Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

GDK Schweizerische Konferenz der kantonalen Gesundheitsdirektorinnen und -direktoren
CDS Conférence suisse des directrices et directeurs cantonaux de la santé
CDS Conferenza svizzera delle direttrici e dei direttori cantonali della sanità

The Swiss federated eHealth architecture

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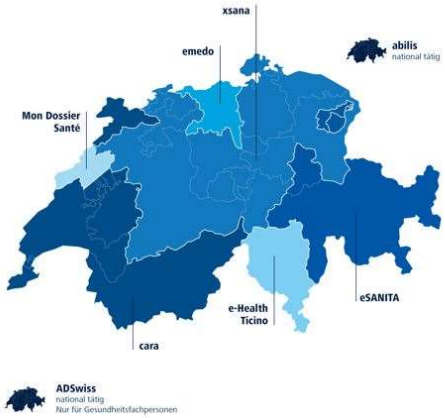
Centre de compétences et de coordination
de la Confédération et des cantons
Centro di competenza e di coordinamento
di Confederazione e Cantoni

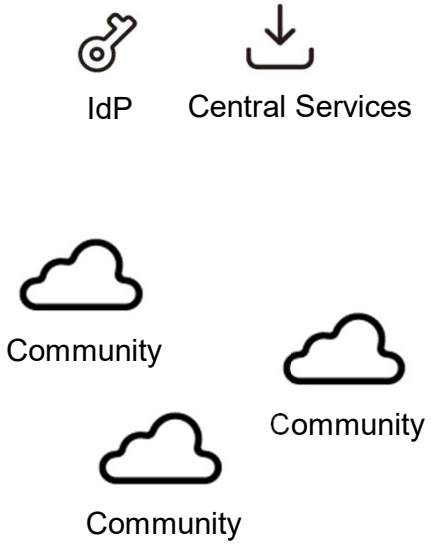
Swiss EPR

- Medical history archive for
  - 9 Mio inhabitants
  - 300 Hospitals
  - 1’500 Nursing homes
  - 1’800 Pharmacies
  - 2’000 Home Care Organizations
  - 18’000 Medical Practices
- Federal Act on the Electronic Patient Record in force since April 2017
- Intended to improve the quality of medical treatment, promote patients' health literacy, increase patient safety and the efficiency of treatments



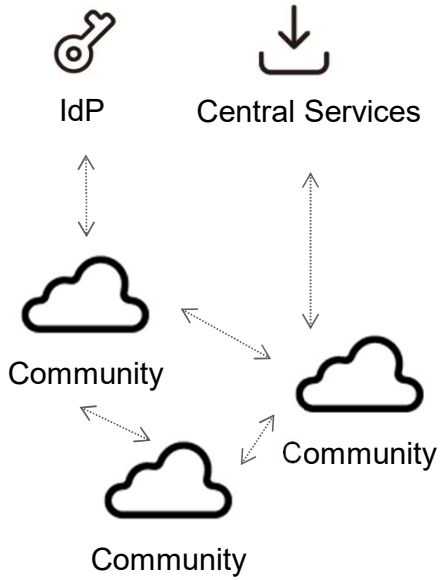
Basic Design: Swiss EPR

- The Swiss EPR is made up of Communities, Identity Providers and Central services
- Community: Organizational unit consisting of healthcare professionals and medical institutions which run a common health exchange infrastructure (affinity domain)
- Identity Provider: accredited IdP providing authentication means on Level of Assurance LOA3
- Central Services: Services operated by the FOPH for sharing operational data (e.g., metadata, healthcare professional, etc.)



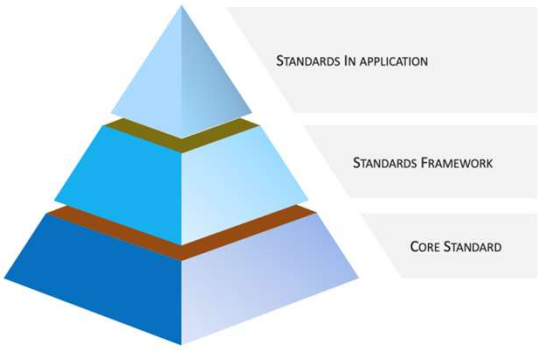
Basic Design: Interoperability

- The Parties communicate using standard based interfaces and protocols to ensure cross community interoperability
- IHE ITI Profiles: When possible IHE ITI Profiles (e.g., Cross Community Access XCA) are used and adapted to Swiss specific requirements in a national extension
- National Profiles: When no IHE Profile could be applied, a Swiss national profile was specified using the IHE ITI as a template. National profiles therefore always specify the use of international and national standards (e.g., FHIR, SAML 2.0)
- IHE ITI Profiles with the national extension and the national profiles are mandatory by law



Why IHE?

- At design time (2013-2016) the team evaluated standard frameworks to build the Swiss EHR upon
- At that time only IHE provided standard frameworks with the required maturity and acceptance by the vendors
- The philosophy of IHE profiles fitted well to the ideas of the architects:
  - IHE profiles provides a language with actors, transactions, grouping of actors, etc. which eases the communication
  - IHE transactions are designed with a focus on practical application and testability
  - IHE actors, transactions and content modules only need little refinement to be applicable for the Swiss EHR

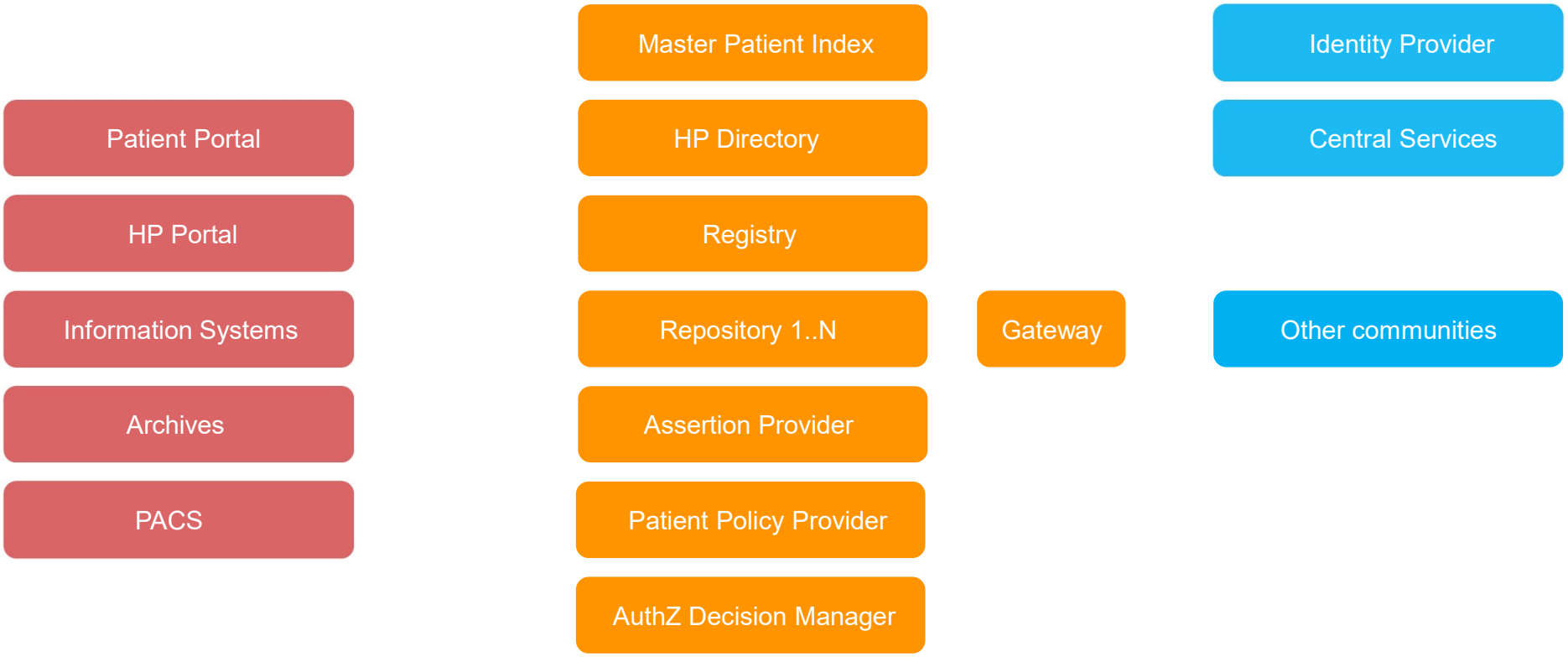


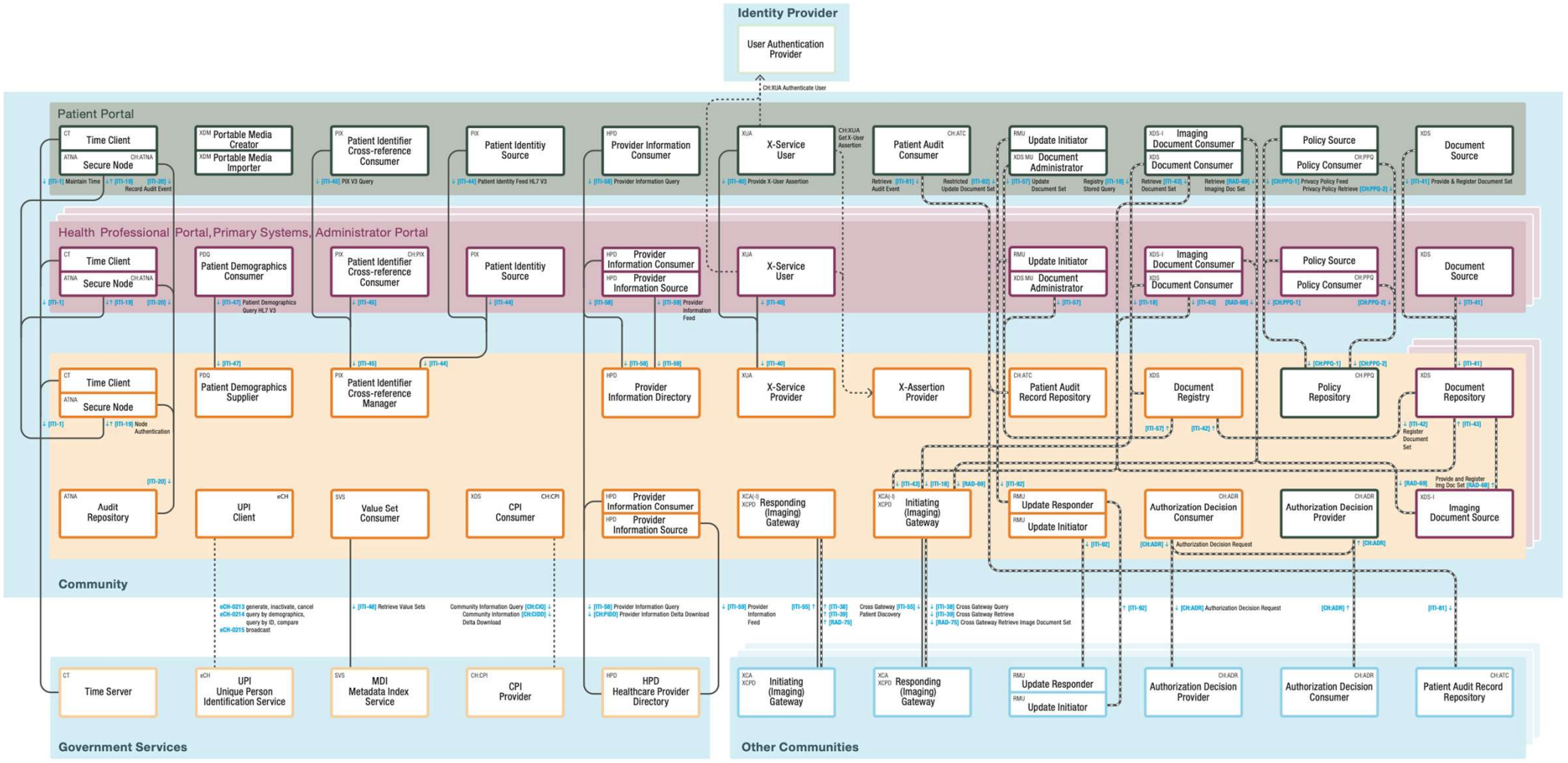
Anatomy of a IHE Profile

- **Volume 1:** Profile definition, use-case analysis, actor definition, and use of transactions and content
  - Defines a vocabulary with actors and transactions and the intended applications
- **Volume 2:** Transaction definitions and constraints
  - Defines the standards used in the transactions which actors support
- **Volume 3:** Metadata and Content Profiles
  - Details of message content, code systems, etc.

IHE INTERNATIONAL Integrating the Healthcare Enterprise

Basic Design: XDS Document Sharing Infrastructure





https://www.e-health-suisse.ch/upload/documents/Graphic_Integration_Profiles_EPR.pdf

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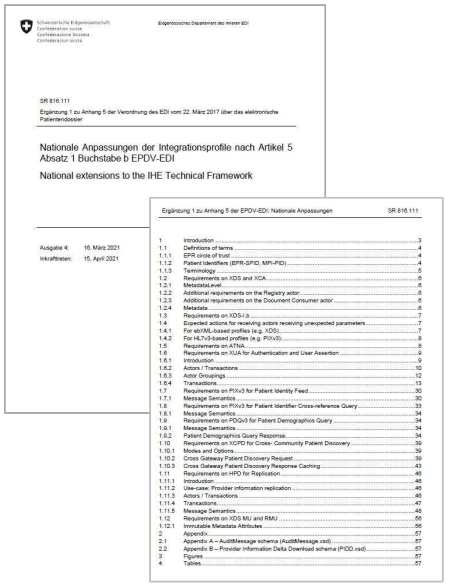
Basic Design: Swiss national Extension

- The Swiss national extension reflect
  - Swiss Value Sets for coded values (e.g., XDS metadata)
  - The legal requirements in Switzerland, especially the regulations for data privacy and security
  - The Swiss requirements for authentication (AuthN) and authorization (AuthZ) are not covered by profiles of the IHE International



Basic Design: AuthN and AuthZ

- Patient consent is stored in policies in XACML 2 format
- Existing IHE ITI profiles do not match the Swiss legal requirements
- National profiles for:
  - Transactions for managing policies from the portals (CH:PPQ)
  - Transactions for retrieving authorization decisions (CH:ADR)
- National extension for linking authentication information with authorization tokens (XUA)
- Planned extensions to manage the challenge of mobile clients for mHealth (IUA and other IHE ITI mHealth profiles)

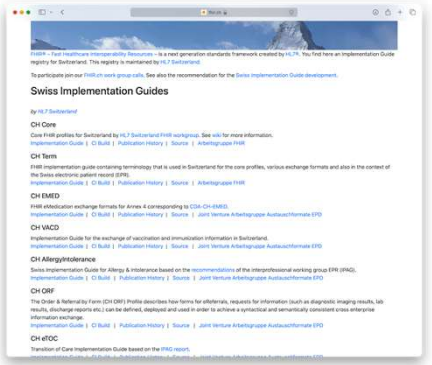
Engagement for IHE International

- We engage in the Infrastructure technical committee of IHE International to pass back the best practices and national profiles to the community
- Past work included the adaption of IUA, PIXm and MHD to be applicable for the Swiss EPR
- Current work is to adapt the Secure Retrieve Trial Implementation to match requirements of the Swiss profile for authorization decisions CH:ADR
- Currently 3 people from Switzerland engage in the regular meetings for CP review and for IHE ITI work items

IHE INTERNATIONAL Integrating the Healthcare Enterprise

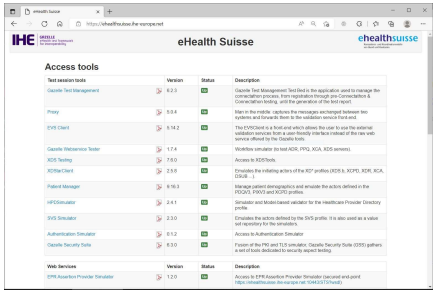
FHIR content profiles

- The Swiss EPR was intended to implement Use Cases from the beginning, e.g. medication, vaccination, etc.
- The Swiss EPR started with a document sharing infrastructure to match the basic need to exchange unstructured documents (e.g. PDF)
- Currently we “step by step” add support for Use Cases with structured documents, starting with vaccinations in 2023
- Planned extensions are: Medication, Allergies, Patient Summary and Questionnaires
- We stopped supporting CDA and move forward with FHIR bundles and resources in close cooperation with HL7 Switzerland



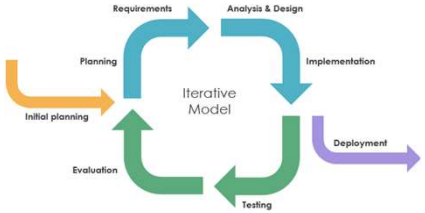
Swiss Reference Environment

- The Reference Environment provides the validators and simulators to test Swiss EPR compliant interfaces
- Validators: Tools to verify the message structure and content
- Simulators: Software components to mock partner applications
- The Reference environment is free to use by vendors without registration
- Using the Reference Environment in combination with the supporting material (Info pages, commented examples) enables vendors to implement the profiles



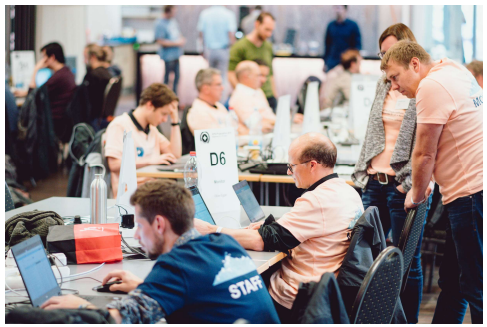
Swiss Reference Environment

- The Reference Environment is a Swiss specific fork of the Gazelle Test Environment used for the EU connectathon, which provides Swiss specific validators and simulators (sometimes in a experimental stage)
- Currently all simulators and validators are provided by IHE Catalyst and Kereval
- Future plan is to use validators and simulators from other vendors under governance of eHealth Suisse in an open source model to increase flexibility of development



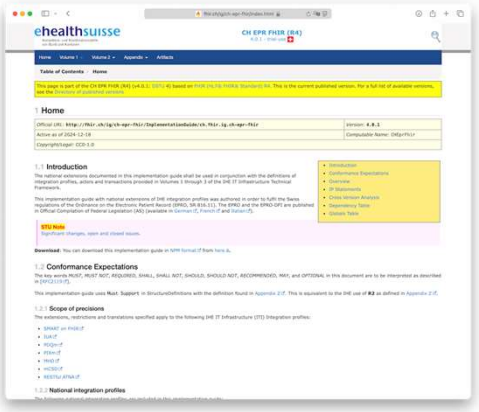
Swiss projectathon

- We use the reference environment for the annual Swiss projectathon
- Simulators and validators to test with the reference environment are open for all vendors during the year and shall be used to prepare the Swiss projectathon
- The focus of the projectaton is on P2P and group tests
  - In P2P tests vendors test their implementations for single transactions
  - In group tests we run tests of complex use cases which cover many transactions and require many vendors



FHIR profiles for document sharing

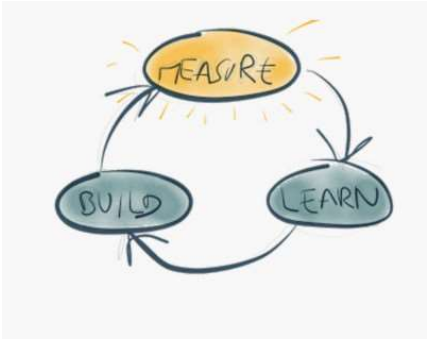
- We currently modernize the interfaces to reflect the intention of the vendors to use FHIR and OAuth
- All new profiles are specified in a single implementation guide
- Up to one, all profiles are based on the FHIR and OAuth based IHE profiles IUA, MHD, PDQm, PIXm, mCSD and RESTful ATNA
- The single national profile is also based on FHIR and OAuth and required to manage the Swiss specific management of access rights
- The final version will be tested during the upcoming projectathon week in September 2025



See https://build.fhir.org/ig/ehealthsuisse/ch-epr-fhir/index.html

Lessons learned

- IHE profiles helped us to “learn from others”
- The condensed knowledge, vendor independency and the testability of the IHE profiles accelerated the invention of the Swiss EPR
- The effort to maintain the national extension and the national profiles and is significant but manageable
- The IHE profiles, the national extensions and the Swiss profiles are used by the communities, the certification authorities, the communities and the vendors in their processes



Thank you for your attention!