System on registration and maintenance of the IMEI codes
IMEIU-Registry*

UNOC

* **IMEIU-Registry** is the brand name and has protection of intellectual property in accordance with legislation.

➡ **The challenges of obtaining operative and realistic information from radio electronic means for use in criminal, Customs, and Tax investigations:**

- **need for mobile forensics and forensics tools,** *for example, history the using of the specific radio electronic means, roaming and number portability cases, the transfer to another mobile network, retrieve relevant data from worldwide IMEI CDB*

- **chains of custody and preservation of evidence,** *for example, when and where a mobile device has been powered off, how and when subscriber has been changed the number as well as saving by users the mobile device, return of activity of the mobile device in the national or EU networks*

- **possibility of Law Enforcement Authority to do operative registration or exclusion of mobile devices and/or subscriber numbers into the "black" and "grey" lists on the basis of national legislation in independent manner from the mobile operators**

- **possibility on-line detection and fix of the potential fraud, fishing and spoofing gaps in 2G-3G networks as environment of the e-commerce**

- **control and accountability of the "grey" radio electronic means include resistance to refile**

- **Customs control and accountability on the quantity and quality of the imported radio electronic means**

- **possibility of the understanding by the Customs and Tax Service the financial forecast, "milestones" and operative market turnover volumes on the basis cross-checks of an information from importers**

- **possibility of the cross-data on-line exchange between Customs, Law Enforcement Authorities, Tax Service, NRA**

➡ **Growing problem of counterfeit products and negative impact of counterfeit and substandard radio electronic means (***one out of every five cellphones sold in the world are illegal or unlicensed copycats – Nokia, 2011***)**

➡ **The threat of TERRORISM, the counter-terrorism activity, and lack of effective online tools to prevention one**

➡ **The increasing need for centralized data storage and exchange of information on electronic tagged objects**

➡️ *Who are the Stakeholders and actors of the IMEIU-registry?*

Stakeholders are:

- Customs,
- Law Enforcement Authorities,
- Tax Service,
- National Regulatory Authority,
- Importers,
- Telcos,
- Subscribers

➡️ *Why IMEIU-Registry system do you need?*

Because all problems and issues are be solved

➡ **Modularization and flexibility of adaptation**

➡ **Clusterization**

➡ **Cloud technologies support**

➡ **Possibility of storing and processing of the electronic identify and track tags**

➡ **Full localization for languages which have the status of "Principal Language" in the country**

➡ **Detection of the potential fraud, fishing and spoofing**

➡ **Support of the roaming subscribers**

➡ **Support of the portable subscribers**

➡ **Uniform data array, cross-data exchange possibility between Customs, Law Enforcement Authorities, Tax Service, NRA and accountability control on the quantity and quality of the imported radio electronic means**

➡ **High reliability parameters, annual availability (uptime) IMEI CDB, not less 99,9%**

➡ **Possibility of integration with worlwide centralized IMEI DB**

➡ **Possibility of the integration with MNP/LNP/ENUM systems**

➡ **No need deep upgrade of the Telcos software**

➡ **No need any upgrade or new types of the Telcos hardware**

➡ **Independent working station for all participants of systems**

➡ **Convergence and NGN/IP Multimedia Subsystem support**

➡ **Monitoring and loggin of all processes**

➡ **Keeps the history of the usage mobile device according to specified parameters**

➡ **The system's architectural principles are based on cloud technologies. The critical requirements for connectivity between IMEIU-Registry and networks of system's other Stakeholders are absent. There are two remote Administrator clusters - the main site and backup site**

➡ **Nothing special requirements for equipment**

➡ **Software has a modular architecture and consists of the server and client components. The server and client components are connected between each other by private and secure sessions**

➡ **Continuous operation mode 24*7*365**

➡ **Reliability and service availability of not less than 99,9%**

➡ **Processing of the incoming IMEI applications in the automatic mode, at least 10,000,000.00 per hour (depends on the computing capacity of the servers may be increased)**

➡ **Storage not less than 50M unique triplets IMEI/IMSI/MSISDN (should be adjusted by Customer's requirements)**

➡ **Receiving of 0.25M triplets IMEI/IMSI/MSISDN / 1 sec. from Telco's EIR**

➡ **Processing time of updated lists of triplets IMEI/IMSI/MSISDN does not exceed 20 minutes**

➡ **Receiving files or HTTP-requests from Telco's EIR with updated of the triplets IMEI/IMSI/MSISDN of total subscriber base (can done several times a day)**

➡ **Actual performance of the solution does not depend on the conditions of the network and can be scaled**

➡ **System can be configured and adjust for different languages on demand of Customer**
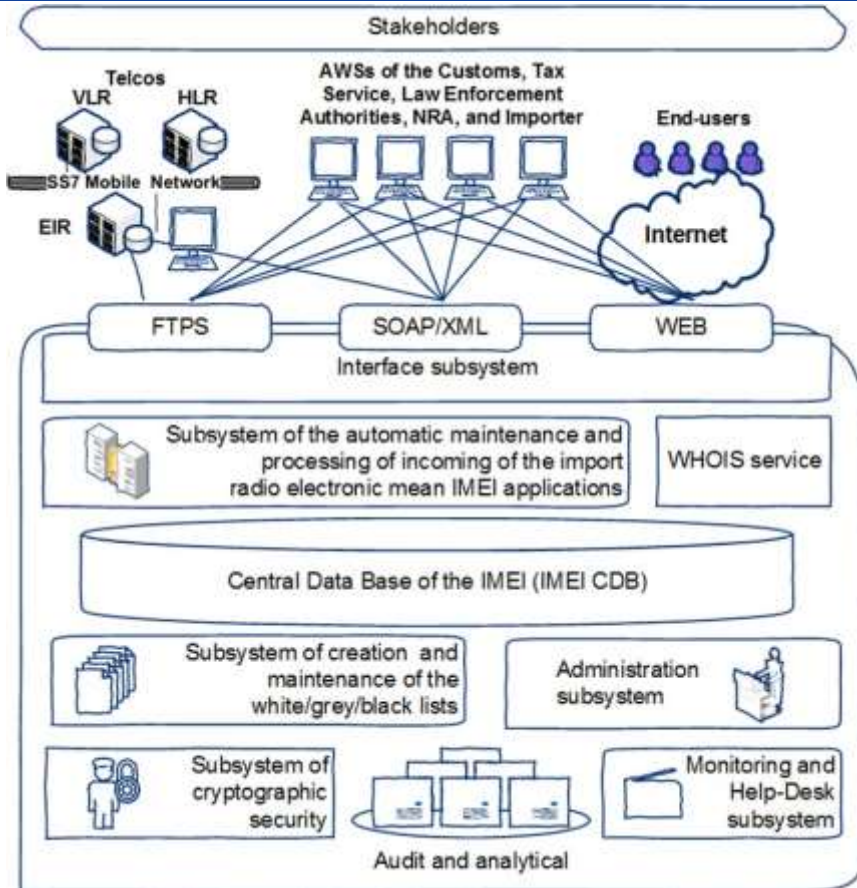
- **All UNOC decisions underwent technical testing and multistage testing from RIPE/IANA/ICANN in compliance with requirements for the central national and generic Registers**

- **UNOC has experience of developing a full set of the technical documentation**

- **UNOC has experience of the organization and maintenance the Help Desk system in 365*24*7 mode with detent "check-ticket"**

- **Since starting the Help Desk in 2013, there has not been a single incident of "orange" and "red" levels of the threat**

➡ **AWS "Importer-IMEI" – is the interactive software of the <u>Importer</u> to run the IMEI codes registry of mobile phones.**

AWS "Importer-IMEI" is the maintenance software that helps to enter, edit, view, search and export the data about the IMEI code within relevant Permits and Certificates of conformity into IMEI CDB.

➡ **AWS "Customs-IMEI" – is the interactive software of the <u>Customs</u> on maintaining the database of Importers.**

AWS "Customs-IMEI" provides performance of the functions:

- **enter, edit, view, search and export the data about Importers;**
- **search, view and export the relevant information about mobile devices and IMEI codes that got the permission on import.**

➡ **AWS "LEA-IMEI"- is the interactive software of the <u>Law Enforcement Authorities</u> on maintaining the database of IMEI codes.**

AWS "LEA-IMEI" provides performance of the functions:

- **enter, edit, view, search and export the data about subscriber's numbers associated with IMEI codes that have been included or excluded in / from "grey" or "black" lists, the relevant data about mobile devices associated with subscriber's numbers;**
- **receive the cross-information from Customs and NRA.**

➡ **AWS "Tax-IMEI"- is the interactive software of the <u>Tax Service</u> on maintaining the database of Importers.**

AWS "Tax-IMEI" provides performance of the functions:

- **enter, edit, view, search and export the data about Importer;**
- **search, view and export the relevant financial information about Importer within the permissions on import.**

➡ **AWS "NRA-IMEI", interactive software of the <u>National Regulatory Authority</u> on maintaining the database of the Certificates of conformity.**

**AWS "NRA-IMEI" provides performance of the functions:**

● **enter, edit, view, search and export the data about IMEI codes associated with Certificates of conformity and importers;**

● **search, view and export the relevant information about mobile devices and IMEI codes that got the Certificates of conformity;**

● **receive the cross-information from Customs and Importers.**

➡ **AWS "ADMIN-IMEI", interactive software of the <u>Administrator</u> on maintaining the database of IMEI codes.**

AWS "ADMIN-IMEI" provides performance of the functions:

● **search, view, and export the all type of data about IMEI codes associated with the triplets are in the colored lists, the system and current statuses,**

● **management of the access rights, verification, validation, and authorization of the operators of the third parties etc.,**

● **search, view and export the relevant information about mobile devices and IMEI codes associated with subscriber's numbers.**

➡ **AWS "PoS-IMEI" is the maintenance software of the <u>Subscribers</u> that helps to enter, view, search, and check the data about the IMEI code of radio electronic means that have been imported by end-user for personal use or are already registered in mobile network**
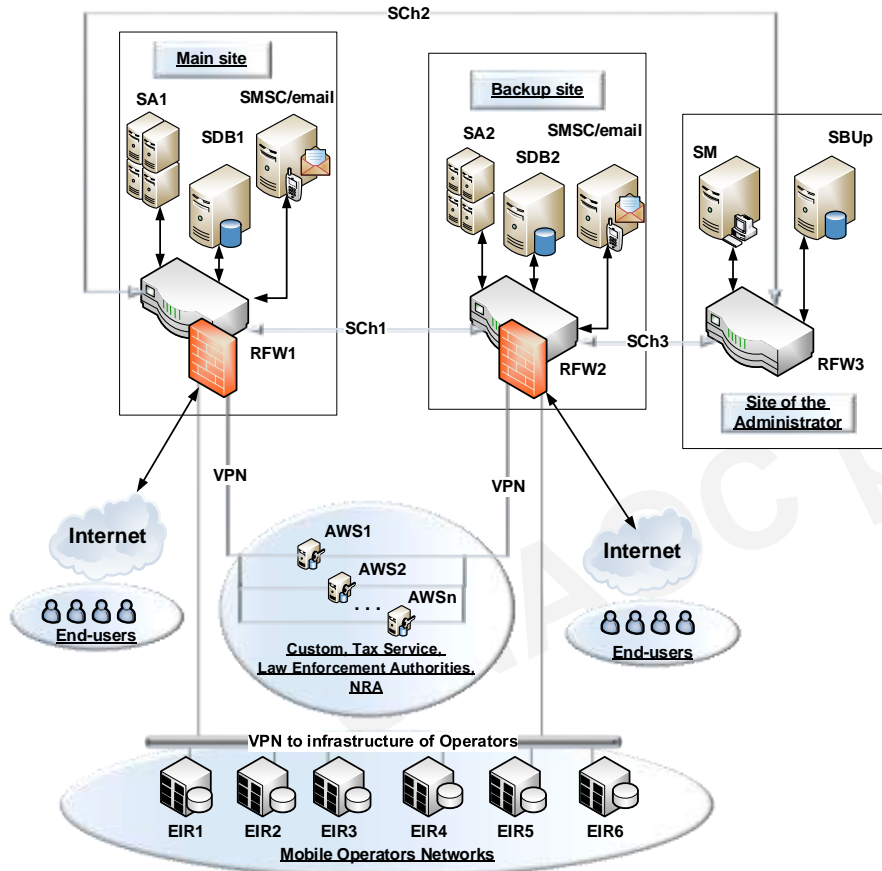
- **Equipment (one of possible configuration):**
  - **Servers – HP Proliant DL180 or Huawei RH1288H,**
  - **Firewall/Router – Cisco ASA 5525 or Huawei AR2240,**
  - **DBMS – Oracle Standard Edition 2 / 2 CPU or PostgreSQL,**
 - **Monitoring system – HP Supp Flex E-LTU.**

- **There are two remote Administrator clusters - the main site and backup site.**

- **One more Administrator cluster can be located directly in the Administrator office and provide monitoring of subsystem and backup of IMEI CBD.**

- **Administrator cluster must be located on secure premises in separate rack. If such option is not available, this cluster can be located at any compliant location which is different from the main and backup sites.**

- **All client software and hardware is located on Stakeholders' clusters only: Customs, Tax Service, Law Enforcement Authorities, and National Regulatory Authority (NRA).**

- **System can be configured for different languages which have the status of "Principal Language" in the country.**
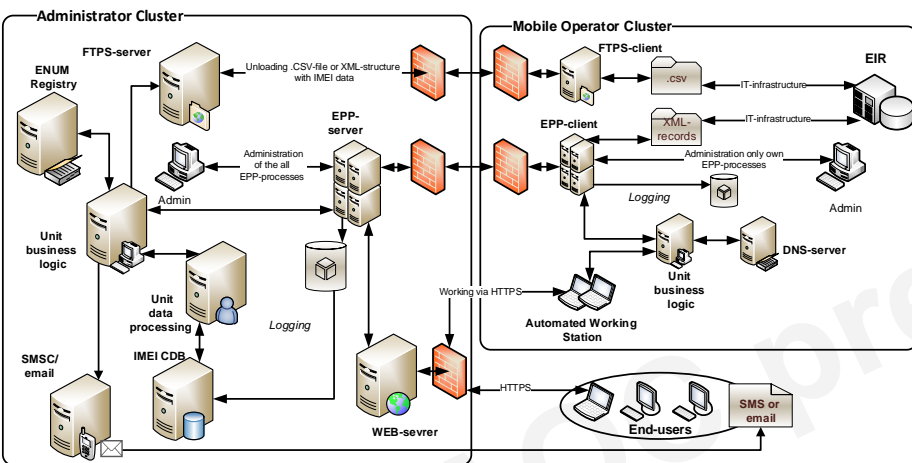
➡ **Nothing special requirements for equipment.**

➡ **Software has a modular architecture and consists of server and client components. The server and client components are connected between each other by private and secure sessions.**

➡ **Processing of information coming into the system done using the protocol EPP (http://tools.ietf.org/html/rfc5730), which describes the exchange of data between the client and server software in the form of data packet**
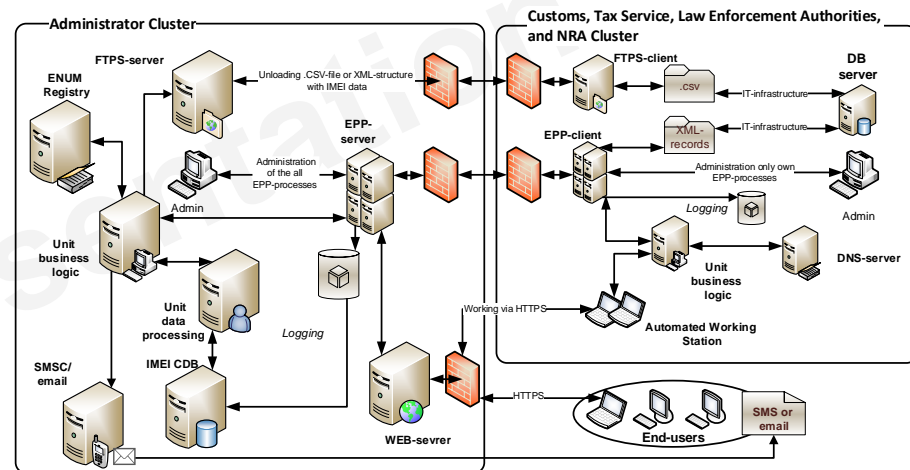
➡ **There is a difference between clusters of Operators and Stakeholders - Operators have the EIR as the source / receiver information about triplets IMEI/IMSI/MSISDN; the Stakeholders have the relevant databases.**

➡ **Communication interface with clusters is carried out either via FTPS-server/client by the .xls/.csv file transfer or through a specialized interface EIR/DB by the data in the form of xml-records.**
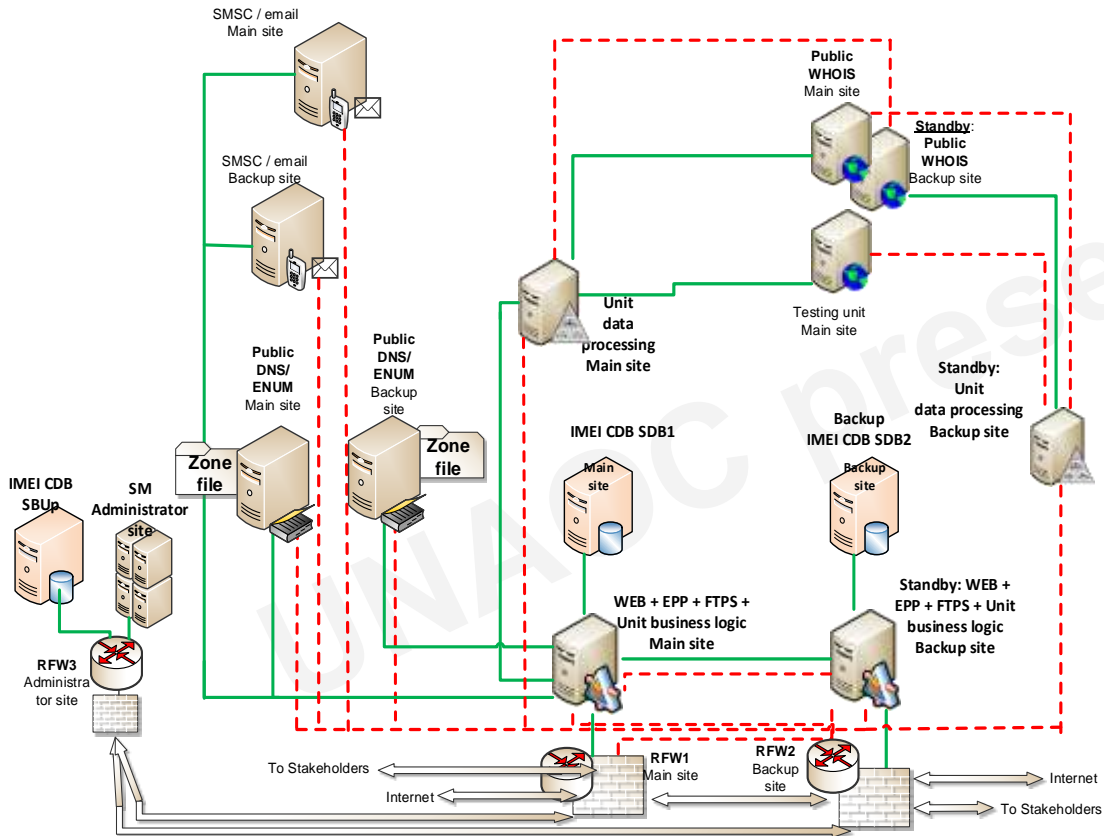
Reliability Parameters	Value
▶ Annual availability (uptime) IMEI CDB, not less	**99,9%**
▶ Annual availability (uptime) directory services of the system, not less	**99,0%**
▶ Annual availability (uptime) web-service registration and processing of applications, not less	**99,0%**
▶ Annual availability (uptime) processing service of applications, not less	**99,9%**
▶ Annual availability (uptime) EPP/FTPS/ENUM/DNS services, not less	**99,9%**
▶ Annual availability (uptime) monitoring and logging system, not less	**99,9%**
▶ Availability of the servers on EPP/FTPS-access to IMEI CDB, at least for 95% of the requests, RTT (TCP/IP) not more	**1500 ms**
▶ Availability of the servers on EPP/FTPS-access to IMEI CDB, at least for 95% of the requests, RTT (UDP/IP) not more	**500 ms**
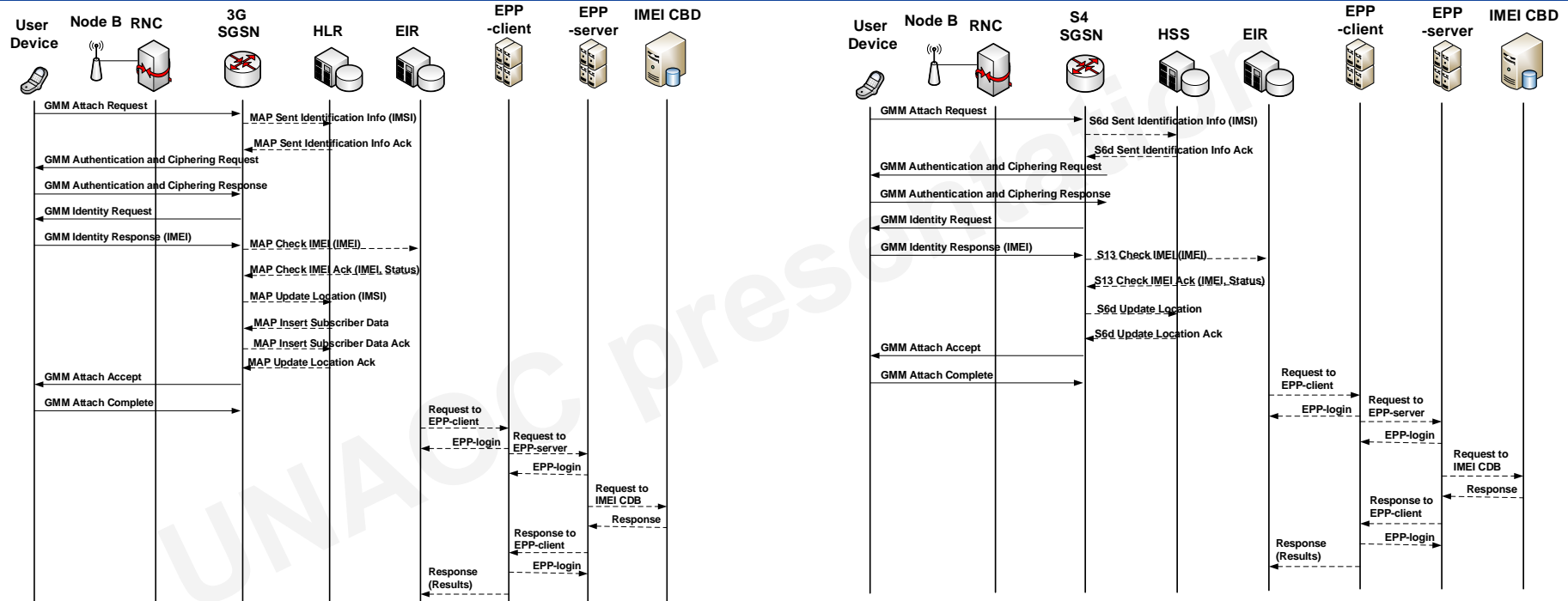
➡ **Operator GSM/UMTS/LTE generates a single request to IMEI CDB using *EPP-protocol* in *on-line/real-time* mode. Not excluded the formation of a group request to IMEI CDB and**

➡ **receives response from IMEI CDB with the complete data set for next actions**
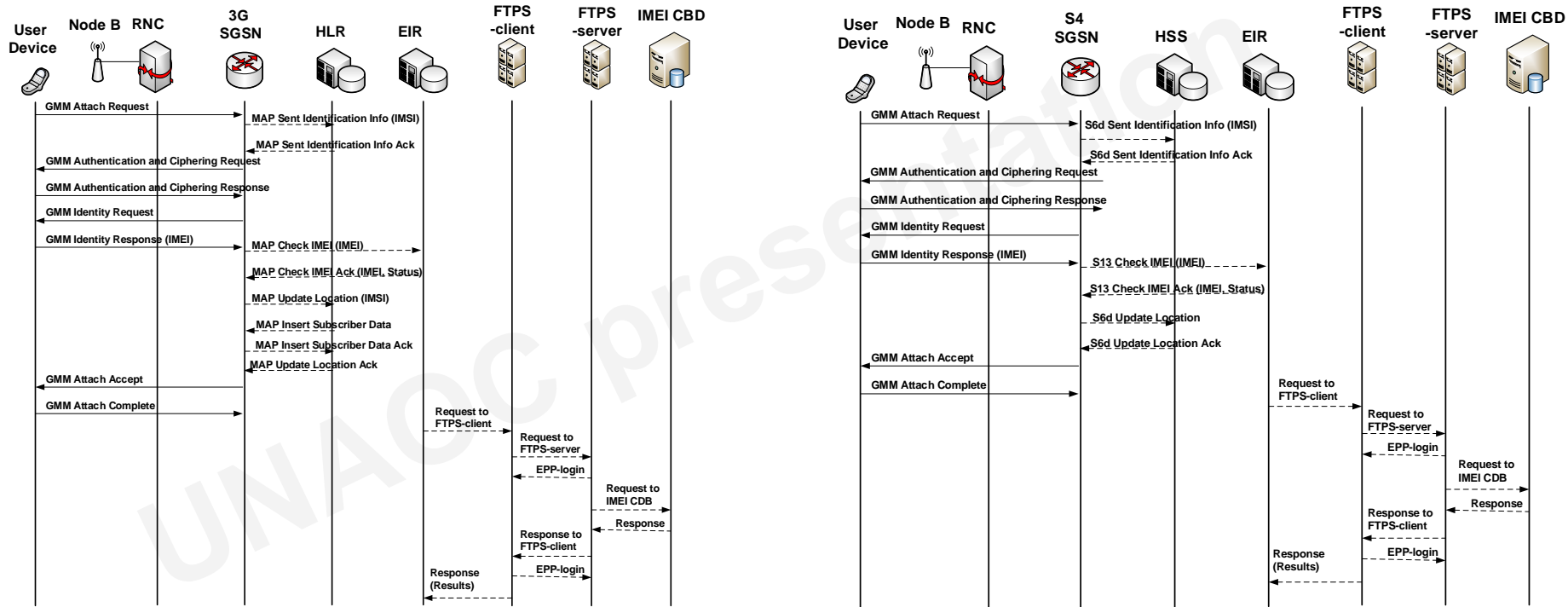
Operator GSM/UMTS/LTE generates a request that comprises a group of data to IMEI CDB using *FTPS-protocol* either in *on-line or in off-line* modes and

receives response from IMEI CDB with the complete data set for next actions
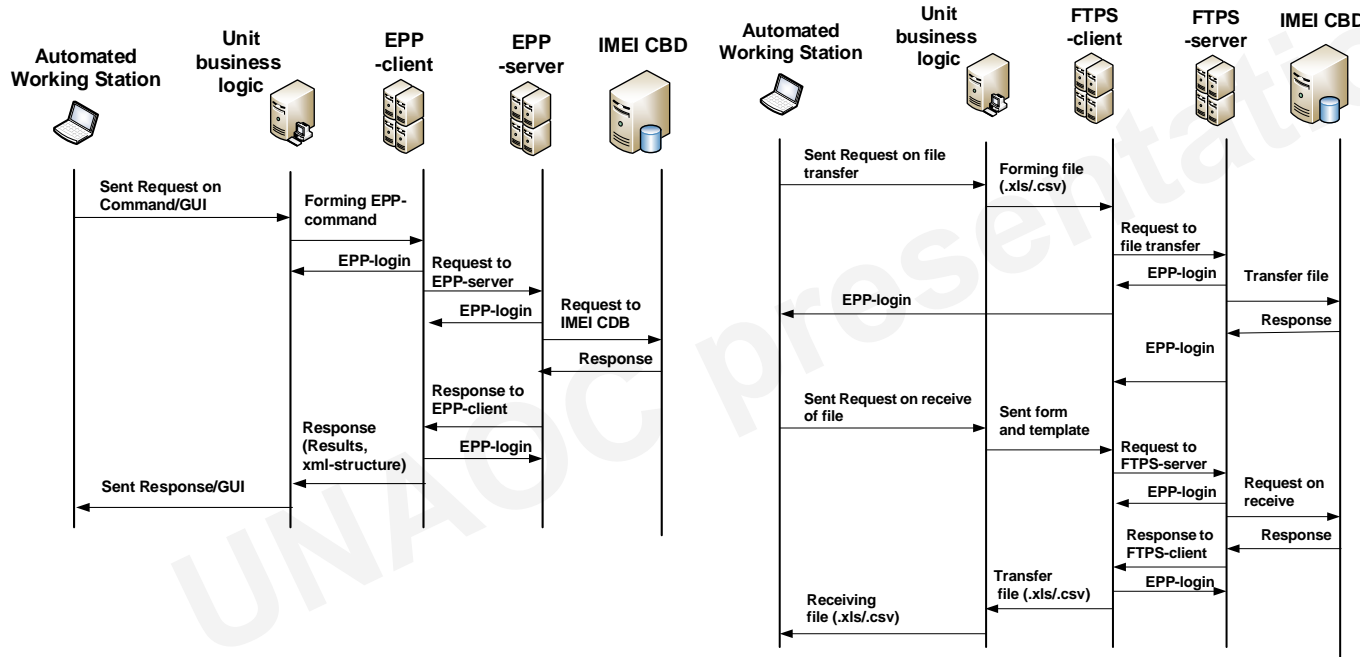
For example:

- Customs Officer has prepared the relevant information for inclusion in the reference book of importers; or Law Enforcement Officials prepared the information to adjust the "gray" list.

- Law Enforcement Officials seek relevant information regarding certain devices from reference book on radio electronic means; or Law Enforcement Officials want to obtain the actual "black list".

➡ **Stakeholder from AWS generates a request to IMEI CDB using *EPP- or FTPS-protocol* either in *on-line/real-time or in off-line* modes and**

➡ **receives response from IMEI CDB with the complete data set for next actions**

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
<command>
        <check>
            <imei:check xmlns:imei="urn:ietf:params:xml:ns:imei-1.0">
                <imei:name>352106050544203</imei:name>
                <imei:name>352106150345703</imei:name>
            </imei:check>
        </check>
    <clTRID>USER-1275850648</clTRID>
    </command>
</epp>
```

```
<?xml version="1.0" encoding="UTF-8"?>
<epp xmlns="urn:ietf:params:xml:ns:epp-1.0">
<response>
    <result code="1000">
    <msg lang="en">Command completed successfully</msg>
    </result>
        <resData>
            <imei:chkData xmlns:imei="urn:ietf:params:xml:ns:imei-1.0">
                <imei:cd>
                    <imei:name avail="0">352106050544203</imei:name>
                    <imei:reason>Object exists</imei:reason>
                </imei:cd>
            </imei:chkData>
        </resData>
    <result code="2303">
    <msg lang="en">Command completed unsuccessfully</msg>
    </result>
        <resData>
            <imei:chkData xmlns:imei="urn:ietf:params:xml:ns:imei-1.0">
                <imei:cd>
                    <imei:name avail="1">352106150345703</imei:name>
                    <imei:reason>Object does not valid</imei:reason>
                </imei:cd>
            </imei:chkData>
        </resData>
<trID>
<clTRID>USER-1275850648</clTRID>
<svTRID>UKR-20100606215846</svTRID>
</trID>
</response>
</epp>
```

Multilanguage:

- <msg lang="**en**">Command completed successfully</msg>

- <msg lang="**ua**">Команду виконано успішно</msg>

➡ **Accountability:**

- each EPP command of the any user of the IMEI-URegistry has a unique ID of the client transaction for strict accountability (**clTRID**)

- each EPP command of the any user of the IMEI-URegistry has a unique time label (time-stamp) of the client transaction for strict accountability (**svTRID**)

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IMEIU-Registry. Screen of AWS "Importer-IMEI". Example.

This is example reflects the entered information about radio electronic devices has been imported according with Customs Permit No. CT07-287/062 from 12-Dec-2015. The name of the Importer is "Company-Importer-of-mobile-devices", company ID = 8978140007623; it's a test example. According to position No. 1 of the Customs Permit, the worker of the Importer has input the data about device "Samsung GT-P3100" with IMEI = 352106050544203, and price = 4800.00 UAH. The data were reflected in the summarizing table.