

Representing Mobile Devices and SIM Cards using CASE/UCO

This document describes the approach, and associated property bundles, account types, and address types to represent Mobile Devices and SIM Cards using CASE.

This document incorporates the following related decisions that combine to represent mobile devices and SIM cards:

Decision 1: Use the *MobileDevice* property bundle to represent common characteristics of mobile devices.

Decision 2: Use the *SIMCard* property bundle to represent common characteristics of SIM cards.

Decision 3: Use the *MobileAccount* types *IMSI* and *MSISDN* to represent the identifiers associated with mobile devices and SIM cards.

Decision 4: Use the Address types *BluetoothAddress* and *WiFiAddress* to represent the addresses on mobile devices.

Decision 5: Use the *iPhoneDevice* and *AndroidDevice* property bundles to represent common characteristics of iPhone and Android devices.

Overview Diagram

The following diagram provides a general overview of how a mobile devices and SIM cards are represented using CASE, and how they can be linked to associated mobile accounts.

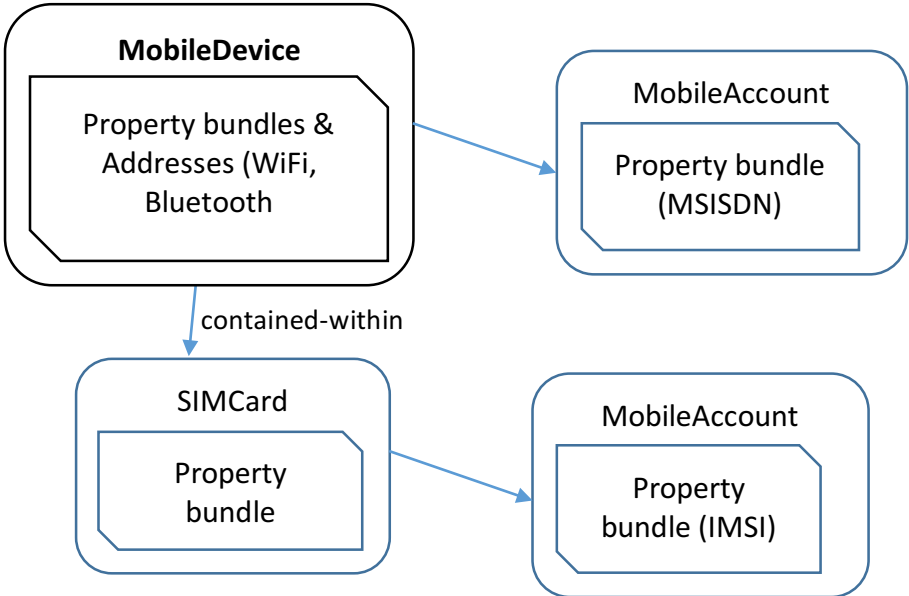


Figure: Depiction of a MobileDevice (referencing an MSISDN mobile account) with a SIMCard (referencing an IMSI mobile account).

Property Bundles

The *MobileDevice* property bundle is used to represent information about a mobile device:

| Property | Description |
|----------------------|---|
| clockSetting | The date and time that the mobile device clock was set to when the phone was observed/documentated |
| storageCapacity | How many bytes of data the mobile device can store |
| IMEI | International Mobile Equipment Identity is a unique number assigned to each mobile device, typically imprinted on the device |
| ESN | Electronic Serial Number or Mobile Equipment Identifier (MEID) is the unique identification number embedded or inscribed on the microchip in a wireless phone by the manufacturer |
| keypadUnlockCode | The code to unlock the device |
| bluetoothDeviceName | Name of the Bluetooth device |
| mockLocationsAllowed | Device configured to allow spoofing of geolocation |
| deviceActivationTime | The time when the device was activated |

IMEI is treated as immutable property of the device and it is not used as an address for routing data. The Bluetooth and WiFi addresses of a device are represented using the Address types *BluetoothAddress* and *WiFiAddress*.

The *SIMCard* property bundle is used to represent information about a SIM card:

| Property | Description |
|-----------------|--|
| SIMType | SIM, USIM, UICC |
| SIMForm | Full-size SIM, Micro SIM, Nano SIM |
| StorageCapacity | Storage capacity in bytes |
| Carrier | Telecommunications service provider that sold the SIM card |
| ICCID | Integrated circuit card identifier (http://www.itu.int/) |
| PIN | Personal Identification Number (PIN) used to access SIM card |
| PUK | Personal Unlocking Key (PUK) to unlock the SIM card |

CASE uses the *MobileAccount* types *MSISDN* and *IMSI* to represent the identifiers associated with mobile devices and SIM cards. *IMSI* and *MSISDN* are treated as *MobileAccount* traces because they can be switched between mobile devices and are used for routing data.

The *AndroidDevice* property bundle is used to represent information about Android devices:

| Property | Description |
|---------------------|---|
| androidID | Unique identifier generated by the operating system |
| androidSerialNumber | Android build serial number set by some manufacturers |
| screenUnlockPattern | Android swipe pattern to unlock screen |

The *iPhoneDevice* property bundle is used to represent information about iPhone devices:

| Property | Description |
|-----------|---|
| iPhoneID | Unique identifier generated by the operating system |
| ownerName | Name set on the device by the owner/user |

Note: For correlation of information it is preferable to provide values such as telephone numbers in a common form.

Descriptive JSON-LD Examples

This illustrative example is provided to show how mobile device and SIM Cards can be represented using CASE.

```
{
  "@id": "mobile-device-uuid",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "Device",
      "manufacturer": "iPhone",
      "model": "MG472ZD/A",
      "serialNumber": "F17RN4DXXXXX"
    },
    {
      "@type": "OperatingSystem",
      "name": "iOS",
      "manufacturer": "Apple",
      "version": "11.2.6"
    },
    {
      "@type": "iPhoneDevice",
      "uniqueID": "B3858A69A29375E6C706226B3633A3A11EB2A774",
      "ownerName": "Johnsons iPhone"
    },
    {
      "@type": "MobileDevice",
      "keypadUnlockCode": "123456",
      "IMEI": "35540607448XXXX",
      "MSISDN": ["mobile-account1-uuid"],
      "clockSetting": "2018-02-24T07:36:24.35Z",
      "timezoneSetting": "UTC+01:01 (Europe/Rome)",
      "storageCapacity": "16 GB"
    },
    {
      "@type": "BluetoothAddress",
      "address": "DC:41:5F:44:48:24"
    }
  ]
}
```

```

    {
      "@type": "WiFiAddress",
      "address": "DC:41:5F:44:48:25"
    }
  ],
},
{
  "@id": "trace-relationship1-uuid",
  "@type": "Relationship",
  "source": "sim-card-uuid",
  "target": "mobile-device-uuid",
  "kindOfRelationship": "contained-within",
  "isDirectional": "true"
},
{
  "@id": "sim-card-uuid",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "SIMCard",
      "ICCID": "456673345673436xxx",
      "IMSI": ["mobile-account2-uuid"],
      "SIMType": "USIM",
      "SIMForm": "micro",
      "Carrier": "Vodafone "
    }
  ]
},
},
{
  "@id": "mobile-account1-uuid",
  "@type": "Trace",
  "propertyBundle": [
    {
      "@type": "Account",
      "accountType": "Phone",
      "isActive": true
    },
    {
      "@type": "MobileAccount",
      "MSISDN": "31618300XXX"
    }
  ]
},
},
{
  "@id": "mobile-account2-uuid",
  "@type": "Trace",
  "propertyBundle": [

```

```
{
  "@type": "Account",
  "accountType": "Phone",
  "isActive": true
},
{
  "@type": "MobileAccount",
  "IMSI": "12345678910112"
}
]
```