CENTRO NACIONAL EN SISTEMAS DE INFORMACIÓN EN SALUD

OPS DDCC/RACSEL LACPASS Seminars

"Installation of a FHIR Server for DDCC"

Pan American Health Organization

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Goal

In this practical session participants will get to know the installation, authorization and usage process of a HL7 FHIR Server as data repository, which will serve as a test environment for the DDCC: Vaccination Status document(s).

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This presentation...

- The Installation Guide and practical demonstration
- Basic FHIR operations and some resources of interest
- DDCC Repository and Registry Services
- Questions and Answers

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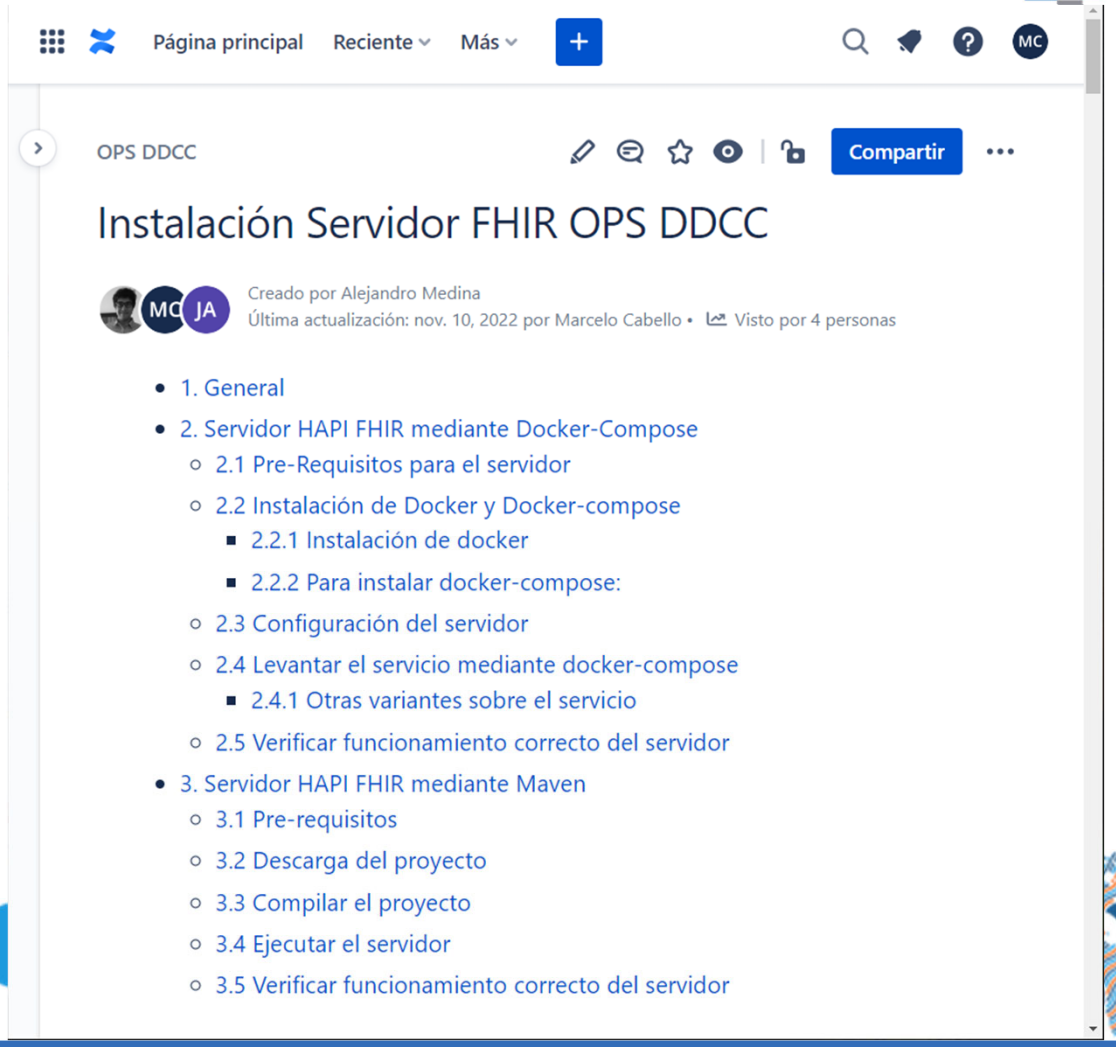
Basic installation of a FHIR Server

FHIR Server Installation Guide

Guide structure

- Fast installation using docker-compose
- Installation based on source code

[Go to Installation Guide]



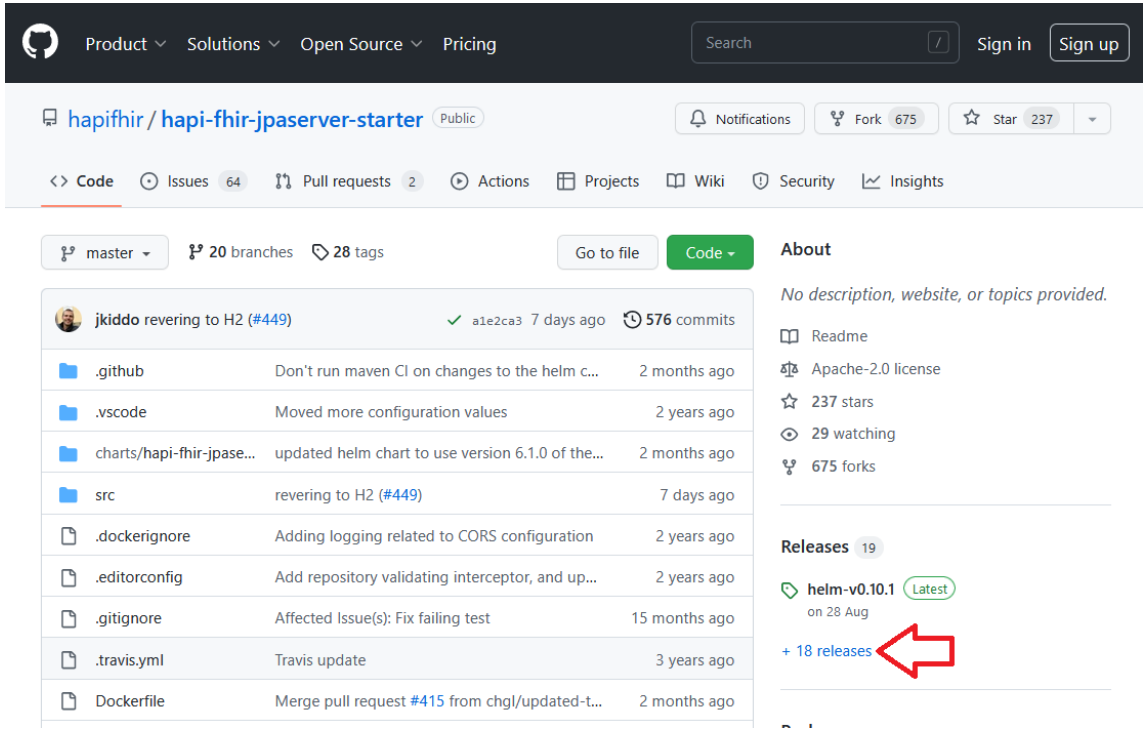
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Practical demonstration

- Installation via docker-compose
  - Verify prerequisites
  - Configure an .env file
  - Create the file *docker-compose.yml*
  - Modify the file *docker-compose.yml* (optional)
  - Start the service for the first time
  - Initiate/stop the service
  - Verify operation

Via source code

- Verify prerequisites
  - Java JDK 17
  - Maven >= 3.6
- Download source code from *github*
- Compile the code
- Execute the server
- Verify operation

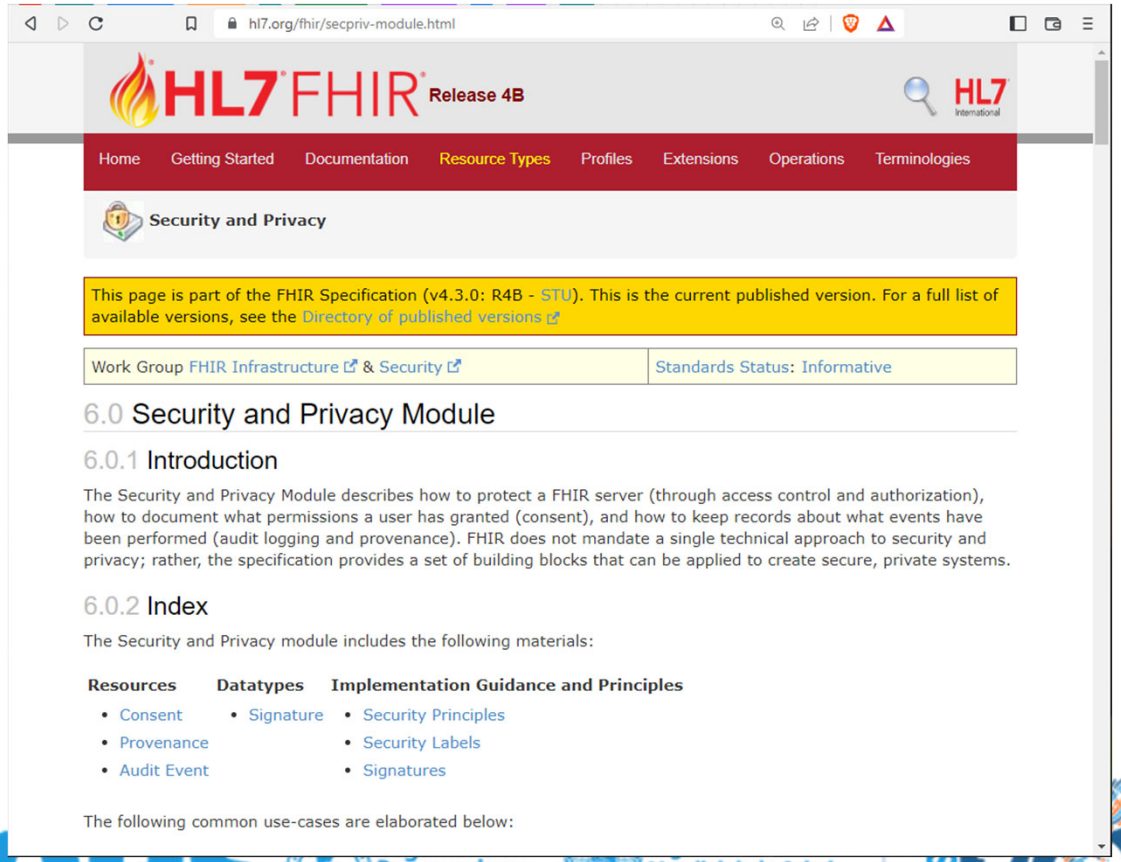


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Security considerations

- FHIR is a Rest API.
- Security is not part of this layer.
- The specification provides recommendations regarding security.



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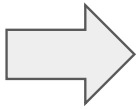
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Basic FHIR operations

Operations of the specification

- Set of interactions defined in the Restful API
- Interactions under RestFul paradigm **C**reate/**R**ead/**U**pdate/**D**elete
  - GET, POST, PUT, DELETE, PATCH
- Others defined under RPC (**E**xecute)
  - When specific actions are required
  - `1045!2P@NODJII<DM@3@NKJIN@ÆrB@I@M<O@)@<GOC$@MODAD><O@`



Standard HTTP codes response
200 OK
201 Created
….

https://hl7.org/fhir/operations.html

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POST /Patient

```
{
  "resourceType": "Patient",
  "id": "example",
  "active": true,
  "name": [
    {
      "use": "official",
      "family": "Timberlake",
      "given": [
        "Justin"
      ]
    }
  ],
  "gender": "male",
  "birthDate": "1974-12-25"
}
```

Status: 201 Created


```
{
    "resourceType": "Patient",
    "id": "1",
    "meta": {
        "versionId": "1",
        "lastUpdated": "2022-11-25T14:22:21.466+00:00"
    },
    "text": {
        "status": "generated",
        "div": "<div xmlns=\"http://www.w3.org/1999/xhtml\"><div
 class=\"hapiHeaderText\">Justin <b>TIMBERLAKE </b></div><table
class=\"hapiPropertyTable\"><tbody><tr><td>Date of birth</td><td
><span>25 December 1974</span></td></tr></tbody></table></div>"
    },
    "active": true,
    "name": [
        {
            "use": "official",
            "family": "Timberlake",
            "given": [
                "Justin"
            ]
        }
    ],
    "gender": "male",
    "birthDate": "1974-12-25"
}
```


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PUT /Patient/1


```
{
  "resourceType": "Patient",
  "id": "1",
  "active": true,
  "name": [
    {
      "use": "official",
      "family": "Timberlake",
      "given": [
        "Justin",
        "Andrew",
      ]
    }
  ],
  "gender": "male",
  "birthDate": "1974-12-25"
}
```


```
{
    "resourceType": "Patient",
    "id": "1",
    "meta": {
        "versionId": "2",
        "lastUpdated": "2022-11-25T14:33:44.708+00:00"
    },
    "text": {
        "status": "generated",
        "div": "<div xmlns=\"http://www.w3.org/1999/xht
ml\"><div class=\"hapiHeaderText\">Justin Andrew <b>TIM
BERLAKE </b></div><table class=\"hapiPropertyTable\"><t
body><tr><td>Date of birth</td><td><span>25 December 19
74</span></td></tr></tbody></table></div>"
    },
    "active": true,
    "name": [
        {
            "use": "official",
            "family": "Timberlake",
            "given": [
                "Justin",
                "Andrew"
            ]
        }
    ],
    "gender": "male",
    "birthDate": "1974-12-25"
}
```


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GET /Patient/1

Status: 200 OK


```
{
    "resourceType": "Patient",
    "id": "1",
    "meta": {
        "versionId": "1",
        "lastUpdated": "2022-11-25T14:22:21.466+00:00",
        "source": "#vcO29yLT4ICgk8Yx"
    },
    "text": {
        "status": "generated",
        "div": "<div xmlns=\"http://www.w3.org/1999/xht
ml\"><div class=\"hapiHeaderText\">Justin <b>TIMBERLAKE
 </b></div><table class=\"hapiPropertyTable\"><tbody><t
r><td>Date of birth</td><td><span>25 December 1974</spa
n></td></tr></tbody></table></div>"
    },
    "active": true,
    "name": [
        {
            "use": "official",
            "family": "Timberlake",
            "given": [
                "Justin"
            ]
        }
    ],
    "gender": "male",
    "birthDate": "1974-12-25"
}
```


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DELETE /Patient/1

Status: 200 OK


```
{
  "resourceType": "OperationOutcome",
  "text":{
    "status": "generated",
    "div": "<div xmlns=\"http://www.w3.org/1999/xhtml\"><h1>Operation Outcome</h1><table border=\"0\"><tr><td style=\"font-weight: bold;\">INFORMATION</td><td>[]</td><td><pre>Successfully deleted 1 resource(s) in 40ms</pre></td>\n\t\t\t</tr>\n\t\t</table>\n\t</div>"
  },
  "issue": [
    {
      "severity": "information",
      "code": "informational",
      "diagnostics": "Successfully deleted 1 resource(s) in 40ms"
    }
  ]
}
```


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Resource of interest based on DDCC

- **Bundle**
  - A container for a collection of resources.
  - Used for:
    - Search, History, Messaging, **Documents, Transactions** and **Storage**
    - 

    - Create towards the root of the server (POST /)
      - Type **Transaction|Batch**
      - Separate resources
    - Create over the route of Bundle (POST /Bundle)
      - Type **Document**
      - Requires a Composition resource together with others
      - The resources remain packaged inside /Bundle



Resource of interest based on DDCC



- **Composition**:
  - An information set related to health care compiled inside a unique logical package.
  - Provides a unique consistent declaration of meaning, establishes its own context.
  - Has a clinical attestation with regard to the person making the declaration. A composition defines the necessary structure and narrative content for a document.
  - Operation /Composition/id/$document
    - Generates a completely packaged document from a Composition resource

Resource of interest based on DDCC

- **DocumentReference**:
  - A reference to a document of any type for any purpose.
  - Provides meta data about the document to allow its discovery and management.
  - The scope of a document is any object serialized with a MIME type. Therefore it contains formal documents focused on the patient (CDA), clinical notes, scanned paper and non-specific documents for the patient.

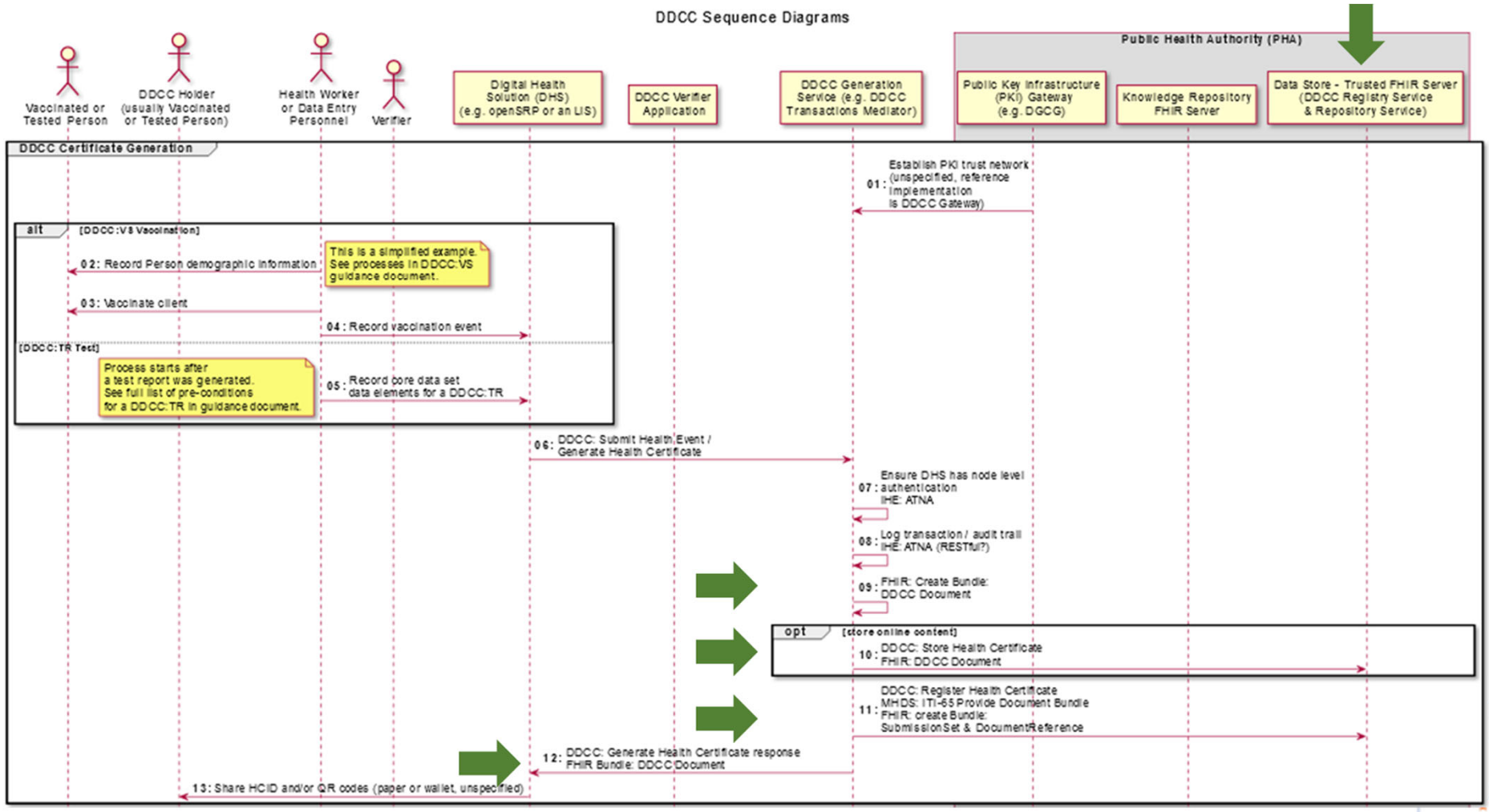
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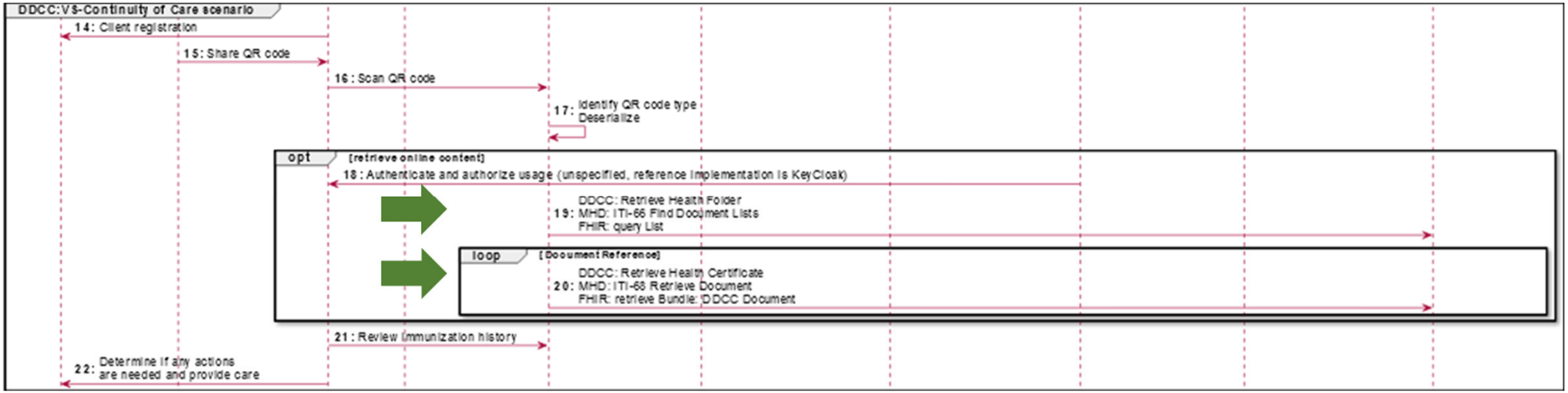
DDCC Repository and Registry Services

Work flow: DDCC Certificate Generation



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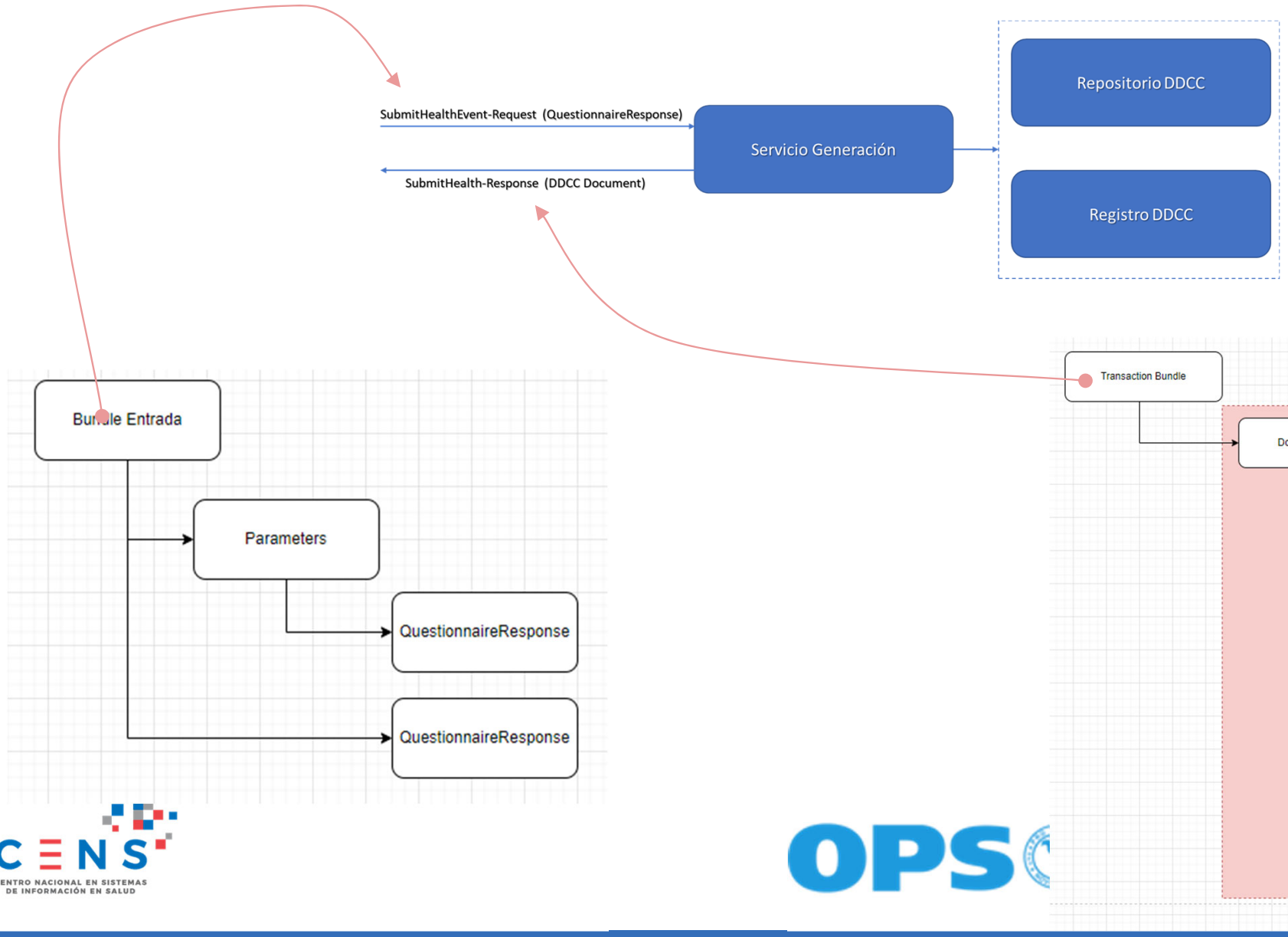
Work flow: VS-Continuity Care scenario



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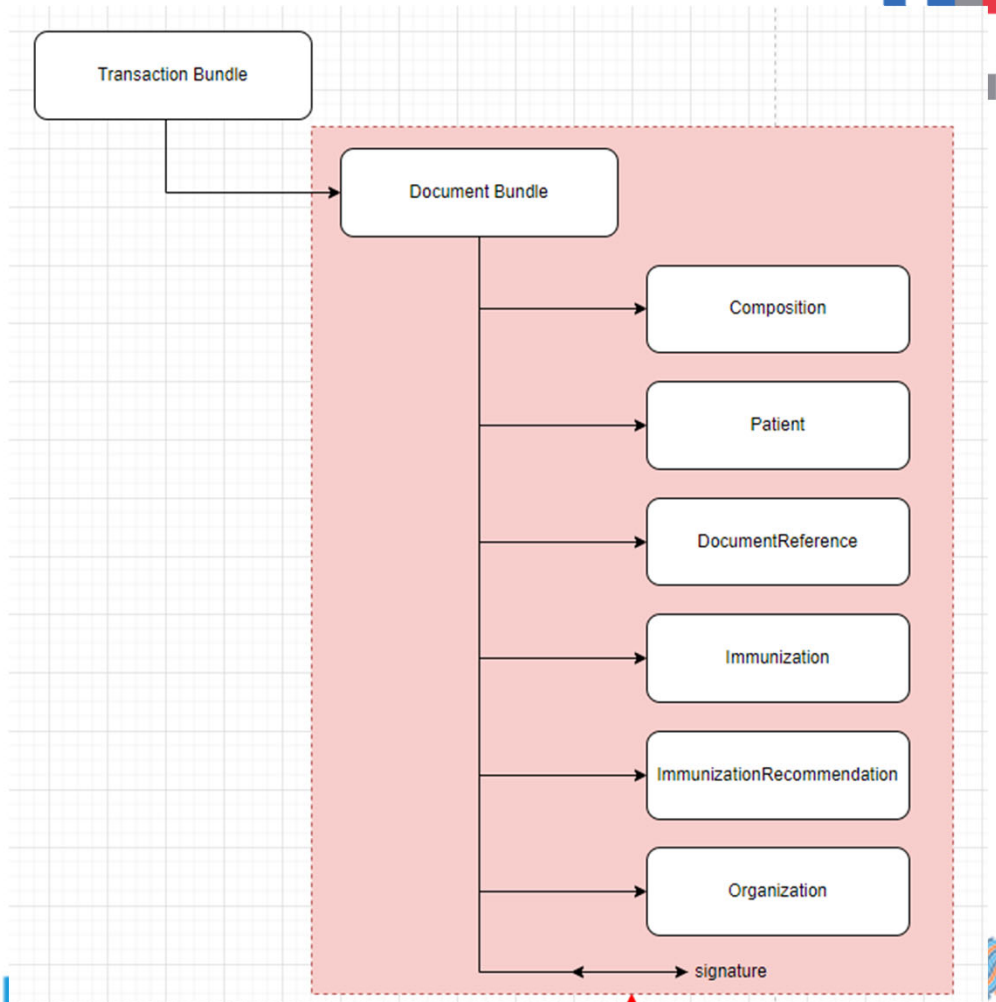
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SubmitHealthEvent-Request (QuestionnaireResponse)
SubmitHealth-Response (DDCC Document)
Servicio Generación
Repositorio DDCC
Registro DDCC
Bundle Entrada
Parameters
QuestionnaireResponse
QuestionnaireResponse
Transaction Bundle
Document Bundle
Composition
Patient
DocumentReference
Immunization
ImmunizationRecommendation
Organization
signature

Repository Service
Store Health Certificate

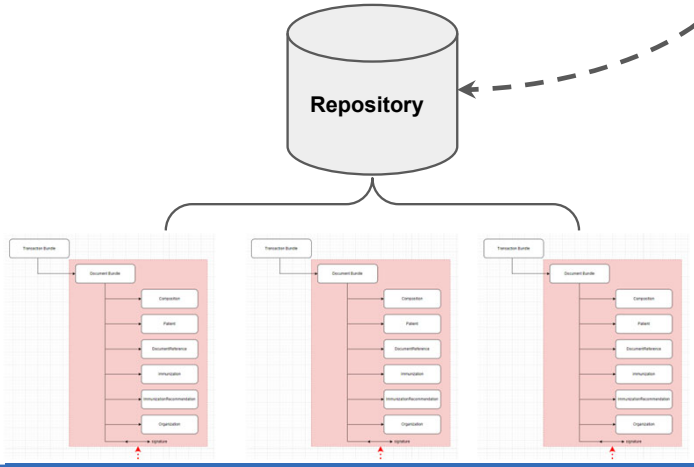


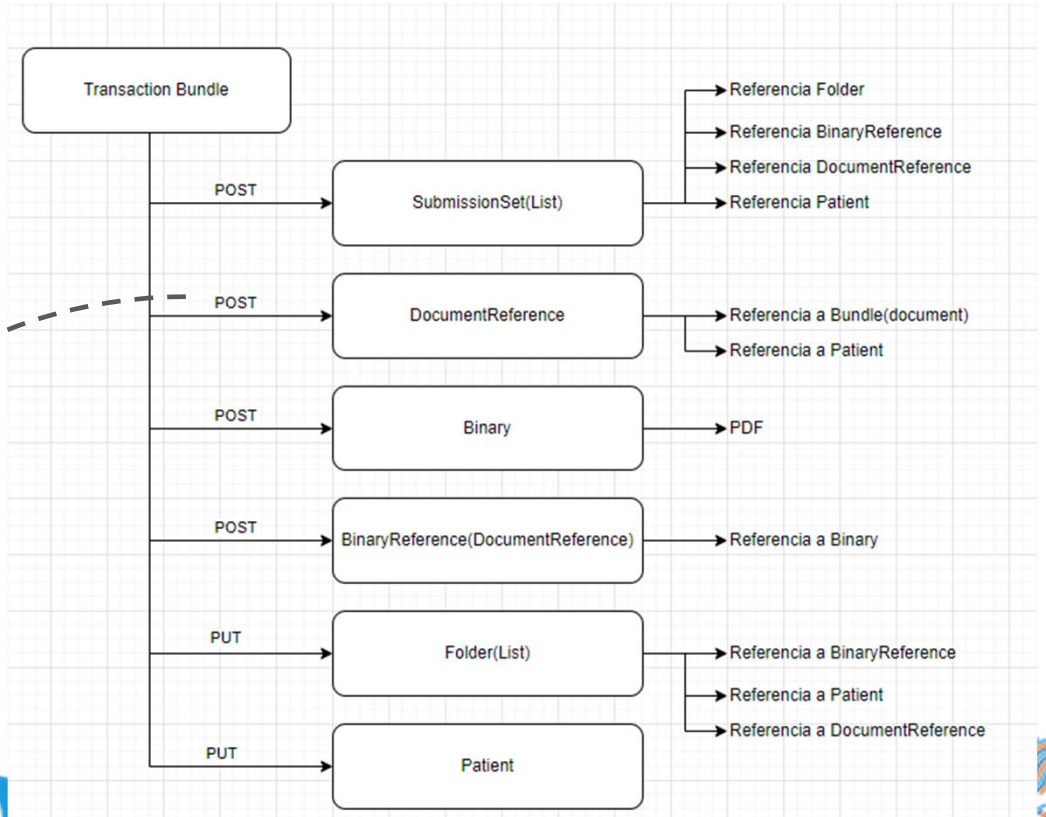


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Registry Service
Provide Document Bundle (ITI-65)







Retrieving certificate information

Reading data from the DDCC repository

ITI-67

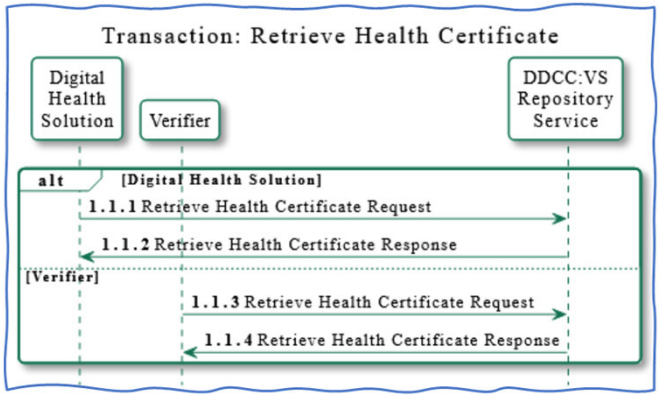
19.4 Retrieve Health Certificate Reference



- Search about DocumentReference

ITI-68

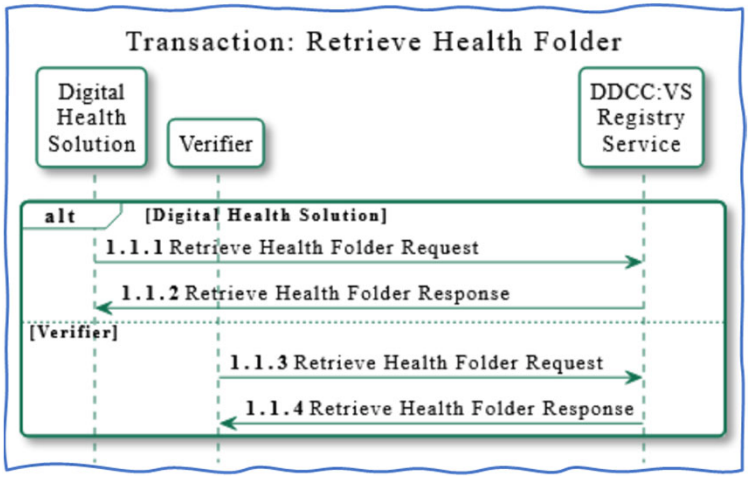
19.5 Retrieve Health Certificate



- Retrieve a DDCC vaccination line from ITI-66 or ITI-67

ITI-66

19.6 Retrieve Health Folder



- Retrieve vaccination history
- From the List resource of the type **Folder**
- DocumentReferences with data of vaccination certificate
- GET fhir/List?code=folder&identifier=123456

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Questions and Answers

Thank you



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