

Interoperable Universal Resource Identifier (iURI) for Selective Disclosure of Information

A harmonized method for
representing and verifying
information across data formats
and encoding systems.



An ordinary situation

A new parent in a hospital must travel to another territory carrying the newborn.

How can the hospital provide a proof of parenthood?

A new necessity: *a portable digital verifiable credential that includes the required information.*



How to successfully issue a specific verifiable credential to a person?

Considering that:

FHIR and OpenEHR API services **do not currently support** selective information disclosure.

An interoperable URI must be able to convert from **URN to URL** and vice versa.

Information has to be presented in **different encoding** systems and formats.

An interoperable URI must be able to be **divided into specific claims**.

Solution: interoperable coding systems

We use reverse-DNS to represent the encoding systems.

For example:

<http://hl7.org/fhir/ValueSet/relatedperson-relationshiptype>
is represented as
"org.hl7.fhir.valueset.relatedperson-relationshiptype"

Thus, information can be concatenated
into a URI (URN, URL)



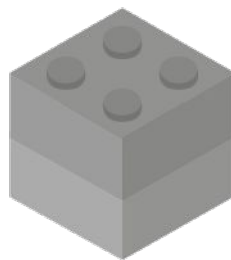
The background of the slide is a white surface covered with various Lego bricks. In the top-left corner, there are several blue bricks of different shapes and sizes. In the top-right corner, there are green bricks. The bottom-right corner is filled with a larger collection of yellow bricks, including some that are connected in a small structure. The text is centered on the left side of the slide.

The complex structure of the iURI but simplified

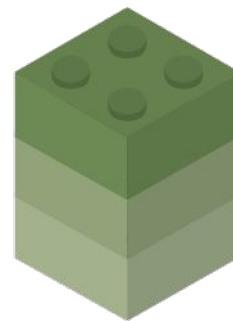
Since the iURI includes many different types of information, it can be thought of as a complex Lego structure built using different kinds (colors) of Lego bricks.

The bricks types

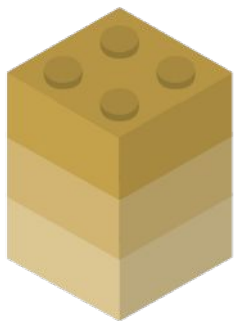
Each part of the iURI is like a different type of Lego brick:



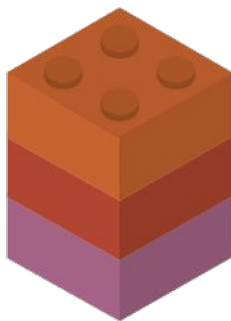
URI prefix and namespace



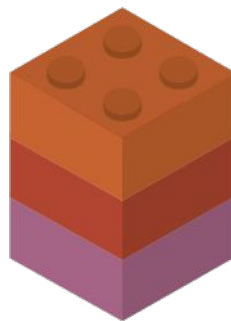
issuer path with territory (CDS approach)



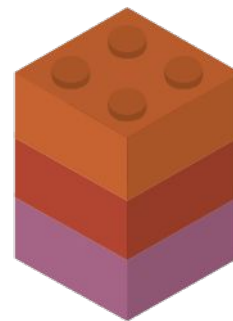
version and category
("v1" + "identity" +
"person")



universal patient
ID (for training
and health)



mother's passport
ID (HL7 coding
system + ISO 3166)



mother's
relationship (HL7
coding systems)

Building with bricks (foundation)

Consumer Data Standard (CDS) standardizes APIs and URLs to define how data should be requested, retrieved, and shared

The base of our Lego structure is the issuer, which can be seen as the **Foundation Brick**. We use the “did:web” conversion. It will look like this:

host.example.com : tenant-provider : cds-esp :

Next brick is a **Category Brick** to indicate the nature of the information that comes after. This brick will separate the previous info from the following with the indicator:

v1 : identity : person :

it is the identity of the owner.

Adding claims to the base structure

The universal health identifier of a person can be represented with the claim name “x-uhc-mid” as per the Unified Identification Protocol for Training and Health.



x-uhc-mid : uuid : <newborn's universal ID> :

To represent a related person, we first add another brick for a legal document: the mother's passport



org.hl7.terminology.codesystem.v2-0203.ppn : org.iso.3166.1.alpha.3.esp : <mother's passport number> :

Finally, the last Lego brick is the relationship between the person represented by the legal document and the newborn



org.hl7.fhir.valueset.relatedperson-relationshiptype : org.hl7.terminology.codesystem.v3-rolecode : nmth

The complete structure

The hash of the iURI can be stored on blockchain as evidence, maintaining privacy.

urn : es.unid :

host.example.com : tenant-provider : cds-esp :

v1 : identity : person :

x-uhc-mid : uuid : <newborn's universal ID> :

org.hl7.terminology.codesystem.v2-0203.ppn : org.iso.3166.1.alpha.3.esp : <mother's passport number> :

org.hl7.fhir.valueset.relatedperson-relationshiptype : org.hl7.terminology.codesystem.v3-rolecode : nmth

Disassembling

- Each iURI claims (individual brick) can be expressed in JSON for selective disclosure of information, using the claim names as the key properties.
- The individual claims can be included in a VC and the complete iURI or its hashed value can be used as the ID of a VC (W3C, OpenID, Sovrin formats).



More cases of use:

- Donations of ova (eggs), human milk, blood, etc.
- Marriage certificate of the parents of a child.
- DID of the universal patient ID for training and health to resolve the public keys and endpoints for secure data exchange

did : es.unid : cds : v1 : identity : person : x-uhc-mid : uuid : <patient's universal ID>



Summary

- The use of iURI harmonizes the representation of claims across disparate data formats and encoding systems.
- Evidence can be constructed by blocks and then certified / verified on blockchain.

Thanks

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