InteropEHRate

EHR in people's hands across Europe

ARCHITECTURE, PROTOCOLS AND API's

MID-TERM PUBLIC WORKSHOP

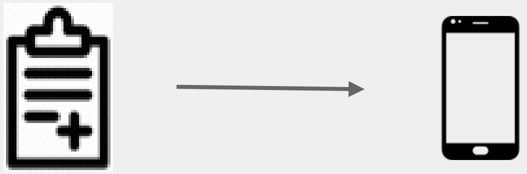
21 OCTOBER 2020

This project has received funding from the European
Union's Horizon 2020 research and innovation
programme under grant agreement No 826106

INTEROPEHRATE
R2D ACCESS | CLOUD | EMERGENCY PROTOCOLS

Alessio Graziani

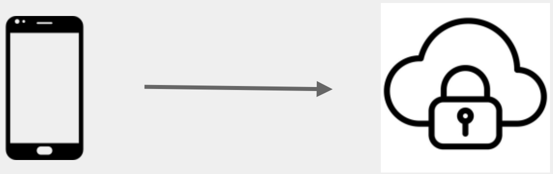
Engineering, Italy



Import Easily

Easily receive your health data from national or foreign healthcare providers and store them onto your mobile device

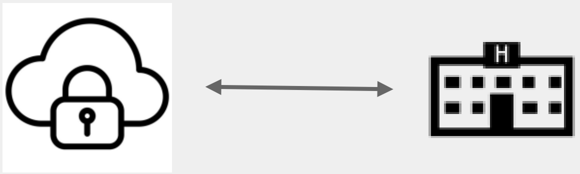
R2D Access



Backup Privately

Automatically backup your health data on your preferred Cloud without disclosing them to your Cloud provider

R2D Backup



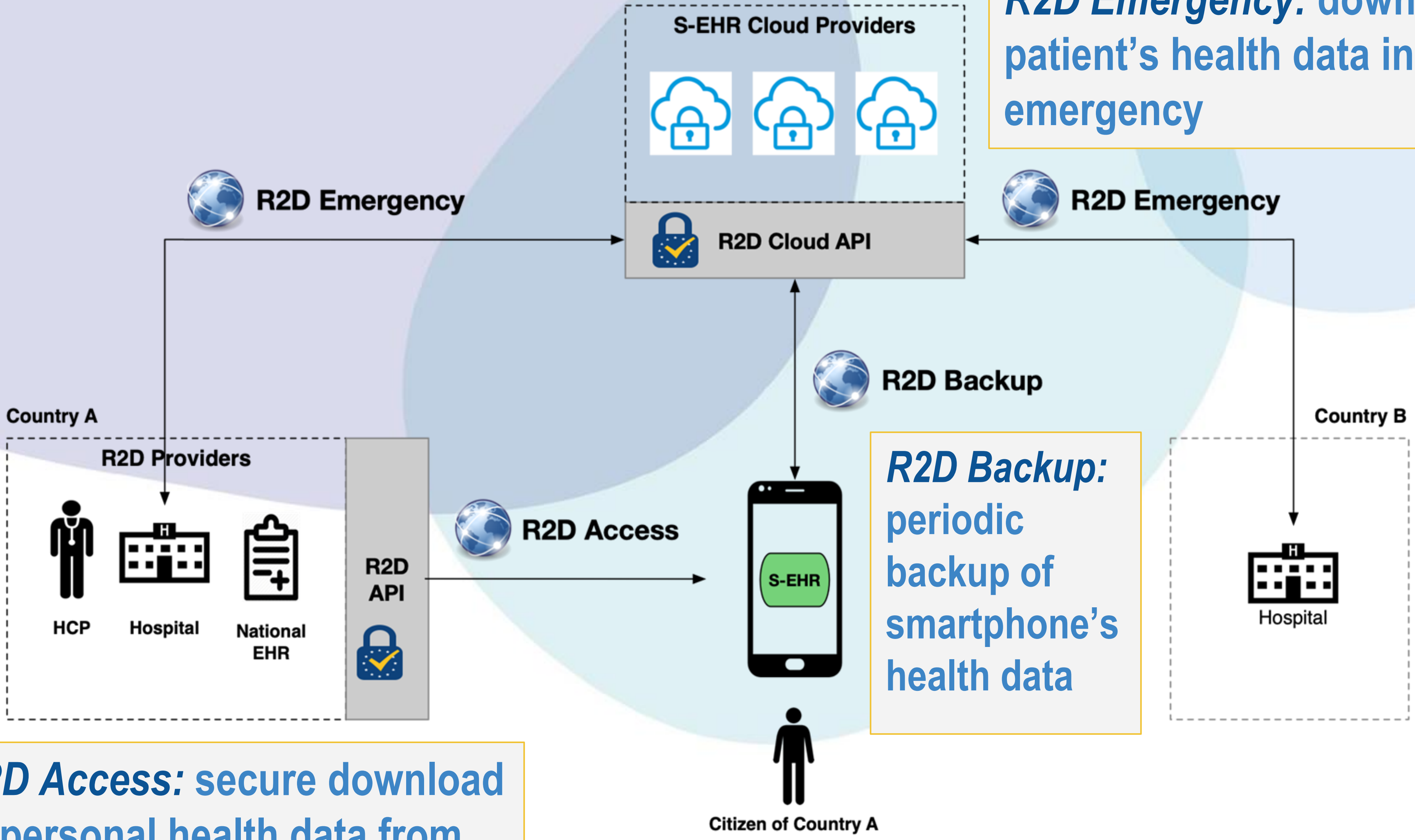
Share Trustly

Enable qualified HCPs to access and enrich your health data in emergency situations anywhere in the EU

R2D Emergency

R2D PROTOCOLS

R2D Emergency: download of patient's health data in emergency



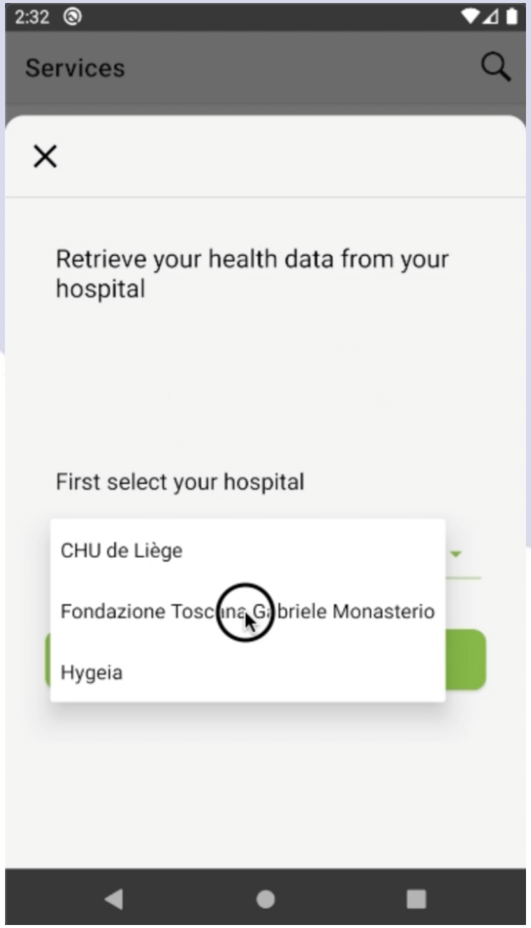
R2D Backup: periodic backup of smartphone's health data

R2D Access: secure download of personal health data from an health care provider

R2D ACCESS BASIC PRINCIPLES

1. Allow a citizen to **access (only) to his / her health data**
2. **Read only** protocol
3. **FHIR** Based
   a. *Data Model based on specific FHIR profiles*
   b. *Query language based on FHIR RESTful APIs*
4. Authentication with eIDAS
5. Encrypted data exchange

R2DACCESS - CITIZEN POINT OF VIEW



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Services

×

Retrieve your health data from your hospital

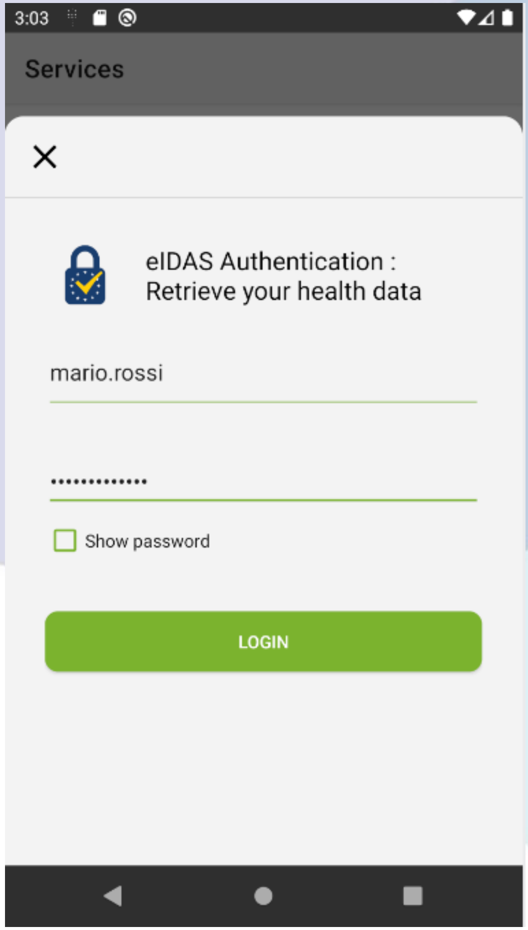
First select your hospital

CHU de Liège

Fondazione Toscana Gabriele Monasterio

Hygeia

1. Initialization



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Services

×

eIDAS Authentication : Retrieve your health data

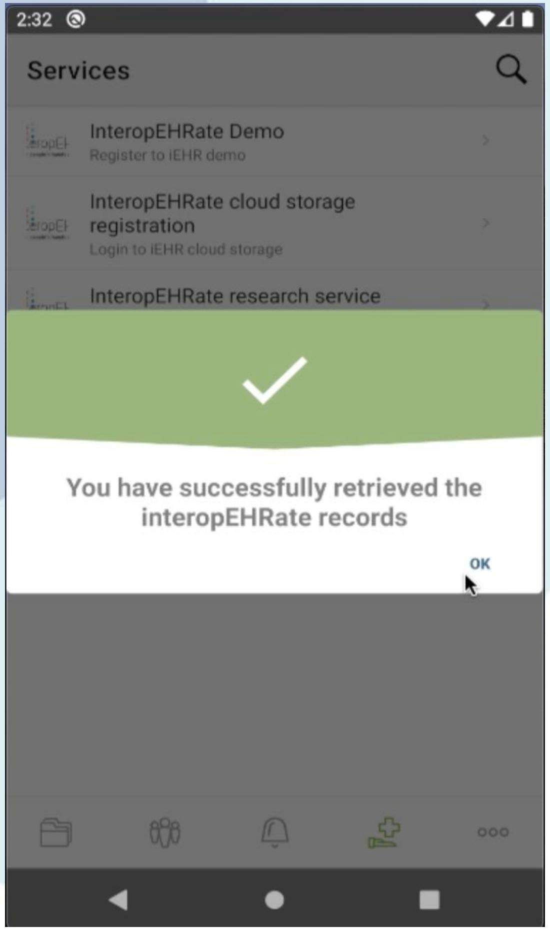
mario.rossi

••••••••••••••

□ Show password

LOGIN

2. Authentication



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Services

InteropEHRate Demo
Register to iEHR demo

InteropEHRate cloud storage registration
Login to iEHR cloud storage

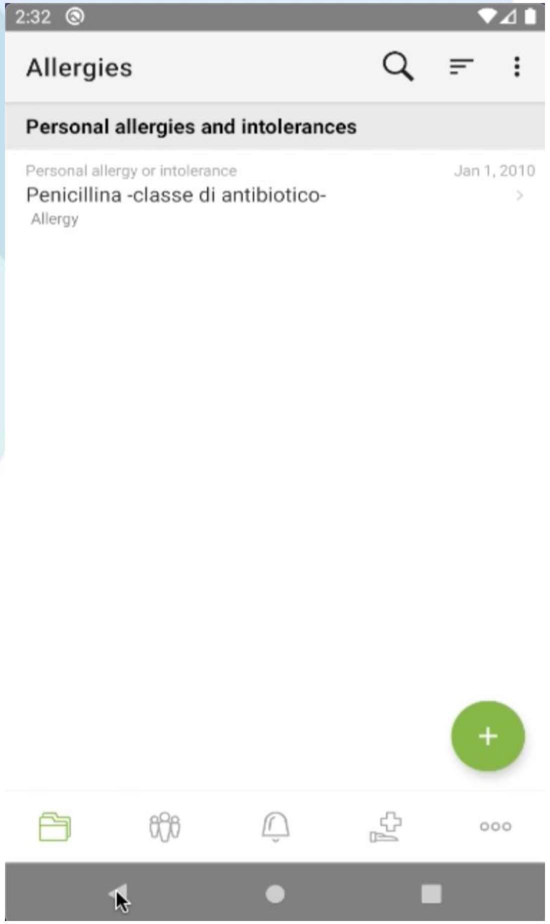
InteropEHRate research service

✓

You have successfully retrieved the interopEHRate records

OK

3. Downloading



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Allergies

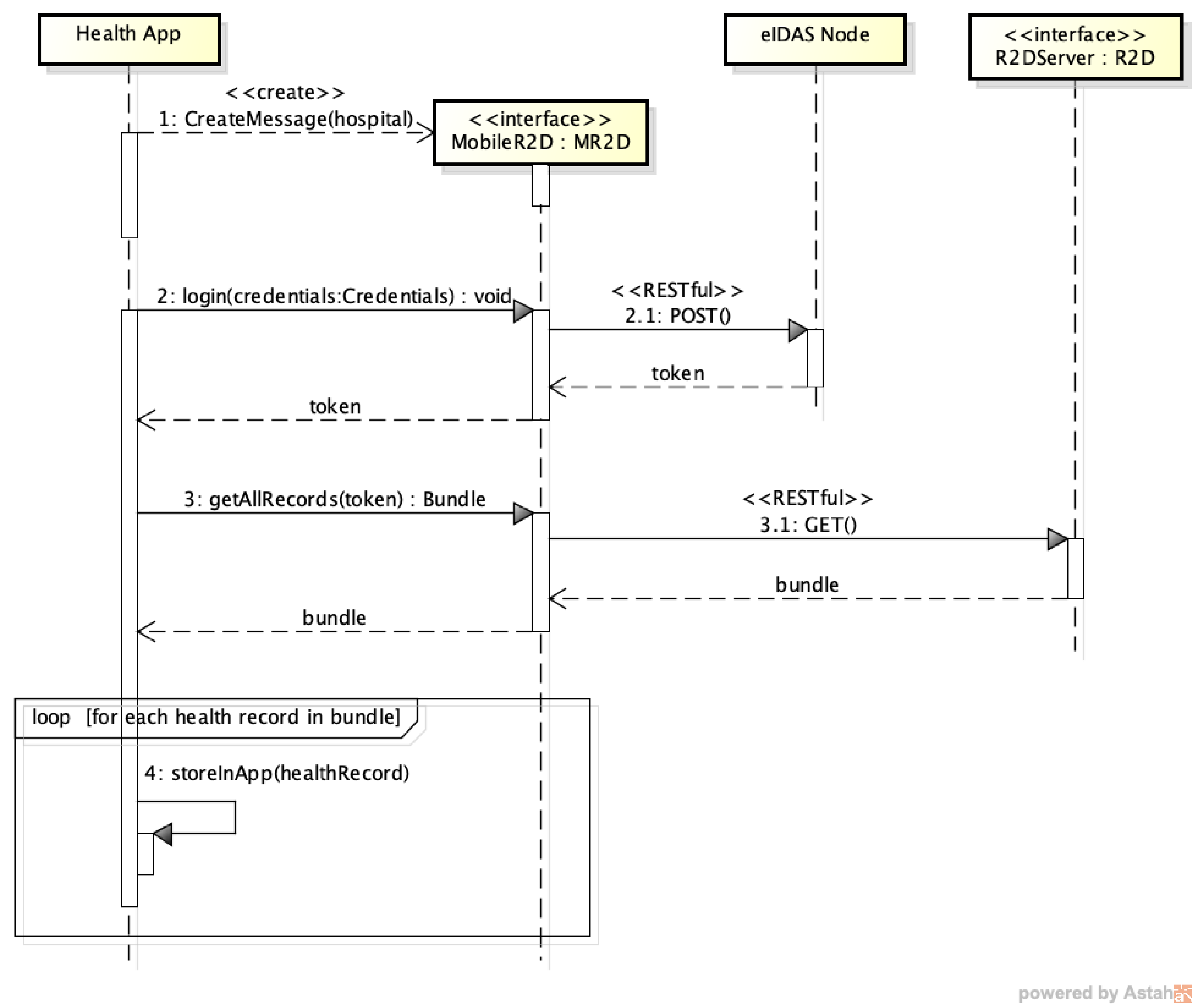
Personal allergies and intolerances

Personal allergy or intolerance — Jan 1, 2010
Penicillina -classe di antibiotico-
Allergy

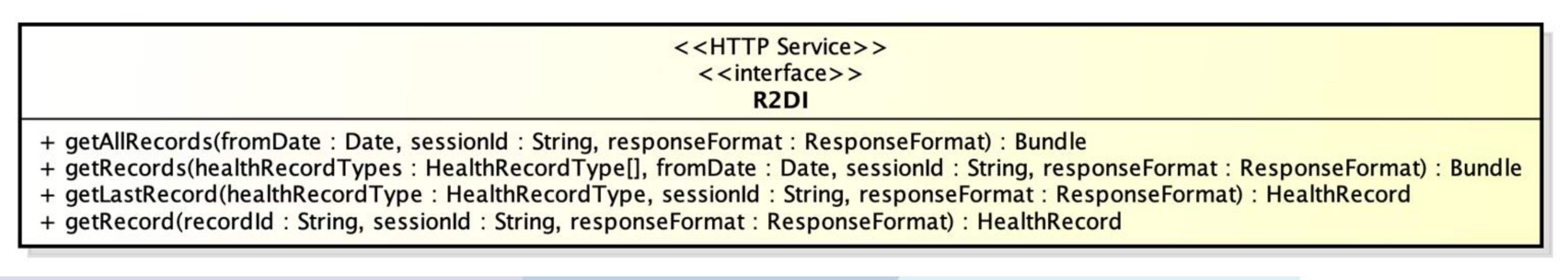
4. Storage

R2D ACCESS- DEVELOPER POINT OF VIEW

- **Step 1:** creates an instance of the Mobile Library
- **Step 2:** authenticate with eIDAS
- **Step 3:** retrieve all the medical records of the citizen
- **Step 4:** use the downloaded records locally in the app



R2D CONCRETE OPERATIONS



```
<<HTTP Service>>
<<interface>>
R2DI
+ getAllRecords(fromDate : Date, sessionId : String, responseFormat : ResponseFormat) : Bundle
+ getRecords(healthRecordTypes : HealthRecordType[], fromDate : Date, sessionId : String, responseFormat : ResponseFormat) : Bundle
+ getLastRecord(healthRecordType : HealthRecordType, sessionId : String, responseFormat : ResponseFormat) : HealthRecord
+ getRecord(recordId : String, sessionId : String, responseFormat : ResponseFormat) : HealthRecord
```

Conceptual R2D operations have been mapped to concrete FHIR query (FHIR RESTful API)

```
getLastRecord(LABORATORY_RESULTS);
```

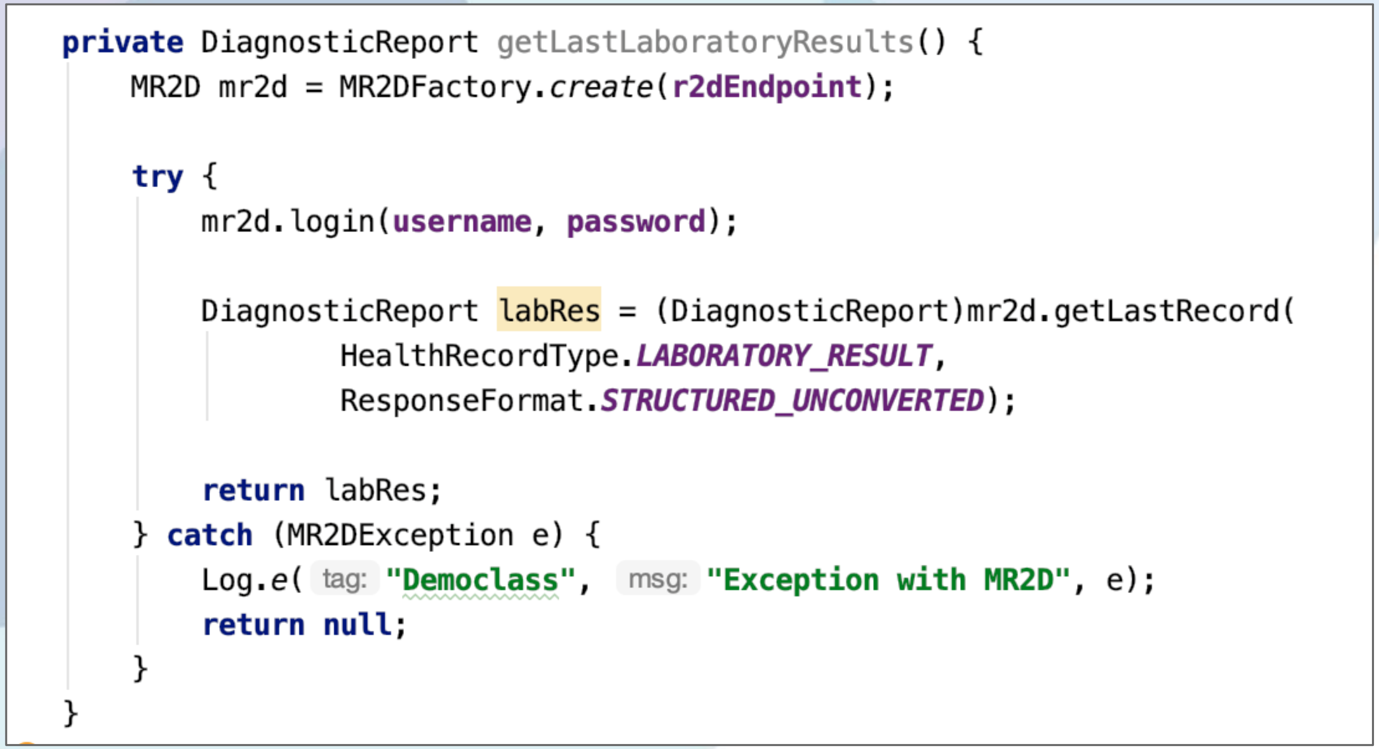
↓

```
GET <BASE>/DiagnosticReport?category=LAB&_sort=-date&_count=1
```

R2D over FHIR applies search narrowing, the implicit subject is the authenticated citizen

R2D ACCESS SAMPLE CODE

Translation of conceptual operations into concrete R2D invocations is a responsibility of **R2D Mobile Library** (IEHR framework)



```
private DiagnosticReport getLastLaboratoryResults() {
    MR2D mr2d = MR2DFactory.create(r2dEndpoint);

    try {
        mr2d.login(username, password);

        DiagnosticReport labRes = (DiagnosticReport)mr2d.getLastRecord(
                HealthRecordType.LABORATORY_RESULT,
                ResponseFormat.STRUCTURED_UNCONVERTED);

        return labRes;
    } catch (MR2DException e) {
        Log.e( tag: "Democlass", msg: "Exception with MR2D", e);
        return null;
    }
}
```

`getLastRecord(LABORATORY_RESULTS);`

↓

HL7 FHIR

GET `<BASE>/DiagnosticReport?category=LAB&_sort=-date&_count=1`

R2D ACCESS – Y3 ROADMAP

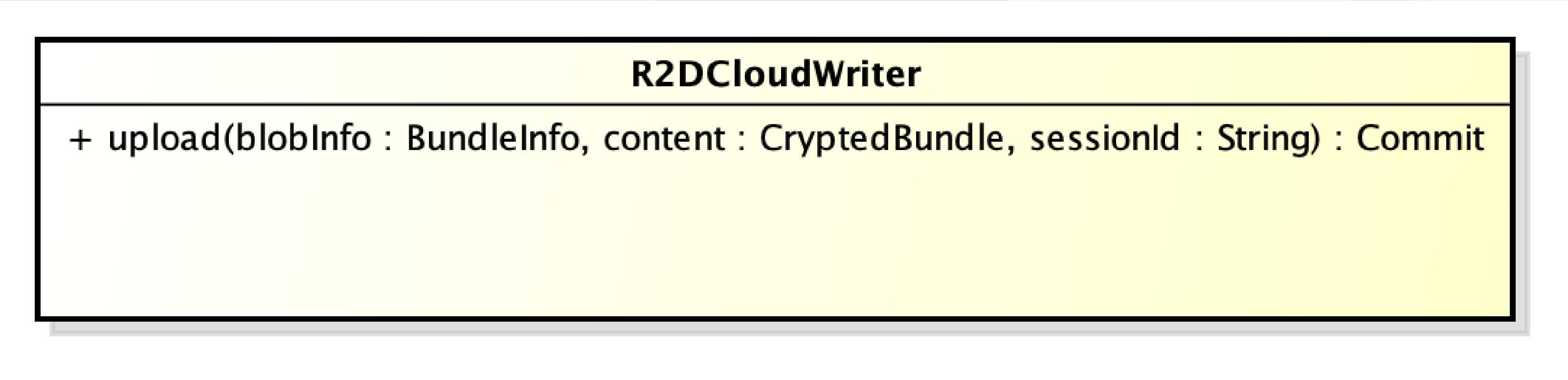
1. Clarify relationship to other standard with similar objectives like MHD (**M**obile **H**ealth **D**evice by IHE) and IPA (**I**nternational **P**atient **A**ccess) by HL7.
2. Implement support for Prescriptions and Diagnostic Reports containing DICOM Images

R2D BACKUP

Backup of health data on the Cloud without disclosing them to the cloud provider

1. Allows the citizen to choose the preferred Cloud provider
2. Does not rely on encryption mechanisms provided by the Cloud provider
3. Provides a secure level of transferring independent from the Cloud provider
4. Prevents the Cloud provider to gain access to the health data stored in the Cloud
   a. *The Cloud provider does not possess a decryption key*

R2DBACKUP CONCRETE OPERATIONS



R2DCloudWriter
+ upload(blobInfo : BundleInfo, content : CryptedBundle, sessionId : String) : Commit

Conceptual R2DBackup operations have been mapped to concrete RESTful API services

```
upload(ENCRYPTED_IPS);
```

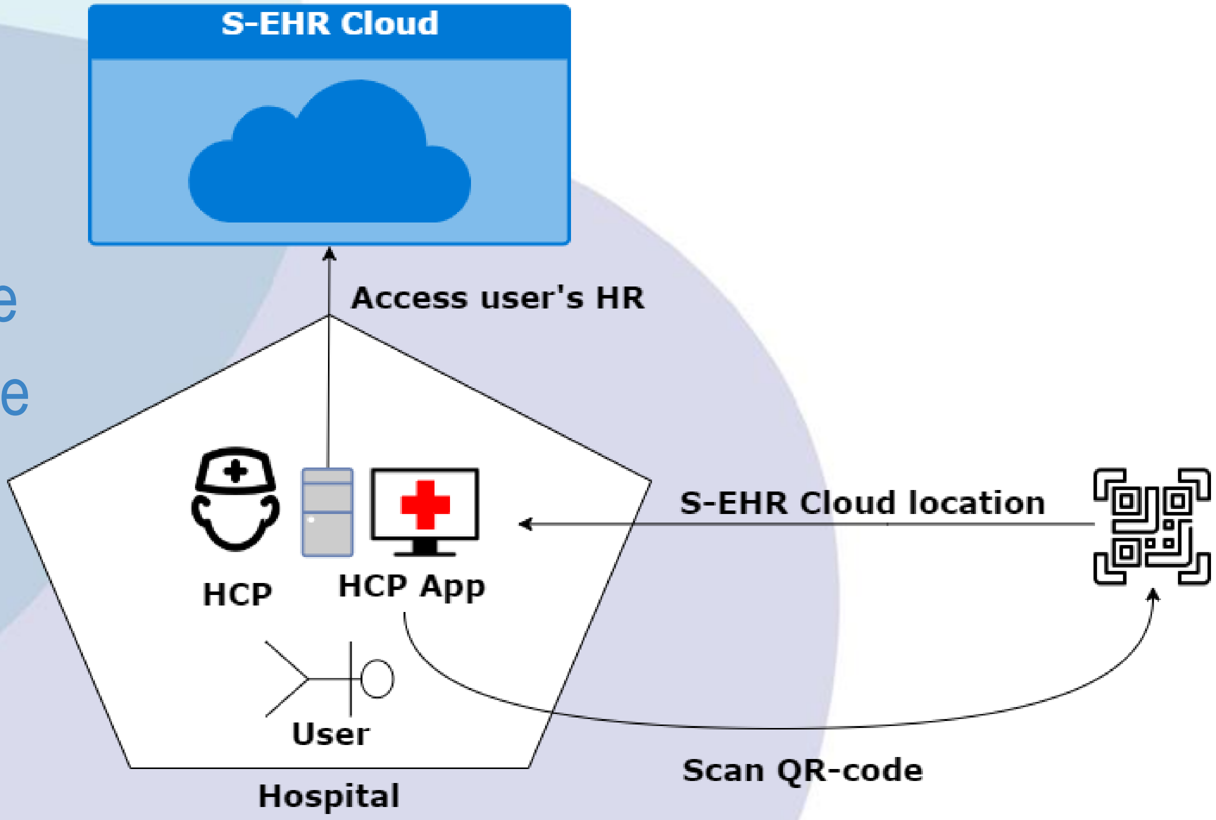
↓

```
POST <BASE>/citizen/upload/ips?token=AUTHENTICATION_TOKEN
```

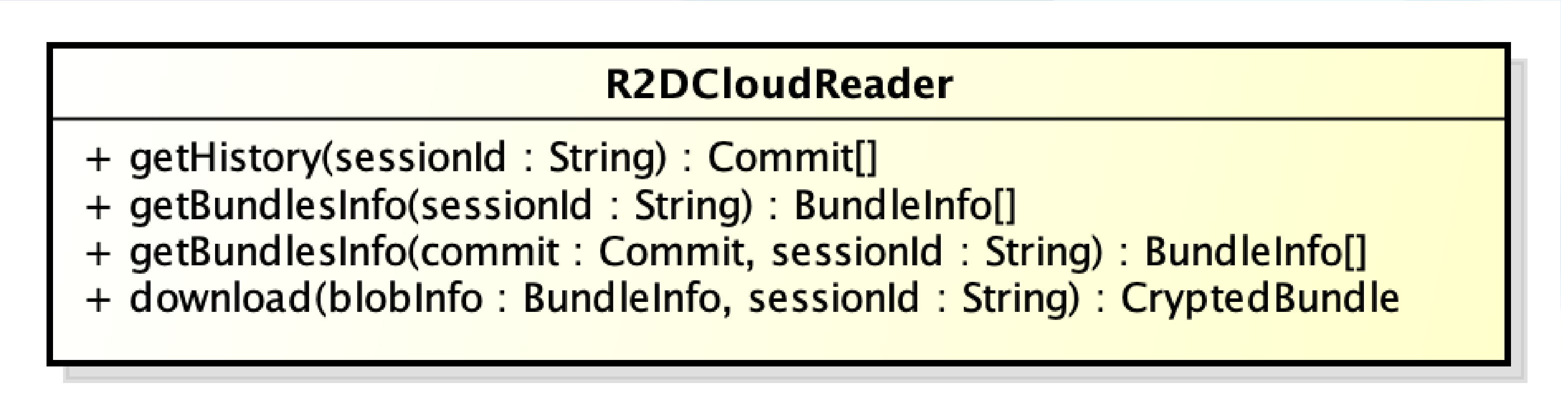
R2D EMERGENCY

Allow HCPs to access to health records from private clouds in emergency

1. Only HCPs owning a QR code provided by the citizen may access health records stored in the Cloud
2. Define a secure approach transferring health records to Cloud providers by HCPs



R2D EMERGENCY CONCRETE OPERATIONS



R2DCloudReader

```
+ getHistory(sessionId : String) : Commit[]
+ getBundlesInfo(sessionId : String) : BundleInfo[]
+ getBundlesInfo(commit : Commit, sessionId : String) : BundleInfo[]
+ download(blobInfo : BundleInfo, sessionId : String) : CryptedBundle
```

Conceptual R2DEmergency operations have been mapped to concrete RESTful API service

```
download(ENCRYPTED_IPS);
```

```
GET <BASE>/hcp/download/ips?token=CITIZEN_EMERG_TOKEN&hcp_ca=HCP_CA&hcp_auth=HCP_AUTH_CREDS
```

THANK YOU

Alessio Graziani

alessio.graziani@eng.it