

# Notes on HSS Schema

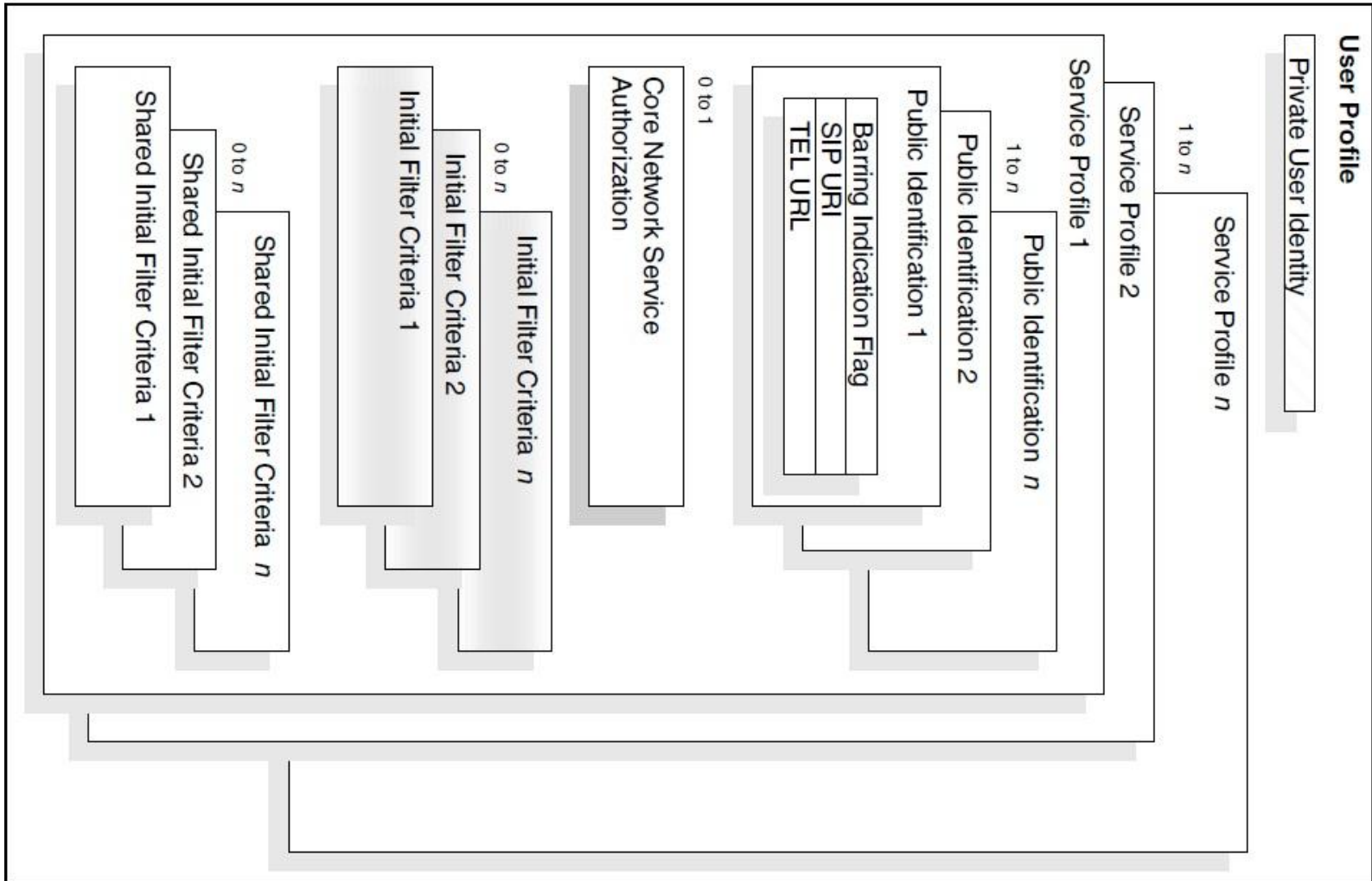
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# Key Elements: HSS Implementation

- HSS Schema and Lookup logic are key elements to the requirements
  - How HSS schema is organized for a subscriber
  - How a subscriber is identified by
    - Private User ID
    - Public User ID
  - How service profiles are associated with a subscriber
    - Each public user ID can have own service profile (standard)
  - What is the primary key in looking up a subscriber for user registration, authentication, session setup and termination
    - Private user ID (Ideal IMSI) ?
    - Public user ID (Ideal MDN) ?

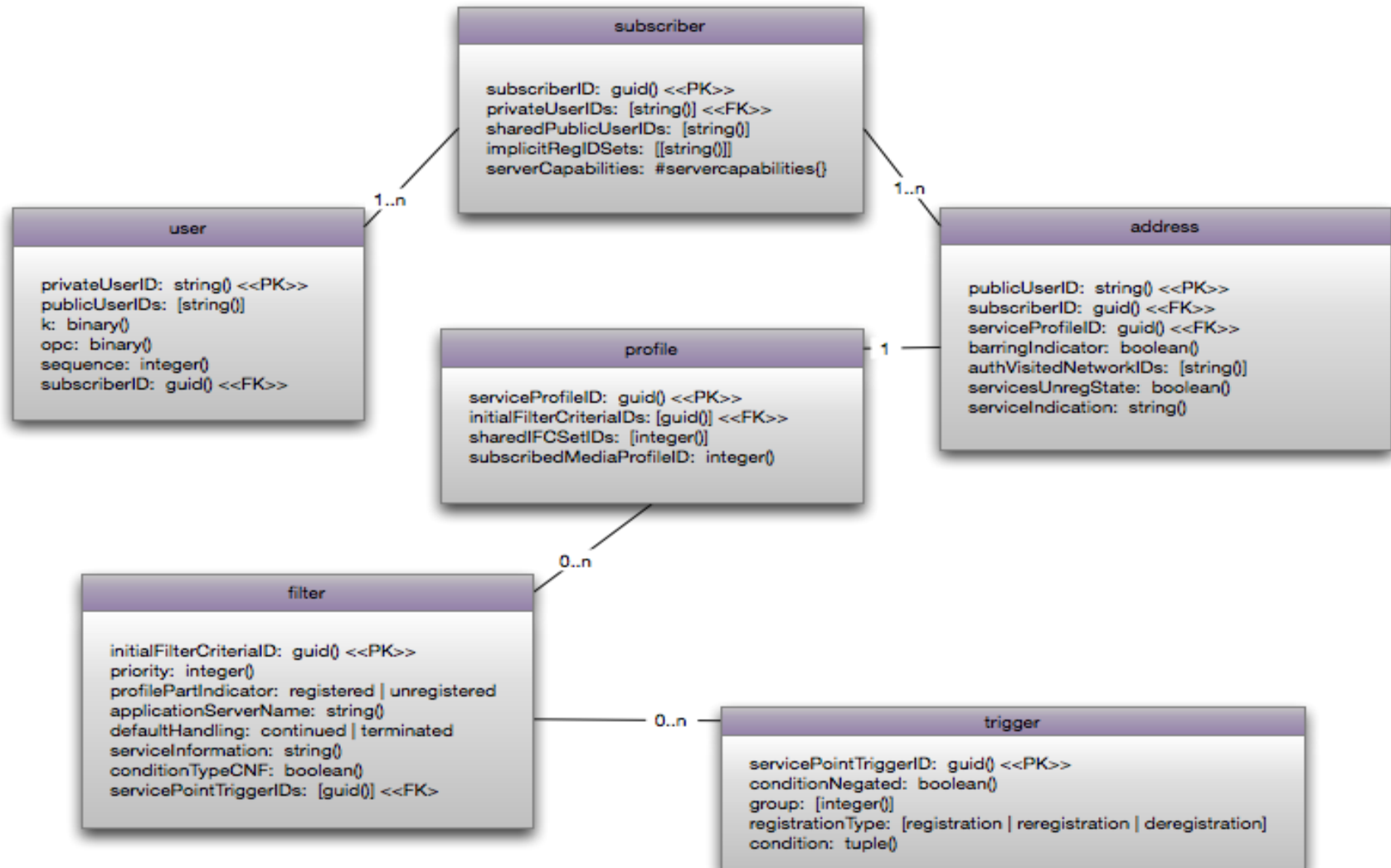
# A Common HSS User Profile Structure

- A user profile is bound to a Private User ID and to a collection of Public User IDs
- A User profile contains a plurality of Service Profiles
- A Public User ID contains either a SIP URI or a TEL URI



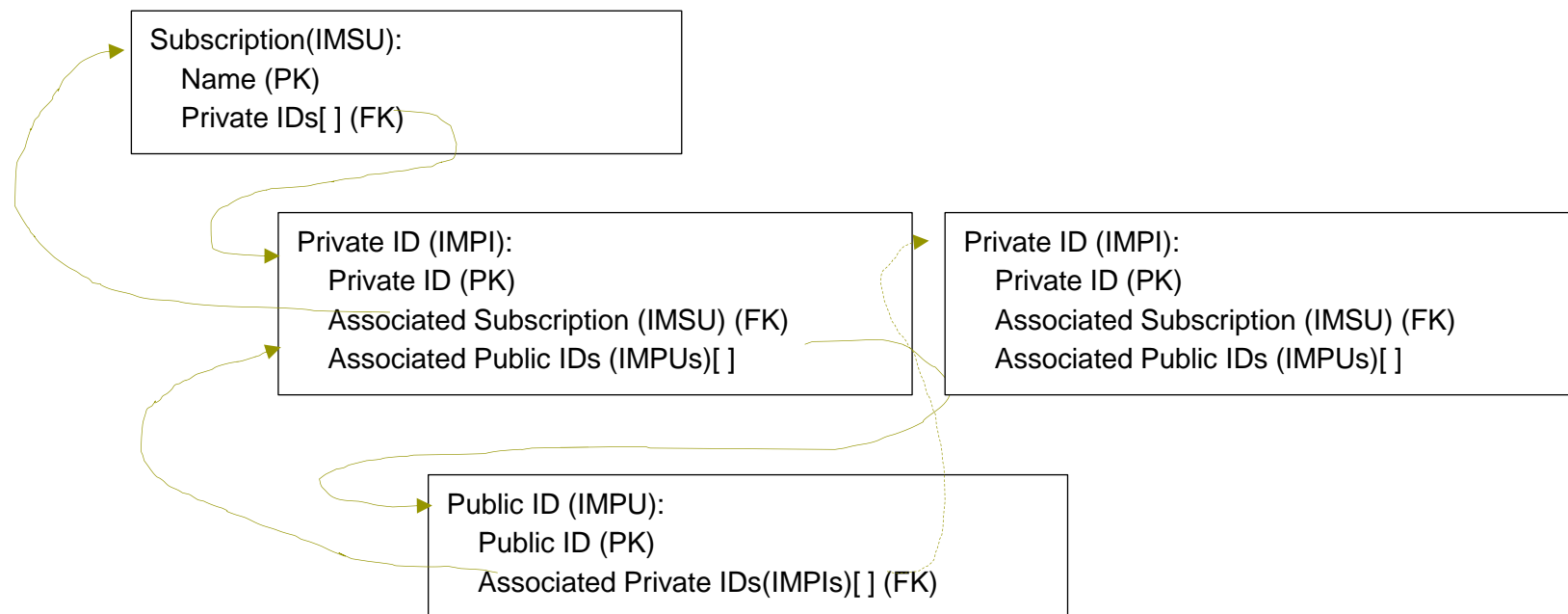
# Open HSS 3GDB HSS Schema

- A public ID can only point to one subscription record
- A private ID can only point to one subscription record



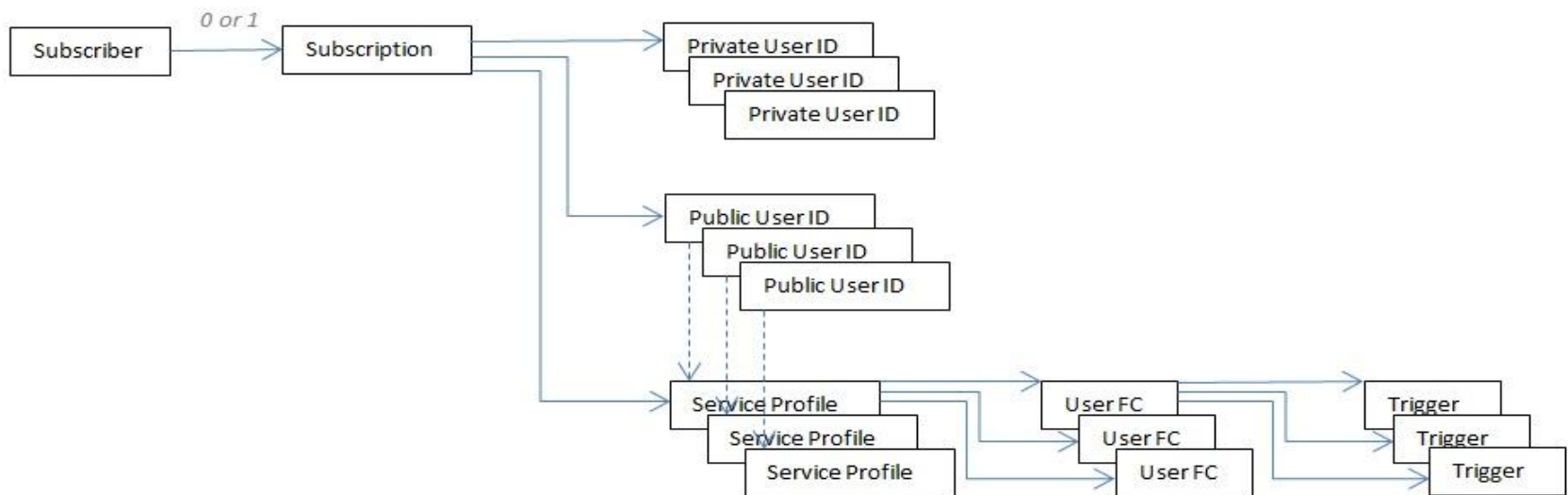
# Open HSS FOKUS Schema

- It allows to point back from public ID records to (multiple) Private ID records.
- To find the subscription from Public ID, it needs to go through private ID.
- Are the multiple private IDs associated with the same public ID are allowed to point to different subscriptions ?



# NSN HSS Schema

- The top most object in NSN HSS model is subscriber
- Subscription is a child object of subscriber
- NSN HSS uses mainly 4 keys to search for both subscriber and subscription data records
  - IMSI
  - MSISDN (i.e. MDN)
  - IPMU (public ID)
  - IMPI (private ID)
- It seems that all above 4 keys are used to uniquely identify a subscriber (may also a unique subscription) – we may ask NSN to clarify this point.



# NSN Schema – Private User ID

```
<xs:sequence>
<xs:element name="privateUserId" type="xsd:string" minOccurs="0"/>
<xs:element name="imsi" type="xsd:string" minOccurs="0"/>
<xs:element name="provisionedImsi" type="subscriber:ProvisionedImsi" minOccurs="0"
maxOccurs="unbounded"/> // ProvisionedImsi SCO
<xs:element name="msisdn" type="xsd:string" minOccurs="0"/>
<xs:element name="ipAddress" type="xsd:string" minOccurs="0"/>
<xs:element name="framedIPv6Prefix" type="xsd:string" minOccurs="0"/>
<xs:element name="framedInterfacelId" type="xsd:string" minOccurs="0"/>
<xs:element name="httpDigestKey" type="xsd:string" minOccurs="0"/>
<xs:element name="httpDigestKeyVersion" type="xsd:int" minOccurs="0"/>
<xs:element name="preferredAuthenticationScheme" type="subscriber:AuthenticationScheme" minOccurs="0"/>
<xs:element name="usedAuthenticationScheme" type="subscriber:AuthenticationScheme" minOccurs="0"/>
<xs:element name="lineIdentifier" type="subscriber:LineIdentifier" minOccurs="0" maxOccurs="unbounded"/> //
LineIdentifier SCO
<xs:element name="sgsnId" type="xsd:string" minOccurs="0"/>
<xs:element name="ggsnId" type="xsd:string" minOccurs="0"/>
<xs:element name="actAsVLR" type="xsd:boolean" minOccurs="0"/>
<xs:element name="chargelId" type="xsd:string" minOccurs="0"/>
<xs:element name="sessionId" type="xsd:string" minOccurs="0"/>
<xs:element name="preferredDomain" type="subscriber:PreferredDomain" minOccurs="0"/>
<xs:element name="refGussDataId" type="subscriber:PrintableString10" minOccurs="0"/>
<xs:element name="looseRoutingIndicationRequired" type="xsd:boolean" minOccurs="0"/>
<xs:element name="digestRealm" type="subscriber:PrintableString255" minOccurs="0"/>
<xs:element name="digestHa1" type="subscriber:PrintableString32" minOccurs="0"/>
</xs:sequence>
```

# NSN HSS Schema – Public User ID

```
<xs:sequence>
<xs:element name="publicUserId" type="xsd:string" minOccurs="0"/>
<xs:element name="originalPublicUserId" type="xsd:string" minOccurs="0"/>
<xs:element name="barringIndication" type="xsd:boolean" minOccurs="0"/>
<xs:element name="defaultIndication" type="xsd:boolean" minOccurs="0"/>
<xs:element name="serviceProfileName" type="xsd:string" minOccurs="0"/>
<xs:element name="irsId" type="xsd:string" minOccurs="0"/> // ImplicitRegisteredDataSet
<xs:element name="displayName" type="xsd:string" minOccurs="0"/>
<xs:element name="displayNamePrivacy" type="xsd:boolean" minOccurs="0"/>
<xs:element name="aliasId" type="xsd:string" minOccurs="0"/>
</xs:sequence>
```



# NSN HSS Schema

- The HSS application currently accesses the subscriber data via IMSI, MSISDN, IMPU and IMPI.

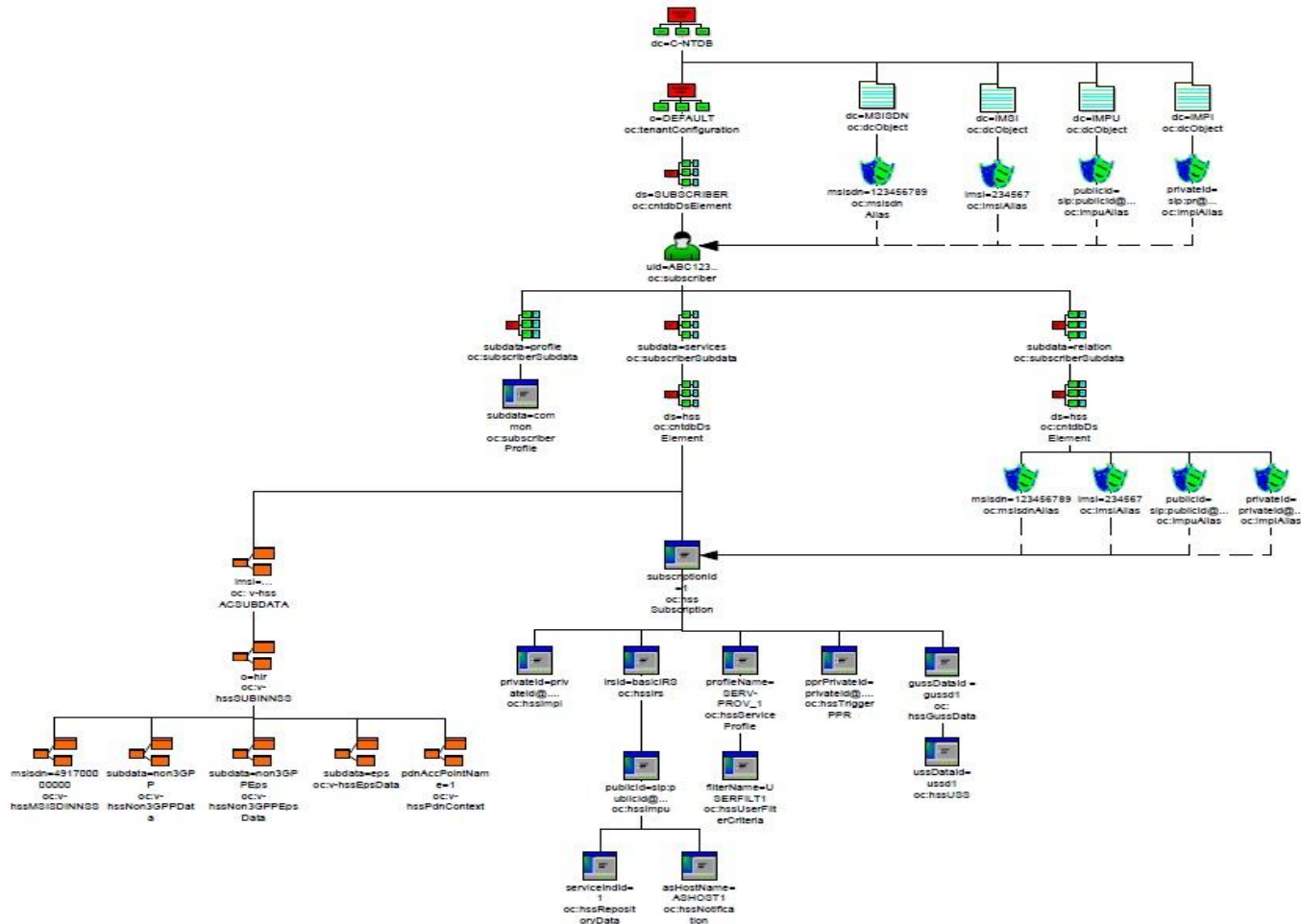


Figure 2: HSS subscriber data area

# NSN HSS Interfaces and Keys

## 1. Cx Interface (CSCF – HSS)

UAR/UA:	Public User ID, Private User ID
SAR/SAA:	Public User ID(s), Private User ID
LIR/LIA:	Private User ID
MAR/MAA:	Public User ID, Private User ID
RTR/RTA:	Public User ID, Private User ID
PPR/PPA:	Private User ID

## 2. S6a Interface (MME – HSS)

ULR/ULA:	IMSI
CLR/CLA:	IMSI
AIR/AIA:	IMSI
IDR/IDA:	IMSI
DSR/DSA:	IMSI
PUR/PUA:	IMSI
RSR/RSA:	User Id List (leading digits of MCC, MNC, MSIN)
NOR/NOA:	IMSI

# NSN HSS Interfaces and Keys

## 3. Sh Interface ( AS -- HSS)

UDR/UDA: Public User ID or MSISDN

PUR/PUA: Public User ID

SNR/SNA: Public User ID

PNR/PNA: Public User ID

## 4. Swx Interface (non-3GPP access 3GPP AAA – HSS)

SAR/SAA: IMSI

MAR/MAA: IMSI

RTR/RTA: IMSI

PPR/PPA: IMSI

## 5. Wx Interface (3GPP access AAA -- HSS)

MAR/MAA: IMSI

## 6. Zh Interface (Bootstrapping Function BSF – HSS)

MAR/MAA: Private User ID

# NSN HSS Interfaces and Keys

## 7. ANSI 41 MAP Interface ( MSC/HLR – HSS)

LOCREQ/locreq: Dialed digits, MSCID

ORREQ/orreq: ESN, MIN

ROUTREQ/routreq: ESN, MIN

ANLYZD/anlyzd: Dialed digits, MSCID

AUTHREQ/authreq: ESN, Serving MSCID, MSID (MIN or

IMSI)

ASREPORT/asreport: ESN, MSID (MIN or IMSI)

REDREQ/redreq: ESN, MSID (MIN or IMSI)

# An Example HSS Schema

