Interoperability



InterSystems IRIS
Multi Model Database



InterSystems IRIS
Analytics



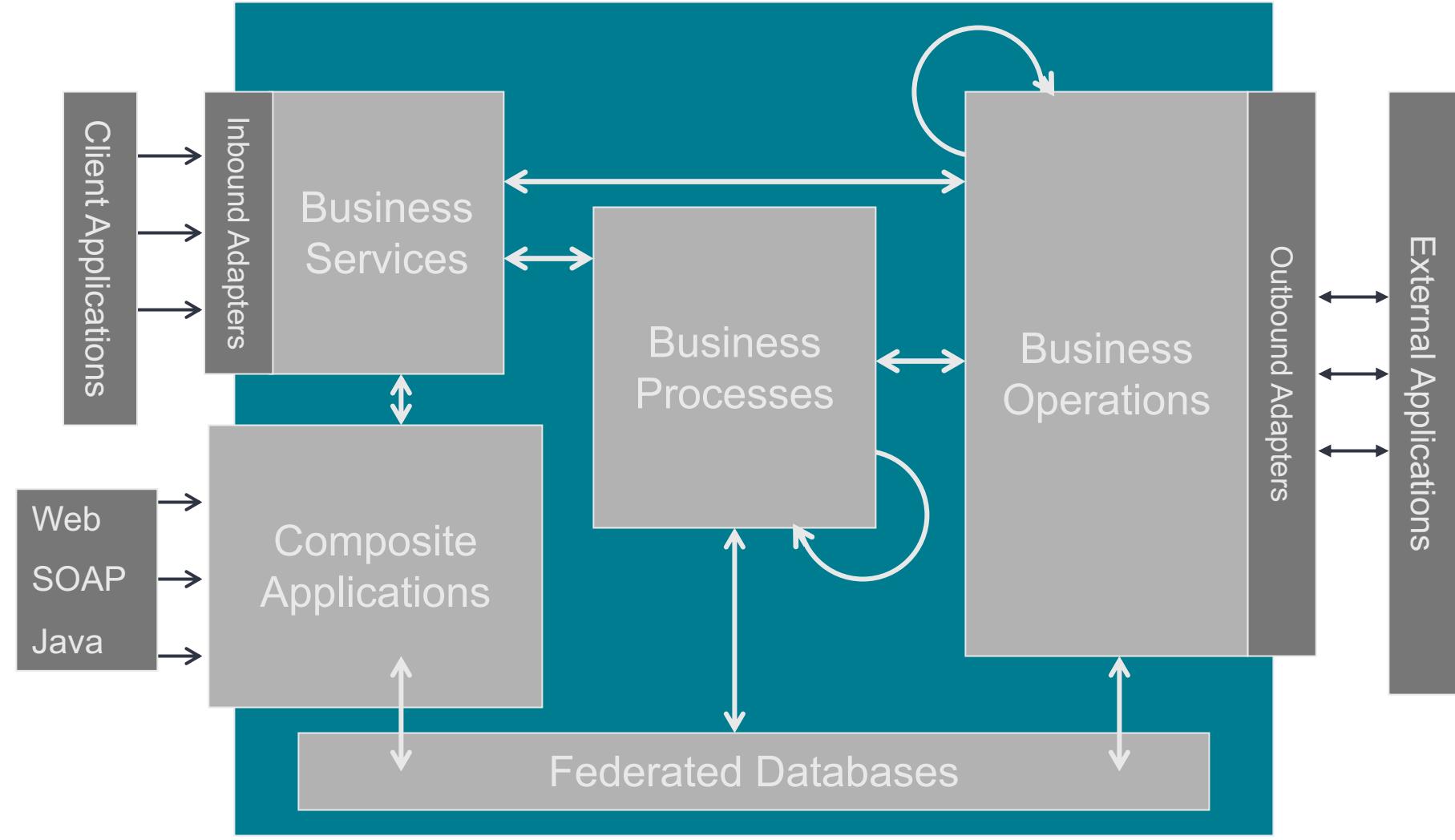
IRIS Mantra

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 focus is the 'Business Service Wizard' dialog box, which guides the user through creating a new business service. The 'Input Type' is specified as 'TCP', and the service is named 'HL7_Tcp_Service'. The 'Port Number' is set to 22222. The background shows the 'Production Settings' page, where basic configurations like 'Actor Pool Size' (set to 2) and various alerting and development settings are visible.

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

Cancel OK

Production Settings

Sort: Name Status Number View:

Add (+) Local_Operation

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.

The screenshot shows the InterSystems Management Portal interface. On the left, a modal window titled 'BUSINESS OPERATION WIZARD' is open, prompting to add a new business operation. It includes tabs for All Operations, HL7 Output (which is selected and highlighted with a red circle), X12 Output, and Workflow. Under 'Output Type', 'File' is selected (also highlighted with a red circle). The 'HL7 Operation Name' field contains 'HL7_File_Operation'. Below it are fields for 'Display Category', 'Comment', and 'Enable Now'. At the bottom are 'File Path' and 'Filename' fields, both with required asterisks. A note at the bottom says '*Default applies if no value' with a checked checkbox and a help icon. At the very bottom of the modal are 'Cancel' and 'OK' buttons. On the right, the main dashboard shows 'Production Settings' for the 'Local_Operation' item. It has sections for 'Informational Settings', 'Basic Settings' (with an 'Actor Pool Size' of 2), 'Additional Settings', 'Alerting Control', and 'Development and Debugging'. A note at the bottom states: 'These are the Production settings. To view item settings, click on a configuration item.' The top navigation bar includes links for Home, Health, About, Help, Logout, and a 'Menu' button. The server information shows 'Server 6123464b3017', 'Namespace TRAINING', 'User SuperUser', 'Licensed To InterSystems IRIS Community', and 'Instance IRIS'.

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 > 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

Actions

FHIR_Http_Service HL7_Tcp_Service Router

FHIR_Router HL7_Tcp_Service_Router

FHIR_Local_Operation HL7_File_Operation HL7_Tcp_Operation HS.Util.Trace.Operations

Test this item Start Stop Restart

Test Start this item if temporarily stopped

Stop Stop this item temporarily

Restart Restart this item

The screenshot shows the 'Production Configuration' section of the InterSystems Management Portal. On the left, there are sections for 'Services' (with FHIR_Http_Service and HL7_Tcp_Service listed), 'Processes' (with FHIR_Router and HL7_Tcp_Service_Router), and 'Operations' (with FHIR_Local_Operation, HL7_File_Operation, HL7_Tcp_Operation, and HS.Util.Trace.Operations). The 'Operations' section has a red circle around the 'Actions' tab. Within the 'Actions' tab, the 'Test' button for the 'HL7_Tcp_Operation' service is also circled in red. Other buttons visible include 'Start', 'Stop', 'Restart', and descriptive text like 'Start this item if temporarily stopped' and 'Stop this item temporarily'.

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
```
- 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 is "main*", the Docker container is "docker:iris:32783[TRAINING]", the HL7 schema is "v2.3.1", and other status information like "You, 6 days ago", "Ln 7, Col 58 (525 selected)", and "Spaces: 4 UTF-8 CRLF HL7".

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

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:

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 !



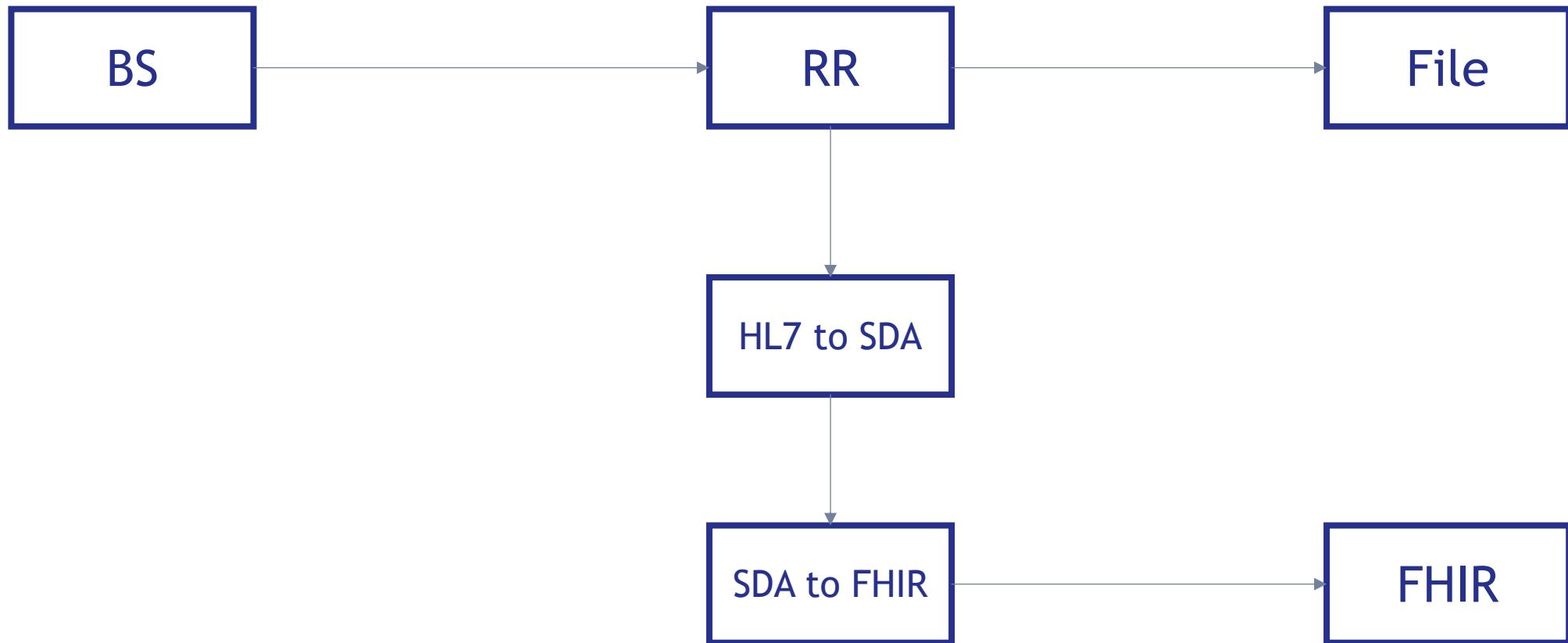
HL7v2 To FHIR
Demographics
Only



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, and Logout. Below the navigation is a banner with the text "Instantiate Training.BP.HL7ToSDA3 as HL7_To_SDA". The main content area has a left sidebar with "Production Running" and "Services" sections, listing FHIR_Http_Service and HL7_Tcp_Service. The central area displays two dialog boxes: a "BUSINESS PROCESS WIZARD" dialog and a "Production Settings" dialog.

BUSINESS PROCESS WIZARD Dialog:

- Header: BUSINESS PROCESS WIZARD, Add a new Business Process to this Production.
- Buttons: All Processes, HL7 Router, X12 Router, Component (selected).
- Form fields:
 - Business Process Class: Training.BP.HL7ToSDA3
 - Business Process Name: HL7_To_SDA
 - Display Category: (dropdown menu)
 - Comment: (text input field)
 - Enable Now: (checkbox)
 - Pool Size: 1
- Instructions: Use this form to add a new business process to the production. For help with any setting in this form, hover the cursor over the setting name.
- Buttons: Cancel, OK.

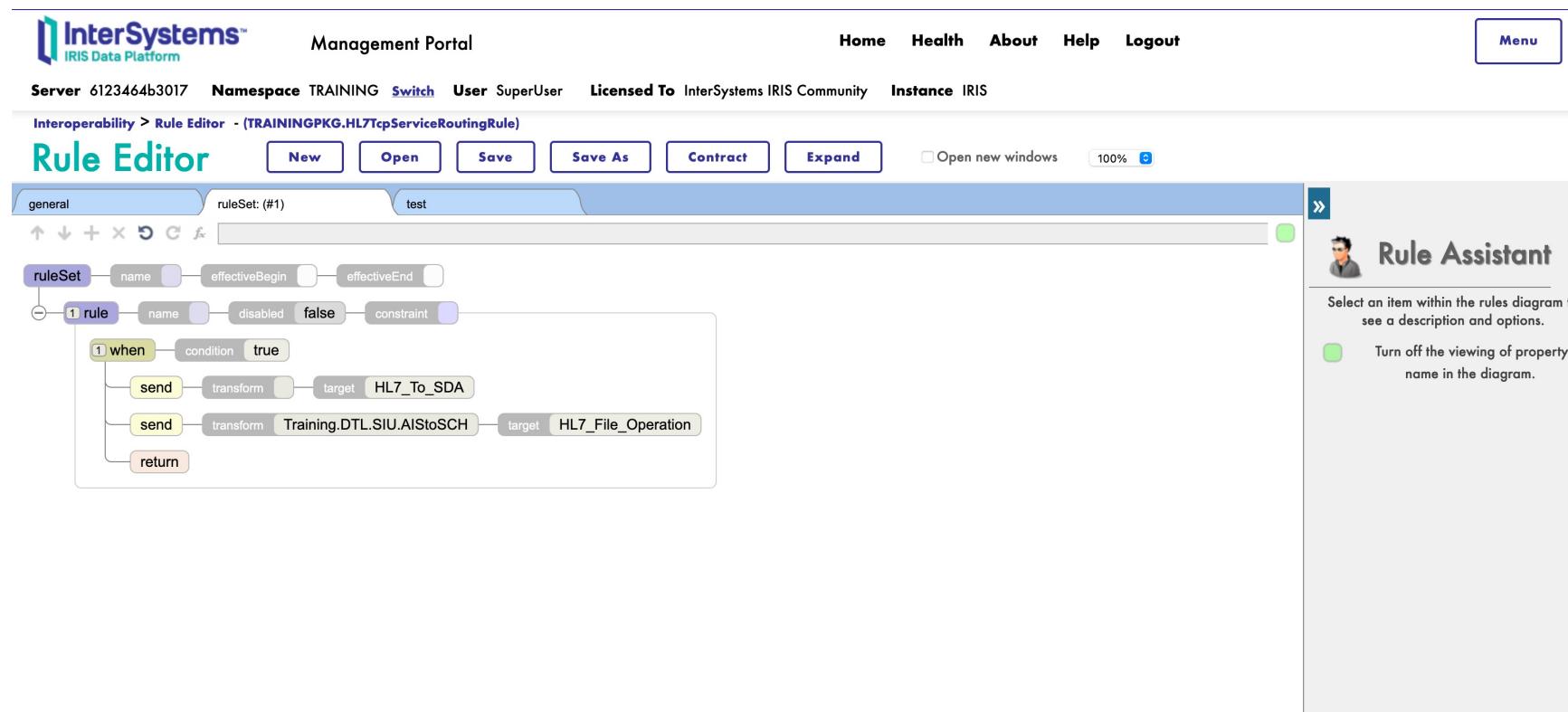
Production Settings Dialog:

- Header: Sort: Name, Status, Number, View: List, Grid, Details.
- Buttons: >>, Apply, Search: [text input], Queue, Log, Messages, Jobs, Actions.
- Section: Production Settings
 - Informational Settings: Description (text input field).
 - Basic Settings: Actor Pool Size (text input field: 2).
 - Additional Settings: Shutdown Timeout (text input field: 120), Update Timeout (text input field: 10).
 - Alerting Control (collapsible section).

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

Use the helper tools in Training.BP.HL7ToSDA3

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

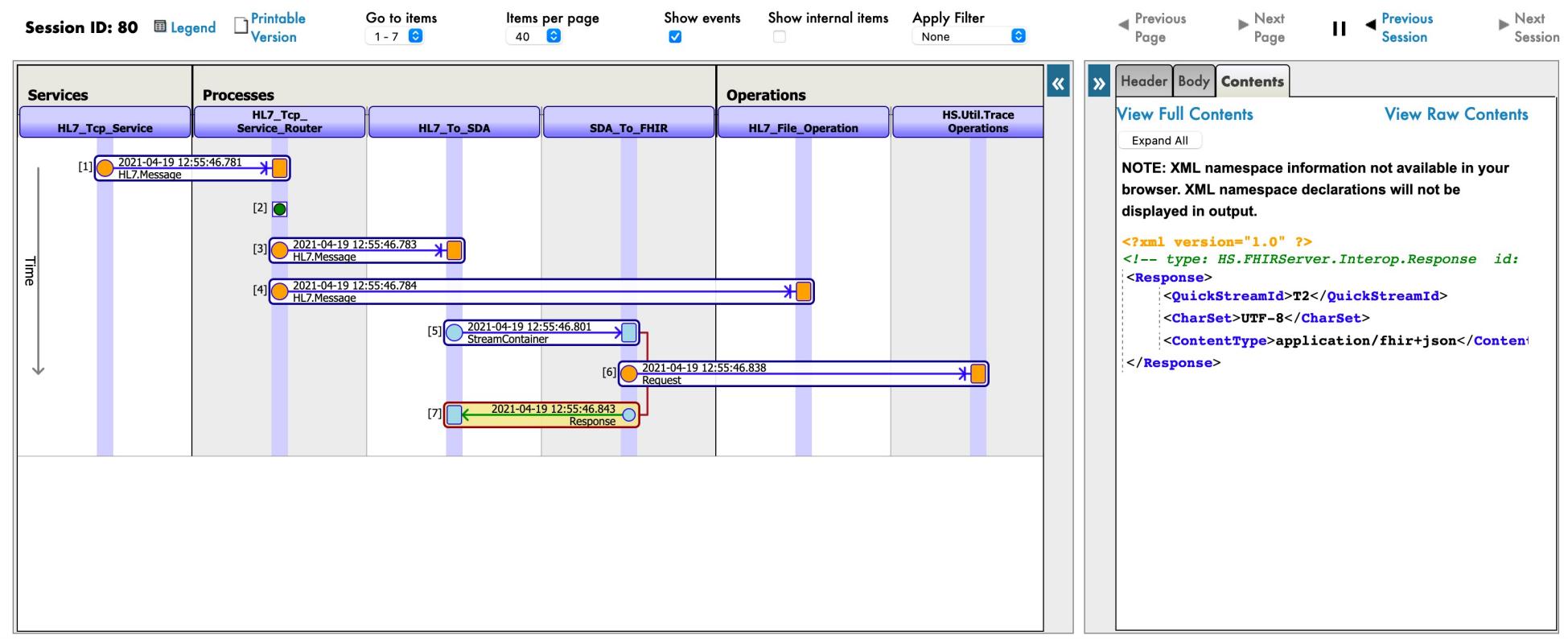
```
/// Transforms an HL7 message to SDA, an internal healthcare format for
InterSystems IRIS for Health.
Method OnRequest(pRequest As EnsLib HL7 Message, Output pResponse As
Ens Response) As %Status
{
set tSC = $$0K
try {
//set tSC = ##class(Training.Gateway.HL7.HL7ToSDA3).GetSDA(pRequest,.tSDA)
//set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

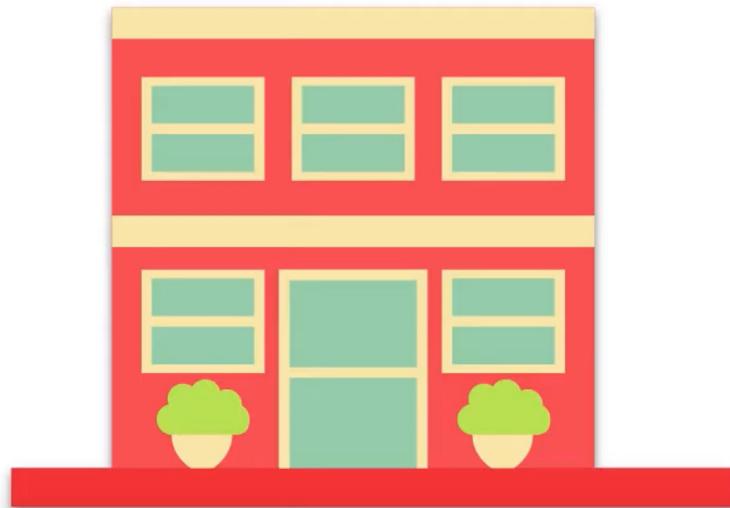
(https://docs.intersystems.com/irisforhealthlatest/csp/docbook/Doc.View.cls?KEY=RCOS_COMMANDS)



Before starting

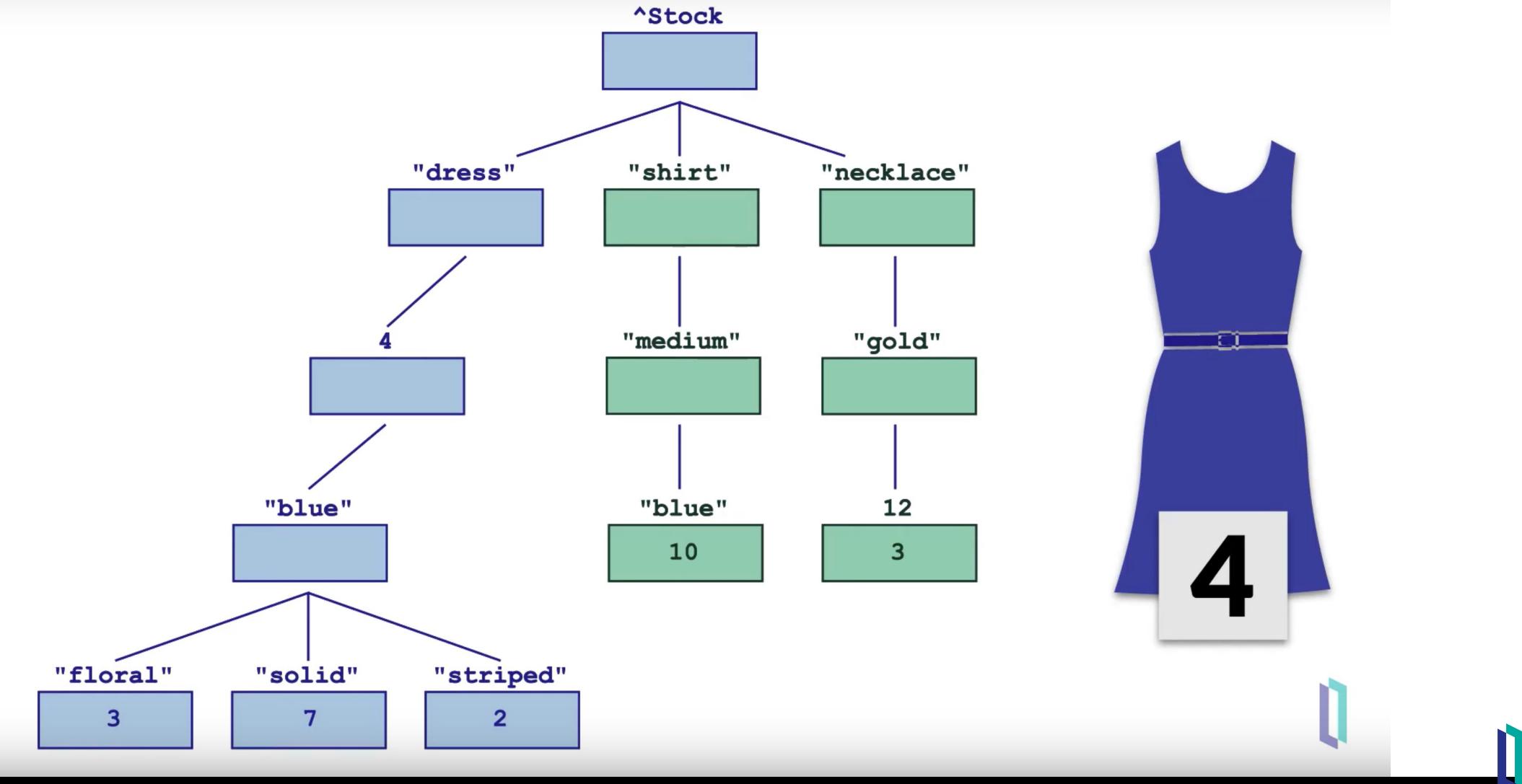
Globals

```
^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 operations (FHIR_Local_Operation, HL7_File_Operation, HL7_Tcp_Operation, HS.Util.Trace.Operations). The HL7_To_SDA process is selected, and its job status is shown as 'OK'. On the right, the VS Code interface displays the code for the HL7toSDA3.cls class, specifically the OnRequest method. The code transforms an HL7 message to an SDA message. A red circle highlights the 'ObjectScript Attach' button in the top bar of the VS Code interface. Another red circle highlights the 'WATCH' panel, which shows a variable named 'tSC' with a value of '\$\$OK'. A third red circle highlights the 'VARIABLES' panel, which also shows the 'tSC' variable.

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

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 :

```
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 screenshot shows the ObjectScript IDE interface. The left sidebar contains the Explorer view with various namespaces like Ens, FHIR, and DTL selected. The main editor window displays the code for ExecDefinition.cls. The bottom status bar shows the path 'solution*' and the connection 'ObjectScript Attach (iris-health-training)'. The bottom right corner features the InterSystems logo.

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.

