HL7® FHIR® DevDays

JUNE | 2021

Tutorial: Advanced FHIR Shorthand and Tools

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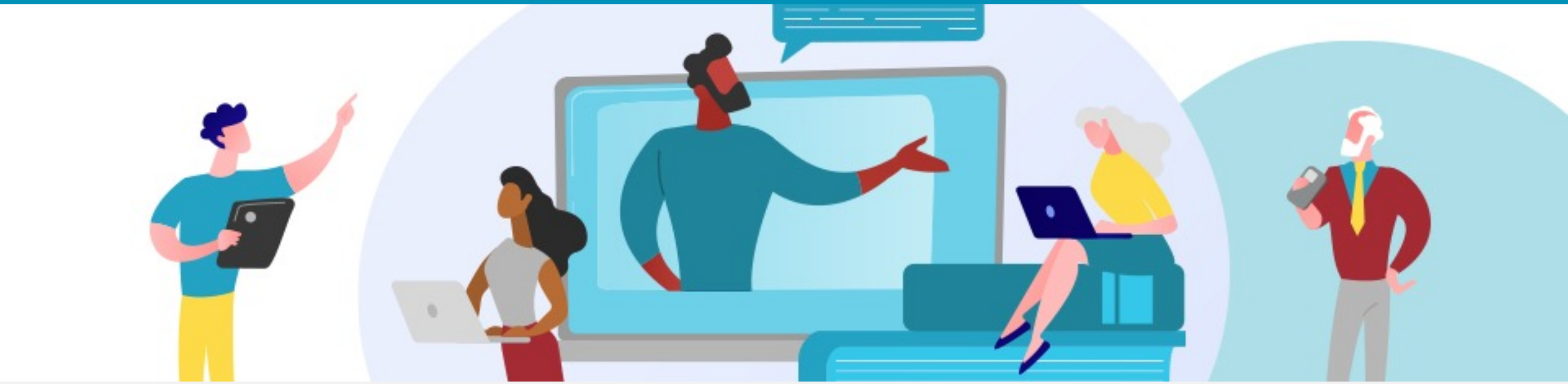

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INFERNO

mCODE™

SYNTHEA

Clinical Quality Language

FHIR® Shorthand™

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Track overview: Let's Build a FHIR specification

Monday

- Introduction to FHIR
  11:00 – 11:45

Tuesday

- Introduction Profiling
  1:00 – 1:45
- Profiling with Forge
  2:15 – 3:00
- Create an IG with FHIR Shorthand
  3:15 – 4:00
- Create an IG with FHIR Shorthand
  4:15 – 5:00

Wednesday

- Accelerating your IG production
  1:00 – 1:45
- IG with IG Publisher
  2:15 – 3:00

Thursday

- FHIR Registry & Packages
  1:00 – 1:45
- Publishing with Simplifier.net
  2:15 – 3:00
- Advanced FHIR Shorthand and Tools
  3:15 – 4:00

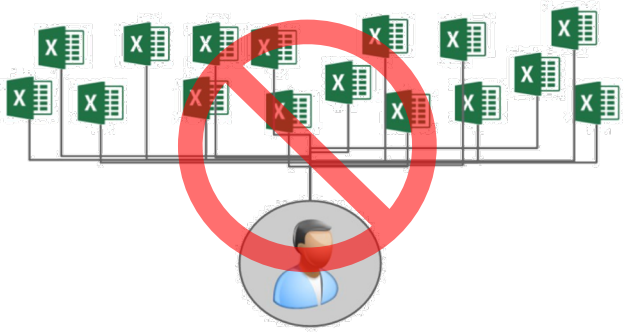
You are here

Background

Profiling Approaches

Hand-Editing

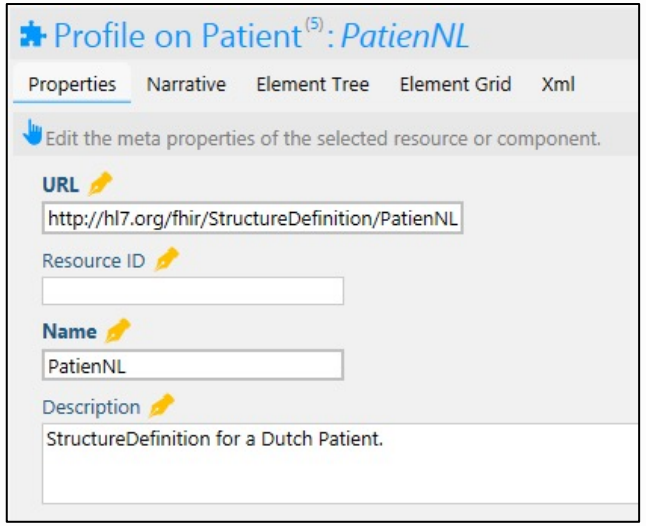
Spreadsheets



User Interfaces

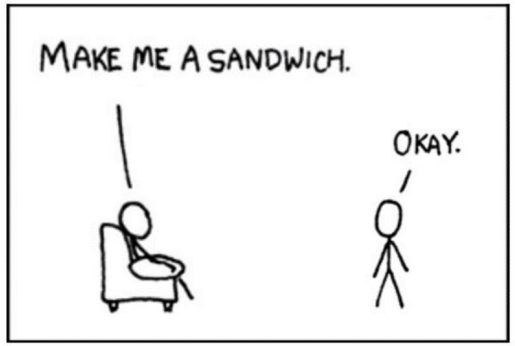
Trifolia-on-FHIR

Forge



Command-Driven

FHIR® Shorthand™




```
Profile: MyPatient
Parent: Patient
* name 1..* MS
```

Example: COVID-19 Diagnosis Profile

```
Profile: CovidDiagnosis
Parent: Condition
Description: "How to report COVID"
* code = $icd#U07.1
* severity from CovidSeverityVS (required)
* subject only Reference(Patient)
* subject 1..1

Alias: $icd = http://hl7.org/fhir/sid/icd-10-cm
```

What's New in FSH STU Two

Get it? Fish stew?
(Don't worry, he'll be fine. FSH will survive this one.)

Explicit Indexing

```
* item[0].linkId = "sp-101"
* item[0].text = "What is your date of birth?"
* item[0].type = #date

* item[1].linkId = "sp-102"
* item[1].text = "What is your country of birth?"
* item[1].type = #code

* item[2].linkId = "sp-103"
* item[2].text = "What country do you currently reside in?"
* item[2].type = #code

* item[3].linkId = "sp-104"
* item[3].text = "What country did you travel to?"
* item[3].type = #code

* item[4].linkId = "sp-105"
* item[4].text = "When did the travel start?"
* item[4].type = #date

* item[5].linkId = "sp-106"
* item[5].text = "When did the travel end?"
* item[5].type = #date
```

Problems with explicit indexing:

- Error prone (oops, I missed one!)
- Adding/removing items in the middle requires renumbering
- Similar blocks of code are not reusable

```
* item[ ].linkId = "sp-108"
* item[ ].text = "When state do you currently reside in?"
* item[ ].type = #code
```

Soft Indexing

```
* item[+].linkId = "sp-101"
* item[=].text = "What is your date of birth?"
* item[=].type = #date

* item[+].linkId = "sp-102"
* item[=].text = "What is your country of birth?"
* item[=].type = #code

* item[+].linkId = "sp-103"
* item[=].text = "What country do you currently reside in?"
* item[=].type = #code

* item[+].linkId = "sp-104"
* item[=].text = "What country did you travel to?"
* item[=].type = #code

* item[+].linkId = "sp-105"
* item[=].text = "When did the travel start?"
* item[=].type = #date

* item[+].linkId = "sp-106"
* item[=].text = "When did the travel end?"
* item[=].type = #date
```

Soft indexing approach:

- [+] → next item in array
- [=] → last referenced item in the array
- Start an empty array with [+] or [0] or implicit index 0

```
* item[+].linkId = "sp-108"
* item[=].text = "When state do you currently reside in?"
* item[=].type = #code
```

Advantages of soft indexing:

- No need to count (counting is hard!)
- Easily add/remove/move items
- Copy/paste and RuleSet friendly

Parameterized RuleSets (a.k.a. Macros)

```
RuleSet: name(parameter1, parameter2, parameter3...)
* rule1
* rule2
// More rules
```

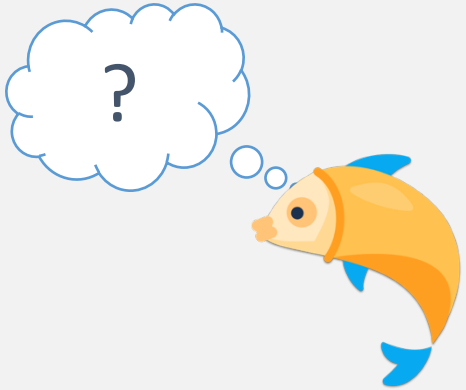
```
RuleSet: Context(path)
* ^context[+].type = #element
* ^context[=].expression = "{path}"

Extension: OrganizationPreferredContact
* insert Context(Organization.contact)
* value[x] only boolean
```

```
Extension: OrganizationPreferredContact
* ^context[+].type = #element
* ^context[=].expression = "Organization.contact"
* value[x] only boolean
```

- **Defining parameterized RuleSets**
  - Use the same **RuleSet** keyword as normal RuleSets
  - Follow the name w/ list of parameter names in parentheses
  - Wrap parameter name in curly braces to use its value in rules
- **Inserting parameterized RuleSets**
  - Use the same **insert** keyword as normal insert rules
  - Follow the name w/ list of parameter values in parentheses
  - Parameter values are inserted as text strings (nothing fancy!)

CapabilityStatement Example

```
// MeasureReport requirements
* rest.resource[0].type = #MeasureReport
* rest.resource[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].extension[0].valueCode = #SHALL
* rest.resource[0].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureReport"
* rest.resource[0].supportedProfile[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].supportedProfile[0].extension[0].valueCode = #SHALL
* rest.resource[0].interaction[0].code = #create
* rest.resource[0].interaction[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].interaction[0].extension[0].valueCode = #SHALL
* rest.resource[0].interaction[1].code = #update
* rest.resource[0].interaction[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].interaction[1].extension[0].valueCode = #SHALL
// Measure requirements
* rest.resource[1].type = #Measure
* rest.resource[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].extension[0].valueCode = #SHALL
* rest.resource[1].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasure"
* rest.resource[1].supportedProfile[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].supportedProfile[0].extension[0].valueCode = #SHOULD
* rest.resource[1].supportedProfile[1] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureStratifier"
* rest.resource[1].supportedProfile[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].supportedProfile[1].extension[0].valueCode = #SHOULD
* rest.resource[1].interaction[0].code = #create
* rest.resource[1].interaction[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].interaction[0].extension[0].valueCode = #SHOULD
* rest.resource[1].interaction[1].code = #update
* rest.resource[1].interaction[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].interaction[1].extension[0].valueCode = #SHOULD
```



Loosely based on https://build.fhir.org/ig/HL7/fhir-saner/

CapabilityStatement Example: Soft Indexing & Aliases

```
// MeasureReport requirements
* rest.resource[0].type = #MeasureReport
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[=].valueCode = #SHALL
* rest.resource[=].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureReport"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHALL
* rest.resource[=].interaction[0].code = #create
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHALL
* rest.resource[=].interaction[+].code = #update
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHALL
// Measure requirements
* rest.resource[+].type = #Measure
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[=].valueCode = #SHALL
* rest.resource[=].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasure"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHOULD
* rest.resource[=].supportedProfile[+] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureStratifier"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHOULD
* rest.resource[=].interaction[0].code = #create
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHOULD
* rest.resource[=].interaction[+].code = #update
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHOULD
```

Loosely based on https://build.fhir.org/ig/HL7/fhir-saner/

CapabilityStatement Example: Parameterized RuleSets

```
RuleSet: SupportResource (resource, expectation)
* rest.resource[+].type = {resource}
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[0].valueCode = {expectation}

RuleSet: SupportProfile (profile, expectation)
* rest.resource[=].supportedProfile[+] = {profile}
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[0].valueCode = {expectation}

RuleSet: SupportInteraction (interaction, expectation)
* rest.resource[=].interaction[+].code = {interaction}
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[0].valueCode = {expectation}
```

```
// MeasureReport requirements
* insert SupportResource(#MeasureReport, #SHALL)
* insert SupportProfile("http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureReport", #SHALL)
* insert SupportInteraction(#create, #SHALL)
* insert SupportInteraction(#update, #SHALL)
```

Loosely based on https://build.fhir.org/ig/HL7/fhir-saner/

CapabilityStatement Example: Comparing Approaches

FSH STU1 Representation

```
Instance: TestCapabilityStatement1
InstanceOf: CapabilityStatement
Usage: #example
* status = #active
* date = "2020-12-18"
* kind = #requirements
* fhirVersion = #4.0.1
* format[0] = #json
* rest.mode = #server
// MeasureReport requirements
* rest.resource[0].type = #MeasureReport
* rest.resource[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].extension[0].valueCode = #SHALL
* rest.resource[0].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureReport"
* rest.resource[0].supportedProfile[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].supportedProfile[0].extension[0].valueCode = #SHALL
* rest.resource[0].interaction[0].code = #create
* rest.resource[0].interaction[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].interaction[0].extension[0].valueCode = #SHALL
* rest.resource[0].interaction[1].code = #update
* rest.resource[0].interaction[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[0].interaction[1].extension[0].valueCode = #SHALL
// Measure requirements
* rest.resource[1].type = #Measure
* rest.resource[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].extension[0].valueCode = #SHALL
* rest.resource[1].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasure"
* rest.resource[1].supportedProfile[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].supportedProfile[0].extension[0].valueCode = #SHOULD
* rest.resource[1].supportedProfile[1] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureStratifier"
* rest.resource[1].supportedProfile[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].supportedProfile[1].extension[0].valueCode = #SHOULD
* rest.resource[1].interaction[0].code = #create
* rest.resource[1].interaction[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].interaction[0].extension[0].valueCode = #SHOULD
* rest.resource[1].interaction[1].code = #update
* rest.resource[1].interaction[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[1].interaction[1].extension[0].valueCode = #SHOULD
// Location requirements
* rest.resource[2].type = #Location
* rest.resource[2].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[2].extension[0].valueCode = #SHALL
* rest.resource[2].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/saner-resource-location"
* rest.resource[2].supportedProfile[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[2].supportedProfile[0].extension[0].valueCode = #SHOULD
* rest.resource[2].interaction[0].code = #create
* rest.resource[2].interaction[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[2].interaction[0].extension[0].valueCode = #SHOULD
* rest.resource[2].interaction[1].code = #update
* rest.resource[2].interaction[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[2].interaction[1].extension[0].valueCode = #SHOULD
// QuestionnaireResponse requirements
* rest.resource[3].type = #QuestionnaireResponse
* rest.resource[3].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[3].extension[0].valueCode = #SHALL
* rest.resource[3].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/SanerQuestionnaireResponse"
* rest.resource[3].supportedProfile[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[3].supportedProfile[0].extension[0].valueCode = #SHALL
* rest.resource[3].interaction[0].code = #create
* rest.resource[3].interaction[0].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[3].interaction[0].extension[0].valueCode = #SHALL
* rest.resource[3].interaction[1].code = #update
* rest.resource[3].interaction[1].extension[0].url = "http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation"
* rest.resource[3].interaction[1].extension[0].valueCode = #SHALL
```

Loosely based on https://build.fhir.org/ig/HL7/fhir-saner/

Soft Indices and Aliases

```
Alias: $ExpExt = http://hl7.org/fhir/StructureDefinition/capabilitystatement-expectation

Instance: TestCapabilityStatement2
InstanceOf: CapabilityStatement
Usage: #example
* status = #active
* date = "2020-12-18"
* kind = #requirements
* fhirVersion = #4.0.1
* format[0] = #json
* rest.mode = #server
// MeasureReport requirements
* rest.resource[0].type = #MeasureReport
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[=].valueCode = #SHALL
* rest.resource[=].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureReport"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHALL
* rest.resource[=].interaction[0].code = #create
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHALL
* rest.resource[=].interaction[+].code = #update
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHALL
// Measure requirements
* rest.resource[+].type = #Measure
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[=].valueCode = #SHALL
* rest.resource[=].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasure"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHOULD
* rest.resource[=].supportedProfile[+] = "http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureStratifier"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHOULD
* rest.resource[=].interaction[0].code = #create
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHOULD
* rest.resource[=].interaction[+].code = #update
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHOULD
// Location requirements
* rest.resource[+].type = #Location
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[=].valueCode = #SHALL
* rest.resource[=].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/saner-resource-location"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHOULD
* rest.resource[=].interaction[0].code = #create
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHOULD
* rest.resource[=].interaction[+].code = #update
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHOULD
// QuestionnaireResponse requirements
* rest.resource[+].type = #QuestionnaireResponse
* rest.resource[=].extension[0].url = $ExpExt
* rest.resource[=].extension[=].valueCode = #SHALL
* rest.resource[=].supportedProfile[0] = "http://hl7.org/fhir/us/saner/StructureDefinition/SanerQuestionnaireResponse"
* rest.resource[=].supportedProfile[=].extension[0].url = $ExpExt
* rest.resource[=].supportedProfile[=].extension[=].valueCode = #SHALL
* rest.resource[=].interaction[0].code = #create
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHALL
* rest.resource[=].interaction[+].code = #update
* rest.resource[=].interaction[=].extension[0].url = $ExpExt
* rest.resource[=].interaction[=].extension[=].valueCode = #SHALL
```

Parameterized RuleSets

```
Instance: TestCapabilityStatement3
InstanceOf: CapabilityStatement
* status = #active
* date = "2020-12-18"
* kind = #requirements
* fhirVersion = #4.0.1
* format[0] = #json
* rest.mode = #server
// MeasureReport requirements
* insert SupportResource(#MeasureReport, #SHALL)
* insert SupportProfile("http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureReport", #SHALL)
* insert SupportInteraction(#create, #SHALL)
* insert SupportInteraction(#update, #SHALL)
// Measure requirements
* insert SupportResource(#Measure, #SHALL)
* insert SupportProfile("http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasure", #SHOULD)
* insert SupportProfile("http://hl7.org/fhir/us/saner/StructureDefinition/PublicHealthMeasureStratifier", #SHOULD)
* insert SupportInteraction(#create, #SHOULD)
* insert SupportInteraction(#update, #SHOULD)
// Location requirements
* insert SupportResource(#Location, #SHALL)
* insert SupportProfile("http://hl7.org/fhir/us/saner/StructureDefinition/saner-resource-location", #SHOULD)
* insert SupportInteraction(#create, #SHOULD)
* insert SupportInteraction(#update, #SHOULD)
// QuestionnaireResponse requirements
* insert SupportResource(#QuestionnaireResponse, #SHALL)
* insert SupportProfile("http://hl7.org/fhir/us/saner/StructureDefinition/SanerQuestionnaireResponse", #SHALL)
* insert SupportInteraction(#create, #SHALL)
* insert SupportInteraction(#update, #SHALL)
```

- Compact
- Consistent
- Easier to read
- Easier to write
- Fewer mistakes

Logical Models and Resources: Custom Content Structures

	Logical Models	Resources
Primary Use Case	Domain Analysis Models	Electronic Data Exchange
Recommended for	IG Authors	HL7 Work Groups
FHIR-conformant?	Yes	HL7 Resources Only
Supported by IG Publisher?	Yes	No
Allowed Parents	Logical Models, Complex Types	DomainResource, Resource
Default Parent (FSH)	Base (R5, backported to R4)	DomainResource

FSH Rules for Logical Models and Resources

- New Rule: AddElement Rule
- Familiar Rules: Binding, Cardinality, Flag, Insert, Obeys, and Type
  - Disallowed: Assignment and Contains (see Interpretation of ElementDefinition in different contexts)
- Logical models and resources cannot constrain elements inherited from their parent

Logical Models: HIVRecord Example

```
Logical: HIVRecord
Id: HIVRecord
Parent: Element
Title: "HIV Longitudinal Record Logical Model"
Description: "This is the logical model for the shared record for an HIV patient."
* identifier                    0..*  Identifier         "Unique business identifiers for the record"
* patientIdentifier             0..*  Identifier         "The patient's identifier"
* patientReference              0..1  Reference          "The patient (as a FHIR Reference)"
* testResults                   0..*  BackboneElement    "Patient's Test results"
  * results                     0..1  SimpleQuantity     "The results of the patient's tests"
  * testDate                    0..1  date               "The date of the patient's test"
  * samplingDate                0..1  date               "The date the samples were collected for the patient's current test"
* arvTreatment                  0..*  BackboneElement    "Antiretroviral treatment information"
  * courseOfTreatement          0..1  BackboneElement    "The current course of ARV treatment"
    * treatmentStartDate        0..1  date               "The starting date of the current course of ARV treatment"
    * treatment_loss_signs      0..1  boolean            "Treatment loss signs"
    * treatment_loss_signs_date 0..1  date               "Treatment loss signs - date"
    * treatmentEndDate          0..1  date               "The end date of the course of ARV treatme
* co-infections                 0..*  BackboneElement    "Other infections reported for the patient
  * prevention                  0..1  boolean            "Whether the patient has any tuberculosis
  * diagnosis                   0..1  BackboneElement    "The patient's concurrent diagnosis"
    * code                      0..1  CodeableConcept    "The patient's concurrent diagnosis"
    * period                    0..1  Period             "The onset for tuberculosis"
  * treatment                   0..*  CodeableReference "The patient's treatments  - should perhap
* death                         0..1  BackboneElement    "The death of the patient"
  * dateofDeath                 0..1  date               "The date of the patient's death"
  * causeofDeath                0..1  CodeableConcept    "The cause of the patient's death"
```

Yes, this does compile!

Name	Flags	Card.	Type	Description & Constraints
HIVRecord		0..*	Element	HIV case record
identifier		0..*	Identifier	Unique business identifiers for the record
patientIdentifier		0..*	Identifier	The patient's identifier
patientReference		0..1	Reference()	The patient (as a FHIR Reference)
testResults		0..*	BackboneElement	Patient's Test results
results		0..1	SimpleQuantity	The results of the patient's tests
testDate		0..1	date	The date of the patient's test
samplingDate		0..1	date	The date the samples were collected for the patient's current test
arvTreatment		0..*	BackboneElement	Antiretroviral treatment information
courseofTreatment		0..1	BackboneElement	The current course of ARV treatment
treatmentStartDate		0..1	date	The starting date of the current course of ARV treatment
treatment_loss_signs		0..1	boolean	Treatment loss signs
treatment_loss_signs_date		0..1	date	Treatment loss signs - date
treatmentEndDate		0..1	date	The end date of the course of ARV treatment if the current treament is ended
co-infections		0..*	BackboneElement	Other infections reported for the patient
prevention		0..1	boolean	Whether the patient has any tuberculosis prevention activity
diagnosis		0..1	BackboneElement	The patient's concurrent diagnosis
code		0..1	CodeableConcept	The patient's concurrent diagnosis
period		0..1	Period	The onset for tuberculosis
treatment		0..*	CodeableReference()	The patient's treatments - should perhaps be a different parent element?
death		0..1	BackboneElement	The death of the patient
dateofDeath		0..1	date	The date of the patient's death
causeofDeath		0..1	CodeableConcept	The cause of the patient's death

Adapted from: http://build.fhir.org/ig/openhie/hiv-ig/branches/master/StructureDefinition-model-hiv-record.html

Logical Models and Resources: AddElement Rule

```
* <element> {min}..{max} {flags} {datatype} "{short}" "{definition}"
```

```
* email 0..* string "The person's email addresses"
```

```
* preferredName[x] 0..1 SU string or HumanName "The person's preferred name" """
    Sometimes patients prefer to be called by a name other than their _formal_ name. This may be:
    * their nick name
    * their maiden name
    * etc.
    """
```

```
* serviceAnimal 0..* BackboneElement "Service animals" "Animals trained to assist the person by performing certain tasks."
* serviceAnimal.name 0..1 string "Name of service animal" "The name by which the service animal responds."
* serviceAnimal.breed 1..* CodeableConcept "Breed of service animal" "The dominant breed or breeds of the service animal."
* serviceAnimal.startDate 0..1 date "Date the service animal began work" "When the service animal began working for the person."
```

Looks familiar, right? Well… almost. *Can you spot the difference?*

Name	Flags	Card.	Type	Description & Constraints
Patient	N		DomainResource	Information about an individual or animal receiving health care services Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	An identifier for this patient
active	?! Σ	0..1	boolean	Whether this patient's record is in active use

FSH STU1 Path Syntax: The ~~Problem~~ Annoyance

Nested elements require redundant paths and result in high text density

```
Logical: HIVRecord
Id: HIVRecord
Parent: Element
Title: "HIV Longitudinal Record Logical Model"
Description: "This is the logical model for the shared record for an HIV patient."
* identifier 0..* Identifier "Unique business identifiers for the record"
* patientIdentifier 0..* Identifier "The patient's identifier"
* patientReference 0..1 Reference "The patient (as a FHIR Reference)"
* testResults 0..* BackboneElement "Patient's Test results"
* testResults.results 0..1 SimpleQuantity "The results of the patient's tests"
* testResults.testDate 0..1 date "The date of the patient's test"
* testResults.samplingDate 0..1 date "The date the samples were collected for the patient's current test"
* arvTreatment 0..* BackboneElement "Antiretroviral treatment information"
* arvTreatment.courseOfTreatement 0..1 BackboneElement "The current course of ARV treatment"
* arvTreatment.courseOfTreatement.treatmentStartDate 0..1 date "The starting date of the current course of ARV treatment"
* arvTreatment.courseOfTreatement.treatment_loss_signs 0..1 boolean "Treatment loss signs"
* arvTreatment.courseOfTreatement.treatment_loss_signs_date 0..1 date "Treatment loss signs - date"
* arvTreatment.courseOfTreatement.treatmentEndDate 0..1 date "The end date of the course of ARV treatment if the current treament ended"
* co-infections 0..* BackboneElement "Other infections reported for the patient"
* co-infections.prevention 0..1 boolean "Whether the patient has any tuberculosis prevention activity"
* co-infections.diagnosis 0..1 BackboneElement "The patient's concurrent diagnosis"
* co-infections.diagnosis.code 0..1 CodeableConcept "The patient's concurrent diagnosis"
* co-infections.diagnosis.period 0..1 Period "The onset for tuberculosis"
* co-infections.treatment 0..* CodeableReference "The patient's treatments  - should perhaps be a different parent element?"
* death 0..1 BackboneElement "The death of the patient"
* death.dateofDeath 0..1 date "The date of the patient's death"
* death.causeofDeath 0..1 CodeableConcept "The cause of the patient's death"
```

Adapted from: http://build.fhir.org/ig/openhie/hiv-ig/branches/master/StructureDefinition-model-hiv-record.html

Indent Rules: A Sensible Way to Represent Path Structure

Indent two spaces to prepend the previous less-indented rule's path

```
Logical: HIVRecord
Id: HIVRecord
Parent: Element
Title: "HIV Longitudinal Record Logical Model"
Description: "This is the logical model for the shared record for an HIV patient."
* identifier 0..* Identifier "Unique business identifiers for the record"
* patientIdentifier 0..* Identifier "The patient's identifier"
* patientReference 0..1 Reference "The patient (as a FHIR Reference)"
* testResults 0..* BackboneElement "Patient's Test results"
  * results 0..1 SimpleQuantity "The results of the patient's tests"
  * testDate 0..1 date "The date of the patient's test"
  * samplingDate 0..1 date "The date the samples were collected for the patient's current test"
* arvTreatment 0..* BackboneElement "Antiretroviral treatment information"
  * courseOfTreatement 0..1 BackboneElement "The current course of ARV treatment"
    * treatmentStartDate 0..1 date "The starting date of the current course of ARV treatment"
    * treatment_loss_signs 0..1 boolean "Treatment loss signs"
    * treatment_loss_signs_date 0..1 date "Treatment loss signs - date"
    * treatmentEndDate 0..1 date "The end date of the course of ARV treatment if the current treament ended"
* co-infections 0..* BackboneElement "Other infections reported for the patient"
  * prevention 0..1 boolean "Whether the patient has any tuberculosis prevention activity"
  * diagnosis 0..1 BackboneElement "The patient's concurrent diagnosis"
    * code 0..1 CodeableConcept "The patient's concurrent diagnosis"
    * period 0..1 Period "The onset for tuberculosis"
  * treatment 0..* CodeableReference "The patient's treatments  - should perhaps be a different parent element?"
* death 0..1 BackboneElement "The death of the patient"
  * dateofDeath 0..1 date "The date of the patient's death"
  * causeofDeath 0..1 CodeableConcept "The cause of the patient's death"
```

Adapted from: http://build.fhir.org/ig/openhie/hiv-ig/branches/master/StructureDefinition-model-hiv-record.html

Indent rules work in:

- Profiles
- Extensions
- Logical Models
- Resources
- Mappings
- Instances
- Code Systems *(stay tuned)*

With:

- Path-based rules
- New "path rule"
- Concept rules *(stay tuned)*

Example Custom Resource and Instance: EmergencyVehicle

```
Resource:       EmergencyVehicle
Title:          "Emergency Vehicle"
Description:    "An emergency vehicle, such as an ambulance or fire truck."
* identifier 0..* SU Identifier
    "Identifier(s) of the vehicle"
    "Vehicle identifiers may include VINs and serial numbers."
* make 0..1 SU Coding
    "The vehicle make"
    "The vehicle make, e.g., Chevrolet."
* make from EmergencyVehicleMake (extensible)
* model 0..1 SU Coding
    "The vehicle model"
    "The vehicle model, e.g., G4500."
* model from EmergencyVehicleModel (extensible)
* year 0..1 SU positiveInt
    "Year of manufacture"
    "The year the vehicle was manufactured"
* servicePeriod 0..1 Period
    "When the vehicle was in service"
    "Start date and end date (if applicable) when the vehicle operated."
* operator 0..* Reference(Organization or Practitioner or PractitionerRole)
    "The operator"
    "The organization or persons repsonsible for operating the vehicle"
* device 0..* Reference(Device)
    "Devices on board"
    "Devices on board the vehicle."
```

```
{
  "resourceType": "EmergencyVehicle",
  "id": "Vehicle258",
  "identifier": [{
    "value": "258",
    "system": "http://acme.org/vehicle/identifiers"
  }],
  "make": {
    "code": "Chevrolet",
    "system": "http://devdays.com/fsh/CodeSystem/EVMake"
  },
  "model": {
    "code": "G4500",
    "system": "http://devdays.com/fsh/CodeSystem/EVModel"
  },
  "year": 2018,
  "servicePeriod": {
    "start": "2018-08-12"
  },
  "operator": [{
    "reference": "Organization/82793"
  }],
  "device": [
    { "reference": "Device/89042537" },
    { "reference": "Device/23490853" },
    { "reference": "Device/58972589" }
  ]
}
```

Defining Code Systems in STU1

Defining URL:	urn:oid:2.16.840.1.113883.6.238
Version:	3.1.1
Name:	RaceAndEthnicityCDC
Title:	Race & Ethnicity - CDC
Status:	Active
Content:	All the concepts defined by the code system are included in the code system resource
Definition:	The U.S. Centers for Disease Control and Prevention (CDC) has prepared a code set for use in codingrace and ethnicity data. This code set is based on current federal standards for classifying data onrace and ethnicity, specifically the minimum race and ethnicity categories defined by the U.S. Office ofManagement and Budget (OMB) and a more detailed set of race and ethnicity categories maintainedby the U.S. Bureau of the Census (BC). The main purpose of the code set is to facilitate use of federalstandards for classifying data on race and ethnicity when these data are exchanged, stored, retrieved,or analyzed in electronic form. At the same time, the code set can be applied to paper-based recordsystems to the extent that these systems are used to collect, maintain, and report data on race andethnicity in accordance with current federal standards. Source: Race and Ethnicity Code Set Version 1.0.
Publisher:	HL7 US Realm Steering Committee
Content Mode:	Complete
Source Resource:	XML / JSON / Turtle

Properties

Code	URL	Description	Type
abstract		True if an element is considered 'abstract' - in other words, the code is not for use as a real concept	boolean

This code system urn:oid:2.16.840.1.113883.6.238 defines the following codes:

Lvl	Code	Display	Definition
1	1000-9	Race	Race, Note that this is an abstract 'grouping' concept and not for use as a real concept
2	1002-5	American Indian or Alaska Native	American Indian or Alaska Native
3	1004-1	American Indian	American Indian
3	1735-0	Alaska Native	Alaska Native
3	1006-6	Abenaki	Abenaki
3	1008-2	Algonquian	Algonquian
3	1010-8	Apache	Apache
3	1021-5	Arapaho	Arapaho
3	1026-4	Arikara	Arikara
3	1028-0	Assiniboine	Assiniboine

Top-level metadata
SUPPORTED

Property definition
SUPPORTED

Property use
NOT SUPPORTED

Hierarchical codes
NOT SUPPORTED

http://www.hl7.org/fhir/us/core/CodeSystem-cdcrec.html

Code systems with hierarchical codes and/or code-specific metadata (property, designation) must be defined as FSH Instances

```
Instance: cdcrec
InstanceOf: CodeSystem
Usage: #definition
* url = "urn:oid:2.16.840.1.113883.6.238"
* version = "3.1.1"
* name = "RaceAndEthnicityCDC"
* title = "Race & Ethnicity - CDC"
* status = #active
* publisher = "HL7 US Realm Steering Committee"
* description = " The U.S. Centers for Disease Control and Prevention (CDC) has prepared a code set for use in coding
* hierarchyMeaning = #is-a
* content = #complete
* property.code = #abstract
* property.description = "True if an element is considered 'abstract' - in other words, the code is not for use as a
* property.type = #boolean
* concept[0].code = #1000-9
* concept[=].display = "Race"
* concept[=].definition = "Race, Note that this is an abstract 'grouping' concept and not for use as a real concept"
* concept[=].property.code = #abstract
* concept[=].property.valueBoolean = true
* concept[=].concept[0].code = #1002-5
* concept[=].concept[=].display = "American Indian or Alaska Native"
* concept[=].concept[=].definition = "American Indian or Alaska Native"
* concept[=].concept[=].concept[0].code = #1004-1
* concept[=].concept[=].concept[=].display = "American Indian"
* concept[=].concept[=].concept[=].definition = "American Indian"
* concept[=].concept[=].concept[+].code = #1735-0
* concept[=].concept[=].concept[=].display = "Alaska Native"
* concept[=].concept[=].concept[=].definition = "Alaska Native"
* concept[=].concept[=].concept[+].code = #1006-6
* concept[=].concept[=].concept[=].display = "Abenaki"
* concept[=].concept[=].concept[=].definition = "Abenaki"
* concept[=].concept[=].concept[+].code = #1008-2
* concept[=].concept[=].concept[=].display = "Algonquian"
* concept[=].concept[=].concept[=].definition = "Algonquian"
* concept[=].concept[=].concept[+].code = #1010-8
* concept[=].concept[=].concept[=].display = "Apache"
* concept[=].concept[=].concept[=].definition = "Apache"
* concept[=].concept[=].concept[+].code = #1021-5
* concept[=].concept[=].concept[=].display = "Arapaho"
* concept[=].concept[=].concept[=].definition = "Arapaho"
* concept[=].concept[=].concept[+].code = #1026-4
* concept[=].concept[=].concept[=].display = "Arikara"
* concept[=].concept[=].concept[=].definition = "Arikara"
* concept[=].concept[=].concept[+].code = #1028-0
* concept[=].concept[=].concept[=].display = "Assiniboine"
* concept[=].concept[=].concept[=].definition = "Assiniboine"
```

Defining Code Systems in FSH STU2

Top-level metadata
SUPPORTED

Property Definition
SUPPORTED

Property Use
SUPPORTED

Hierarchical codes
SUPPORTED

Concept caret rule

Concept hierarchy

```
CodeSystem: RaceAndEthnicityCDC
Id: cdcrec
Title: "Race & Ethnicity - CDC"
* ^hierarchyMeaning = #is-a
* ^property[0].code = #abstract
* ^property[=].type = #boolean
* ^property[=].description = "True if an element is considered 'abstract' - in other words, the code is not for use..."
* #1000-9 "Race" "Race, Note that this is an abstract 'grouping' concept and not for use as a real..."
* #1000-9 ^property.code = #abstract
* #1000-9 ^property.valueBoolean = true
* #1000-9 #1002-5 "American Indian or Alaska Native" "American Indian or Alaska Native"
* #1000-9 #1002-5 #1004-1 "American Indian" "American Indian"
* #1000-9 #1002-5 #1735-0 "Alaska Native" "Alaska Native"
// ...
* #1000-9 #2028-9 "Asian" "Asian"
* #1000-9 #2028-9 #2029-7 "Asian Indian" "Asian Indian"
* #1000-9 #2028-9 #2030-5 "Bangladeshi" "Bangladeshi"
// ...
* #1000-9 #2131-1 "Other Race" "Note that this term remains in the table for completeness, even though..."
* #2133-7 "Ethnicity" "Ethnicity Note that this is an abstract 'grouping' concept and not for use as a real..."
* #2133-7 ^property.code = #abstract
* #2133-7 ^property.valueBoolean = true
* #2133-7 #2135-2 "Hispanic or Latino" "Hispanic or Latino"
* #2133-7 #2135-2 #2137-8 "Spaniard" "Spaniard"
* #2133-7 #2135-2 #2148-5 "Mexican" "Mexican"
// ...
* #2133-7 #2186-5 "Not Hispanic or Latino" "Note that this term remains in the table for completeness, even though..."
```

Adapted from http://www.hl7.org/fhir/us/core/CodeSystem-cdcrec.html

Defining Code Systems in FSH STU2: Indent Paths

Top-level metadata
SUPPORTED

Property Definition
SUPPORTED

Property Use
SUPPORTED

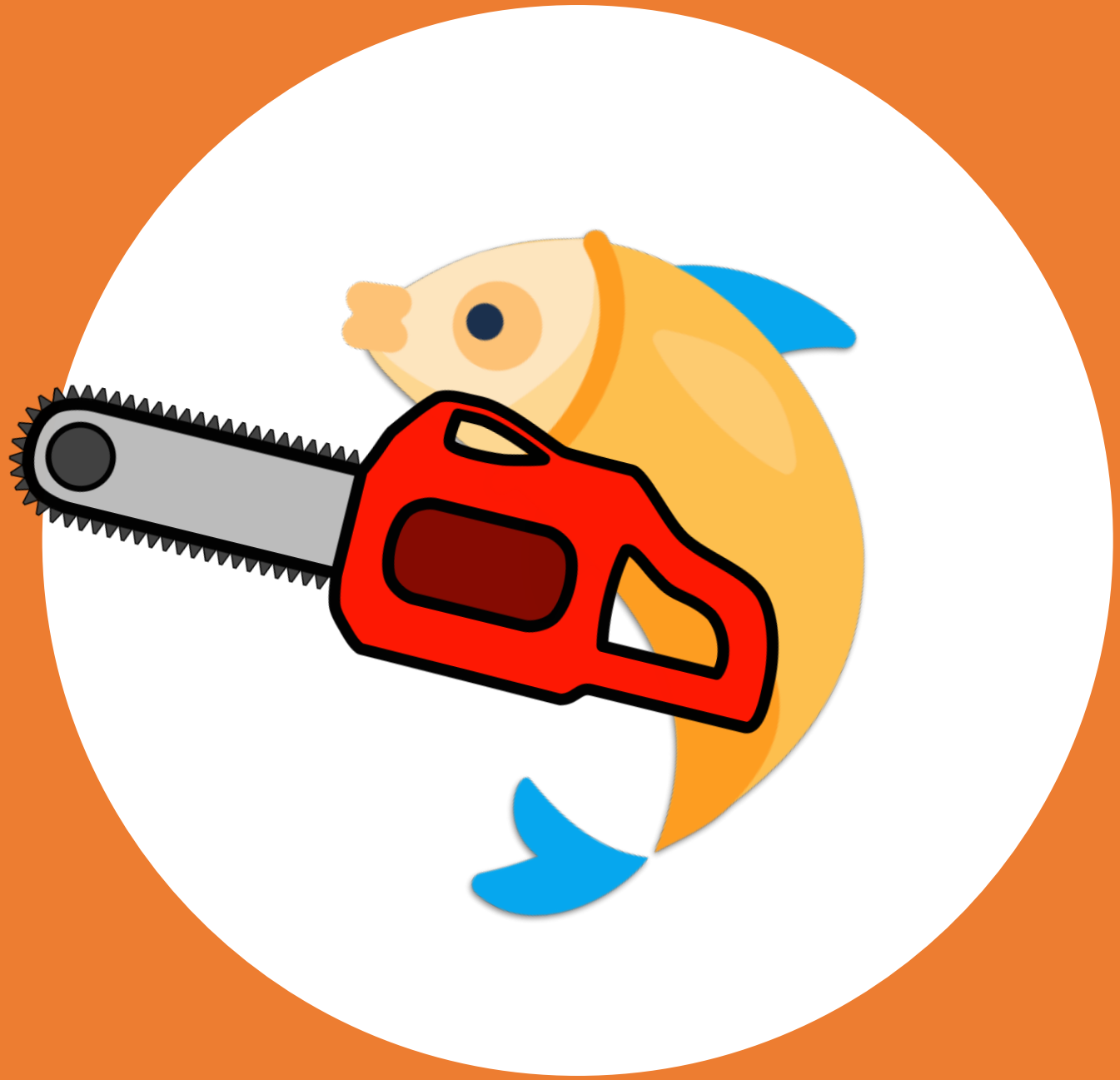
Hierarchical codes
SUPPORTED

Concept caret rule

3rd level code

```
CodeSystem: RaceAndEthnicityCDC
Id: cdcrec
Title: "Race & Ethnicity - CDC"
* ^hierarchyMeaning = #is-a
* ^property[0].code = #abstract
* ^property[=].type = #boolean
* ^property[=].description = "True if an element is considered 'abstract' - in other words, the code is not for use..."
* #1000-9 "Race" "Race, Note that this is an abstract 'grouping' concept and not for use as a real..."
  * ^property.code = #abstract
  * ^property.valueBoolean = true
  * #1002-5 "American Indian or Alaska Native" "American Indian or Alaska Native"
    * #1004-1 "American Indian" "American Indian"
    * #1735-0 "Alaska Native" "Alaska Native"
    // ...
  * #2028-9 "Asian" "Asian"
    * #2029-7 "Asian Indian" "Asian Indian"
    * #2030-5 "Bangladeshi" "Bangladeshi"
    // ...
  * #2131-1 "Other Race" "Note that this term remains in the table for completeness, even though..."
* #2133-7 "Ethnicity" "Ethnicity Note that this is an abstract 'grouping' concept and not for use as a real..."
  * ^property.code = #abstract
  * ^property.valueBoolean = true
  * #2135-2 "Hispanic or Latino" "Hispanic or Latino"
    * #2137-8 "Spaniard" "Spaniard"
    * #2148-5 "Mexican" "Mexican"
    // ...
  * #2186-5 "Not Hispanic or Latino" "Note that this term remains in the table for completeness, even though..."
```

Adapted from http://www.hl7.org/fhir/us/core/CodeSystem-cdcrec.html

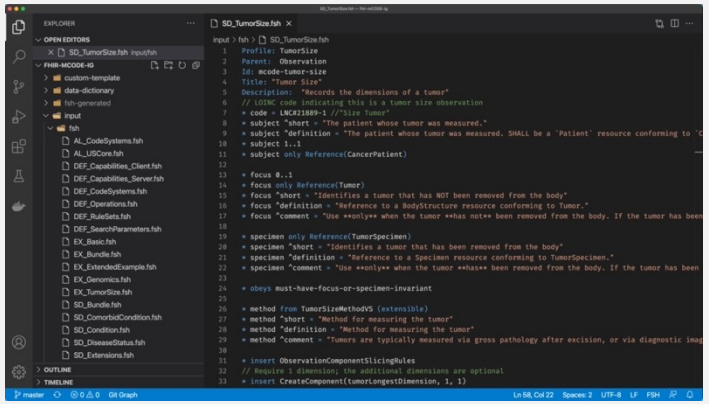


FSH Tools

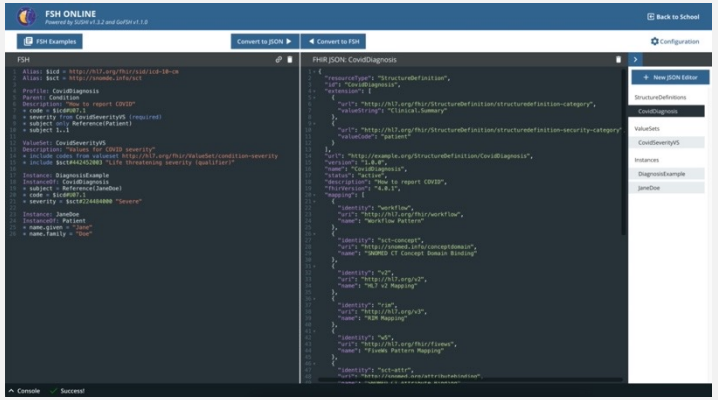
Chainsaw Henry Mühlpfordt / WikiMedia Commons: https://commons.wikimedia.org/wiki/File:Chainsaw_symbol_2010-02-16.svg

SUSHI

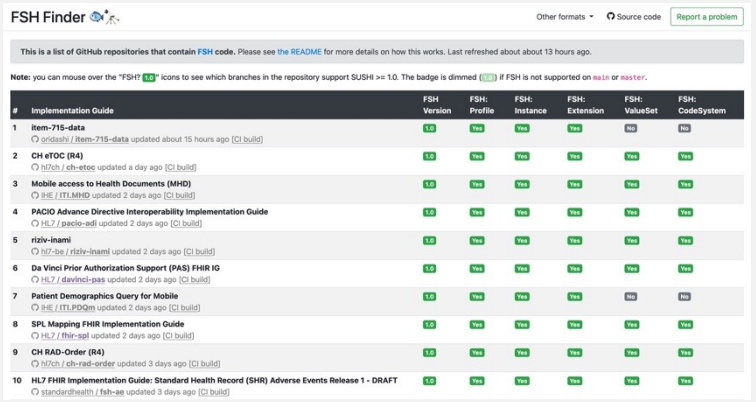
GoFSH



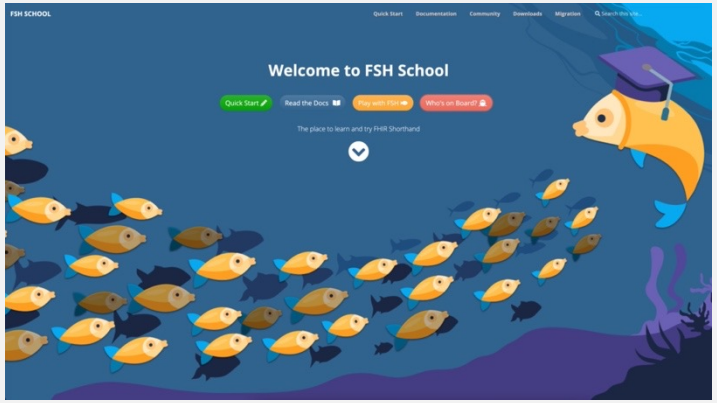
VS Code Extension



FSH Online



FSH Finder



FSH School

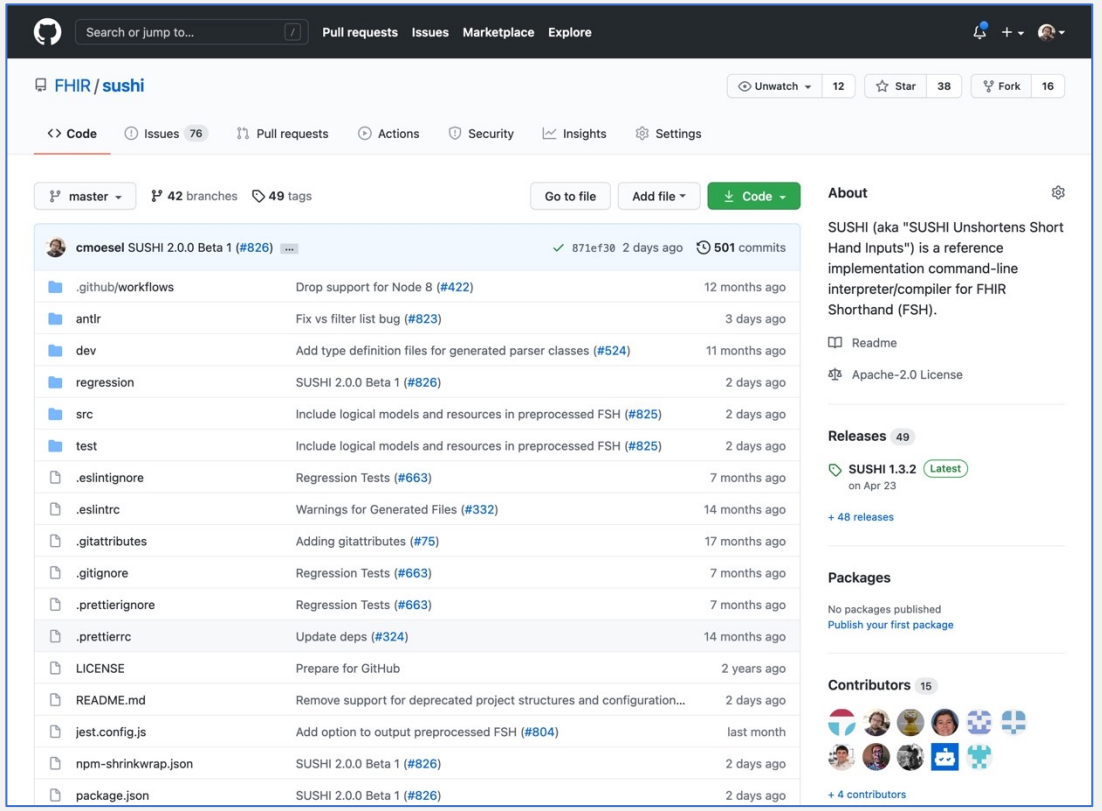
SUSHI platter by Dllu / WikiMedia Commons: https://commons.wikimedia.org/wiki/File:Grocery_store_sushi_from_Pittsburgh_2.jpg

Fishing boat by Kritzolena / WikiMedia Commons: https://commons.wikimedia.org/wiki/File:Fishing_boat_off_the_coast_of_Naxos.jpg

SUSHI: SUSHI Unshortens Shorthand Inputs

New! SUSHI 2.0.0-beta.1

- Logical Models & Resources
- Indent Paths
- Concept Hierarchy & Caret Rules
- Preprocessed FSH Output
- *Breaking Changes*
  - Space before * is now meaningful
  - Deprecated syntax not supported
  - Legacy project format not supported



https://github.com/FHIR/sushi

Install SUSHI Beta: `npm install -g fsh-sushi@2.0.0-beta.1`

SUSHI 2.0.0: Preprocessed FSH Output

```
sushi -p myproject
```

FSH in /input/fsh

```
Alias: CAT = http://hl7.org/fhir/ValueSet/observation-category

Profile: ObservationProfile
Parent: Observation
* insert Metadata
* category from CAT (required)

RuleSet: Metadata
* ^version = "1.2.3"
* ^publisher = "Example publisher"

Instance: PatientInstance
InstanceOf: Patient
* name
  * given[+] = "John"
  * given[+] = "Q"
  * family = "Patient"
```

Preprocessed FSH in /_preprocessed

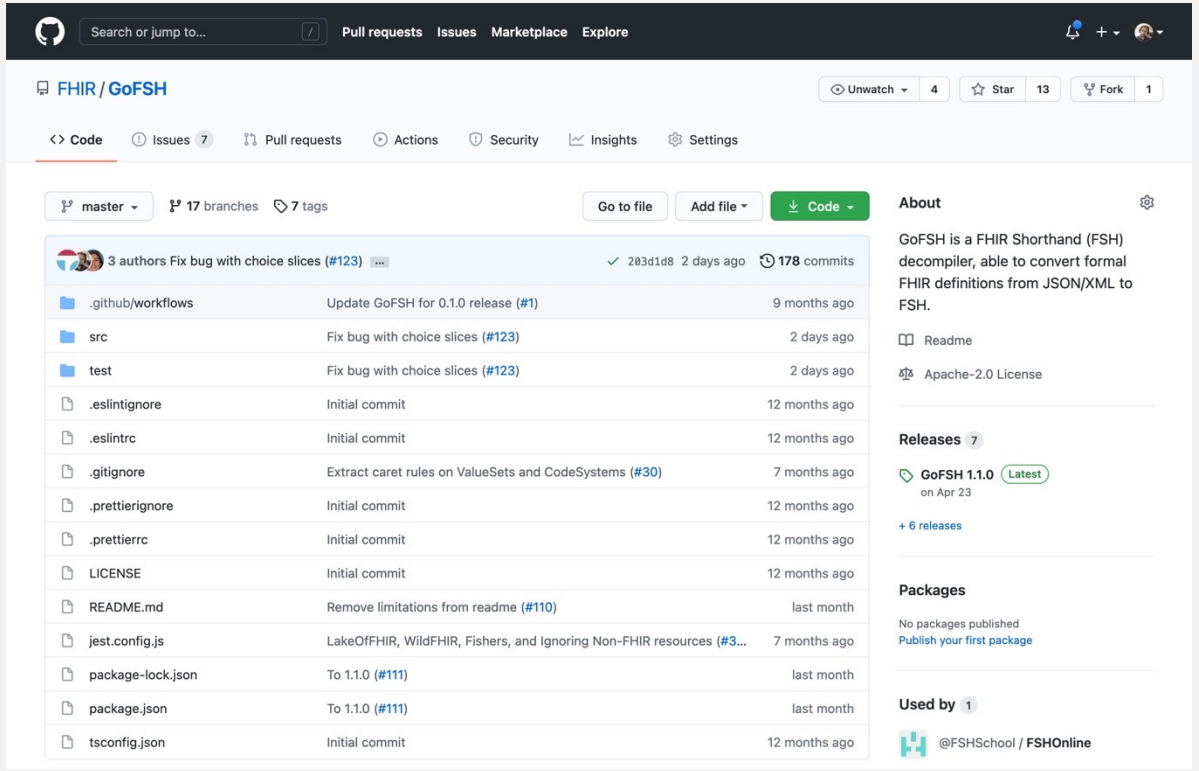
```
Alias: CAT = http://hl7.org/fhir/ValueSet/observation-category

// Originally defined on lines 3 - 6
Profile: ObservationProfile
Parent: Observation
Id: ObservationProfile
* ^version = "1.2.3"
* ^publisher = "Example publisher"
* category from http://hl7.org/fhir/ValueSet/observation-category (required)

// Originally defined on lines 12 - 17
Instance: PatientInstance
InstanceOf: Patient
Usage: #example
* name.given[0] = "John"
* name.given[1] = "Q"
* name.family = "Patient"
```

Resolved alias | Inserted RuleSet | Expanded paths | Explicit indices

GoFSH: Converts FHIR JSON/XML to FSH

GoFSH 1.x (Current Release)

- Command line interface
- Converts FHIR JSON/XML to FSH
- Multiple output formats
- Supports FSH STU1, plus
  - Soft Indexing
- Development *in progress* for:
  - Logical Models & Resources
  - Hierarchical CodeSystems
  - Concept Caret Rules
  - Indent Paths



https://github.com/FHIR/GoFSH

Install: `npm install -g gofsh`

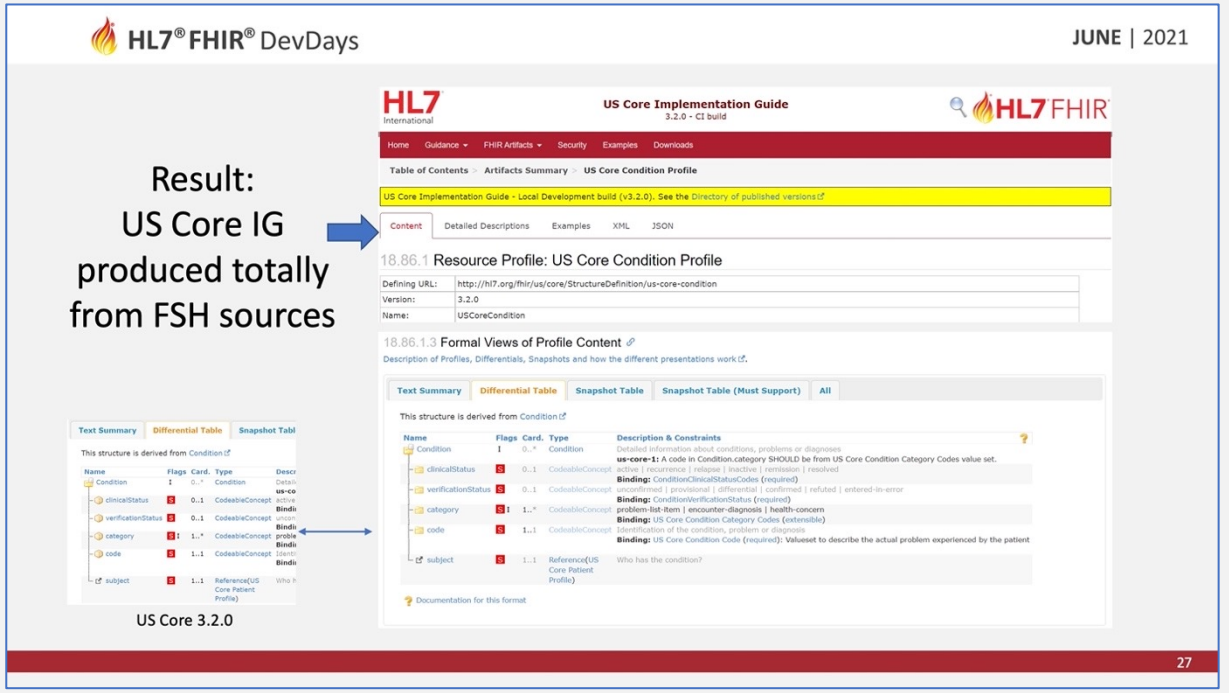
GoFSH: Converting US Core IG to FSH

Sound exciting? Check out:

Let's Build: Create an Implementation Guide with FHIR Shorthand

June 8 @ 4:15pm (time travel required)

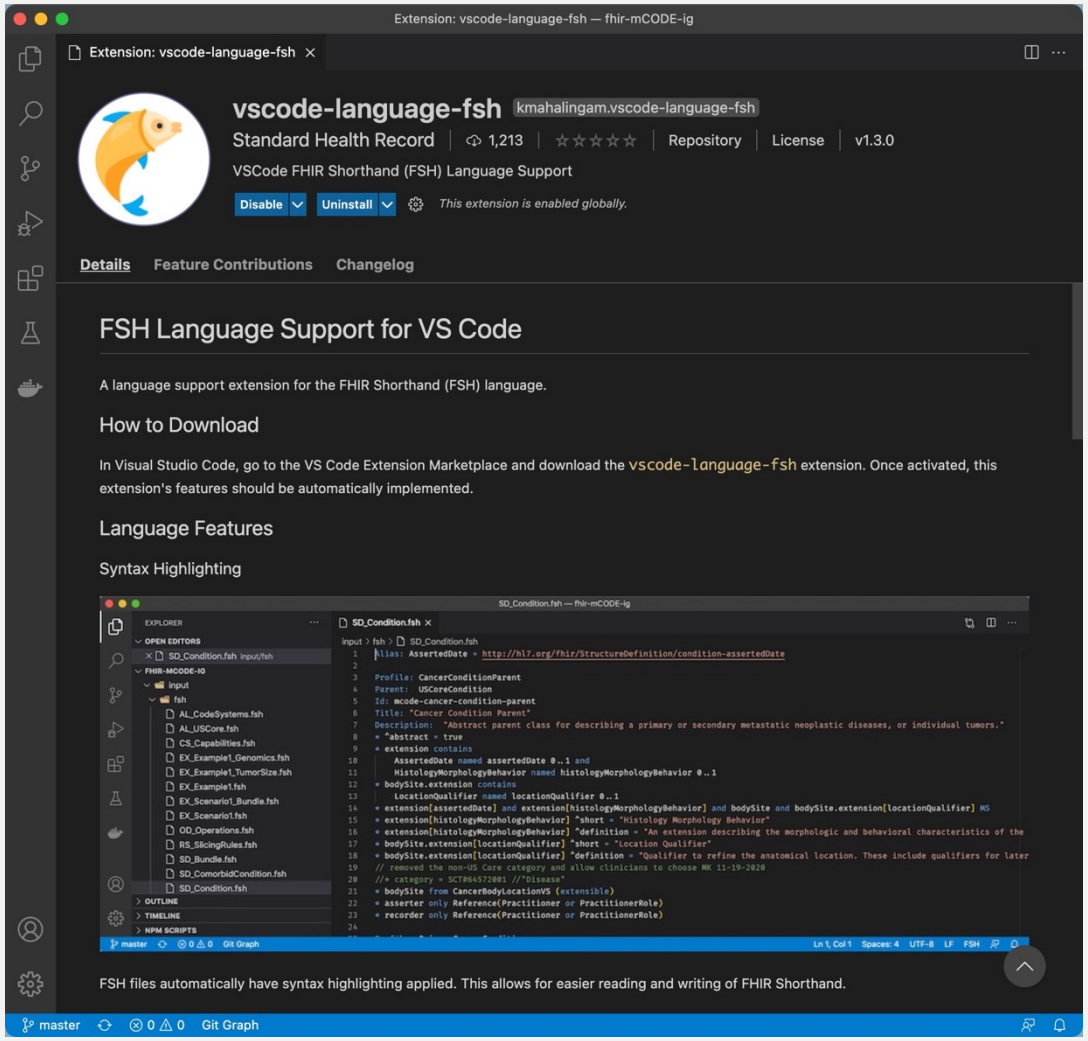
Spoiler Alert!



VS Code Extension: vscode-language-fsh

VS Code FSH Extension

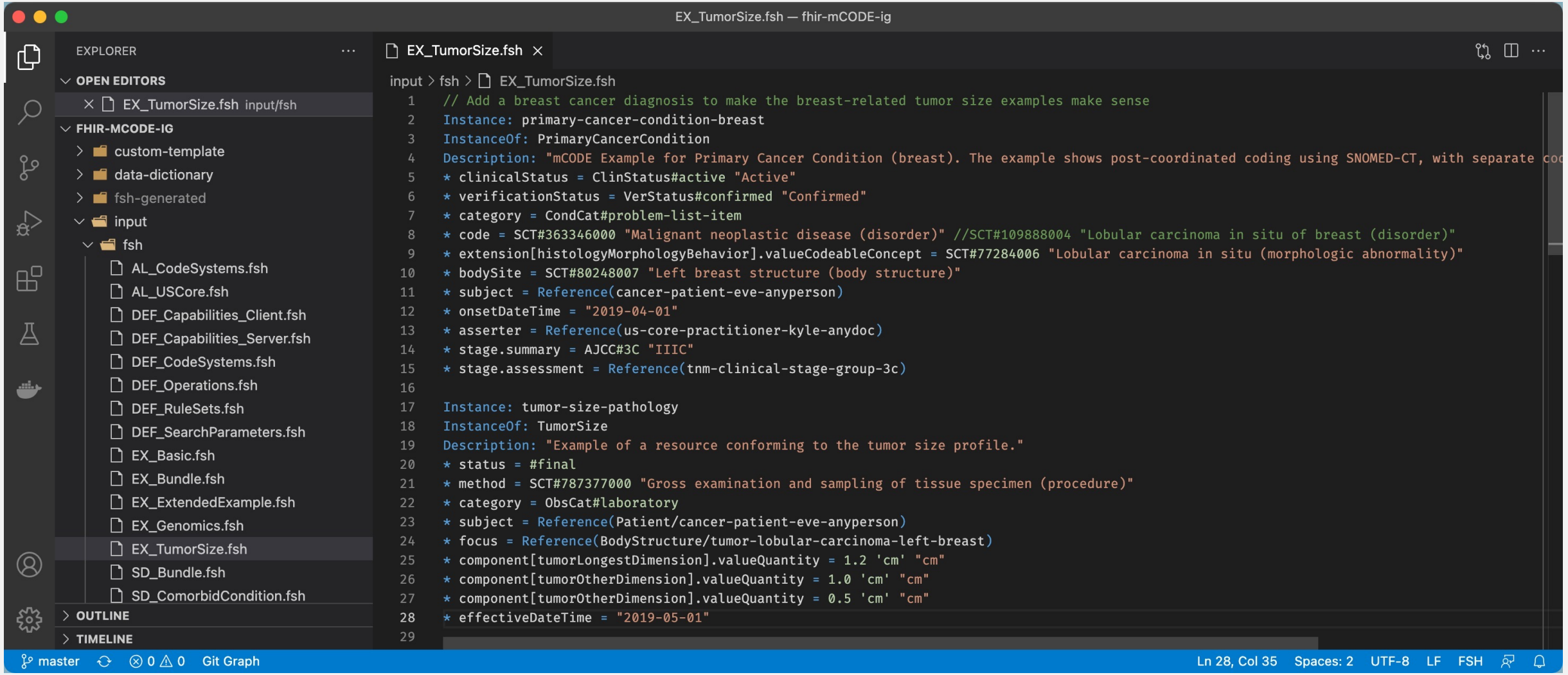
- Visual Studio Code Editor
- Syntax highlighting
- Snippets
- Go to definition
- Open FHIR documentation



Install:

- Open a .fsh file in VS Code, or
- Search “FSH” in marketplace
- Go to: https://bit.ly/3fUsIk7

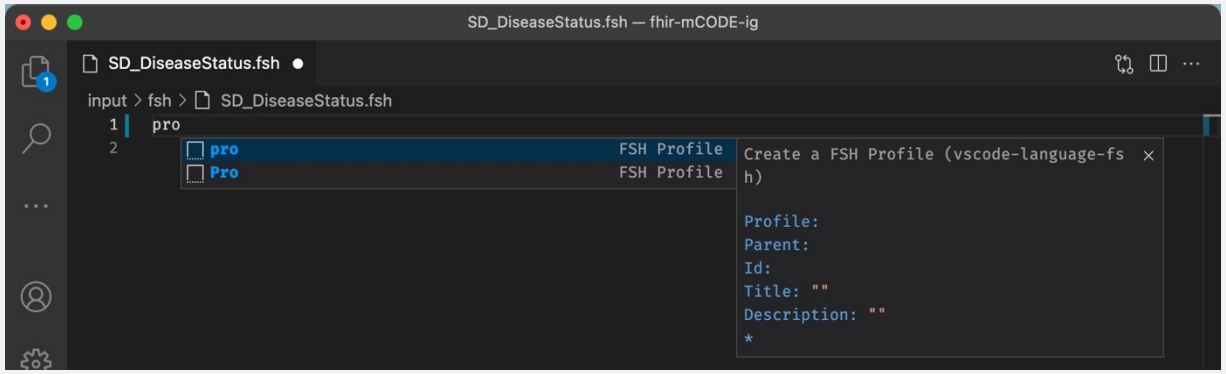
VS Code Extension: Syntax Highlighting



VS Code Extension: Snippets

1. Type a FSH trigger phrase*

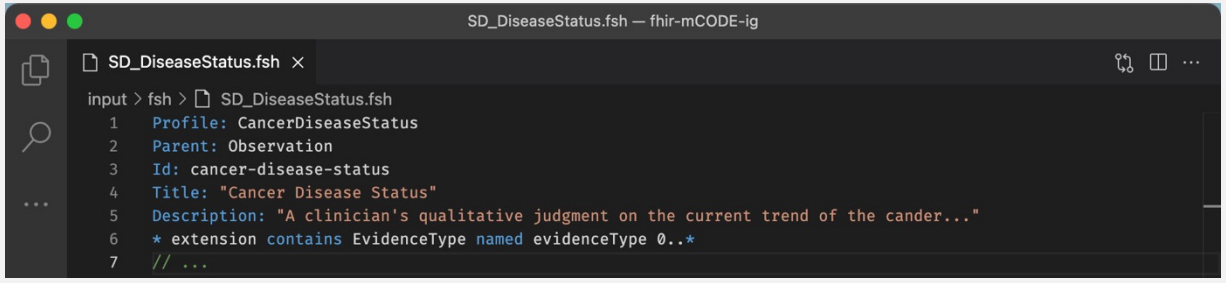
Trigger	FSH Item	Keywords
`pro`	Profile	Profile, Parent, Id (auto), Title (auto), Description
`ext`	Extension	Extension, Id (auto), Title (auto), Description
`vs`	ValueSet	ValueSet, Id (auto), Title (auto), Description
`cs`	CodeSystem	CodeSystem, Id (auto), Title (auto), Description
`inst`	Instance	Instance, InstanceOf, Usage (choice), Title (auto), Description



2. Hit <Enter> or <TAB> to start

- Use <TAB> to visit placeholders
- Bonus: Automatic id and title

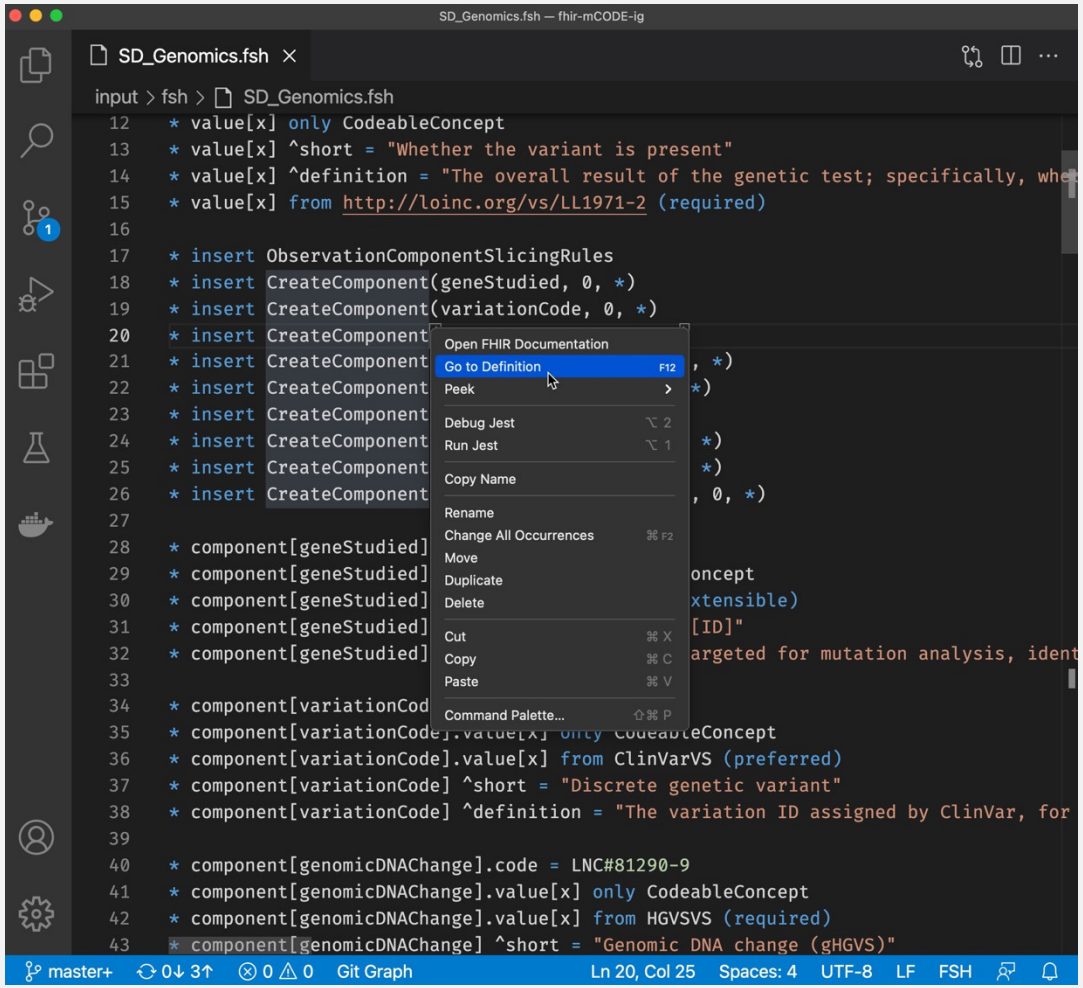
3. Start writing your rules

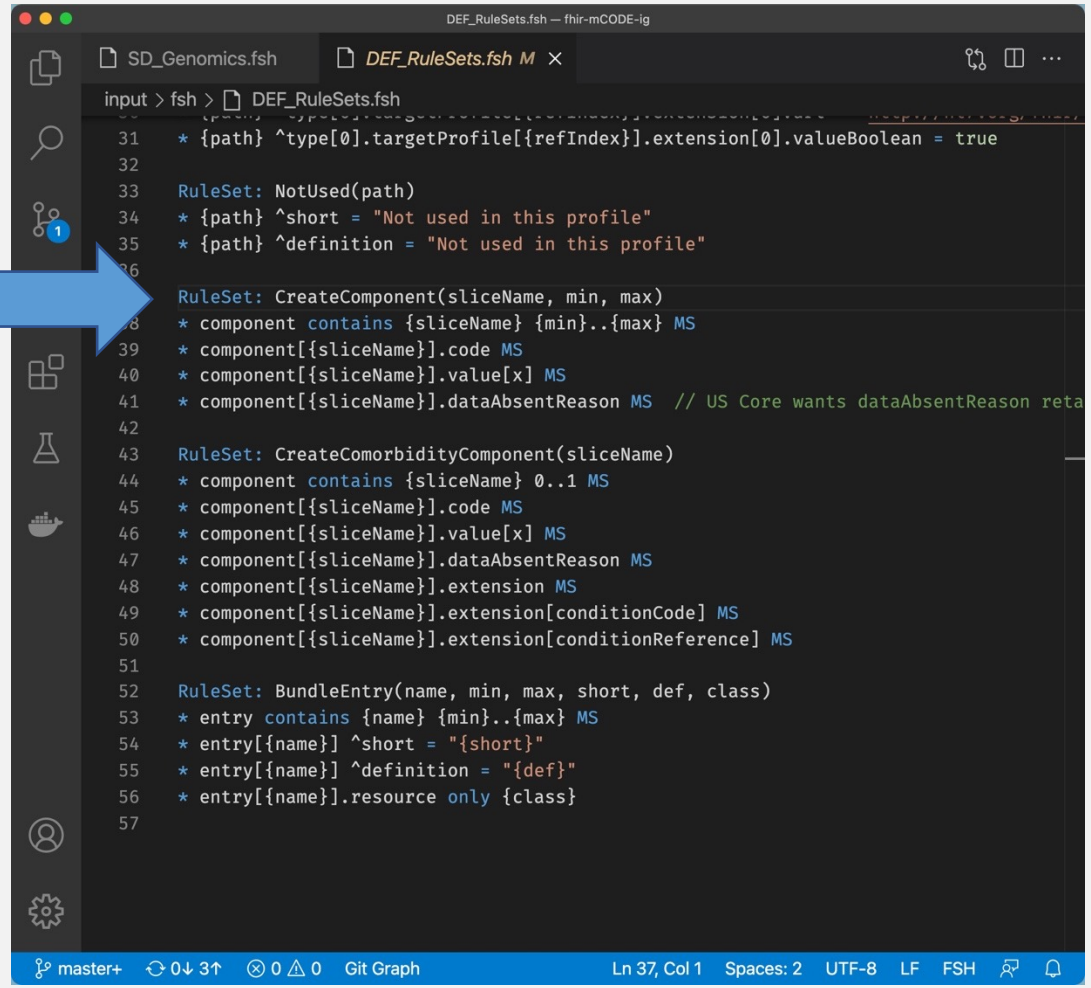


** Logical / Resource to be added soon.*

VS Code Extension: Go to Definition

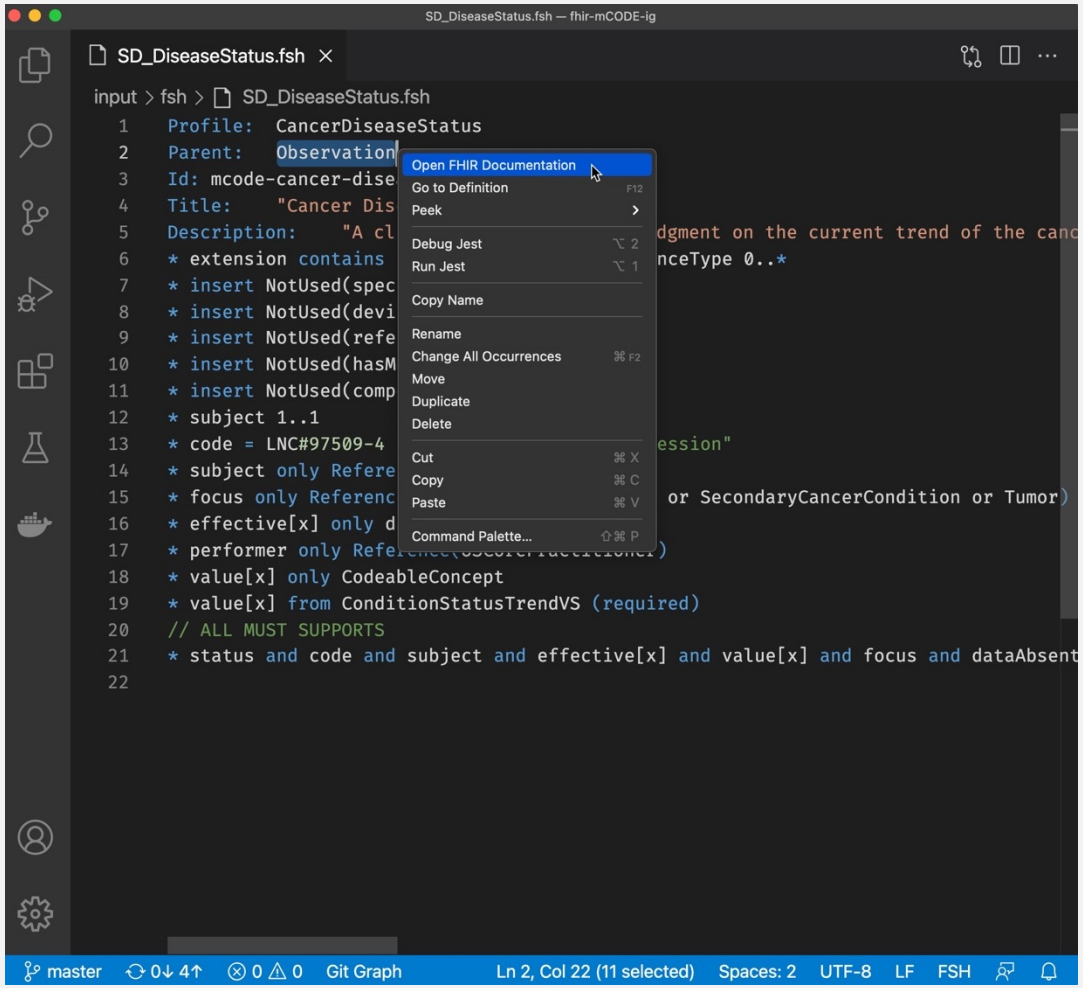
Right-click a FSH name and “Go to Definition” to see its definition

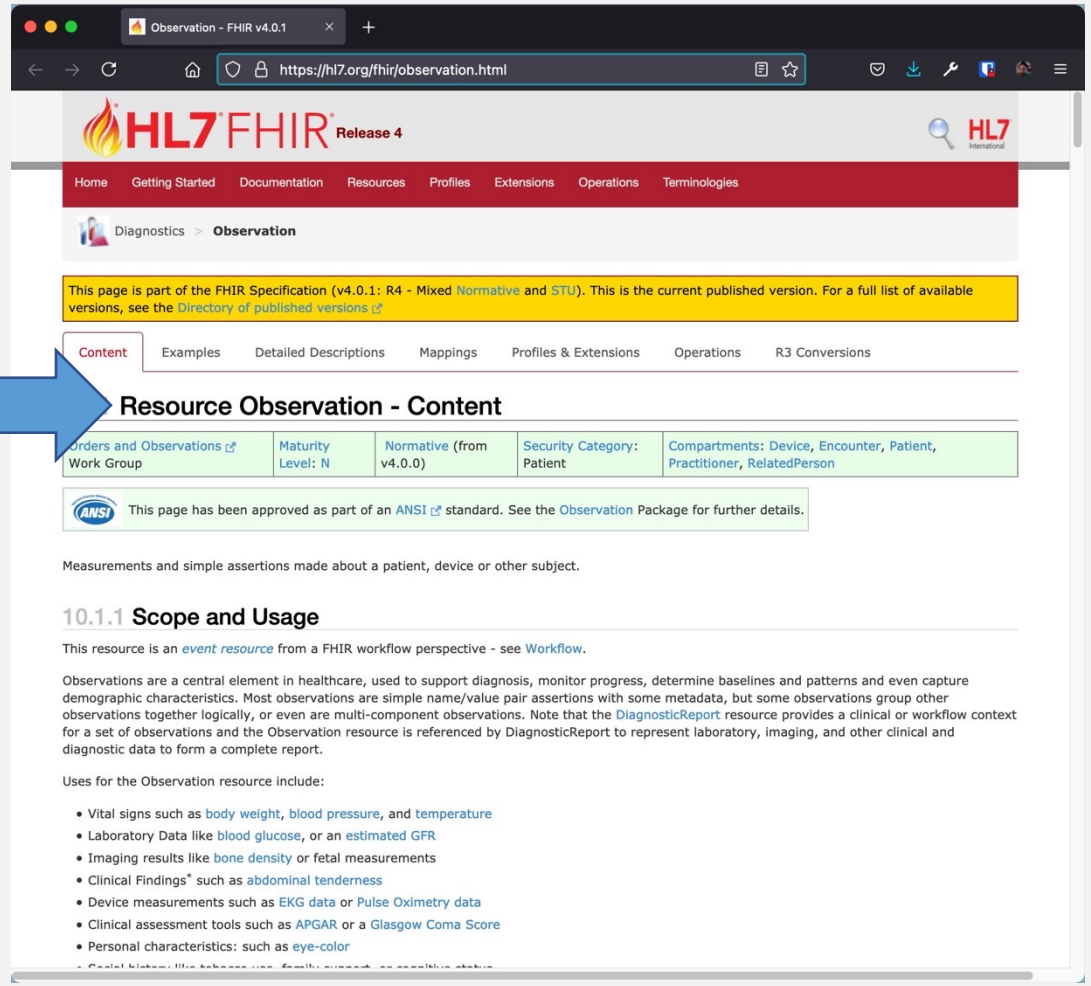




VS Code Extension: Go to FHIR Documentation

Right-click a FHIR name and “Go to FHIR Documentation” to see its definition





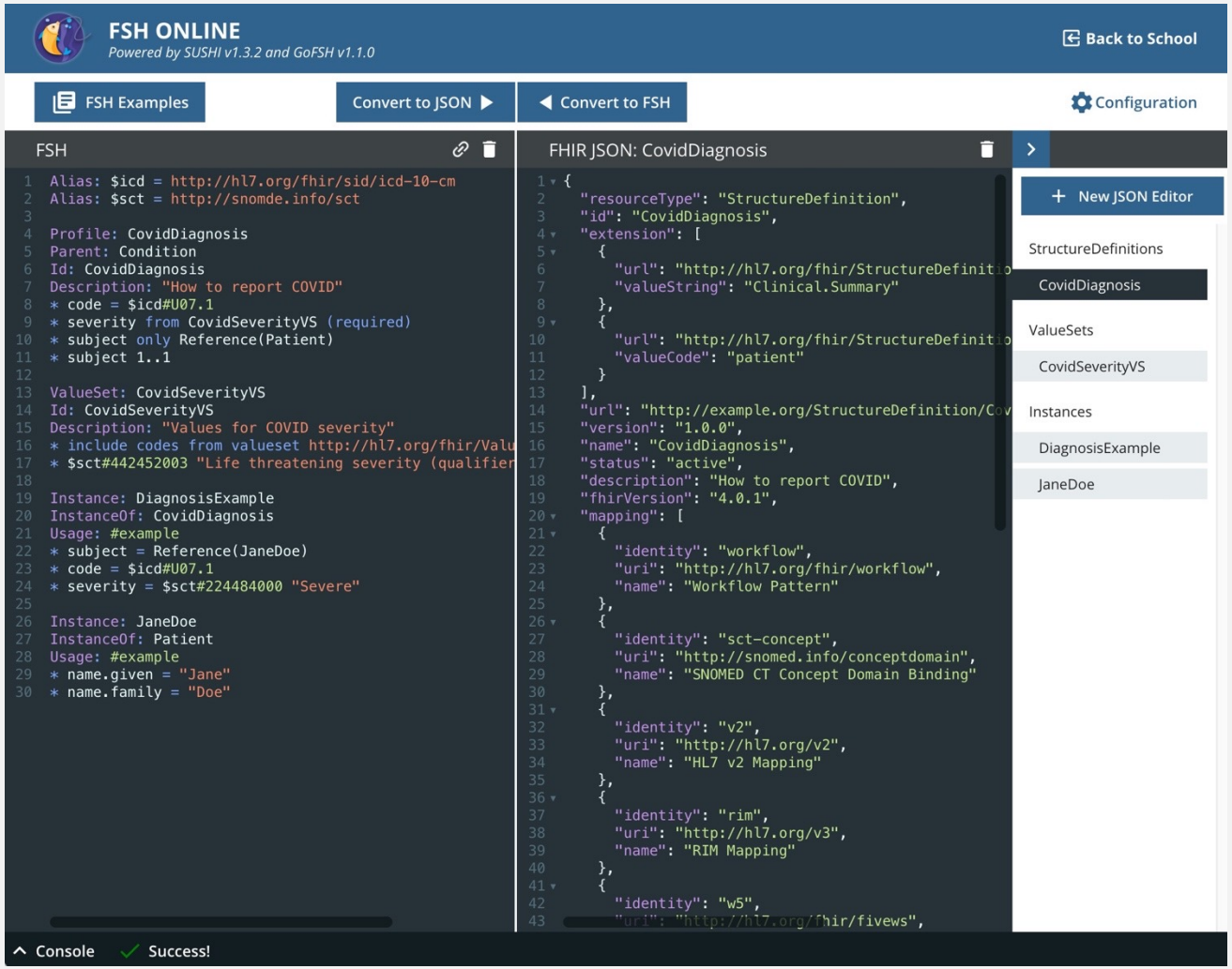
FSH Online

FSH Online Features

- Convert FSH to FHIR on the web
- Convert FHIR to FSH on the web
- Browse and Copy FSH examples
- Share FSH definitions w/ others

Recommended for:

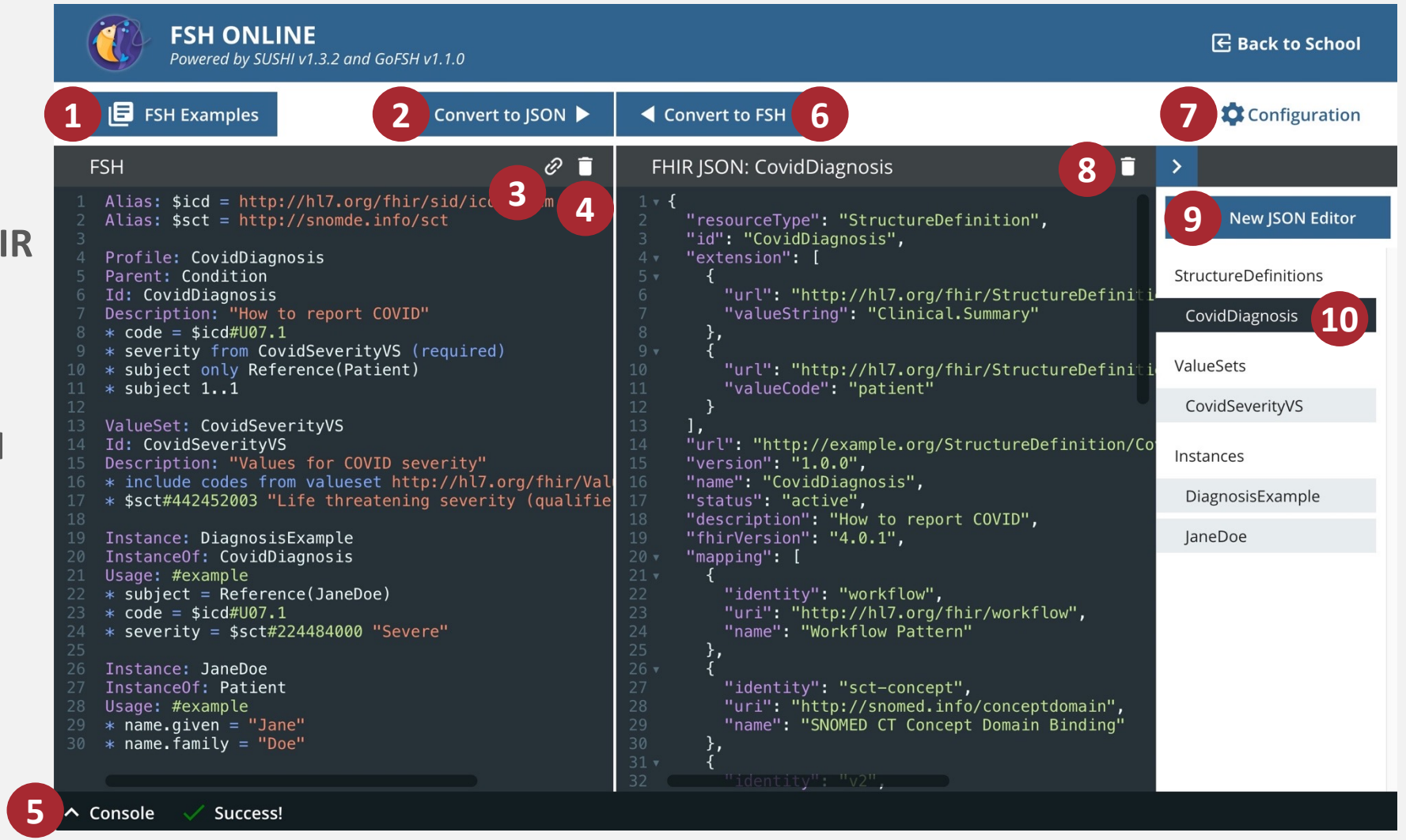
- Quickly trying some FSH out
- Quickly converting FHIR to FSH
- Debugging FSH definitions
- Reporting errors (share your link)



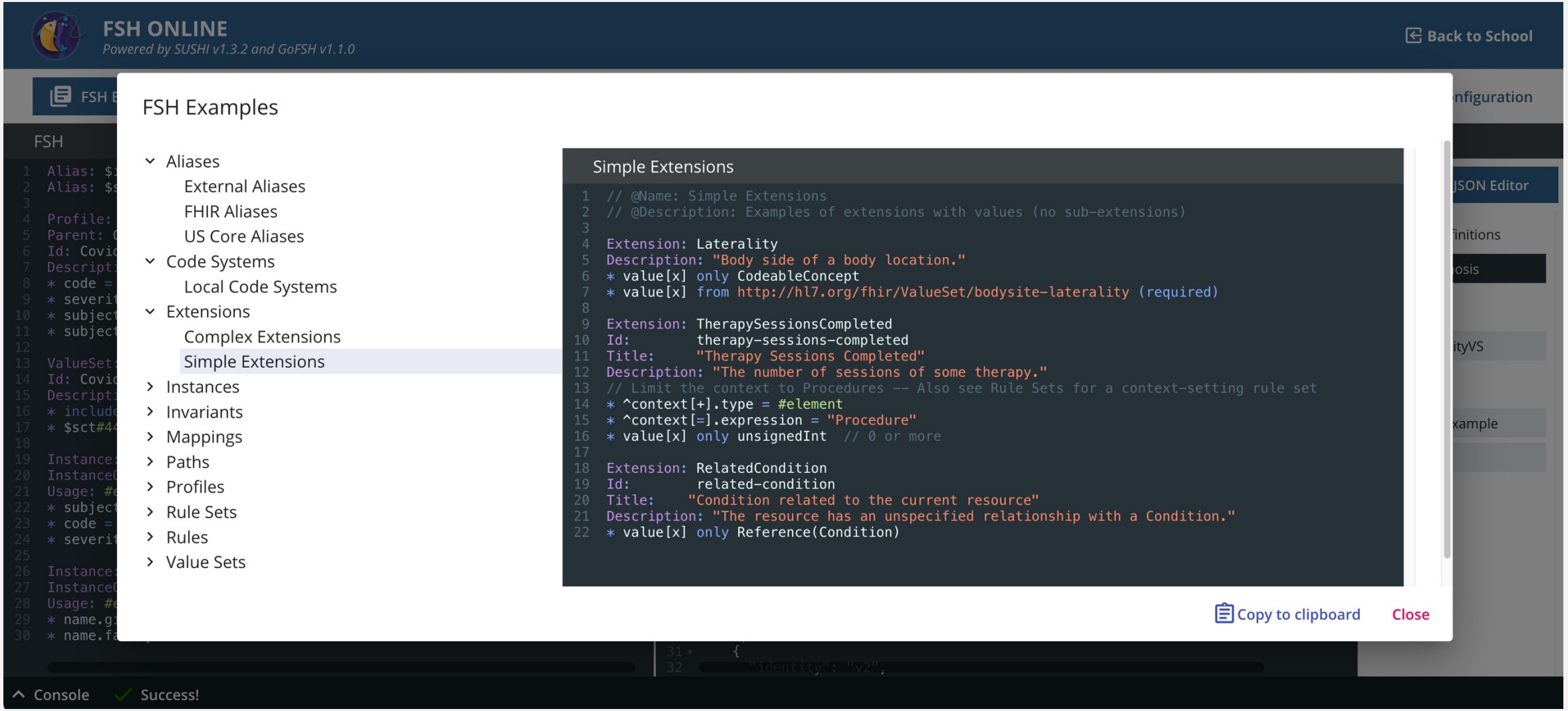
https://fshschool.org/FSHOnline

FSH Online: Features

1. Browse Examples
2. FSH to FHIR (SUSHI)
3. Share FSH
4. Clear FSH
5. View Log
6. FHIR to FSH (GoFSH)
7. Configure Settings
8. Clear JSON
9. New JSON
10. View JSON



FSH Online: Browse and Copy Examples (New!)

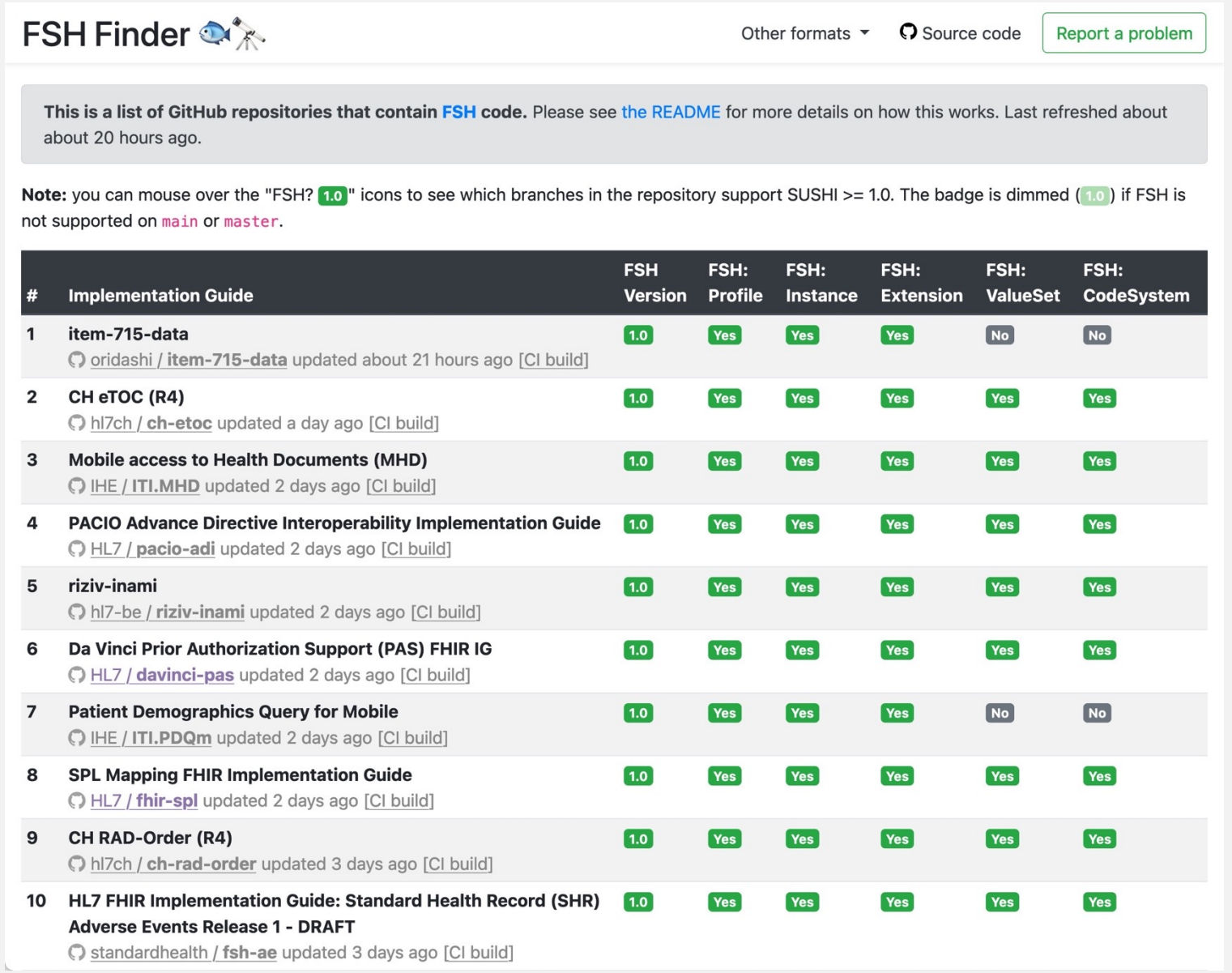


FSH Finder

100+ Implementation Guides

- US
- New Zealand
- Switzerland
- Belgium
- Denmark
- Sweden
- WHO
- DaVinci
- Covid SANER, Logica
- CARIN Blue Button
- SMART Vaccine Credential

https://fshschool.org/fsh-finder



FSH Finder

Other formats | Source code | Report a problem

This is a list of GitHub repositories that contain FSH code. Please see the README for more details on how this works. Last refreshed about about 20 hours ago.

Note: you can mouse over the "FSH? 1.0" icons to see which branches in the repository support SUSHI >= 1.0. The badge is dimmed (1.0) if FSH is not supported on `main` or `master`.

#	Implementation Guide	FSH Version	FSH: Profile	FSH: Instance	FSH: Extension	FSH: ValueSet	FSH: CodeSystem
1	**item-715-data** oridashi / **item-715-data** updated about 21 hours ago [CI build]	1.0	Yes	Yes	Yes	No	No
2	**CH eTOC (R4)** hl7ch / **ch-etoc** updated a day ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
3	**Mobile access to Health Documents (MHD)** IHE / **ITI.MHD** updated 2 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
4	**PACIO Advance Directive Interoperability Implementation Guide** HL7 / **pacio-adi** updated 2 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
5	**riziv-inami** hl7-be / **riziv-inami** updated 2 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
6	**Da Vinci Prior Authorization Support (PAS) FHIR IG** HL7 / **davinci-pas** updated 2 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
7	**Patient Demographics Query for Mobile** IHE / **ITI.PDQm** updated 2 days ago [CI build]	1.0	Yes	Yes	Yes	No	No
8	**SPL Mapping FHIR Implementation Guide** HL7 / **fhir-spl** updated 2 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
9	**CH RAD-Order (R4)** hl7ch / **ch-rad-order** updated 3 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes
10	**HL7 FHIR Implementation Guide: Standard Health Record (SHR) Adverse Events Release 1 - DRAFT** standardhealth / **fsh-ae** updated 3 days ago [CI build]	1.0	Yes	Yes	Yes	Yes	Yes

FSH School

Your portal to

- FSH Online
- FSH Finder
- SUSHI docs
- GoFSH docs
- Tutorials
- Presentations
- Other resources

https://fshschool.org

FSH Resources and Tools

- FSH Language Specification -- HL7 FHIR Standard
- SUSHI -- compile FSH into FHIR Artifacts
- FSH School -- web site with documentation, tools, examples
- FSH Online -- interactive FHIR Shorthand with examples
- GoFSH -- convert existing implementation guides into FSH (beta)
- FSH Finder -- web crawler to find FSH projects
- VS Code extension -- code highlighter for VS Code editor
- # shorthand -- Zulip chat channel

Track overview: Let's Build a FHIR specification

Monday

- Introduction to FHIR
  11:00 – 11:45

Tuesday

- Introduction Profiling
  1:00 – 1:45
- Profiling with Forge
  2:15 – 3:00
- Create an IG with FHIR Shorthand
  3:15 – 4:00
- Create an IG with FHIR Shorthand
  4:15 – 5:00

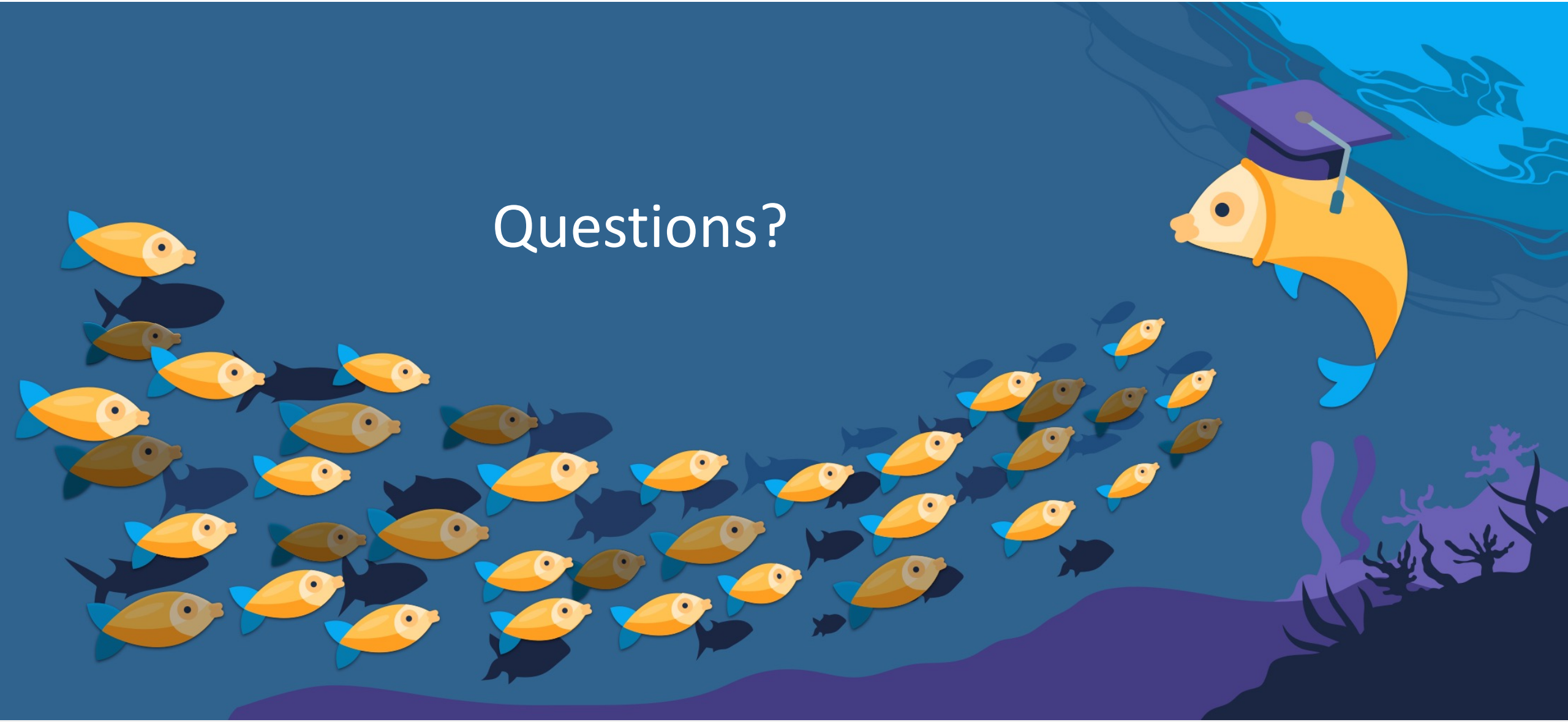
Wednesday

- Accelerating your IG production
  1:00 – 1:45
- IG with IG Publisher
  2:15 – 3:00

Thursday

- FHIR Registry & Packages
  1:00 – 1:45
- Publishing with Simplifier.net
  2:15 – 3:00
- Advanced FHIR Shorthand and Tools
  3:15 – 4:00

You *were* here


Questions?

ORGANIZED BY

PARTNER