



NG112 Wireline

03. Oktober 2023
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swisscom

C2 internal

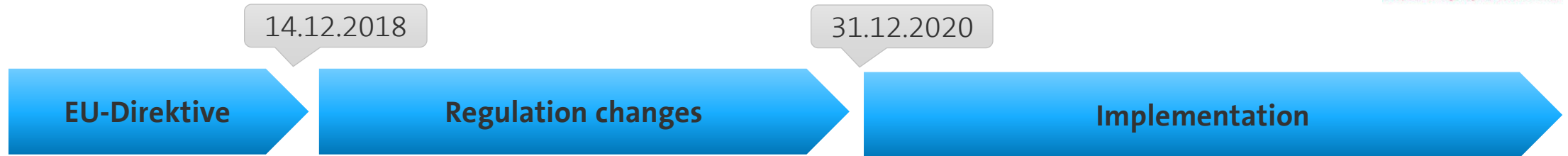


Requirements



Directive 2018 of EECC to all EU regulators (NG112)

Topics affects Switzerland as well



Topics to solve:

- Network based caller location (Wireless, Wireline)
- Handset derived caller location info (AML, eCall)
- Zero-rating for emergency calls
- Accessibility for people with disabilities
- Access from Online platforms (OTTs e.g. Skype-out, Apps)
- Transnational emergency calls (ESInet)
- Access from private networks
- Emergency calls in different languages



*OFCOM start at 01.01.2020
with this topics.*



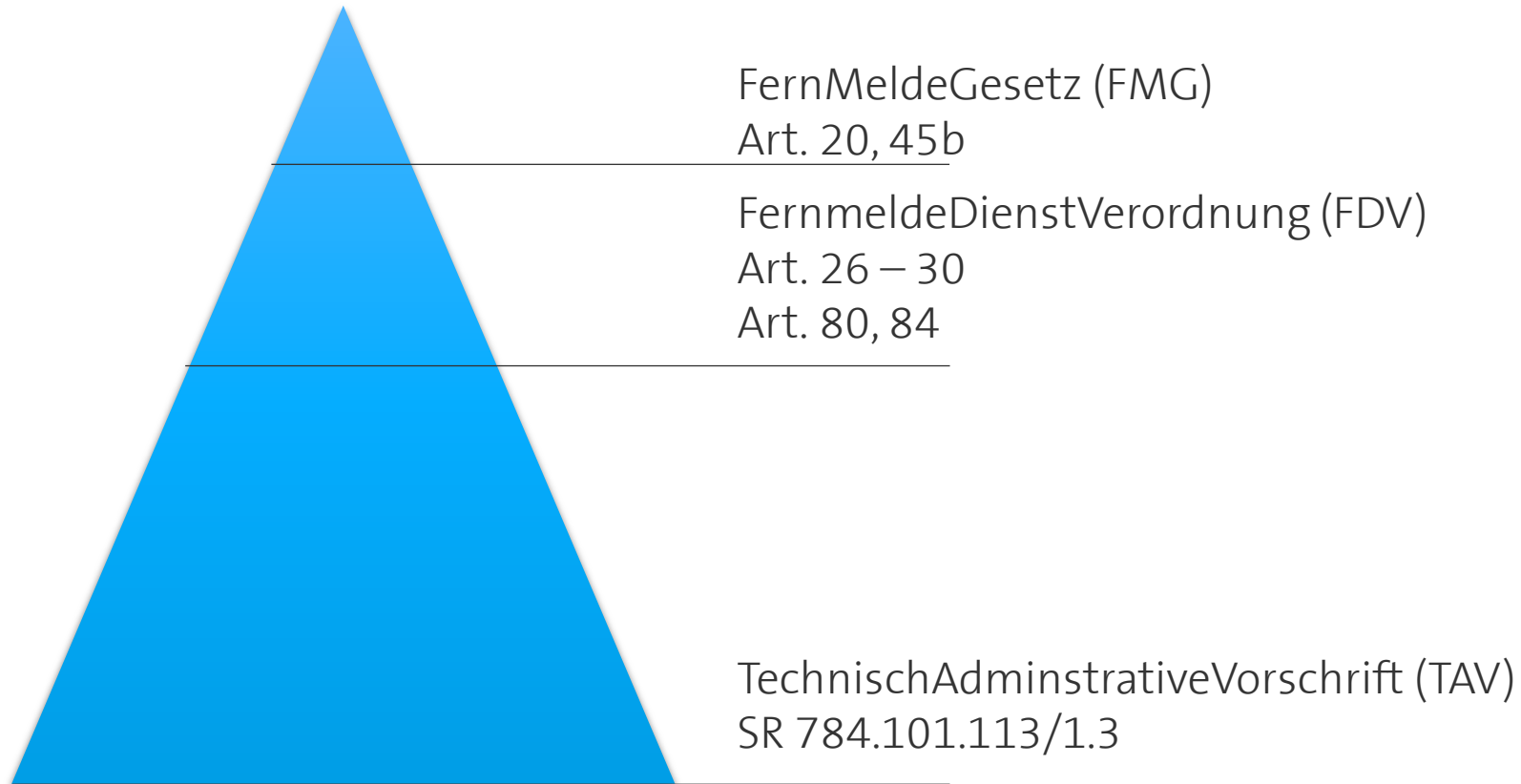
Regulation, three levels of legislation

FMG, FDV, TAV



NG112 for mobile (incl. AML & eCall112) at each MNO by 01.07.2022.

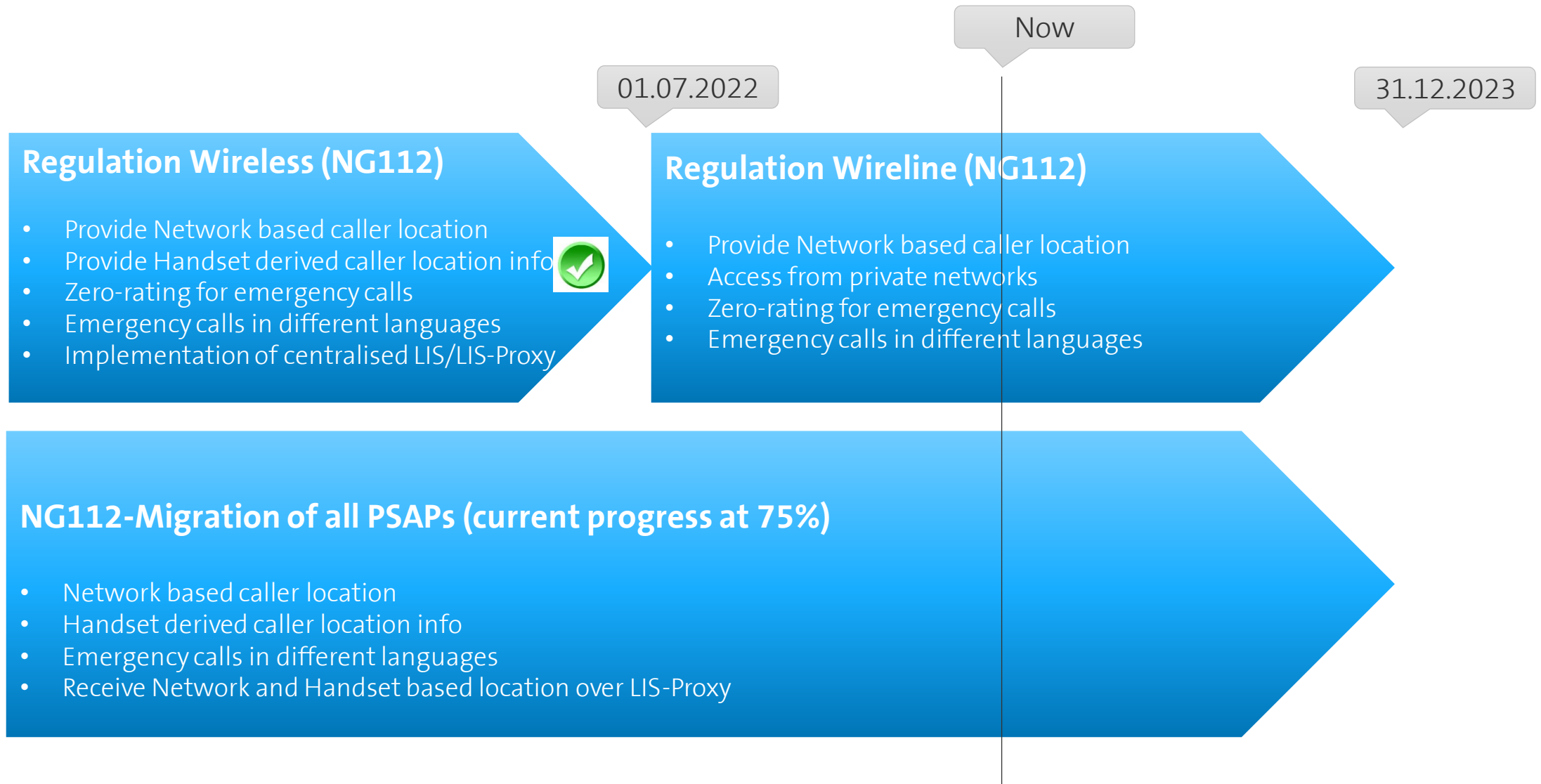
The regulation of Wireline 2023 (01.07. – 04.12.2023).





Regulation at Switzerland and PSAP Migration

Deadline EoY 2023





Swiss PSAP's requirements

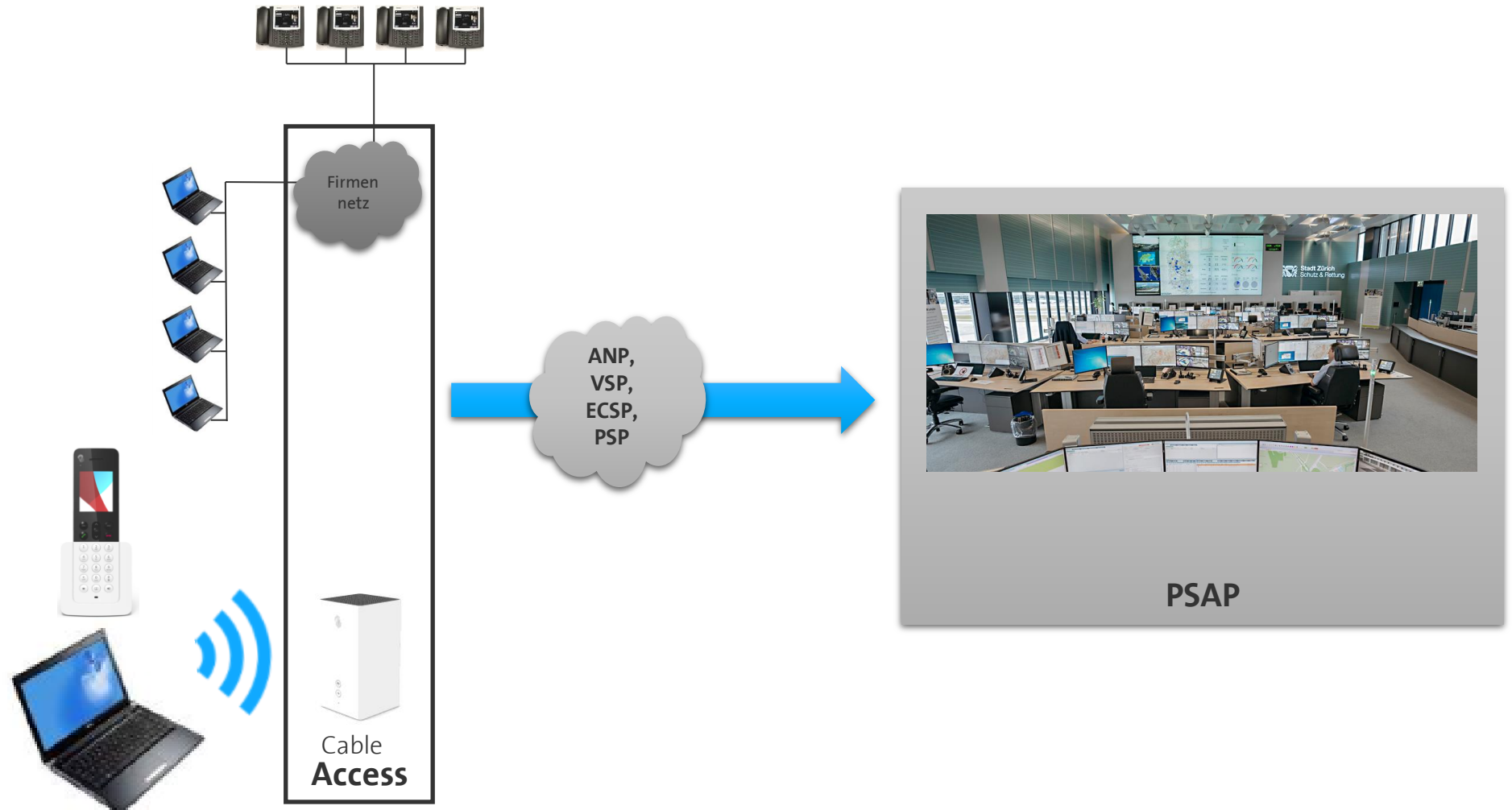
Public Safety Answering Point (117, 118, 144, ...)

- More info
- More quality
- More accuracy
- More locations
- More flexibility for the future
- More transparency
- More standardized
- ...



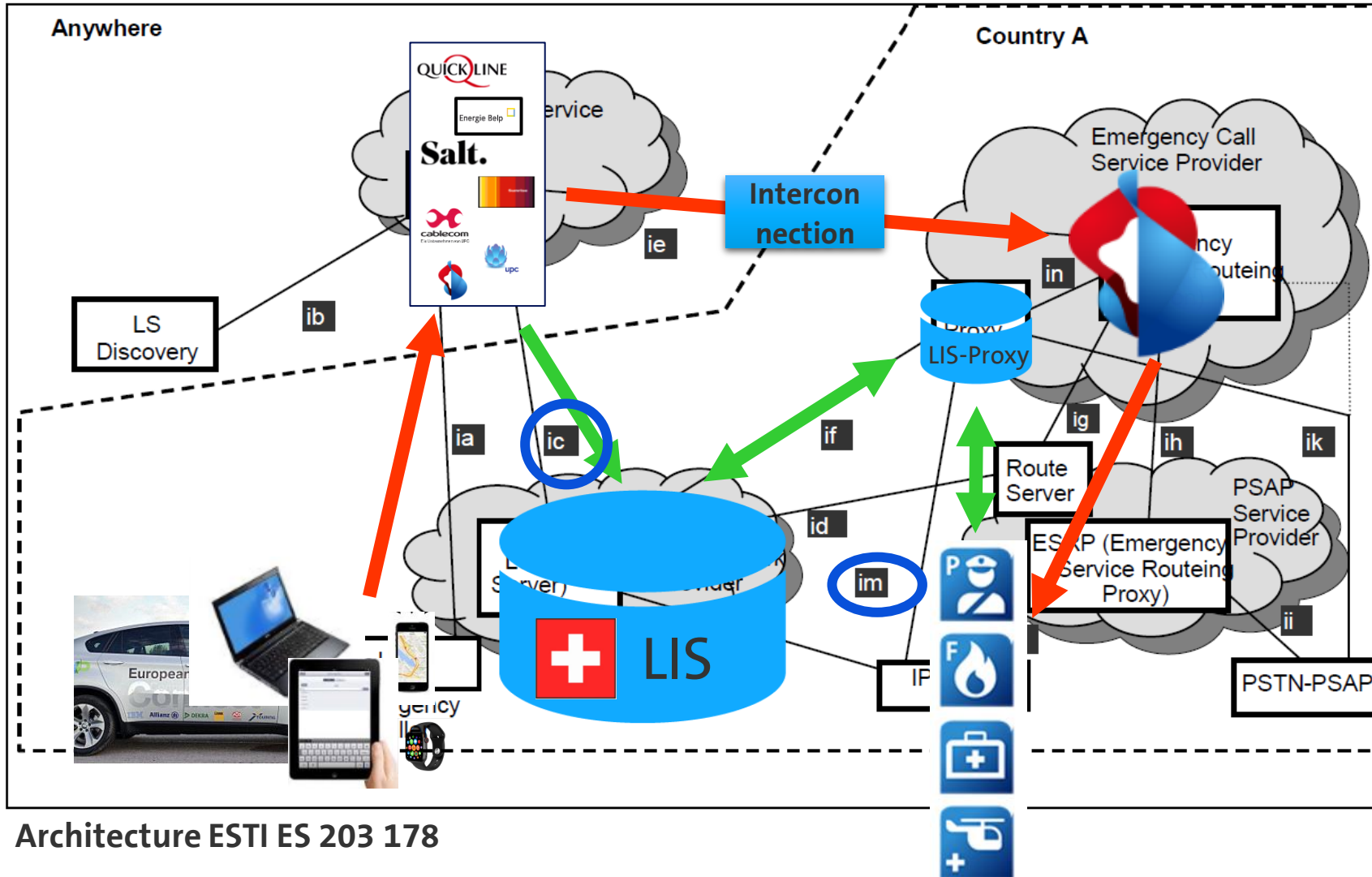


Handling wireline location





Everything according "new" NG112 standards but no regulation of AccessNetProviders (ANP) > Centralised LIS is required





Consequences



Consequences

We have rebuilt Switzerland's entire emergency communications!

- **Migration of all VSPs and all PSAPs to NG112**
- **Parallel operation;** existing localisation database SOSDB and the NG112 components LIS/LIS-Proxy
 - The existing protocol (emerep/MLP) can only handle net-based localisation **max. 31.12.2023**
 - With the new NG112 protocol (HELD, PIDF-LO and MSD-XML)
 - **handling net-based and device-based data**
- Transport of additional geographic data and informations
 - Transport of net-based and device-based localizations
 - Handling of SIP Header Geolocation and Call-info over Interconnection (BCF) an towards PSAP
 - Additional data comes offset to the emergency call -> 10 – 60sec.
- A "NG112" approved, hardened LIS/LIS-Proxy is needed
 - **The VSP writes data over <ic> into the LIS.**
 - **Request's** and **LocationUpdates** have to do with **HELD**
- Adaptations within the PSAP for NG112 are required.
 - Information (SIP-INVITE) from telephony (SBC/PBX) must be transferred to the emergency call centres (e.g. AVANTI). Meaning, **product adaption** for PBX's and emergency call centres for NG112 are s prerequisite. "Location by Reference" or "Location by Value" have to be handled.
 - Multiple queries over a period of time from PSAP for one emergency call is needed. E.g. all 10 sec.



Basics for NG112 Interfaces are Standards, PSAP requirements and regulation

Switzerland has precise interfaces since Sept. 2021

Requirements

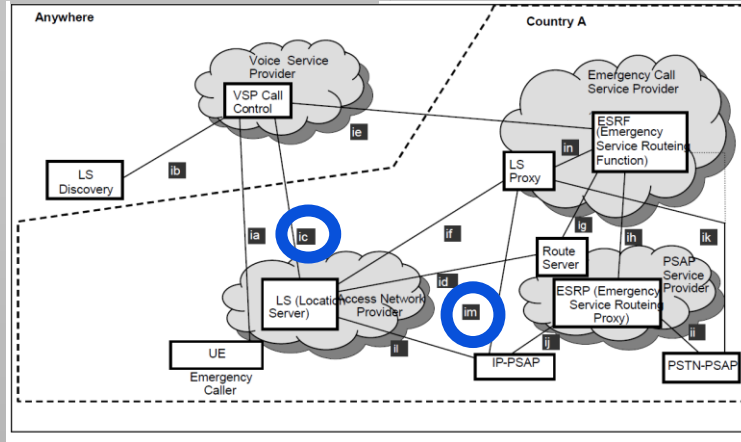
Standards



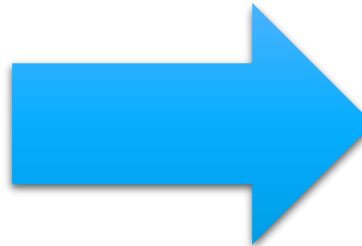
PSAP requirements



NG112 architecture (Standard)

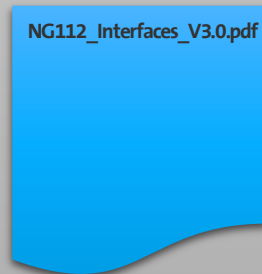
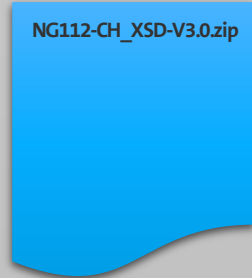


Swiss regulation



<https://swisscom.com/emergencylocalization>

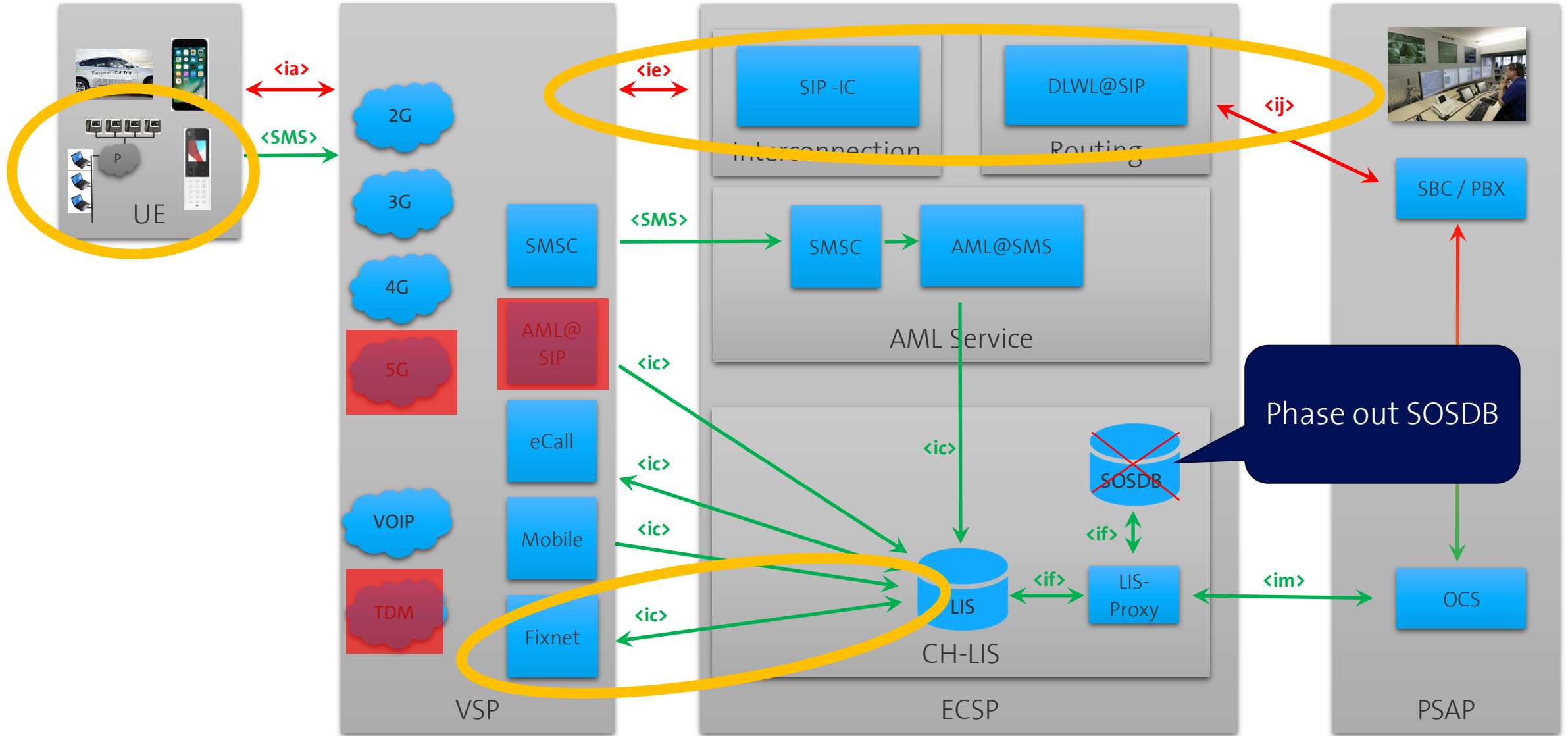
NG112 interface definition Switzerland



V3.0 01.06.2021



Big picture



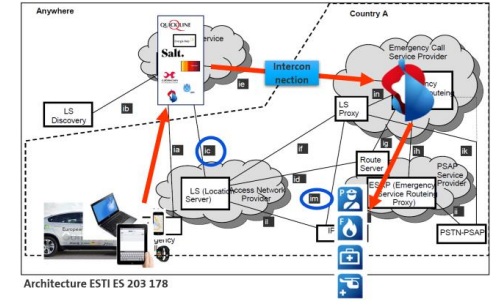


Elements of NG112 Wireline communication



Location by Reference (LbyR) from VSP to PSAP inside SIP

SIP Header Geolocation

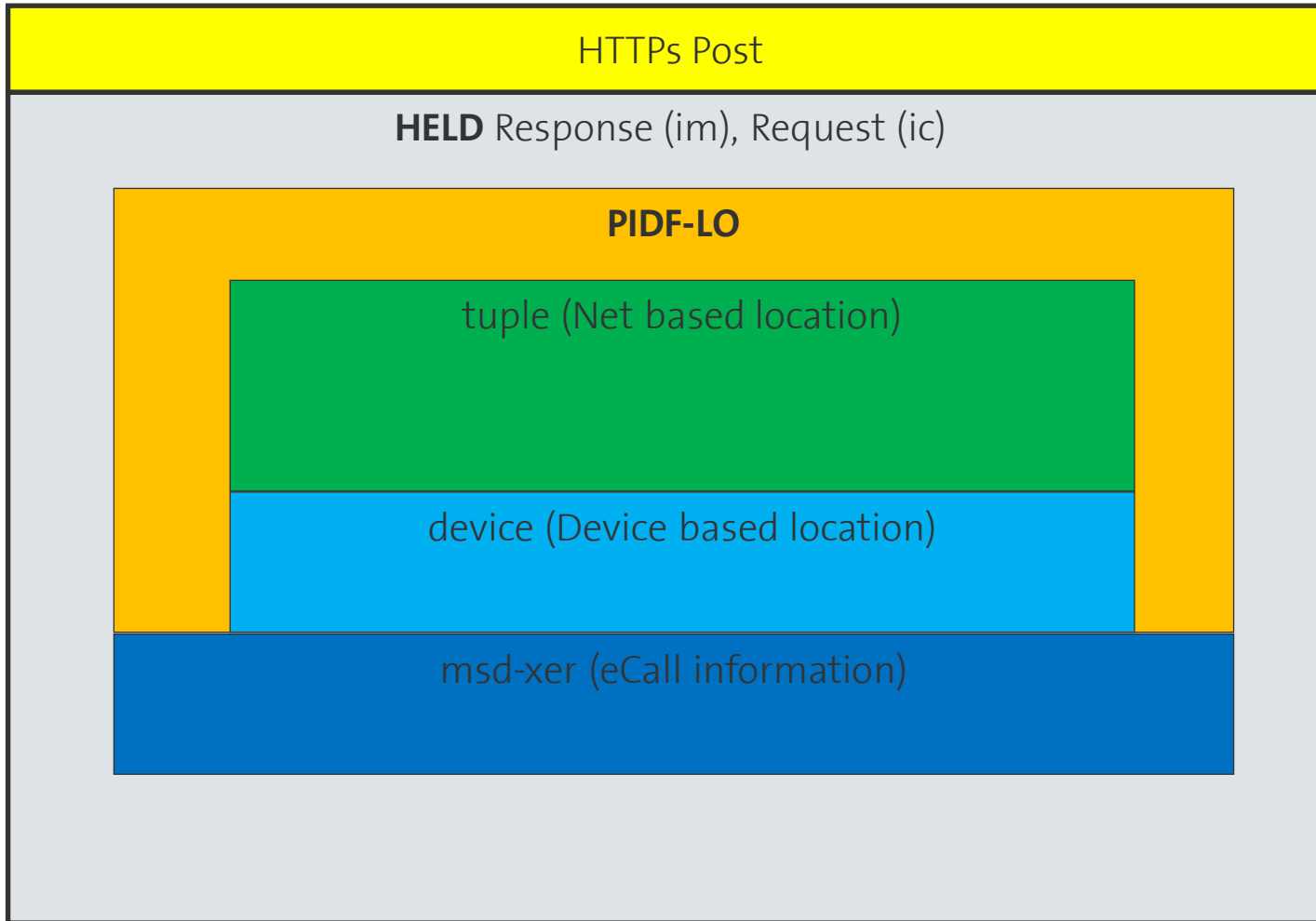
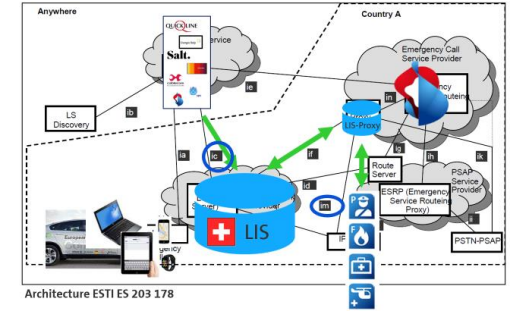


```
INVITE sip:112@swisscom.ch;user=phone SIP/2.0
To: "112" <sip:112@swisscom.ch;user=phone>
From: "+41580000000" <sip:+41580000000@swisscom.ch>;tag=h7g4Esbq_f6338b40-101a8c0-13c4-55013-1c0-76d9a532-1c0
Call-ID: f633f598-101a8c0-13c4-55013-1c0-75f2ef4c-1c0
Supported : timer, 100rel, Geolocation, http
Geolocation: <https://lis.sosservice.ch:8443/location/357yc6s64ceyouiuy5ax2o>
Geolocation-Routing: no
Call-Info: https://lis.sosservice.ch:8443/location/124abcd6e68ccqxero8y>;purpose=held+xml
P-Asserted-Identity: <sip:+41580000000@swisscom.ch>
Resource-priority: esnet.0
```




Structure of HELD for LIS <ic> an LIS-Proxy <im>

Geographical objects and address elements capsolated in HELD





"Wireline" netbased location elements

Possible geographic objects



Point



Circle

pos

Longitude, Latitude of point

radius

Radius of circle around the point (The VSP have to define. Suggestion: 30m)

confidence

How trustworthy the localisation is

Text elements (CivicAddress)

SIP-URI

User part (ex. +41791234567) and domain part (ex. @swisscom.com)

NAM

Name (First name, last name OR company name)

RD

Street name

HNO

House number (number and text e.g. 12a)

BLD

House name (instead of RD and HNO)

PC

Postcode

A3

Village

ADDCODE

Address number from public register. Example EGID

Methode

manual = Nomadische Nutzung, DHPC = IP-Lokalisierung, 802.11 = IP-Lokalisierung WifiCalling

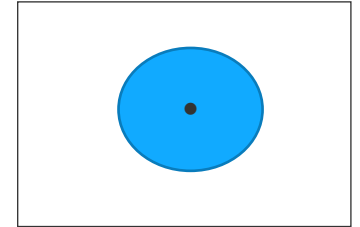
Provider

Sender of information

Timestamp

YYYY.MM.DD hh:mm:ss.sss

example



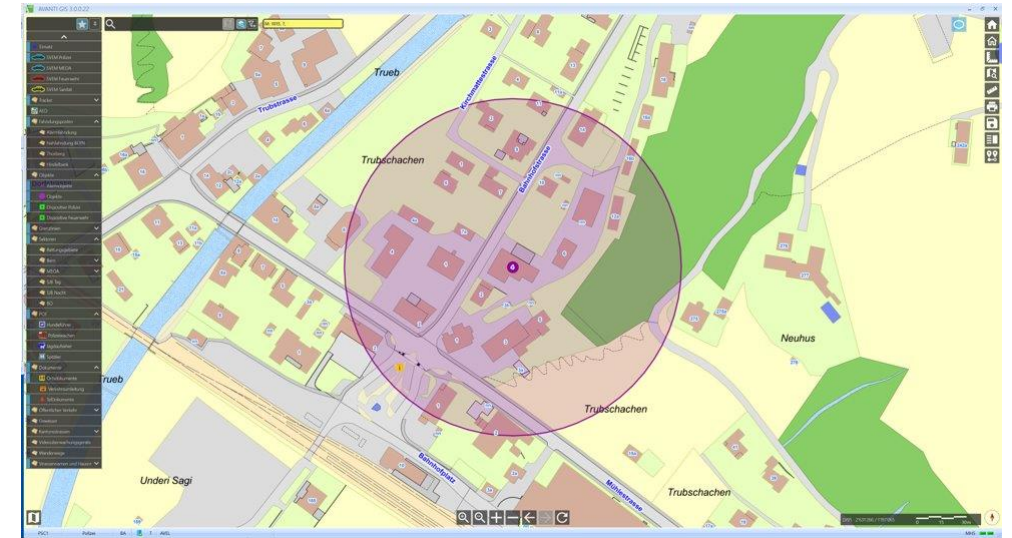


PSAP-HELD-Request example > net-based location/data

Civic address at HELD-Request to LIS over interface <ic>

```
<?xml version="1.0" encoding="UTF-8"?>
<locationRequest
  xmlns="urn:ietf:params:xml:ns:geopriv:held"
  xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10"
  xmlns:gpb="urn:ietf:params:xml:ns:pidf:geopriv10:basicPolicy"
  xmlns:id="urn:ietf:params:xml:ns:geopriv:held:id"
  xmlns:gml="http://www.opengis.net/gml"
  xmlns:gs="http://www.opengis.net/pidflo/1.0"
  xmlns:pd="urn:ietf:params:xml:ns:pidf"
  xmlns:conf="urn:ietf:params:xml:ns:geopriv:conf"
  xmlns:ca="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
  xmlns:ad="urn:ietf:params:xml:ns:EmergencyCallData"
  xmlns:pi="urn:ietf:params:xml:ns:EmergencyCallData:ProviderInfo"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <locationType exact="true">locationURI</locationType>
  <id:device>
    <id:uri:sip:+41590000002@example.swisscom.com</id:uri>
  </id:device>
  <pd:presence entity="pres:+41590000002">
    <pd:tuple id="WireLine">
      <pd:status>
        <gp:geopriv>
          <gp:location-info>
            <gs:Circle srsName="urn:ogc:def:crs:EPSG::4326">
              <gml:pos>46.519330 6.632840</gml:pos>
              <gs:radius uom="urn:ogc:def:uom:EPSG:9001">30.0</gs:radius>
            </gs:Circle>
            <conf:confidence pdf="normal">95</conf:confidence>
            <ca:civicAddress>
              <ca:country>CH</ca:country>
              <ca:NAM>Maria Muster</ca:NAM>
              <ca:A3>Lausanne</ca:A3>
              <ca:RD>Place Saint Francois</ca:RD>
              <ca:HRD>15</ca:HRD>
              <ca:PC>1003</ca:PC>
              <ca:ADD CODE>EGID:2119553</ca:ADD CODE>
            </ca:civicAddress>
          </gp:location-info>
          <gp:usage-rules />
          <gp:method>DHCP</gp:method>
          <gp:provided-by>
            <ad:EmergencyCallDataValue>
              <pi:EmergencyCallData.ProviderInfo>
                <pi:DataProviderString>Swisscom (Schweiz) AG</pi:DataProviderString>
                <pi:ProviderID>VSP:255100420</pi:ProviderID>
              </pi:EmergencyCallData.ProviderInfo>
            </ad:EmergencyCallDataValue>
          </gp:provided-by>
        </gp:geopriv>
      </pd:status>
      <pd:timestamp>2021-08-19T13:21:05Z</pd:timestamp>
    </pd:tuple>
  </pd:presence>
</locationRequest>
```

Information at the "Einsatzleitsystem" of PSAP





Challenges



1.) IMS > Data flow

Standard ETSI TS 124 229, Kap. 5.12 handling routing & LbyR

Beat Egger, 07.10.2021, How Switzerland is implementing NG112, C1-Klassifizierung

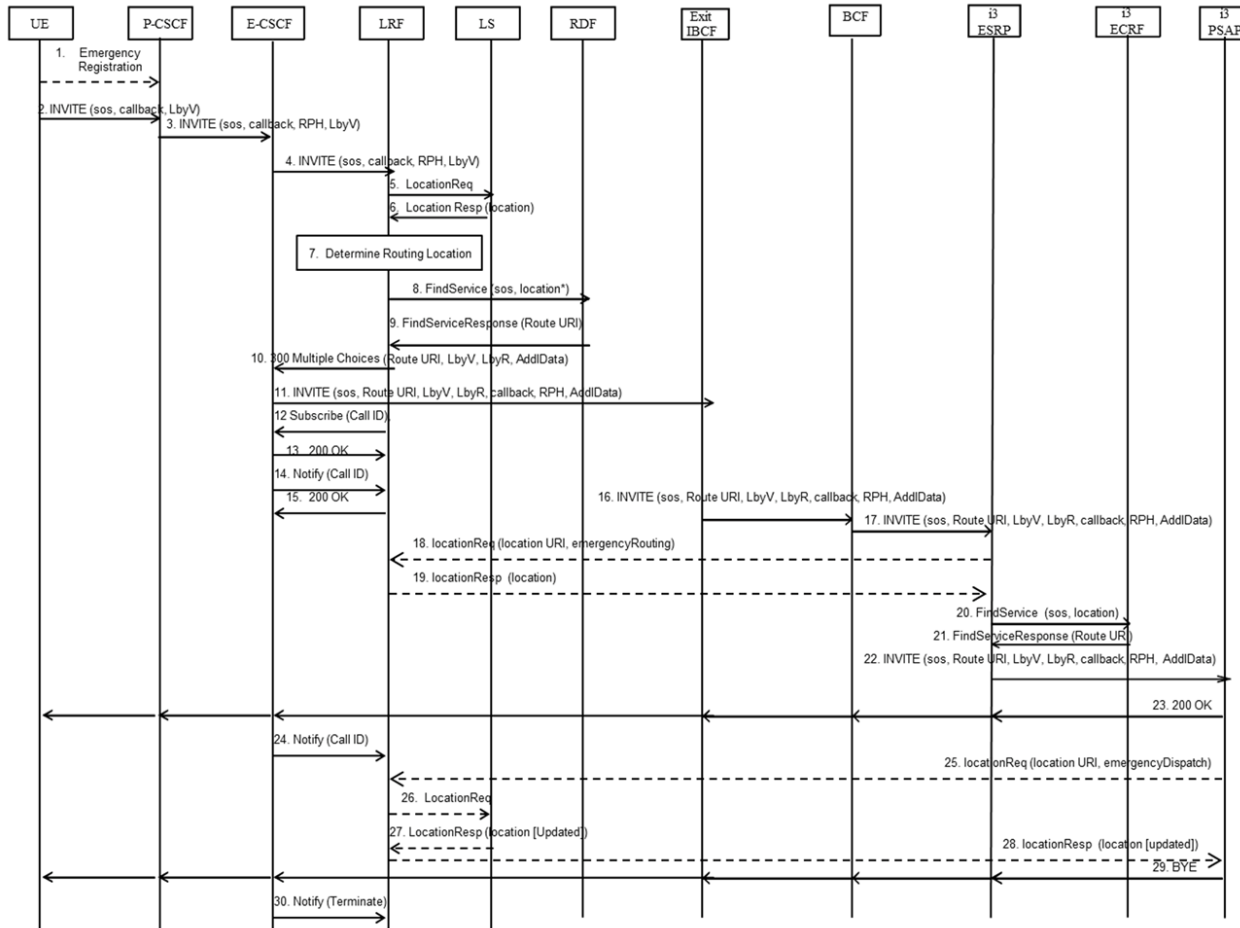


Figure 1: 9-1-1 Origination - Cellular Network Available - IMS Originating Network

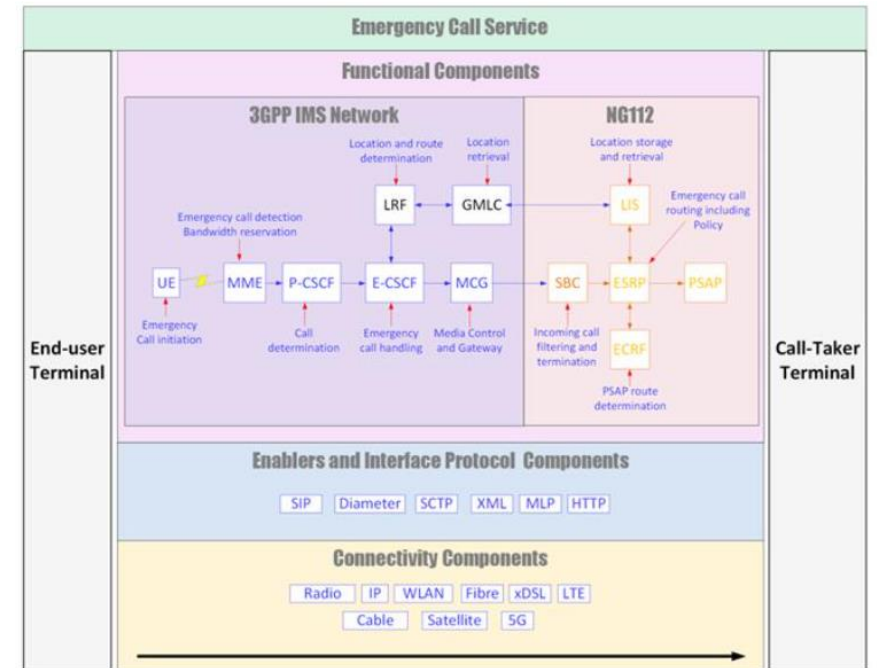


Figure B.1: IMS Emergency Services

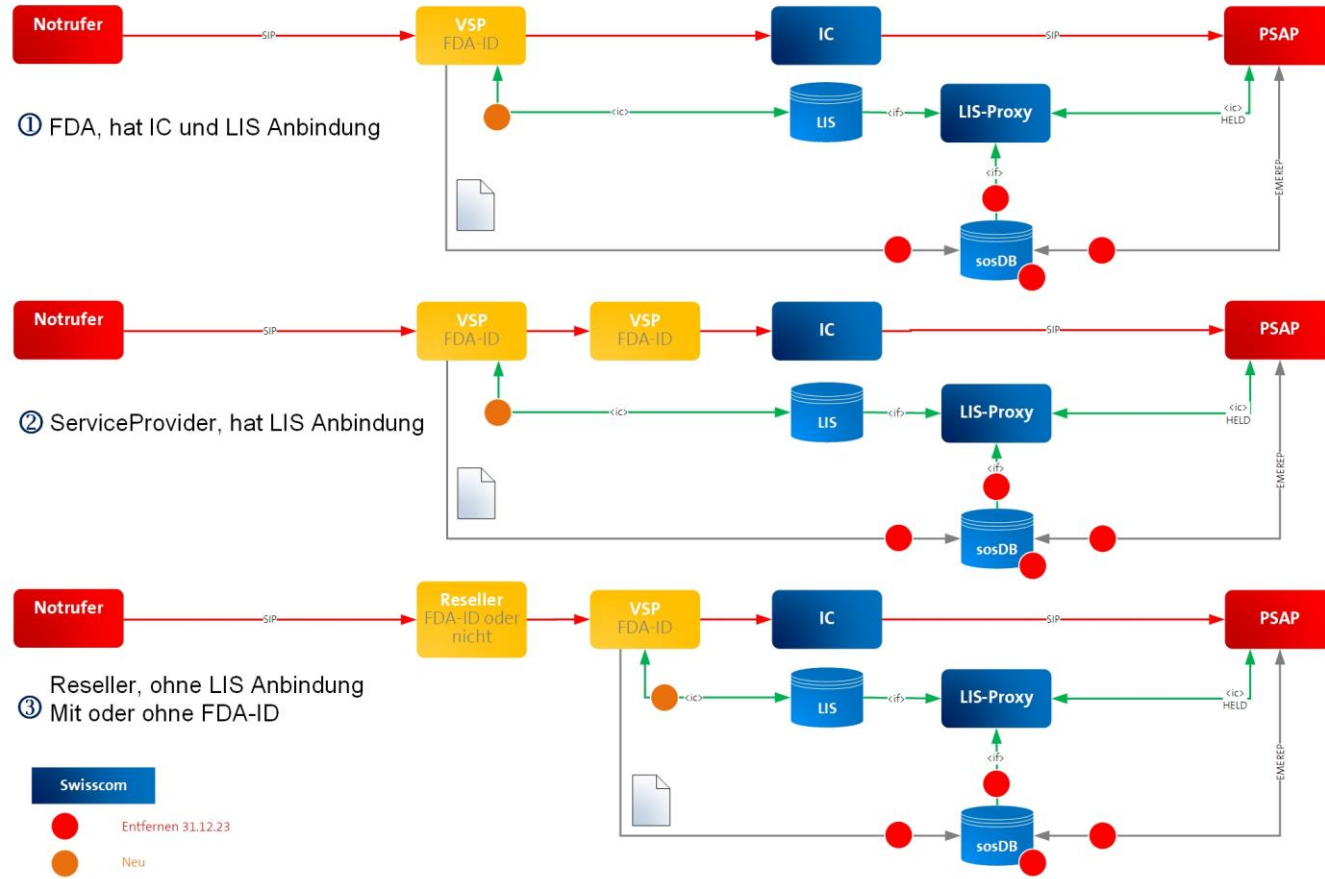
ETSI TR 102 445 02/2023



197 VSP, 3 use cases

Theoretically, every VSP with a number block should have a LIS connection.
Practically, there are fewer, as some VSPs take over the service for others.

FDA Varianten



Swisscom

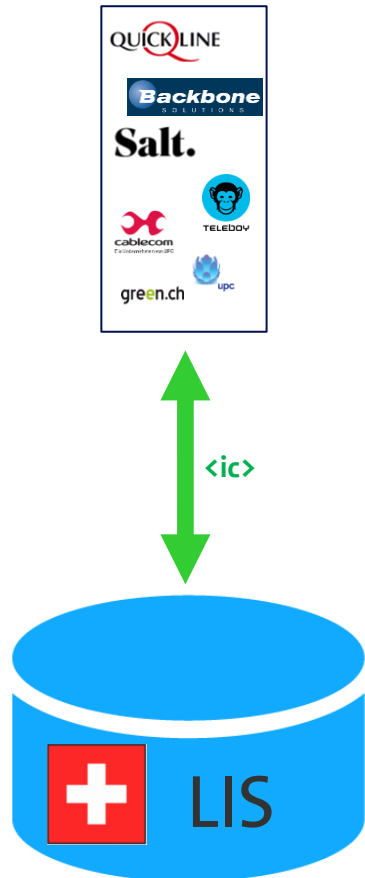
- Entfernen 31.12.23
- Neu
- Notruf / SIP
- HELD
- Grundlagendaten



Onboarding of ? 80 – 180 VSP at LIS

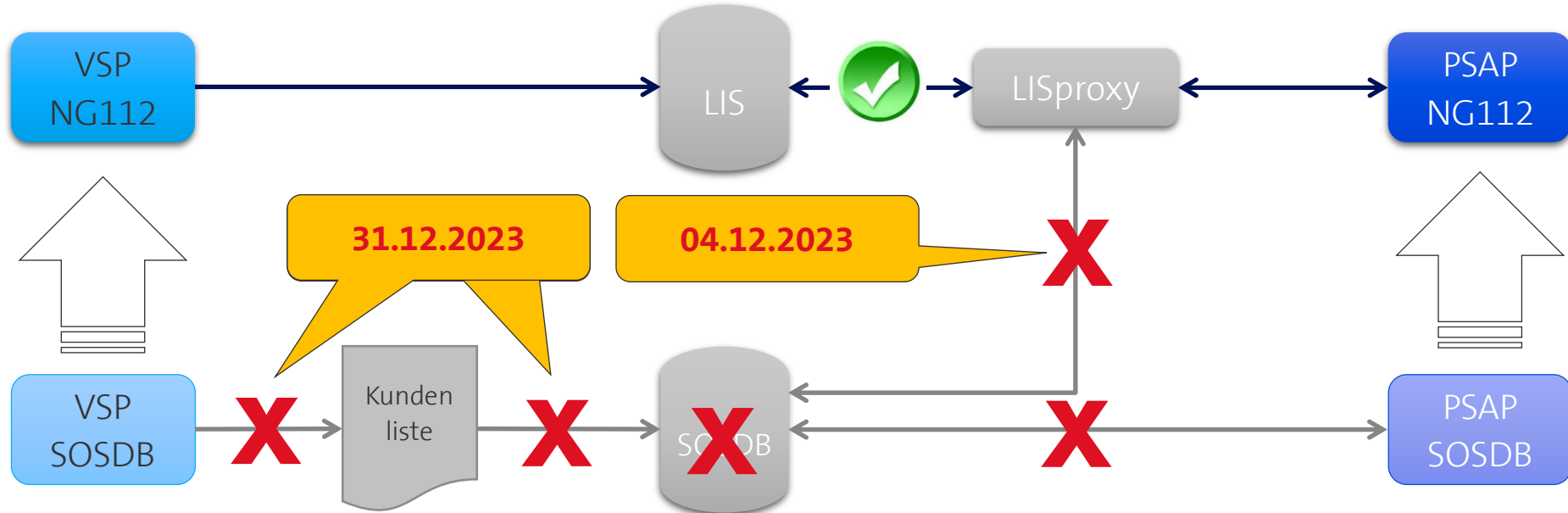
Swisscom has optimised the process, but the VSPs started too late.

- 4 VSP are migrated to NG112
- There are 197 Wireline VSP.
- Swisscom does not know how many need an LIS connection.
- Onboarding should have started at the beginning of 2023, so we are 60 VSP behind schedule.
- Onboarding takes about 20 hours.
- Swisscom can migrate approx. 20 VSP / 3 Mnt.
- We therefore ask the VSPs to be patient as they all want to migrate together now.





Planned migration by the end of November 2023



All PSAPs have migrated to NG112

All VSP have migrated to NG112

All localisations incl. fixed network are obtained from the LIS



Official address data



Official address data

GWR | Eidg. Gebäude- und Wohnungsregister (housing-stat.ch)

Beat Egger, 07.10.2021, How Switzerland is implementing NG112, C1-Klassifizierung

DE FR IT Q

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

**Bundesamt für Statistik
Eidg. Gebäude- und Wohnungsregister
(GWR)**

Hilfe und Schulungen | Aktualisation des Registers | Bereitstellung von Daten MADD | Abfrage-Tools | Projekt Erweiterung GWR | Bereich Energie | Erhebung von Grundbuchdaten | Dokumentation

Eidg. Gebäude- und Wohnungsregister > Bereitstellung von Daten MADD > Öffentlich zugängliche Daten

← Eidg. Gebäude- und Wohnungsregister

Bereitstellung von Daten MADD

Öffentlich zugängliche Daten

Beschränkt zugängliche Daten

Gebäude suchen 🔍

Öffentlich zugängliche Daten


[Einführung](#)
[Daten herunterladen](#)
[Webservices](#)
[Zugriff via URL](#)
[Zugriff via API von swisstopo](#)
[Zugriff via SQLite](#)

Einführung

Anhang 1 der VGWR definiert die Berechtigungsstufe der einzelnen zugänglichen Informationen (Gebäude, Wohnung, Projekt). Daten der Stufe A sind öffentlich und können ohne Einschränkung verwendet werden. Eine Quellenangabe ist Pflicht (Autor, Titel und Link zum Datensatz).

i Bitte beachten Sie, dass die Daten des GWR als Rohdaten zu betrachten sind, d. h. sie sind nicht korrigiert, imputiert und statistisch ergänzt. Wenn Sie statistische Daten benötigen, empfehlen wir die Verwendung der Daten aus der [Gebäude- und Wohnungsstatistik \(GWS\)](#).

Daten herunterladen



Wichtigste Punkte

- Die Daten haben immer den Stand Ende des Vortages;
- Der Download erfolgt durch eine Zip-Datei, welche mehrere Dateien enthält;
- Die Dateien sind zeilenorientiert, wie man das von *.csv/*.dsv Dateien her kennt;
- Der Download enthält eine Dokumentation aller Felder.

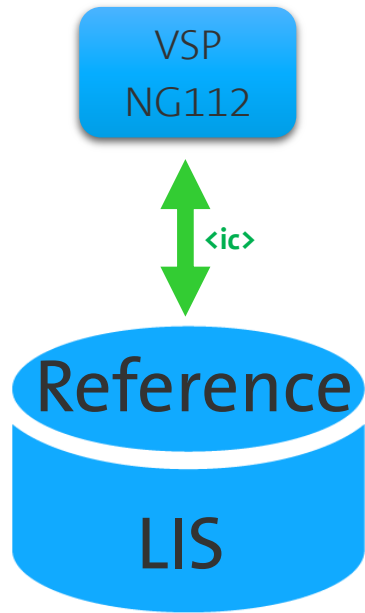


Infrastruktur Reference, Staging, Production

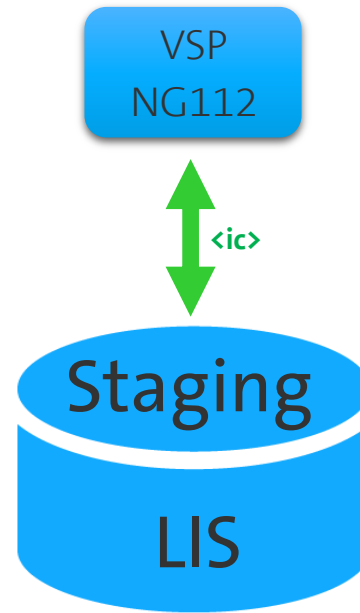


Infrastructure from Test to PROD

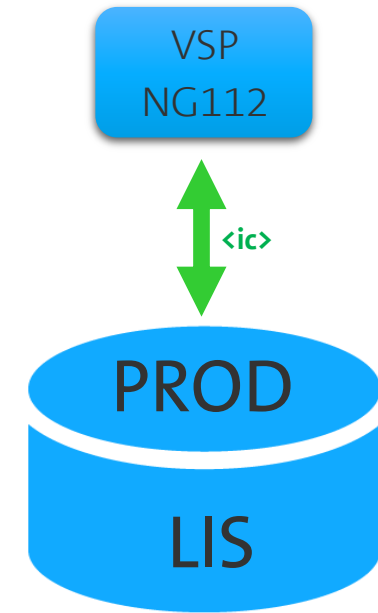
Swisscom support the VSPs with different infrastructure



1 System for development and testing. Reference test cases, see: <https://swisscom.com/emergencylocalization>



4 Systems for pre production and integration testing.



4 Systems for production

Detailed info you get by order. You order by:

Localization.Emergency@swisscom.com



Operational aspects

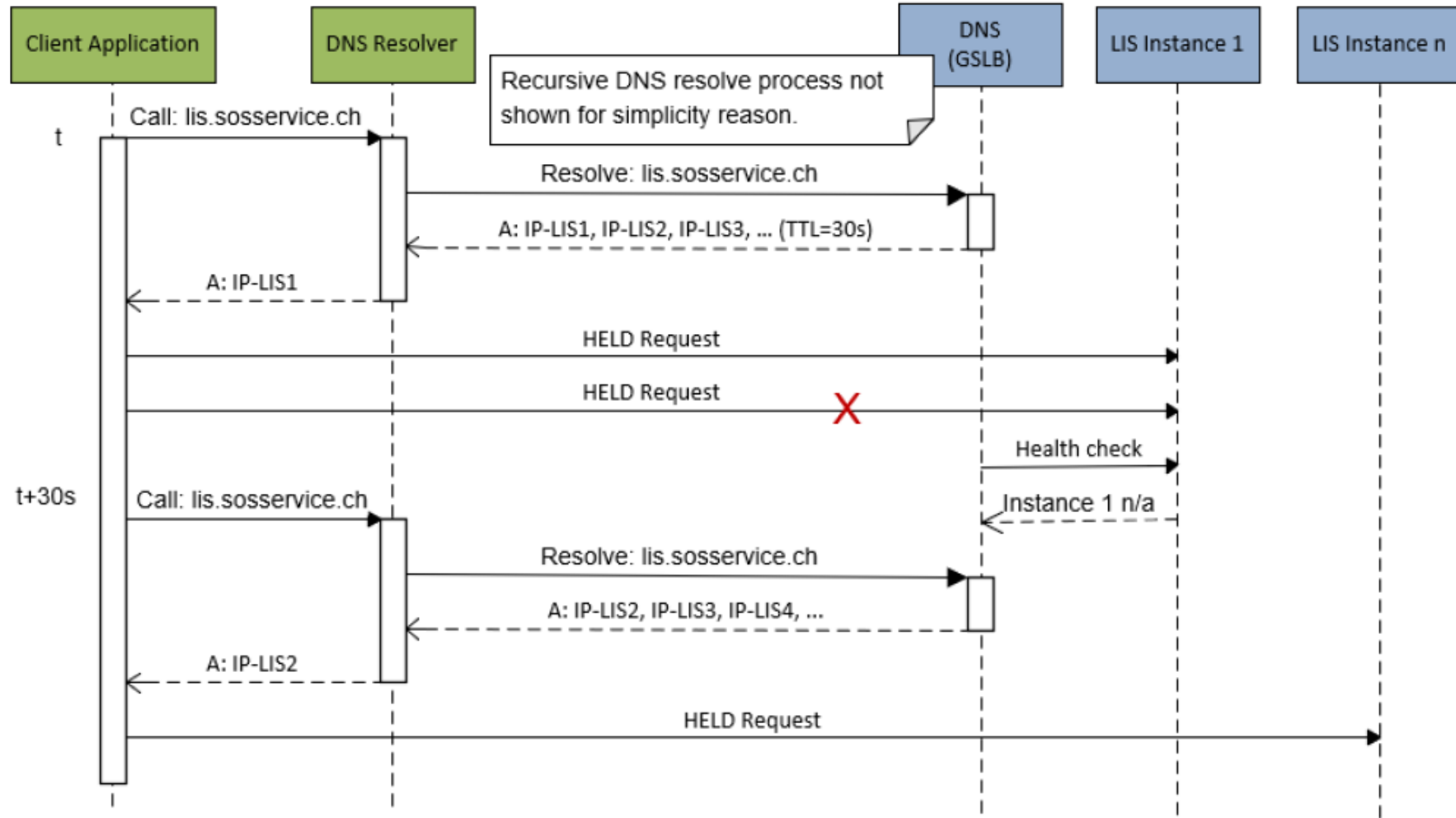


Failover mechanism

- Failover mechanism towards 4 LIS instances is DNS based
- DNS returns a list with IP addresses of currently available LIS instances upon a DNS request for FQDN lis.sosservice.ch
- VSPs need to respect TTL (time to live) of DNS response and request an updated IP address list if expired.
- In an optimal case, the VSP is caching the last DNS response in case of a DNS outage.



Failover mechanism





Authentication/Authorization/Encryption

- Basic Authentication/Authorization
- Client Certificate based Authentication/Authorization
 - Client Certificate can be issued by a public certificate authority
 - Client Certificate can be issued by the Swisscom certificate authority
- Public IP of is used as second factor in any case (allow-listing)
- Traffic is encrypted based on TLS 1.2 with modern cipher suites



Integration Tests

- Goal: Ensure the VSP is ready to deliver into production from a data but also from an operational perspective
- Carried out in close collaboration between VSP and Swisscom
- Tested aspects
 - Input validation (data quality)
 - Failover handling
- Test protocol is being created and shipped
- Access to production will be granted, as soon as all tests have passed



Test procedure

General test	Responsible	Step description
1	VSP	The onboarded VSP sends into LIS Staging at least 10 different locations. If a VSP integrates other VSPs, these different locations should be sent for each supported VSP.
2	Swisscom	Swisscom is analyzing and validating the incoming requests according to the rules below.

Test step	Responsible	Step description
1	VSP	Continuous delivery of localization data to https://stag-lis.sosservice.ch:8443 . 1 call per second. Observe traffic to LIS.
2	Swisscom	Monitoring calls from VSP
3	Swisscom	Remove LIS 1 from DNS response
4	Swisscom	Remove LIS 2 from DNS response
5	Swisscom	Remove LIS 3 from DNS response
6	Swisscom	Wait for 1 minute
7	Swisscom	Add LIS 1 back to DNS response
8	Swisscom	Add LIS 2 back to DNS response
9	Swisscom	Add LIS 3 back to DNS response
10	Swisscom	Wait for 1 minute
11	Swisscom	Remove LIS 4 from DNS response
12	Swisscom	Wait for 1 minute
13	Swisscom	Add LIS 4 back to DNS response
14	VSP	Analyze behavior of sending system (client)



Fertig! Thanks for your attention

Contact

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