



HL7 FHIR DevDays 2017



Advanced Directories

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Amsterdam, 15-17 November | [@fhir_furore](#) | [#fhirdevdays17](#) | [www.fhirdevdays.com](#)



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FHIR core team member

FHIR Management Group member

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Author of ServD Standard endorsed by the Object Management Group

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Agenda

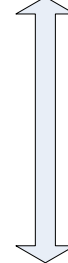


- What are directories?
- Why do we have them?
- How is it done today?
- How much of this does FHIR cover?
- Who's doing it today
- What's coming for R4?

Service Co-ordination

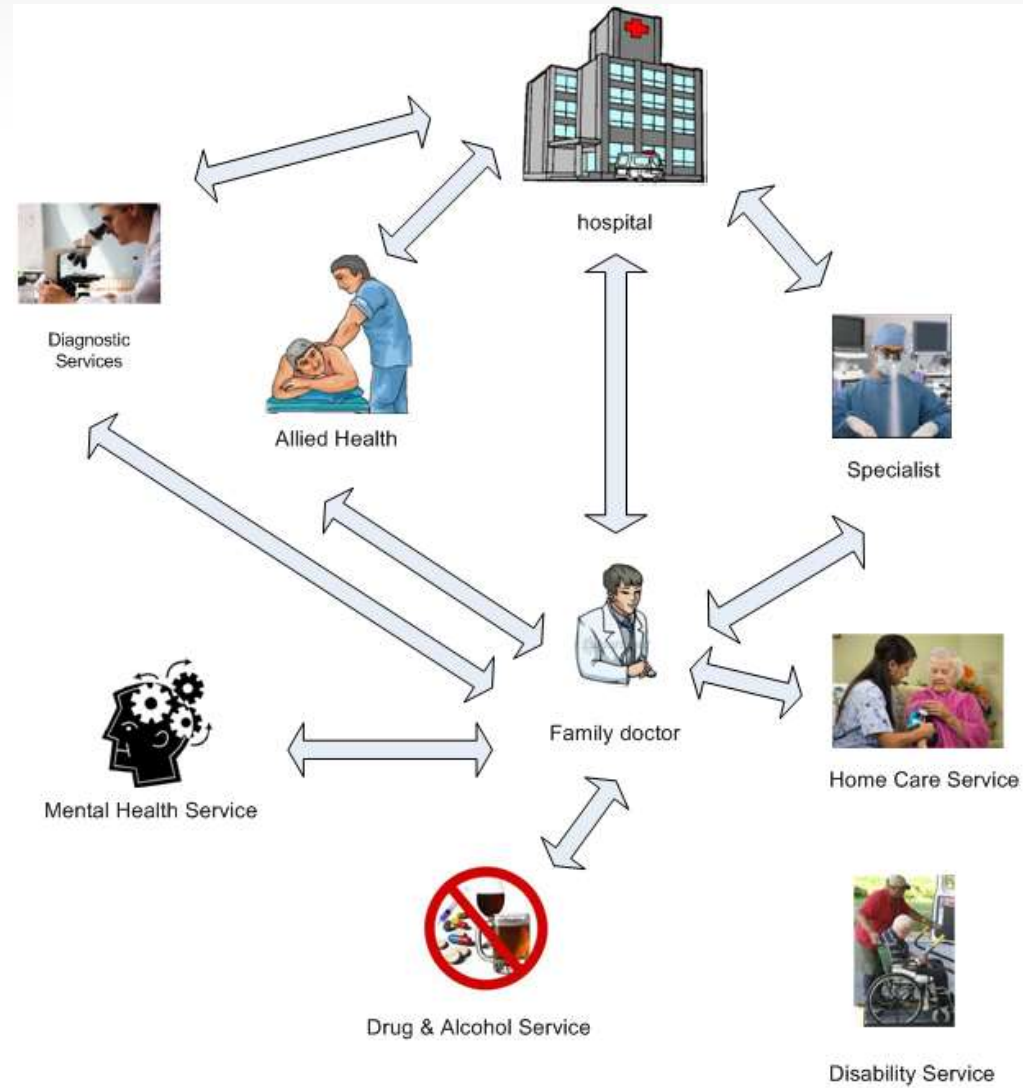


hospital

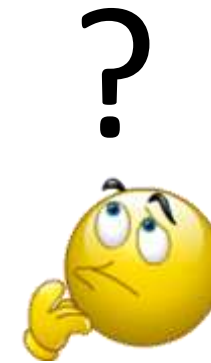
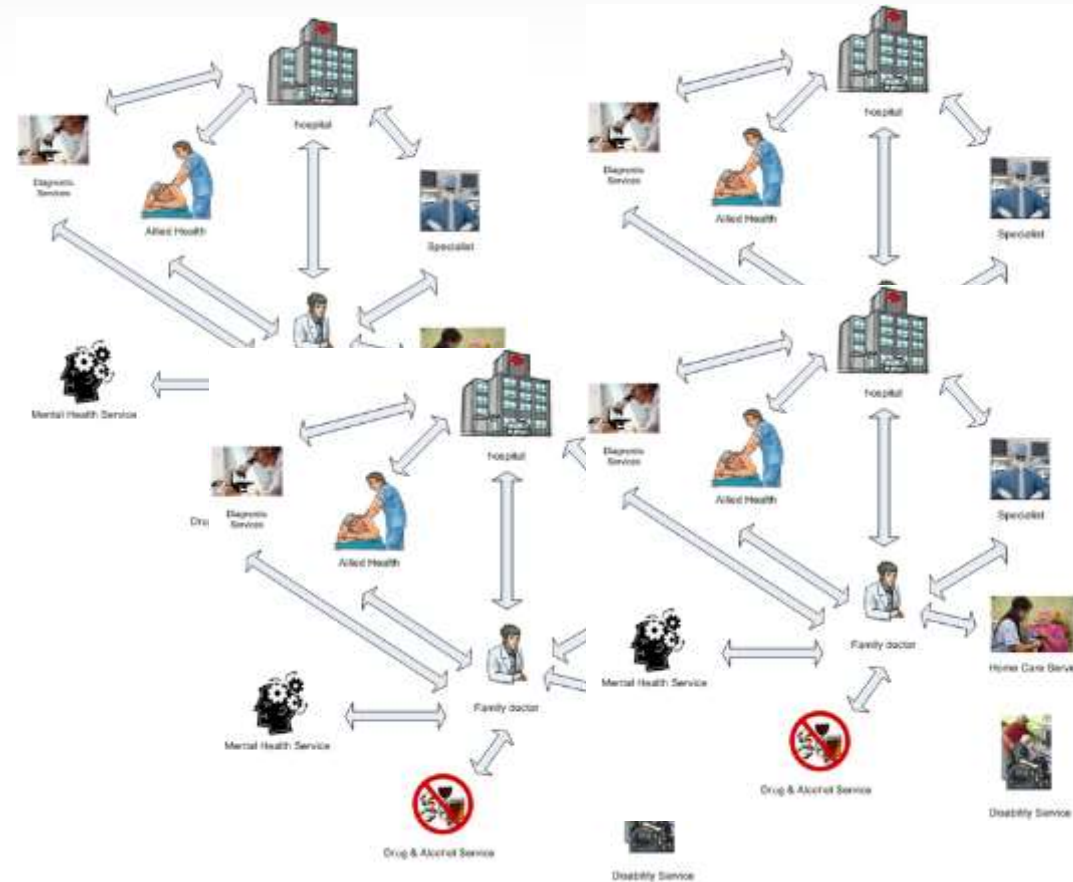


Family doctor

Service Co-ordination



Service Co-ordination



Patient

Complexity of the system is a barrier to service access

Directories are everywhere (*widely varied content/uses*)

National/Regional

- *Yellow Pages*

Organisational/Institutional

- Service provision directory structure
- Organization structure (HR/legal)

Registration/Certification Bodies

- *White Pages*

Enterprise

- *Localised content*

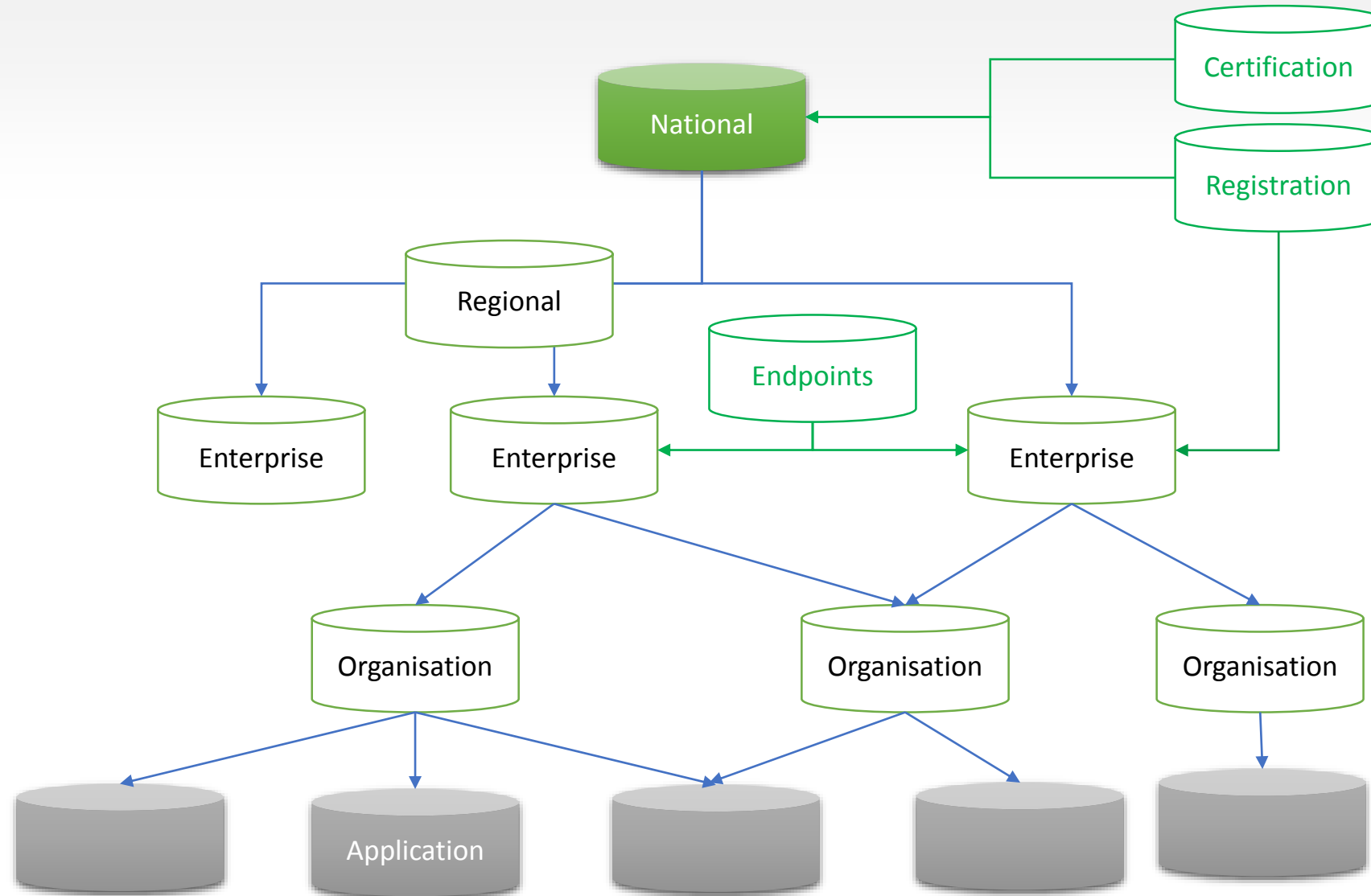
Terminology Services

Solution/Application Directories

- Internal information
- *Black book*
- External information

Supporting other activities

- Referrals
- Appointments/Rostering/Scheduling
- Departments, Practitioners, Locations, Services, ...
- Care Planning/Shared care
- Care Teams
- Service costs/availability



Scenario – Colonoscopy at a hospital



- Visit General Practitioner
- Referred to Gastroenterologist
- Visit Gastroenterologist
- Prescribe medications
- Take medications
- Have Tests done
- Visit Gastroenterologist
- Book Colonoscopy
- Admission to hospital
- Colonoscopy Performed
- Discharged from hospital
- Review results with Gastroenterologist

Appointments

Forms

Search/Lookup

Endpoints

Directory Use Cases

Practitioner **looking up** a known practitioner's details

(internal or external)

System **looking up** a practitioner's endpoint details

Practitioner **searching** for a practitioner that provides a specific service or specialty

Practitioner **searching** for a service with specific properties

(practitioner not relevant)

Consumer **searching** for a service with specific properties

(covered by my insurance, open now, near-by)

Consumer **searching** for availability of a practitioner at a specific location

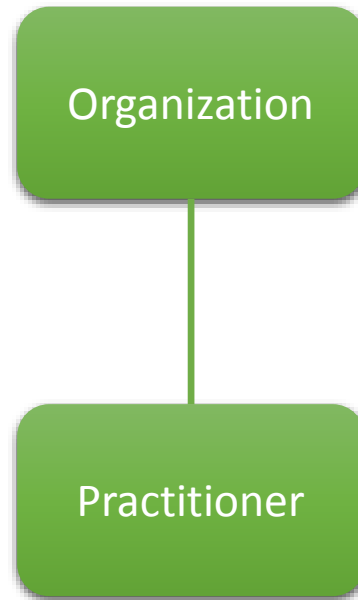
Fundamentals for Success



- Accurate
- Current
- Breadth of content
- Relevant terminology
- Accessible
- Minimal technical barriers
- Securely partitioned data

How is this done today?

Healthcare Provider Directory



Typically Standard Hierarchy
(Org chart)

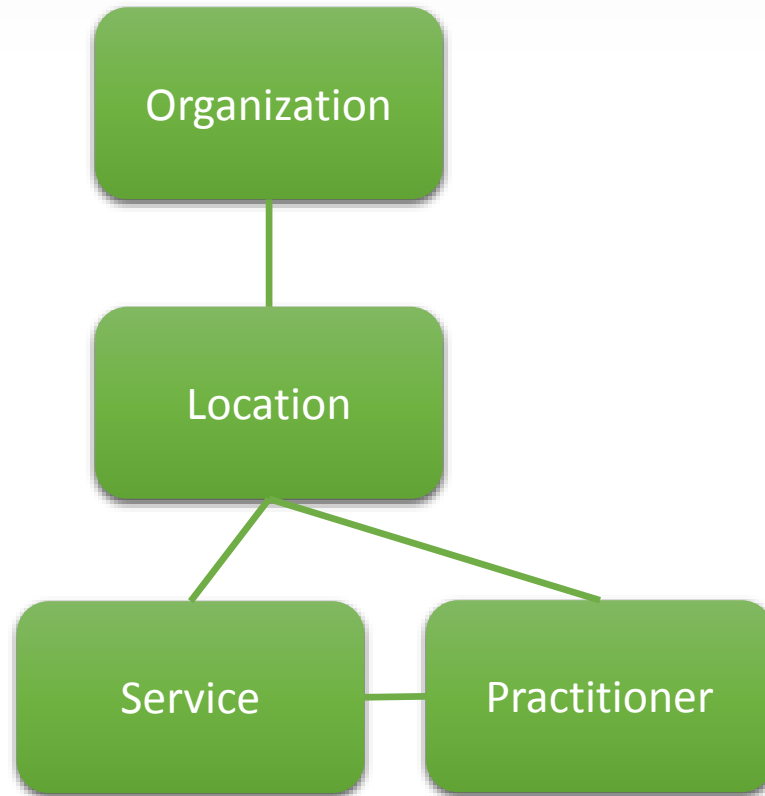
Locations as nested organizations

Specialties/Services properties of
locations/practitioners

Duplicate details rather than share

*How to deal with non hierarchical
data?*

Services Directory



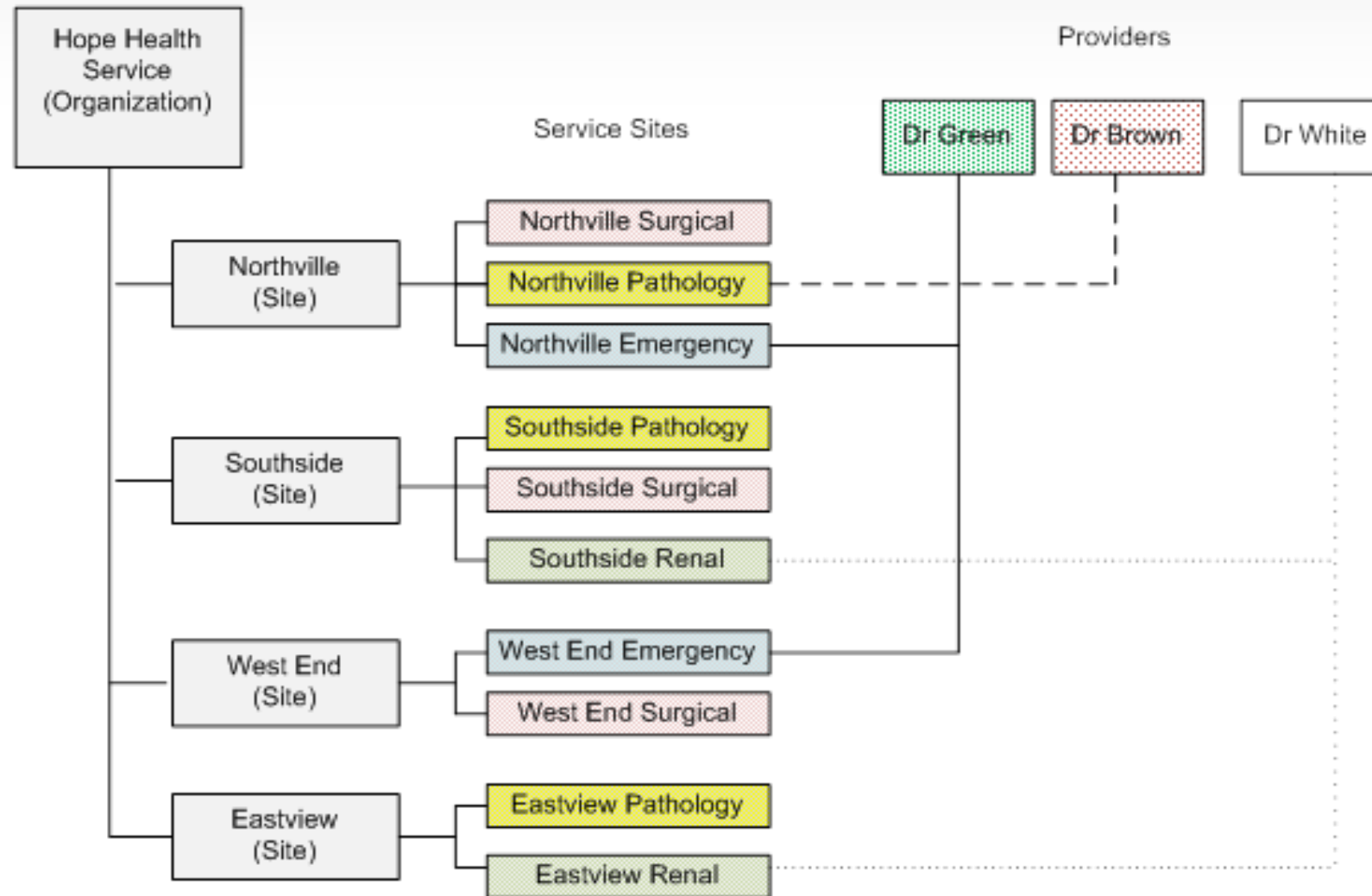
Multi-Hierarchy

Specialties/Services separated from practitioners

Practitioners have different details at different locations

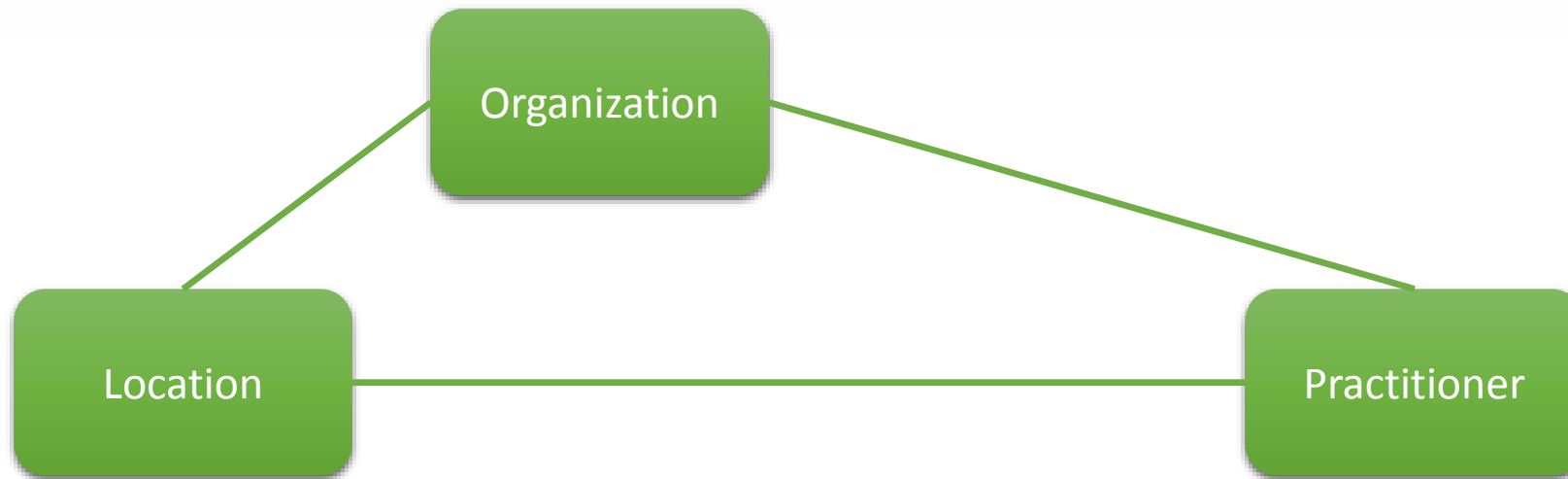
Recognition of real world

Practitioner Roles

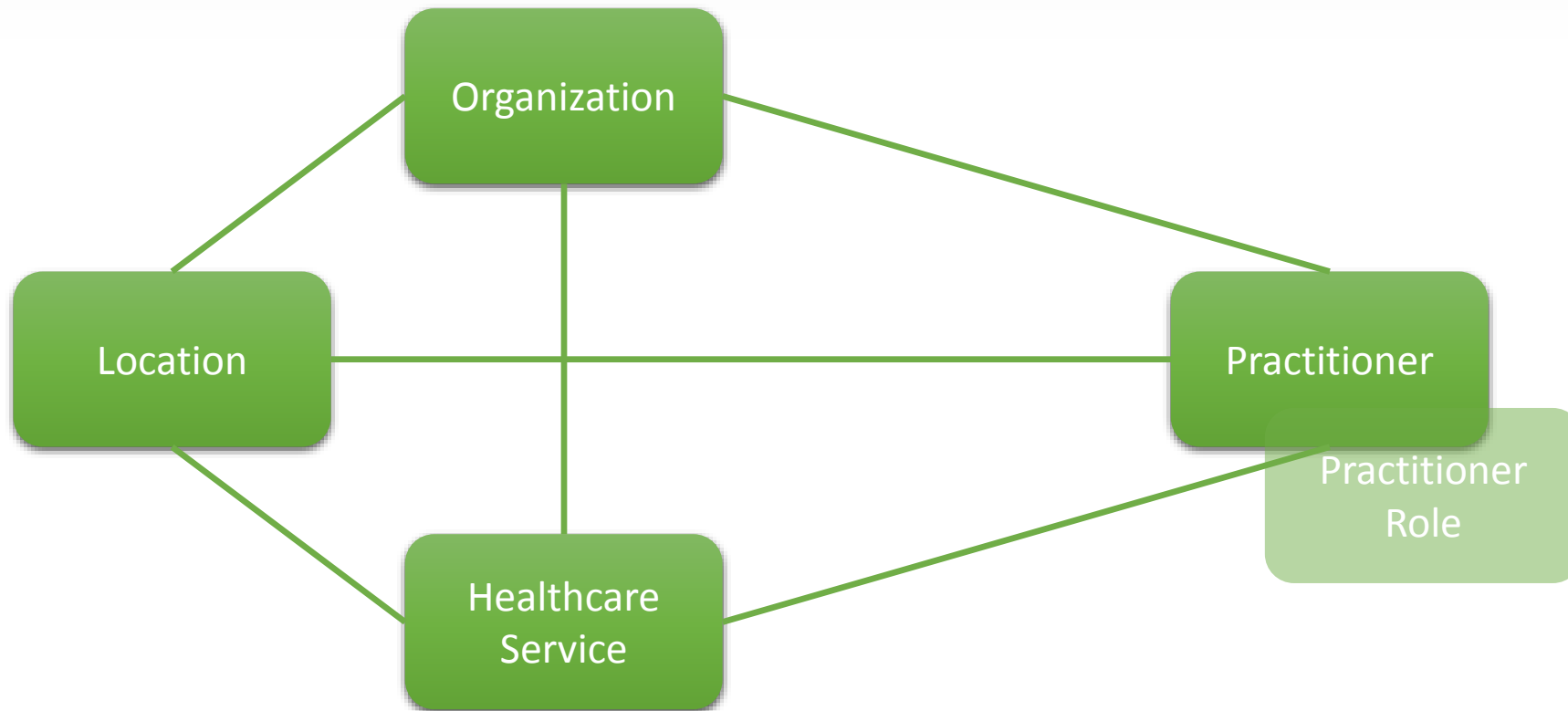


How much of this does FHIR do?

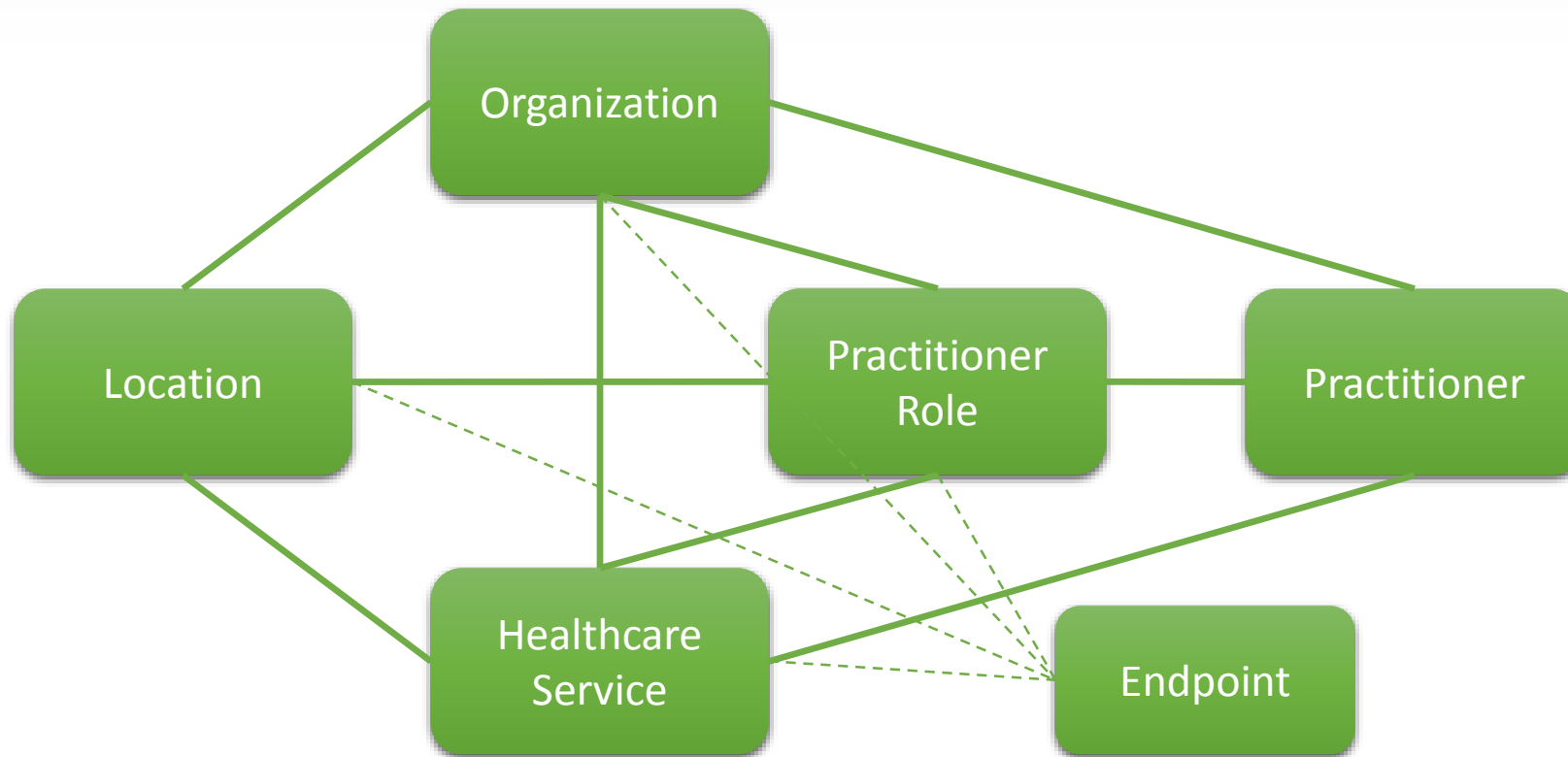
DSTU1



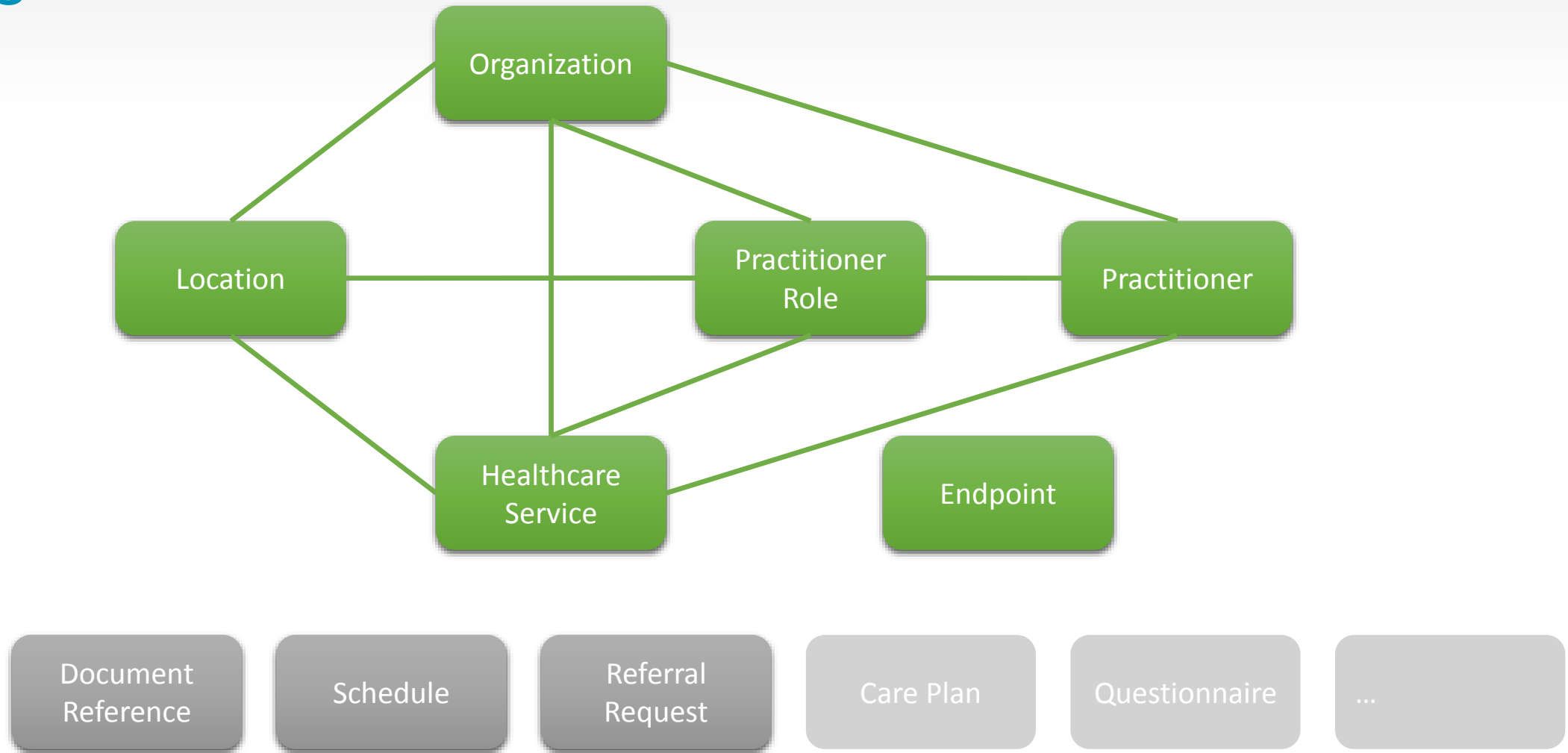
DSTU2



STU3



STU3



Endpoint Resource

- <http://hl7.org/fhir/endpoint.html>
- Technical details to connect to a server/service
- NOT a description of details of the current system, as found in [CapabilityStatement](#), but of another system
- Expect Extensions/profiles for each connectivity type
 - e.g. IHE XDS, DICOM, Direct

| Name | Flags | Card. | Type |
|----------------------|-------|-------|-----------------------------|
| Endpoint | | 0..* | Endpoint |
| meta | Σ | 0..1 | Meta |
| implicitRules | Σ ?! | 0..1 | uri |
| language | | 0..1 | code Binding |
| text | | 0..1 | Narrative |
| contained | | 0..* | Resource |
| extension | | 0..* | Extension |
| modifierExtension | ?! | 0..* | Extension |
| identifier | Σ | 0..* | Identifier |
| status | Σ ?! | 1..1 | code Binding |
| connectionType | Σ | 1..1 | Coding Binding |
| name | Σ | 0..1 | string |
| managingOrganization | Σ | 0..1 | Reference(Organization) |
| contact | | 0..* | ContactPoint |
| period | Σ | 0..1 | Period |
| payloadType | Σ | 1..* | CodeableConcept |
| payloadMimeType | Σ | 0..* | code Binding |
| address | Σ | 1..1 | uri |
| header | | 0..* | string |

Geo-graphic location search

GET [base]/Location?near=-83.694810:42.256500&near-distance=11.20|km...

```
<entry>
  <resource>
    <Location> <!-- location details --> </Location>
  </resource>
  <search>
    <extension url="http://hl7.org/fhir/StructureDefinition/location-distance">
      <valueDistance >
        <!-- The distance that this location resource is from the provided point in the query -->
        <value value="10.5"/> </unit value="km"/>
      </valueDistance>
    </extension>
  </search>
</entry>
```

Organization/Location Hierarchies

- Reference different levels
- Not a fixed nesting structure
- Location Instance vs kind

```

Burgers University Medical Center
  Eastern Services (prov)
    Emergency Dept
    Oncology Dept
      Neuclear Medicine Research Trials (edu)
    Maternity Ward
    Childrens Ward
    Day Procedures Unit
  Mobile Services (Ambulance)
  Research Center (edu)
    Neuclear Medicine (edu)
  Burgers University (edu)
    Neuclear Medicine Faculty (edu)
    Undergraduate Medicine (edu)
  ...
  
```

```

Hospital A Building C (instance)
  East Wing (instance)
    Level 1 (instance)
      Reception (instance)
      Nurses Station EM-ns1 (instance)
        Medication Cupboard A (instance)
      Room 1 (instance)
        Room 1a (instance) - space in room separat.
          Bed 1a (instance) - always in this room
        Room 1b (instance)
          Trolley 43 (instance) - moves about
        Room 1d (instance)
          Trolley 19 (instance) - moves about
        Room 2 (instance)
        ...
      Theatre EM-TA (instance)
      Coridor (generic)
    Level 2 (instance)
      Reception (instance)
      ...
      Nurses Station EM-ns1 (instance)
        Medication Cupboard A (instance)
      Coridor (generic)
  Mobile Services (kind)
    Ambulance (kind)
      Ambulance AMB1 (instance)
      Ambulance AMB2 (instance)
  
```

Who's using it today?

Using FHIR today



Private sector initiative advancing interoperability

- The purpose of the Argonaut Project is to rapidly develop a first-generation FHIR-based API and Core Data Services specification to enable expanded information sharing for electronic health records and other health information technology based on Internet standards and architectural patterns and styles.



Michigan State-wide Health Provider and Consumer Directory

- Are using the FHIR standard (DSTU2) to create a Provider and Consumer directory. Including the active relationships between patients and the providers that are servicing them.
- They have extended it to support many of the features that are being incorporated into STU3, including the service endpoints.

Using FHIR today



Enterprise Services Directory

- An enterprise grade services directory caching service that is able to consume data from multiple sources, match, merge and remove duplicates.
- Extend directory with local content
- Then distribute to down-stream applications using v2 master-file update messages.
- Internally is a pure FHIR server.

Connecting Care

- Provides Referral capabilities based on a services directory model to send FHIR Questionnaires between providers electronically.
- This approach being considered for the Australian national e-referral architecture.

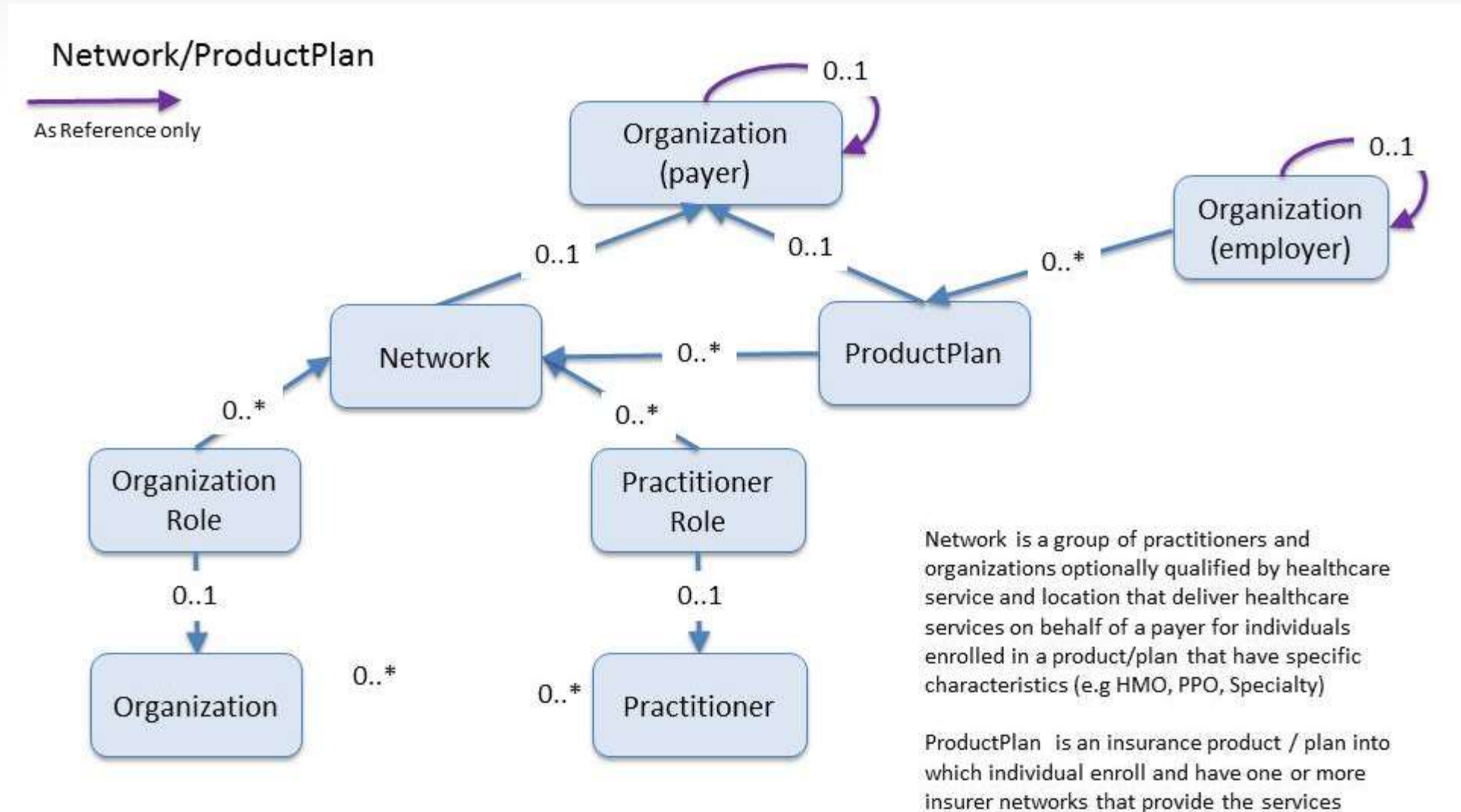
What is coming in R4?

HL7 Validated Healthcare Services Directory



- US ONC assisting development
- Profiles resource updates, and new resources
 - Validation
 - Usage Restriction
 - Network (payor)
 - Product (insurance)
 - Organization Association*
- Initial draft of Implementation Guide
 - For comment ballot in Jan 18 (with R4)
 - Planning to be published alongside R4

New Resources * (subject to change)



Summary



- Directories are everywhere
- No single true directory
- Many levels of detail
- Many uses

- Hierarchical structures

Questions?

Thank you

Keep FHIR-ing on all cylinders