# Finding, Using, Shaping Pan-Canadian FHIR Standards: Bases, Cores & Mores

# Agenda

**Finding, Using, Shaping Pan-Canadian FHIR Standards:**
Bases, Cores & Mores

University of Victoria
Workshop in Health
Information Exchange

| | |
|---|---|
| Agenda & Introductions | 5 minutes |
| Why Don’t We Just Use FHIR Out-of-the-Box? | 10 minutes |
| Why Leverage Pan-Canadian Standards? | 10 minutes |
| How do Pan-Canadian Specifications Get Developed? | 10 minutes |
| What Pan-Canadian FHIR Specifications Exist? | 35 minutes |
| How Do You Use Them? (JIST) | 10 minutes |
| Resources to Help You Get Started | 5 minutes |
| Questions? | Remaining |

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# Introductions

**Sheridan Cook**

Data & AI Manager, Accenture Consulting (formerly Gevity Consulting)

- Background in HIE Service Development & Patient Access APIs
- Assists clients in developing Pan-Canadian profiles/ implementation guides, and FHIR implementations
- Co-chair of Canadian FHIR Baseline working group
- Member of HL7 Canada Council

**Irfan Hakim**

Data & AI Consultant, Accenture Consulting (formerly Gevity Consulting)

- Background mental health, digital solution evaluation, and patient centred care
- Assists clients in developing Pan-Canadian profiles/ implementation guides, and FHIR implementations
- Co-chair of SMART-on-FHIR working group
- Faculty at University of Toronto

# Why Don’t We Just Use FHIR Out-of-the-Box?

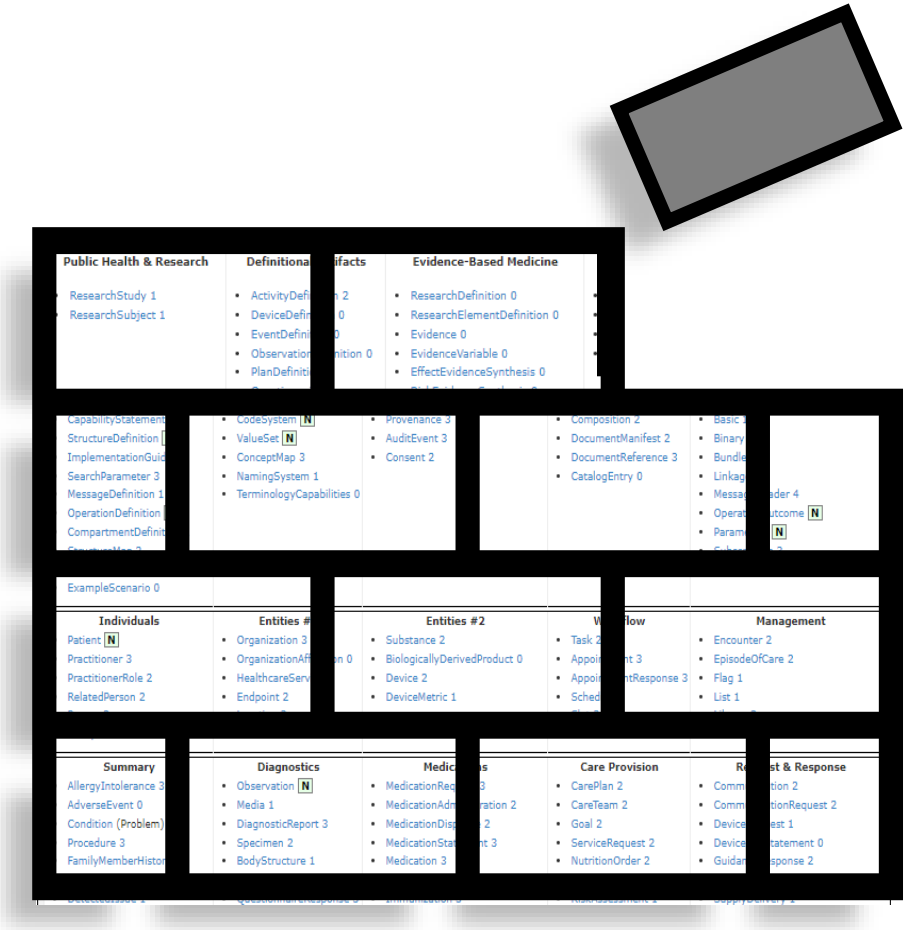
# FHIR as a Platform Standard

FHIR Base Specification = “building blocks”, whose defined data elements are expected to be encountered in 80% of systems around the world

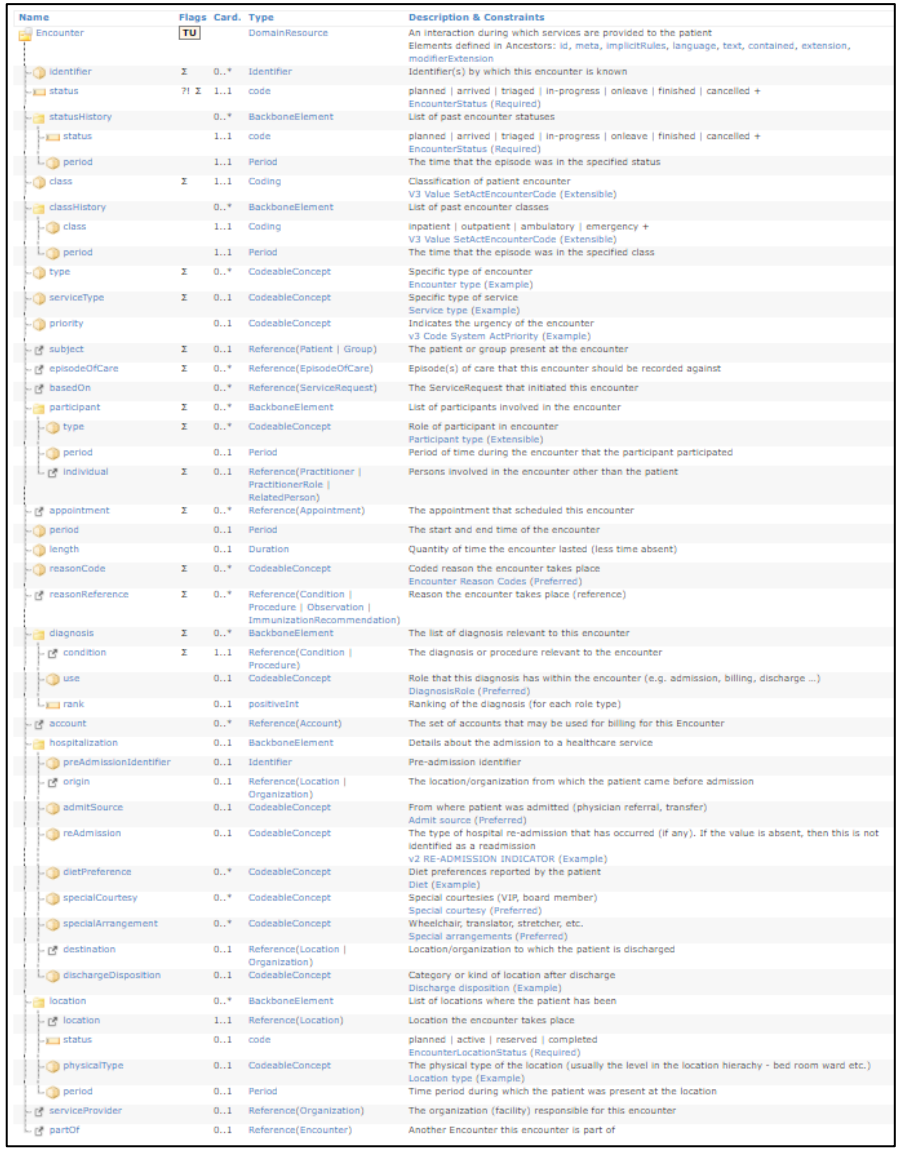
Resources that are intended to support broad range of activities: Clinical Care, Patient Access, Pharmacy,  Transitions of Care, Administrative Workflows, Insurance & Billing, Public Health, Research Trials, etc.

FHIR Base Specification is international - intentionally avoids region-specific code systems & business rules (based on policy)

Expects implementations to constrain and extend the building blocks to meet their specific needs



# Making use of a Platform Specification



| Name | Flags | Card. | Type | Description & Constraints |
|---|---|---|---|---|
| Encounter | TU | | DomainResource | An interaction during which services are provided to the patient<br>Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension |
| identifier | Σ | 0..* | Identifier | Identifier(s) by which this encounter is known |
| status | ?! Σ | 1..1 | code | planned \| arrived \| triaged \| in-progress \| onleave \| finished \| cancelled +<br>EncounterStatus (Required) |
| statusHistory | | 0..* | BackboneElement | List of past encounter statuses |
| status | | 1..1 | code | planned \| arrived \| triaged \| in-progress \| onleave \| finished \| cancelled +<br>EncounterStatus (Required) |
| period | | 1..1 | Period | The time that the episode was in the specified status |
| class | Σ | 1..1 | Coding | Classification of patient encounter<br>V3 Value SetActEncounterCode (Extensible) |
| classHistory | | 0..* | BackboneElement | List of past encounter classes |
| class | | 1..1 | Coding | inpatient \| outpatient \| ambulatory \| emergency +<br>V3 Value SetActEncounterCode (Extensible) |
| period | | 1..1 | Period | The time that the episode was in the specified class |
| type | Σ | 0..* | CodeableConcept | Specific type of encounter<br>Encounter type (Example) |
| serviceType | Σ | 0..1 | CodeableConcept | Specific type of service<br>Service type (Example) |
| priority | | 0..1 | CodeableConcept | Indicates the urgency of the encounter<br>v3 Code System ActPriority (Example) |
| subject | Σ | 0..1 | Reference(Patient \| Group) | The patient or group present at the encounter |
| episodeOfCare | Σ | 0..* | Reference(EpisodeOfCare) | Episode(s) of care that this encounter should be recorded against |
| basedOn | | 0..* | Reference(ServiceRequest) | The ServiceRequest that initiated this encounter |
| participant | Σ | 0..* | BackboneElement | List of participants involved in the encounter |
| type | Σ | 0..* | CodeableConcept | Role of participant in encounter<br>Participant type (Extensible) |
| period | | 0..1 | Period | Period of time during the encounter that the participant participated |
| individual | Σ | 0..1 | Reference(Practitioner \| PractitionerRole \| RelatedPerson) | Persons involved in the encounter other than the patient |
| appointment | Σ | 0..* | Reference(Appointment) | The appointment that scheduled this encounter |
| period | | 0..1 | Period | The start and end time of the encounter |
| length | | 0..1 | Duration | Quantity of time the encounter lasted (less time absent) |
| reasonCode | Σ | 0..* | CodeableConcept | Coded reason the encounter takes place<br>Encounter Reason Codes (Preferred) |
| reasonReference | Σ | 0..* | Reference(Condition \| Procedure \| Observation \| ImmunizationRecommendation) | Reason the encounter takes place (reference) |
| diagnosis | Σ | 0..* | BackboneElement | The list of diagnosis relevant to this encounter |
| condition | Σ | 1..1 | Reference(Condition \| Procedure) | The diagnosis or procedure relevant to the encounter |
| use | | 0..1 | CodeableConcept | Role that this diagnosis has within the encounter (e.g. admission, billing, discharge ...)<br>DiagnosisRole (Preferred) |
| rank | | 0..1 | positiveInt | Ranking of the diagnosis (for each role type) |
| account | | 0..* | Reference(Account) | The set of accounts that may be used for billing for this Encounter |
| hospitalization | | 0..1 | BackboneElement | Details about the admission to a healthcare service |
| preAdmissionIdentifier | | 0..1 | Identifier | Pre-admission identifier |
| origin | | 0..1 | Reference(Location \| Organization) | The location/organization from which the patient came before admission |
| admitSource | | 0..1 | CodeableConcept | From where patient was admitted (physician referral, transfer)<br>Admit source (Preferred) |
| reAdmission | | 0..1 | CodeableConcept | The type of hospital re-admission that has occurred (if any). If the value is absent, then this is not identified as a readmission<br>v2 RE-ADMISSION INDICATOR (Example) |
| dietPreference | | 0..* | CodeableConcept | Diet preferences reported by the patient<br>Diet (Example) |
| specialCourtesy | | 0..* | CodeableConcept | Special courtesies (VIP, board member)<br>Special courtesy (Preferred) |
| specialArrangement | | 0..* | CodeableConcept | Wheelchair, translator, stretcher, etc.<br>Special arrangements (Preferred) |
| destination | | 0..1 | Reference(Location \| Organization) | Location/organization to which the patient is discharged |
| dischargeDisposition | | 0..1 | CodeableConcept | Category or kind of location after discharge<br>Discharge disposition (Example) |
| location | | 0..* | BackboneElement | List of locations where the patient has been |
| location | | 1..1 | Reference(Location) | Location the encounter takes place |
| status | | 0..1 | code | planned \| active \| reserved \| completed<br>EncounterLocationStatus (Required) |
| physicalType | | 0..1 | CodeableConcept | The physical type of the location (usually the level in the location hierachy - bed room ward etc.)<br>Location type (Example) |
| period | | 0..1 | Period | Time period during which the patient was present at the location |
| serviceProvider | | 0..1 | Reference(Organization) | The organization (facility) responsible for this encounter |
| partOf | | 0..1 | Reference(Encounter) | Another Encounter this encounter is part of |

In FHIR base specification – most elements are considered optional – it's a guide to how concepts can be modeled but not intended to be implemented out of the box

**Profiling** – allows implementors to further restrict and extend the base specification to meet and enforce their specific needs. Examples include:

- Rules about which resource elements are or are not used, and what additional elements are added that are not part of the base specification
- Rules about which API features are used, and how
- Rules about which terminologies are used in particular elements
- Descriptions of how the Resource elements and API features map to local requirements and/or implementations

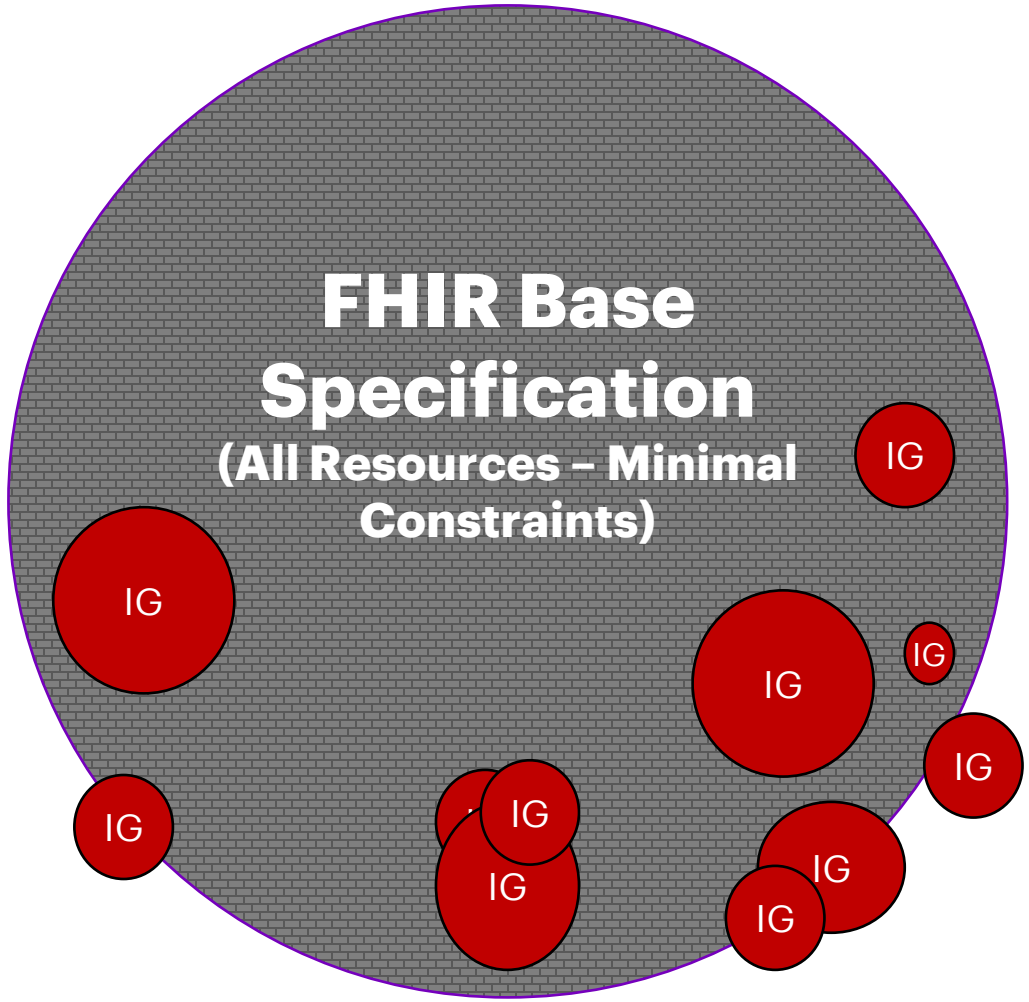
*Note that because of the nature of the healthcare ecosystem, there may be multiple overlapping sets of adaptations - by healthcare domain, by country, by institution, and/or by vendor/implementation.*

https://www.hl7.org/fhir/profiling.html#5.1.0

# What are the limitations of the FHIR Base Specification?

Each implementor builds an Implementation Guides (IG) that uses those blocks to meet their needs

Starting from base specification is like starting from scratch each time




Lack of alignment between IGs operating in same countries and domains

We all need customization, but we aren't leveraging each other's efforts

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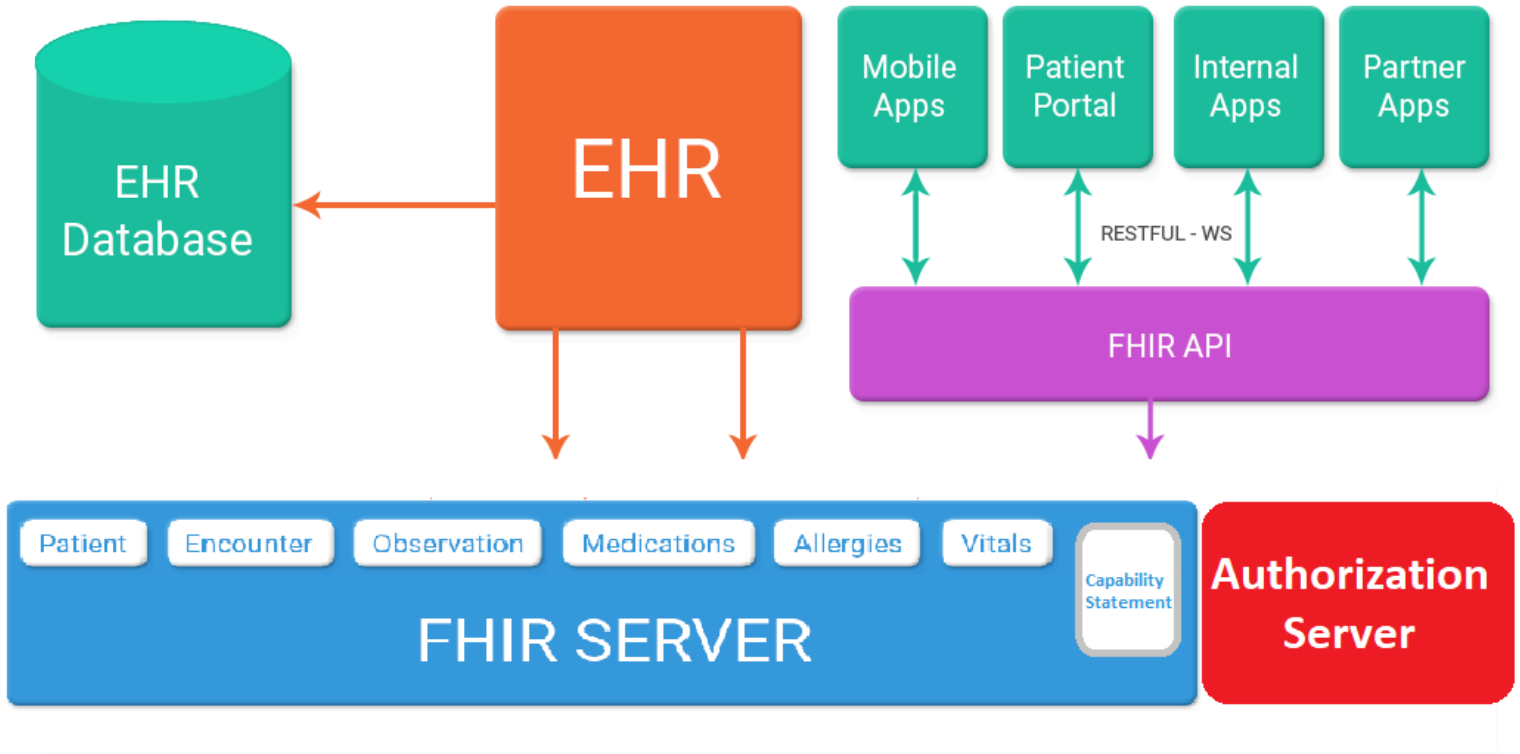
# What's the big deal about our FHIR guides not being aligned with each other?



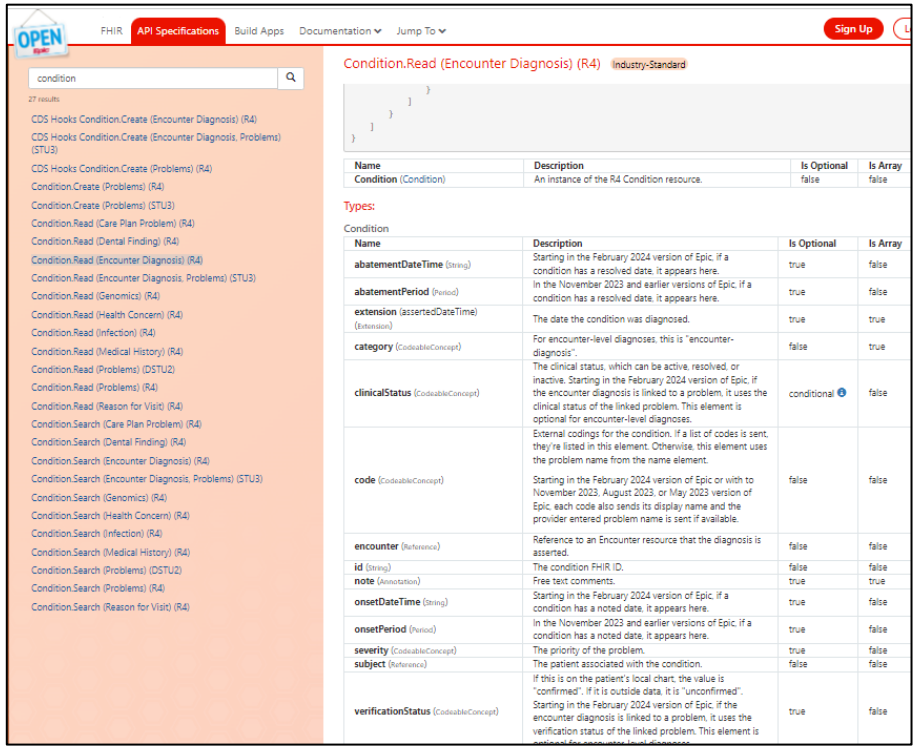

FHIR Implementation:
FHIR can be implemented into a single system in the form of FHIR resources, servers, and FHIR APIs.

*Ex: These are the rules for interacting with Hospital X EHR endpoint to do Y behavior*

**Question for Class:** If one hospital or even jurisdiction doing discharge summaries says they want to map "date of diagnosis" in Condition.recordedDate and in another place they say it should go into Condition.onsetDateTime – what happens?

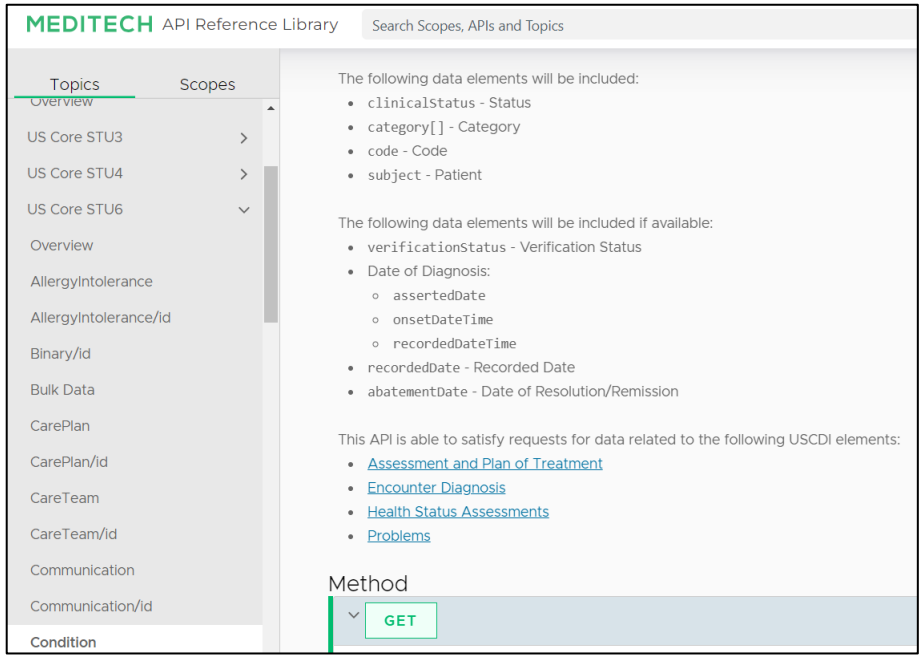
# What's the big deal about our FHIR guides not being aligned with each other? EMR System APIs

https://fhir.epic.com/Specifications?api=950




https://fhir.cerner.com/millennium/r4/clinical/summary/condition

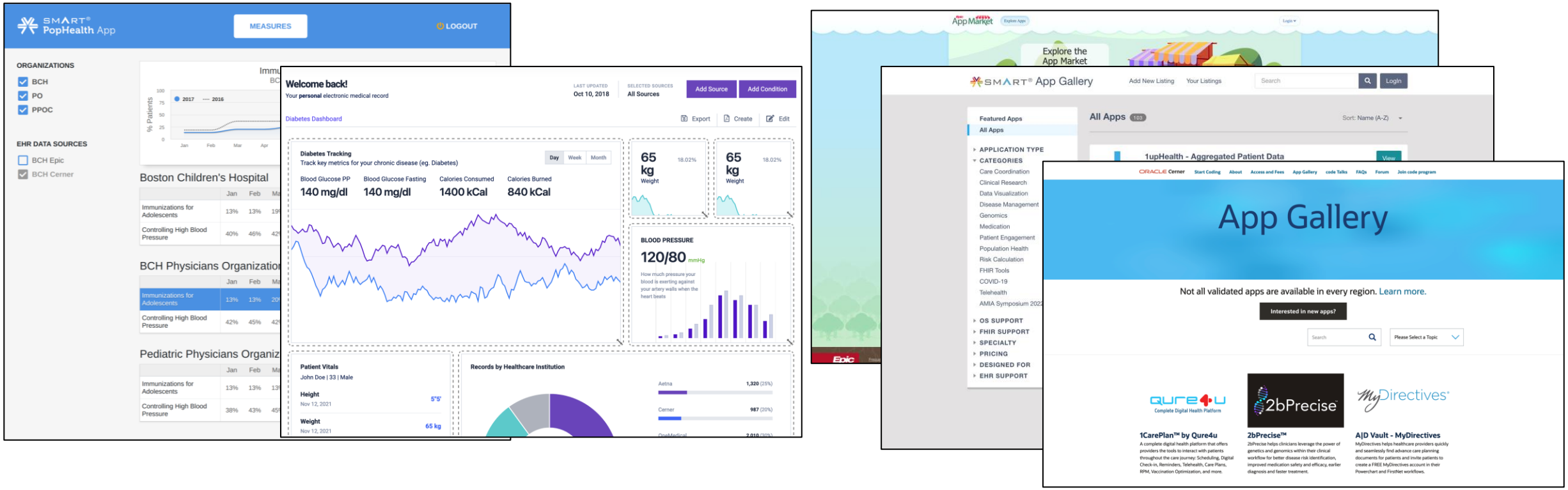

https://fhir.meditech.com/explorer/api/uscore.STU6.Condition/2




EMR System APIs expose the concept to different fields, some have to be customized to support all the possible fields that the concept could map to

> Customization costs our workplaces, provinces, and citizens more money that could go towards care

# What's the big deal about our FHIR guides not being aligned with each other? Applications




Customization erodes predictability for applications and analytic solutions that want to develop once and deploy in a bunch of places

It makes it challenging for them to find and interpret data - the time they spend onboarding and tweaking could be spent delivering value to people and populations

# Why Leverage Pan-Canadian Standards?

# Existing Patterns/Levels for Constraining the Base Specification

**FHIR Base Specification:** global, use case agnostic, platform specification that includes an information model, framework for defining terminology, framework for constraining the model & defining expectations, and guidance on FHIR usage.

**National Base/Baseline:** a constrained version of the FHIR base specification that provides awareness of realm concepts and encourages a minimal constraints be present in IGuides. Constraints applied only where shared across implementations within the country regardless of use cases/context.

**National Core:** a constrained version of the FHIR base specification that defines a stricter set of conformance requirements that enforce system alignment to a prescribed set of profiles and interactions. Typically, profiles are tied by broad use cases (e.g., allow patient access to data via APIs) and are informed and driven by regulatory and/or contractual agreements.

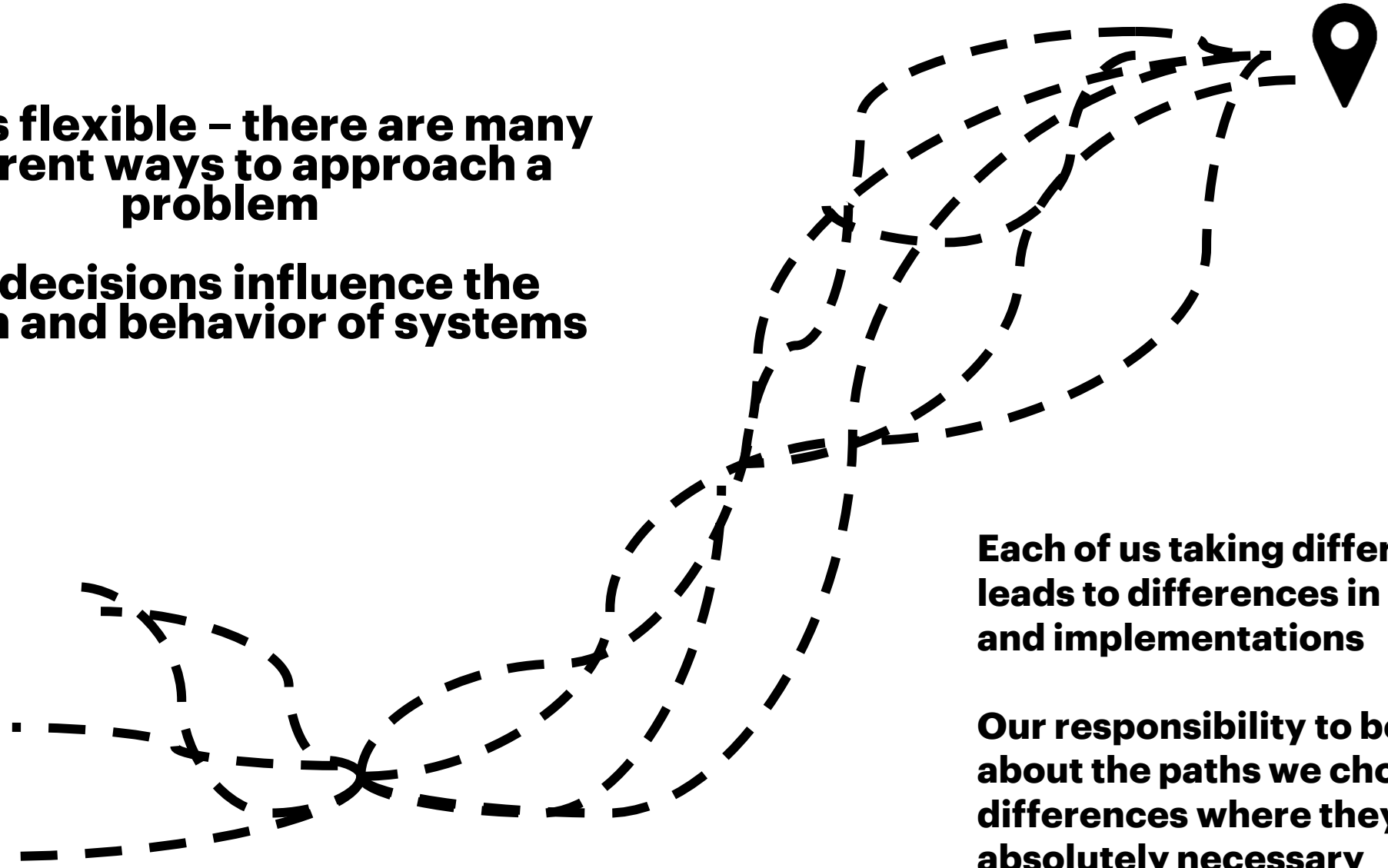
**Domain:** a constrained version of the FHIR base specification (sometimes constraining a core) that define the data model, interactions, and exchange expectations for a particular use case or type of data.

**Implementation:** a constrained specification that outlines the expectations for implementing a particular workflow against a defined asset or set of assets. Typically includes profiles that are tied to tighter use cases & established system design. These specifications often include details (or pointers to details) for security, connectivity, & onboarding expectations for the assets involved.

# Landscape of Standards

**FHIR is flexible – there are many different ways to approach a problem**

**Our decisions influence the design and behavior of systems**



**Each of us taking different roads leads to differences in our guidance and implementations**

**Our responsibility to be thoughtful about the paths we chose – reduces differences where they aren't absolutely necessary**

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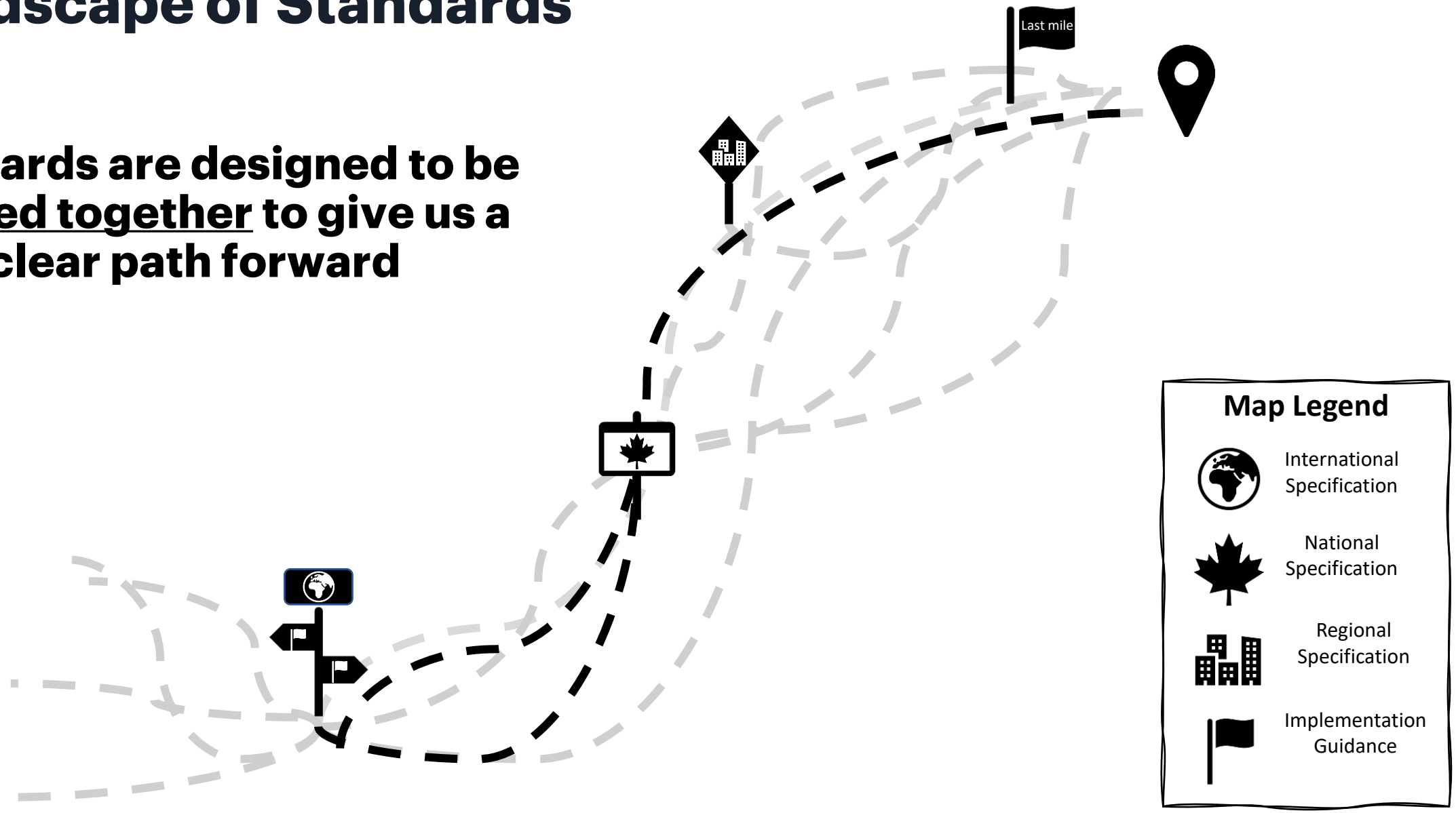
# Landscape of Standards

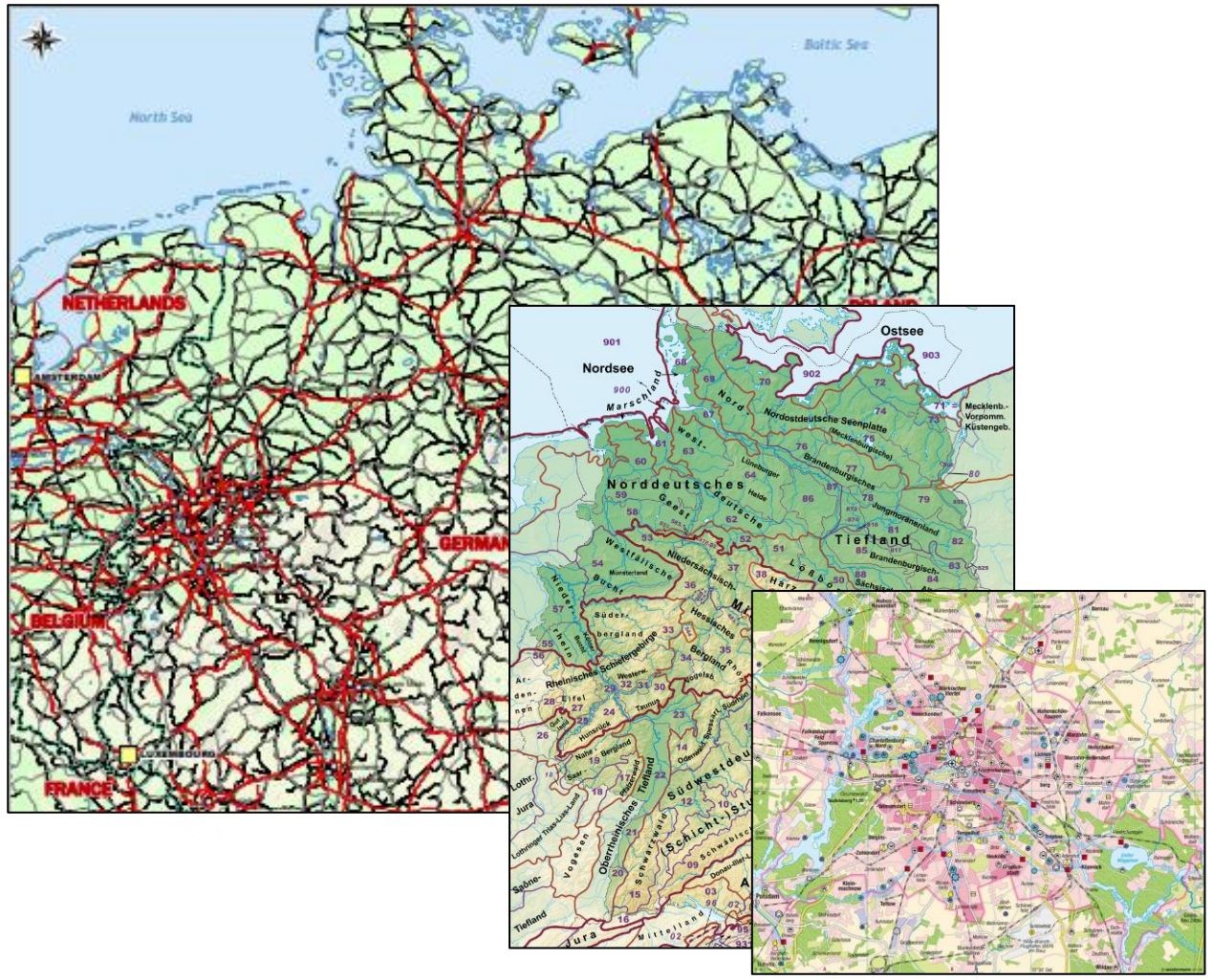
**Standards are designed to be <u>layered together</u> to give us a clear path forward**



# Landscape of Standards

Multiple layers of standards are **effective** at driving interoperability when:

- Layers are aligned
- Each layer is performing its proper function
- Functions aren’t overlapping or contradicting



# How do Pan-Canadian Specifications Get Developed?

# How do Pan-Canadian Specifications Get Developed?

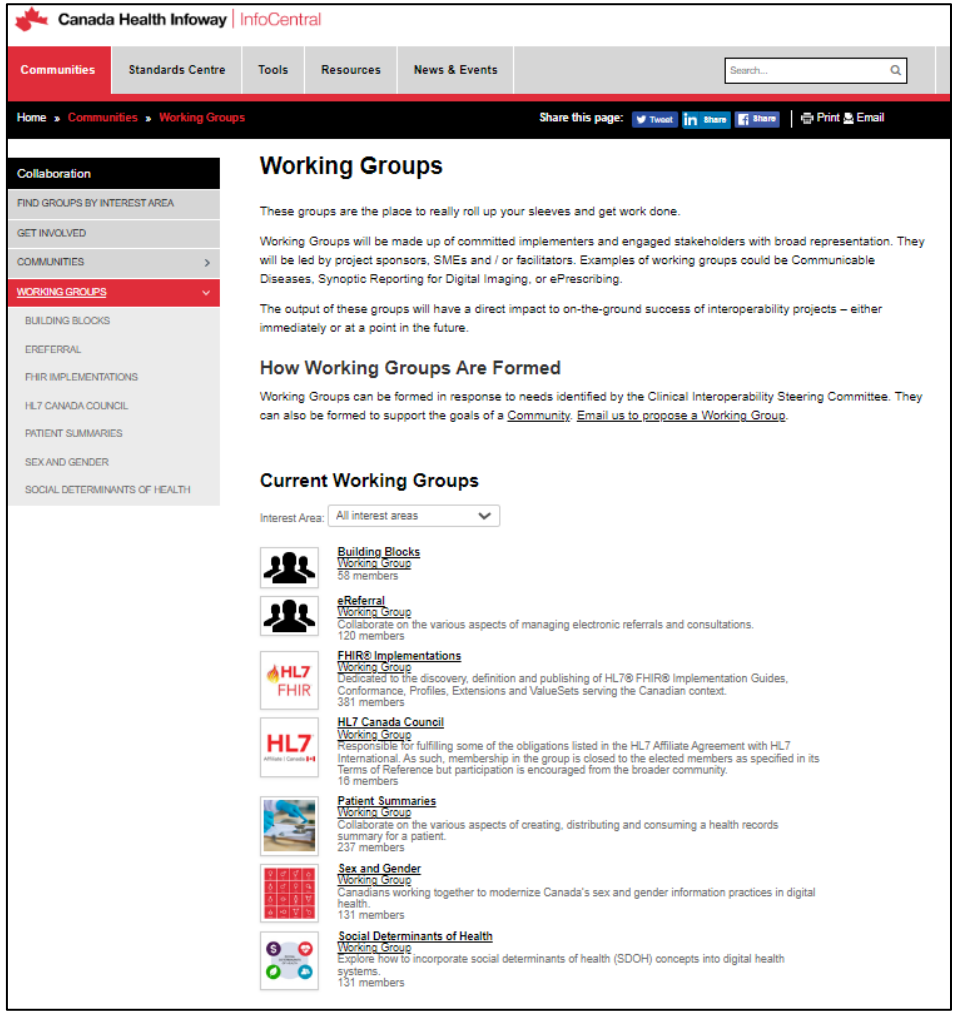
## People!

*People who are passionate about solving health interoperability problems form a*

*"Coalition of the Willing"*

## Process!

*Process that builds trust for others to implement, based on transparency and progressive maturity in the artefacts that the working group produces*

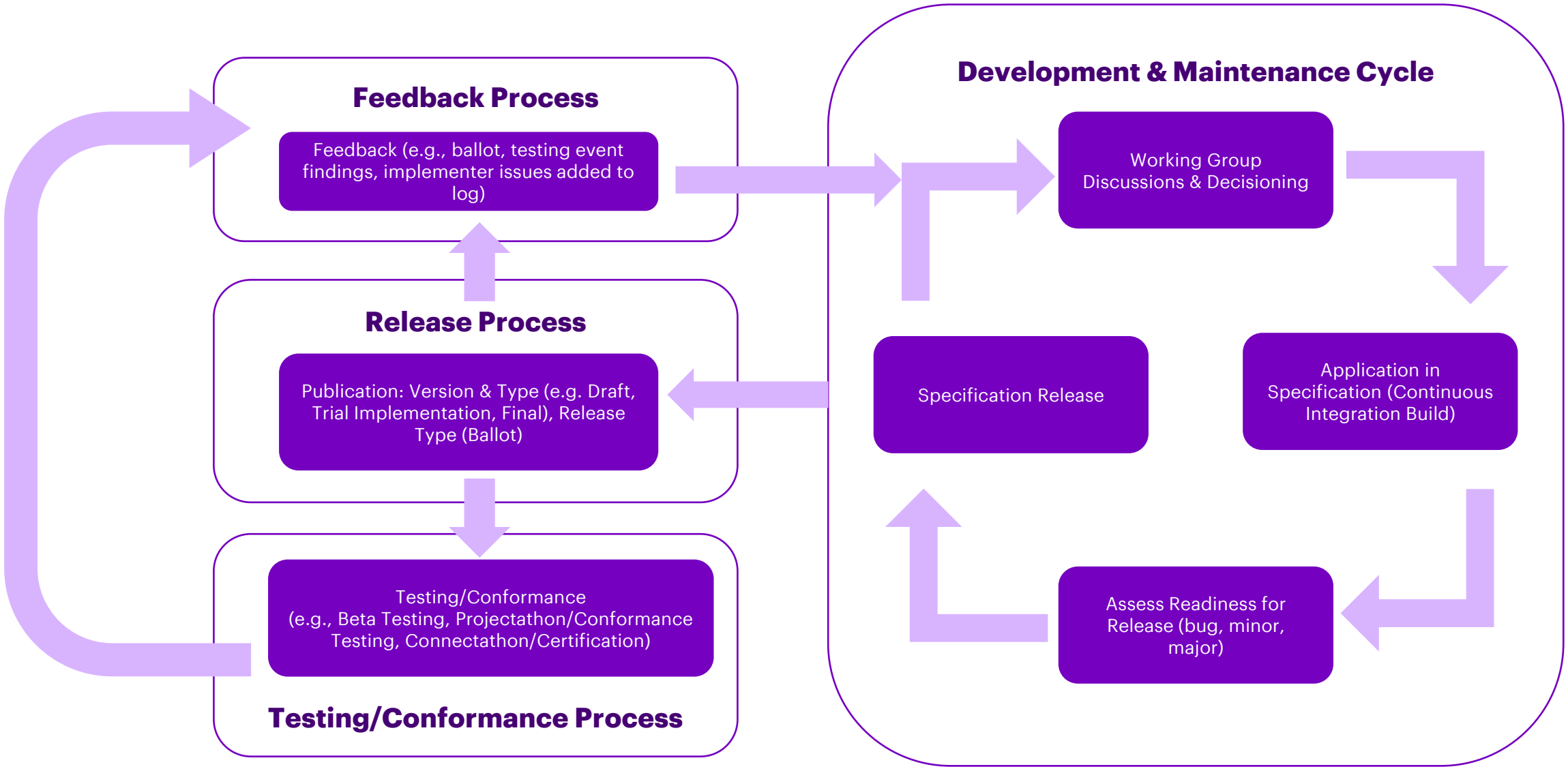



**Example Grassroots WGs:** eServices, CA Baseline, SMART North

**Example Hosted WGs:** Patient Summaries, eReferral, Building Blocks

# How do Pan-Canadian Specifications Get Developed?

## Collaborative Standards Development Lifecycle (cSDLC)



# What Pan-Canadian FHIR Specifications Exist?

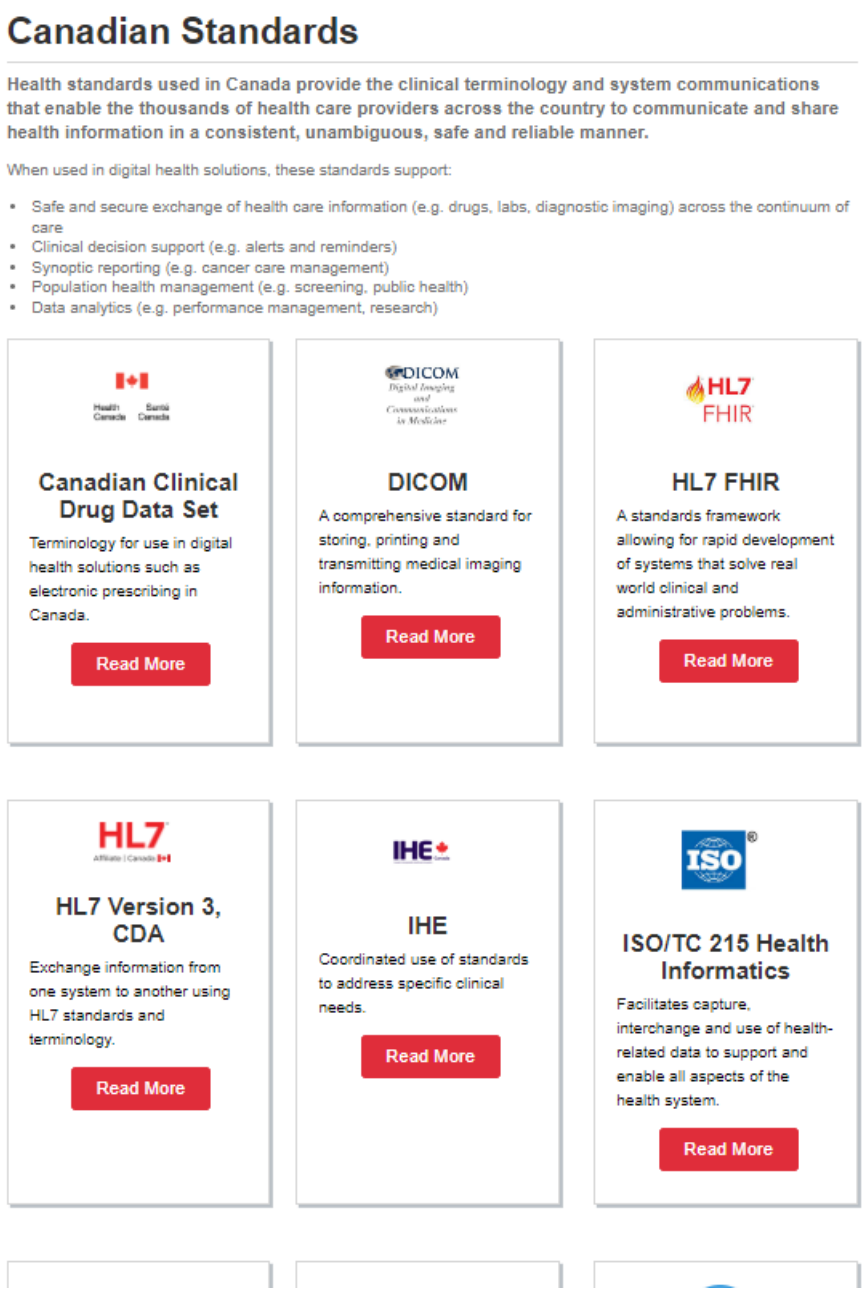
# Pan-Canadian Specifications

Standards & Specifications = More than Just FHIR IGuides!

**Focusing today on FHIR Guides that are part of Interoperability Specifications:**

Pan-Canadian Interoperability Specifications:

- Includes rules about the following to support a use case:
  - How the data is formatted at the point of exchange
  - What interaction capabilities are expected (read/write, search parameters, etc.)
  - How the exchange happens (transaction patterns between actors)
  - What reference architecture patterns should be used (authorization, audit logging)




https://infocentral.infoway-inforoute.ca/en/standards/canadian

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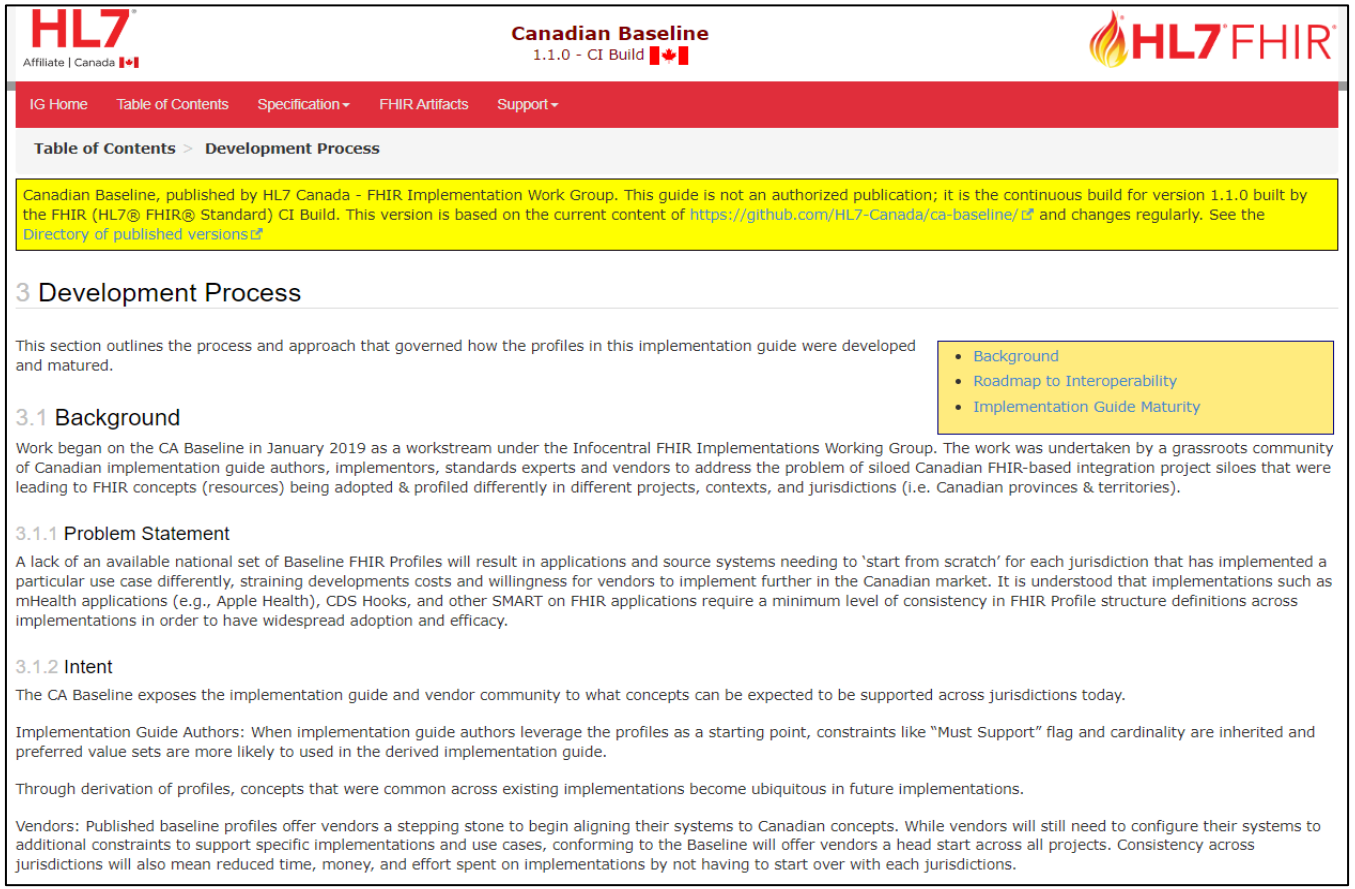
# CA Baseline

Project Page: https://simplifier.net/cabaseline

Working Group: https://infocentral.infoway-inforoute.ca/en/collaboration/wg/fhir-implementations




Version: Canadian Baseline 1.1.0 - CI Build

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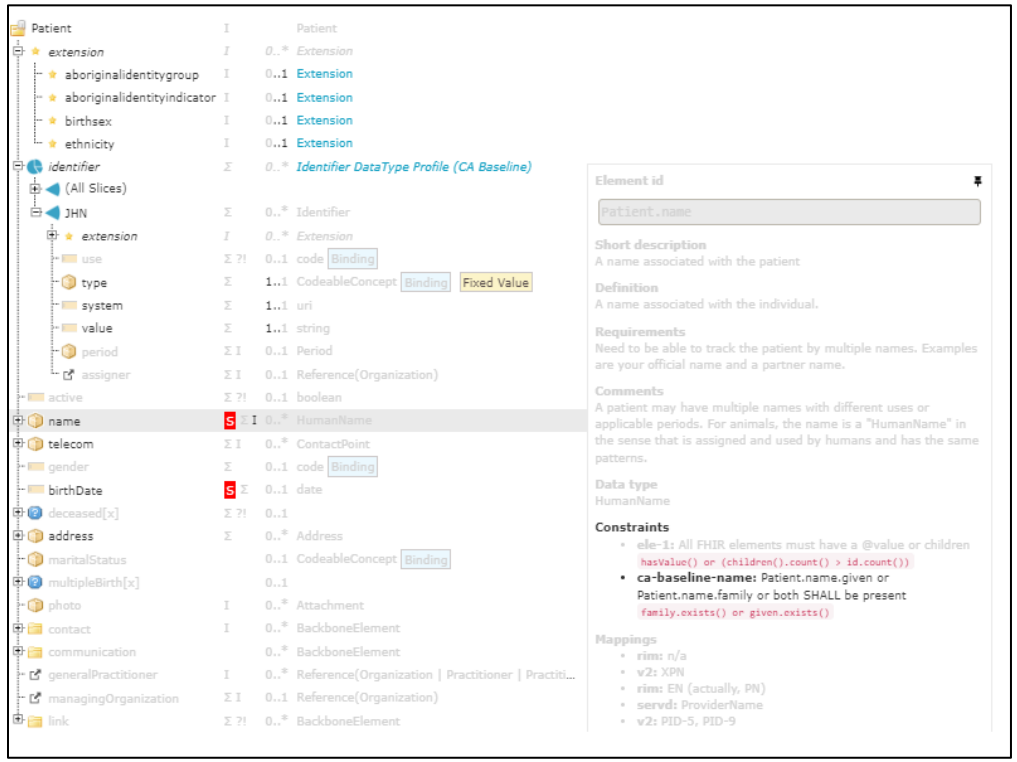
# CA Baseline




CA Baseline Patient Profile v1.1.7 (Updates pending)

Realm-specific Baseline that softly harmonizes using lowest common denominator approach– needs to be use case & implementation agnostic

Expose implementation guide and vendor community to what concepts can be expected to be supported across jurisdictions today

Drive consistency and harmonization through socialization

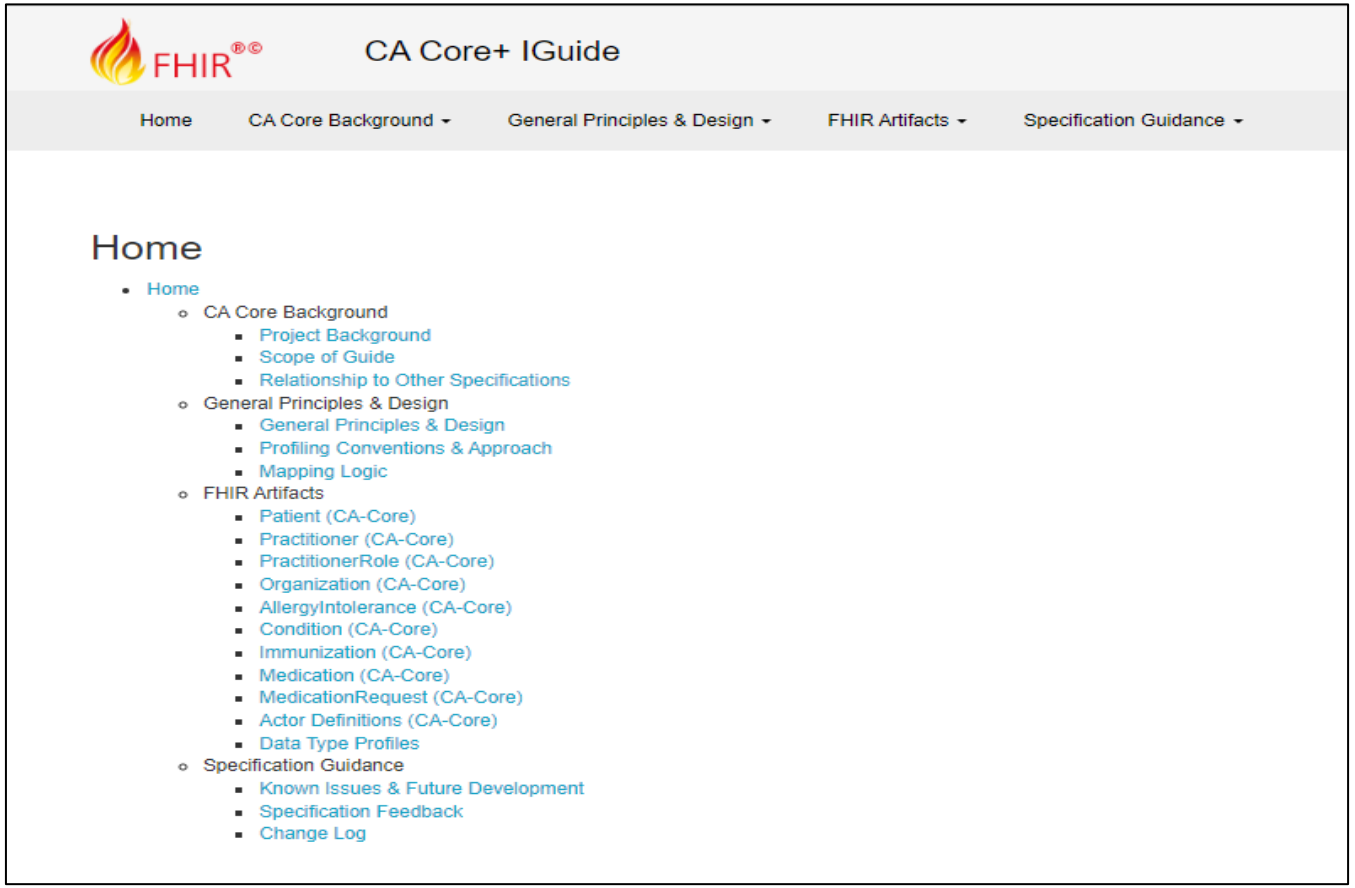
- Concepts that were common across existing implementations become ubiquitous in future implementations.

Avoid overly prescriptive constraints before an incentive/ governance structure is in place

- Absence of united front with vendors = configuration costs passed down to implementing systems to ensure presence of concepts & use of prescribed coding systems

# CA Core

Project Page: https://simplifier.net/ca-core
Working Group: TBD




Version: CA Core v0.2 Draft For Ballot

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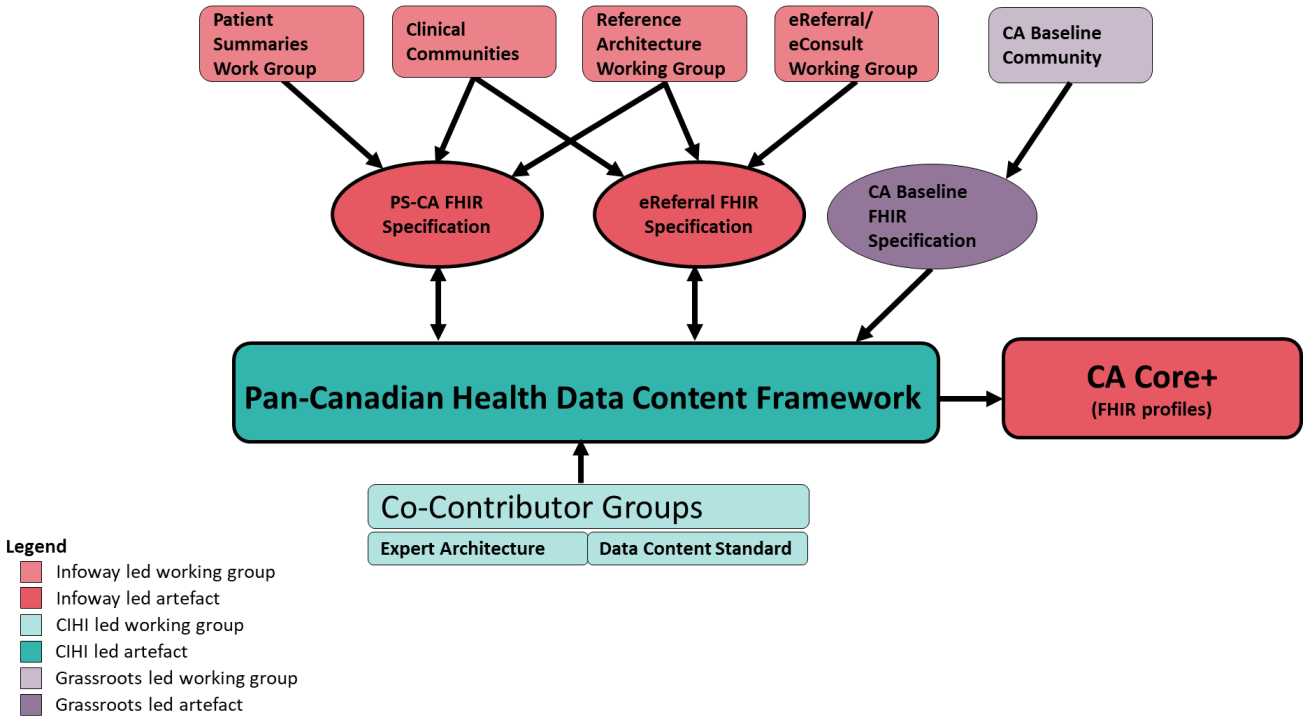
# CA Core

Project Page: https://simplifier.net/ca-core

Working Group: TBD




Interpretation of the constraints in the Pan-Canadian Health Data Content Framework (pCHDCF) into FHIR Profiles

Very early in development, exposing mappings and terminology

- Expected to apply more prescriptive expectations (demonstrable capabilities) after Core Data For Interoperability (CDI)

Intent is a set of constraints that are expected to be demonstrated across domains

- Rules about how data will be structured and what elements will be part of server “default configuration”

# CA:FeX – Pan-Canadian FHIR Exchange Specification

Project Page: https://simplifier.net/ca-fex-canadian-fhir-exchange
Working Group: TBD


Versions:

- CA:FeX v1.0.0 Trial Implementation
- CA:FeX v2.0.0 Draft For Ballot

Exchange requirements that can be applied across use cases– ensures certain capabilities are present in every FHIR server in Canada

Conditional expectations that are Resource-specific:

*"If your system supports AllergyIntolerance Resources, you have to demonstrate you support query using the Patient id + the clinical status of the allergy"*

Raises the floor for default capabilities – creates predictability for applications/data requesters to build around

# PS-CA- Pan-Canadian Patient Summary Specification

Project Page: https://simplifier.net/ps-ca-r1

Working Group: https://infocentral.infoway-inforoute.ca/en/collaboration/wg/patient-summaries


Versions:

- PS-CA v1.0.0 Trial Implementation
- PS-CA v1.1.0 Draft

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# CA:eReC - Pan-Canadian eReferral-eConsult

Project Page: https://simplifier.net/ca-erec

Working Group: https://infocentral.infoway-inforoute.ca/en/collaboration/wg/ereferral


Version: CA:eReC v1.0.0 Draft for Ballot

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# Pan-Canadian Service Directory

Project Page: [Pan-Canadian HealthcareService Directory (CA-HSD) - SIMPLIFIER.NET]

Working Group: [https://infocentral.infoway-inforoute.ca/en/collaboration/wg/ereferral]


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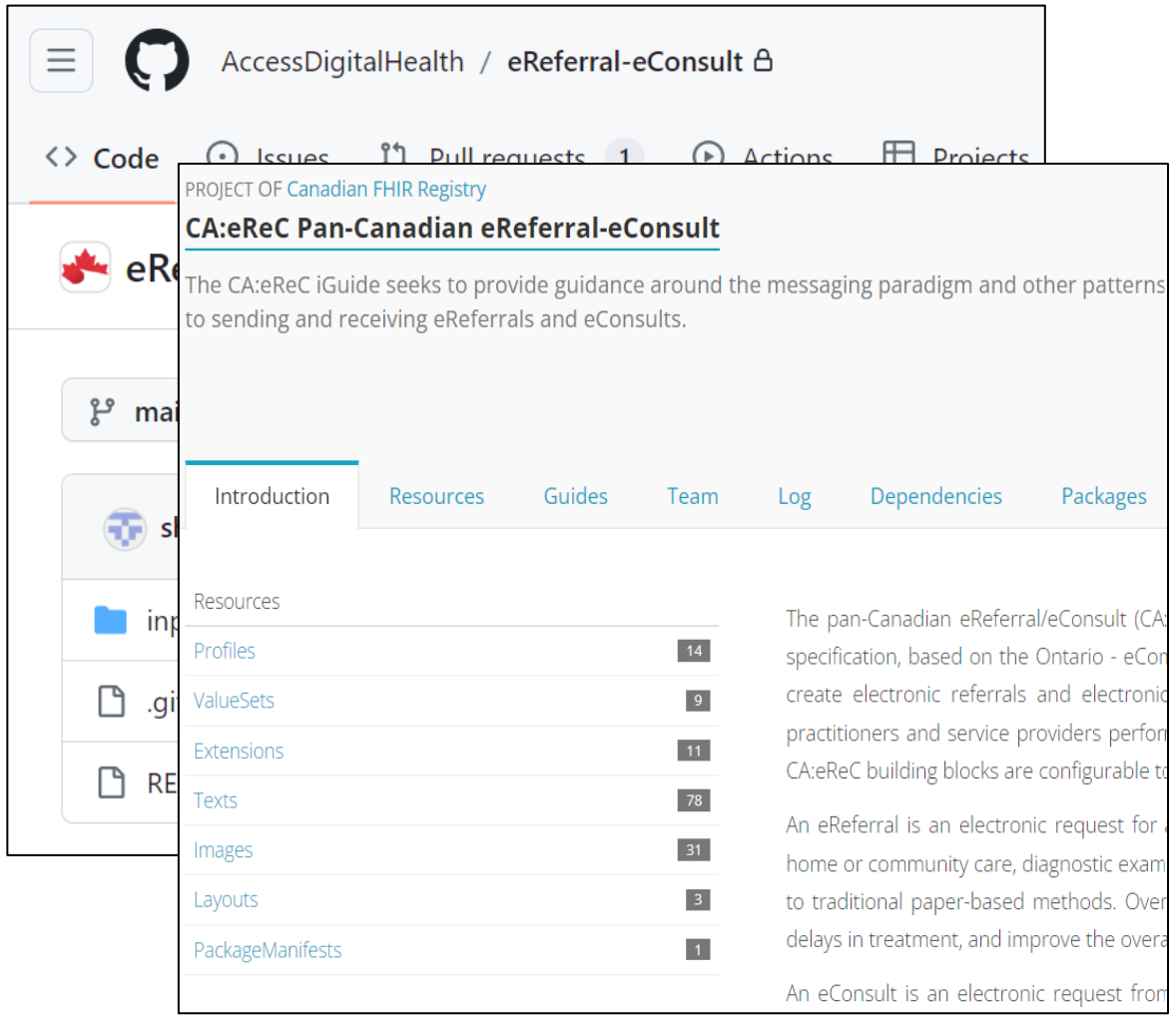
# cSDLC Process – CA:eReC (pt.1)




- Conduct an environmental scan and find relevant guides that compliment your project
- Structure your guide and do use case analysis including scoping
- Set up environment, develop resources and the guide

Link: [CA:eReC - SIMPLIFIER.NET]

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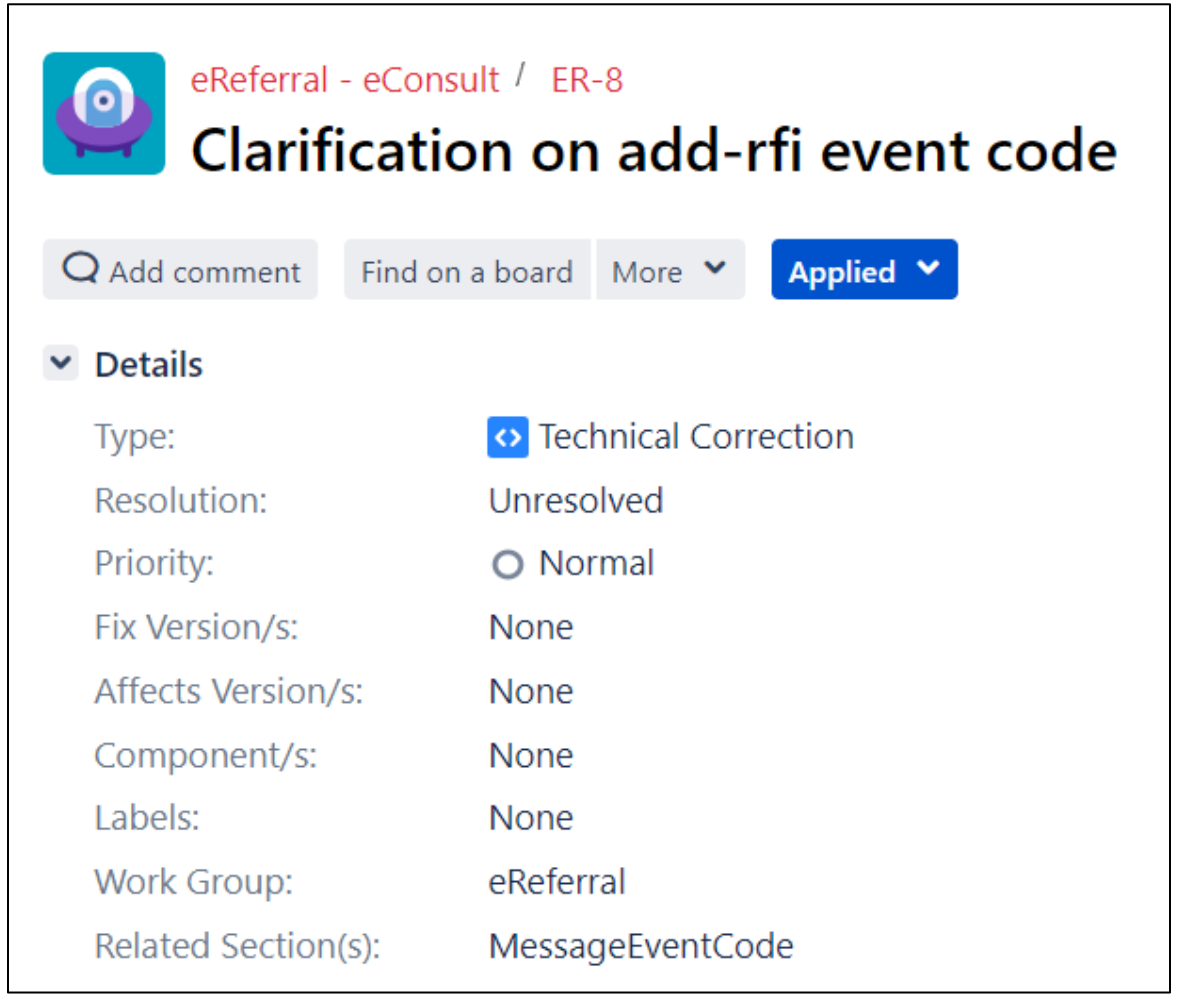
# cSDLC Process – CA:eReC (pt.2)




- Discussions with working group on inclusion of information in the guide
- Working group provides feedback (represented in JIRA tickets)
- Ticket is triaged, assigned to the party responsible, and acted upon

[ER-8] Clarification on add-rfi event code - InfoRMS (infoway-inforoute.ca)

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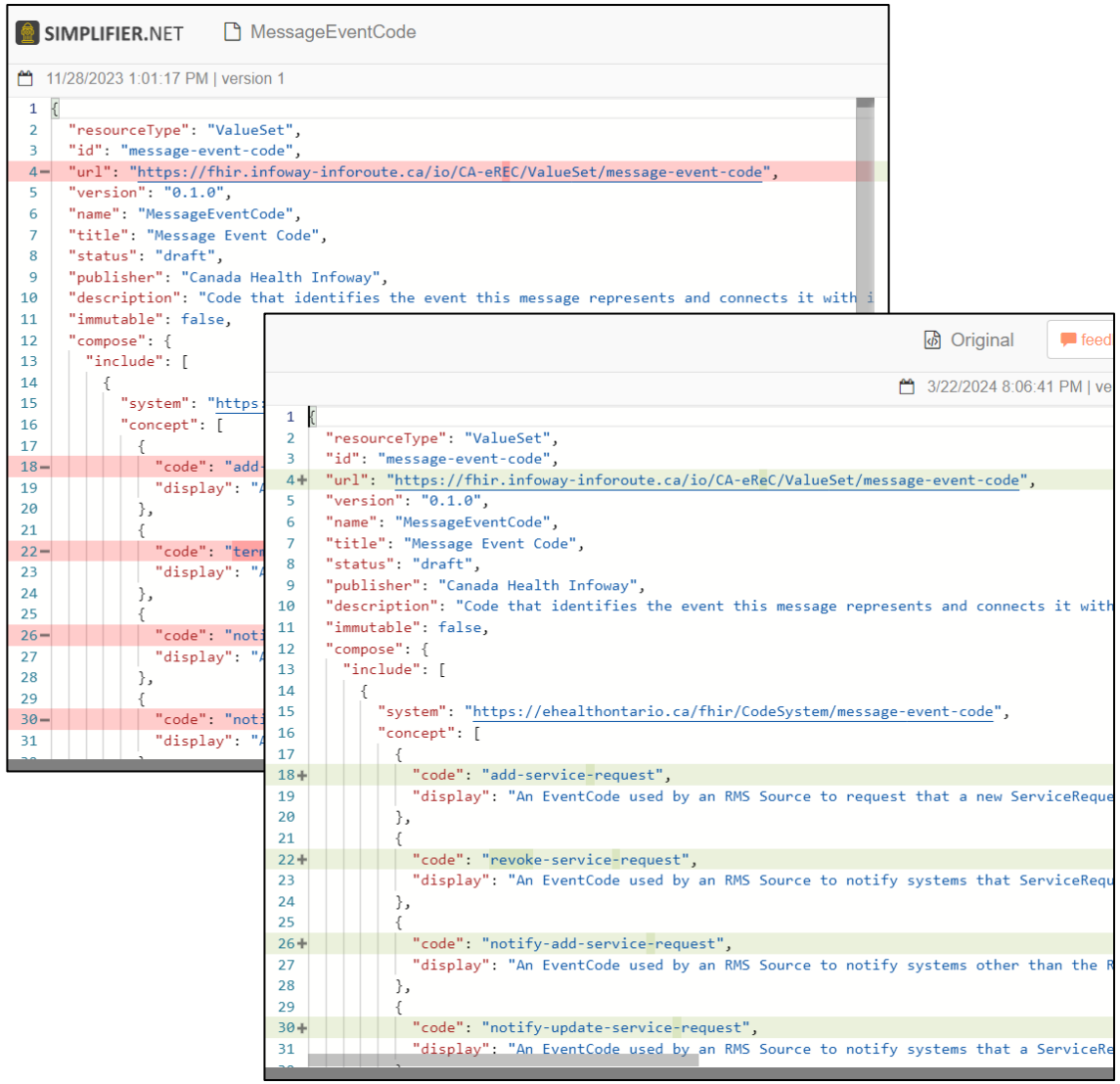
# cSDLC Process – CA:eReC (pt.3)




- Make the appropriate changes to the section of the guide
- Provide updates and socialize with the working group and get approved

Link: [SIMPLIFIER.NET - Diff Page]

# Jurisdictional Implementation Style (JIST) Guide

# Jurisdictional Implementation Style (JIST) IGuide

PROJECT OF Canadian FHIR Registry

## Jurisdictional Implementation Style iGuide (JIST)

This guide is intended to provide jurisdictional FHIR implementation guide (iGuide) authors with the tips, patterns, and messaging needed to ensure their iGuides are properly harmonized and aligned with pan-Canadian standards (e.g., PS-CA, CA:FeX).

PUBLIC PROJECT | FHIR R4 | Scope National CA | Subscriptions 0

Introduction | Resources | Guides | Team | Log | Issues | Dependencies | Packages

Resources

| | |
|---|---|
| Profiles | 6 |
| Texts | 19 |
| Images | 17 |
| Layouts | 3 |
| PackageManifests | 1 |

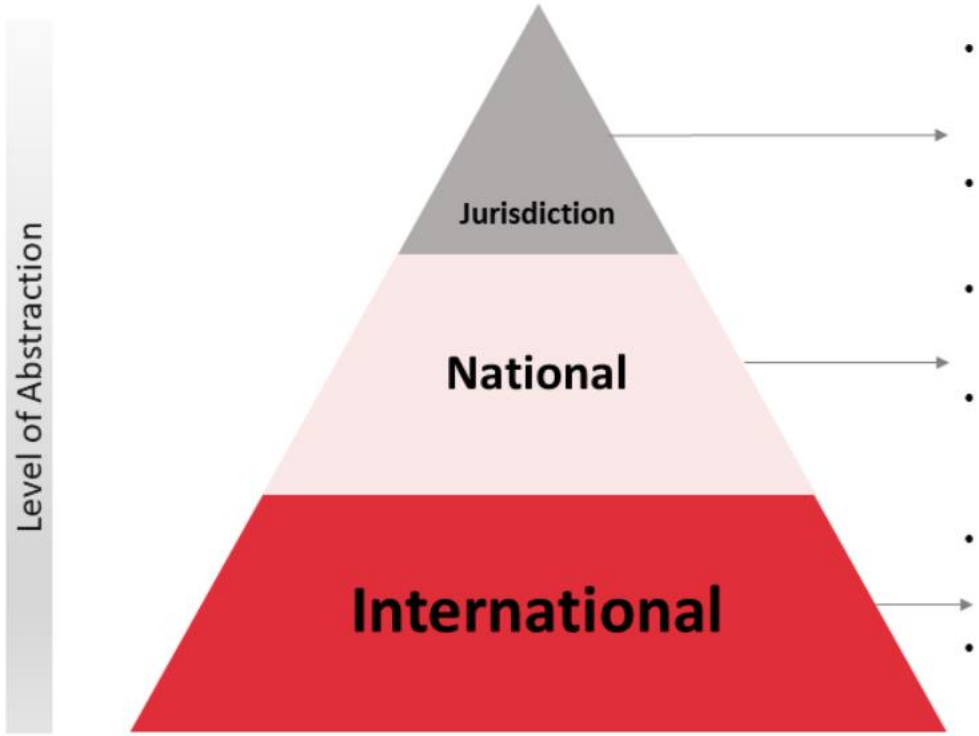
Provide guidance to IG authors (International, National, and Jurisdiction FHIR implementation guides) on the technical patterns and style guide for conveying jurisdictional implementation patterns, details, & extensions etc.

> [Jurisdictional Implementation Style iGuide (JIST) - SIMPLIFIER.NET]

# Purpose of Creating an iGuide

## Guides and Their Purpose

For each specification type, there is also a guide that identifies how the specification should be implemented according to its geographic scope:




- Re-enforce adherence to a standard within a jurisdiction and they typically fall into two categories:
  1) Direct implementation against regional assets, or
  2) Vehicles for procurement / program / regional policy expectations
- Provide additional solution-specific guidance on how to implement/integrate with a defined asset

- Promote the international specification content that best aligns to the nation's architecture and workflows and provide expectations for localized data that will be encountered (e.g., identifiers, extensions)
- Rules can also be slightly abstracted – occasionally, they are written to describe integration with national assets (e.g., NHS Spine Directory Service)

- Provide conceptual and functional models that outline expectations for how inbound/outbound interfaces in an environment should behave for the use case(s) in scope
- They almost always have some level of abstraction and aren't typically designed to be instructions for how to integrate with a specific asset

# Resources to Find Each Others Work and Get Involved

# Additional Resources

| | |
|---|---|
| Canadian FHIR Registry | Hosts the nationally recommended FHIR profiles, extensions, value sets, URIs and other useful, commonly used components. |
| FHIR.Org/Guides/Stats | Provides relevant FHIR iGuides across the globe and how they use the profile, extension, value set etc. that you are searching for, within HL7 FHIR. |
| Chat.fhir.org | Your one stop shop for finding any and solutions within the HL7 FHIR community. Gives you access to the greatest minds using FHIR, including yourself. |
| Extension Registry | HL7 FHIR defined extension pack that can be used for finding relevant extensions for your guide. |

# Questions?