

OmniSEP □□□□

OmniSEP □□□□□□□□□□□□

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- HTTP □□□□□
- □□□□
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- □□□□
- EAP-AKA □□
- Diameter □□
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HTTP □□□□□

□□□□□□ HTTP □□□

```
config :omni_sep,  
  http_port: 9014,  
  http_ip: {0, 0, 0, 0},  
  server_fqdn: "sep.mnc001.mcc001.pub.3gppnetwork.org",  
  entitlement_version: "2.0"
```

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http_port	□ □	□	9014	HTTP □□□ TCP □□□□□□□□□□ 443 □ TLS
http_ip	□ □	□	{0, 0, 0, 0}	□□□□ IP □□□ {0,0,0,0} □□□□□□□□□□
server_fqdn	□ □ □	□	-	□□□□□□□□□□□□□□ aes.mnc<MNC>.mcc<MCC>.pub. □□ GSMA TS.43 □ 2.1 □□
entitlement_version	□ □ □	□	"2.0"	TS.43 □□□□□ Android □□□□□□ "2.0"□

FQDN □□

□□□ FQDN □□ 3GPP □□□□□

```
aes.mnc<MNC>.mcc<MCC>.pub.3gppnetwork.org
```

名前	説明	値
aes	暗号化方式	aes
mnc<MNC>	ネットワークID (MNC)	mnc001
mcc<MCC>	ネットワークID (MCC)	mcc310
pub.3gppnetwork.org	3GPP ネットワーク	-

ネットワークID: MCC 310, MNC 410, AT&T

```
aes.mnc410.mcc310.pub.3gppnetwork.org
```

設定

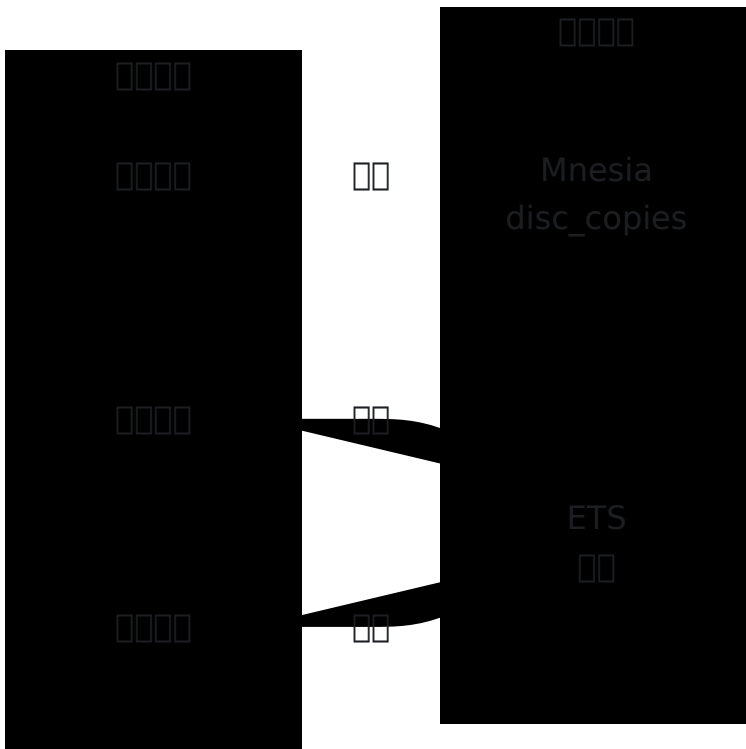
Mnesia データディレクトリ

```
config :omni_sep, :storage,
  data_dir: "priv/data"
```

設定

名前	タイプ	値	説明
data_dir	文字列	"priv/data"	Mnesia データディレクトリ

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Mnesia □

□□□□□□□ Mnesia `disc_copies` □□□□□□□

□	□□	□□□
<code>activity</code>	□□□□□□□□□□	Mnesia disc_copies
<code>activity_by_imsi</code>	IMSI □□□□□□□□	Mnesia disc_copies
<code>activity_by_terminal</code>	□□ ID □□	Mnesia disc_copies

目録

```
priv/data/  
└─ mnesia/  
   ├── schema.DAT          # Mnesia 目録  
   ├── activity.DCD        # 目録  
   ├── activity.DCL        # 目録  
   ├── activity_by_imsi.DCD  
   ├── activity_by_imsi.DCL  
   ├── activity_by_terminal.DCD  
   ├── activity_by_terminal.DCL  
   ├── DECISION_TAB.LOG  
   └─ LATEST.LOG
```

目録

目録

1. 目録
2. 目録
3. 目録 Mnesia 目録
4. 目録 Mnesia 目録

```
# config/prod.exs  
config :omni_sep, :storage,  
  data_dir: "/var/lib/omni_sep/data"
```

目録

目録

```

config :omni_sep, :default_entitlements,
  # VoWiFi (ap2004) []
  vowifi: %{
    entitlement_status: 1,          # []
    addr_status: 2,                # []
    tc_status: 2,                  # []
    prov_status: 1,                # []
    service_flow_url: "",
    service_flow_user_data: "",
    message_for_incompatible: "[] VoWiFi []"
  },

  # [] (ap2003) []
  volte: %{
    entries: [
      %{
        access_type: 1,            # 4G/LTE
        home_roaming_nw_type: 1,   # []
        entitlement_status: 1       # []
      },
      %{
        access_type: 2,            # 5G/NR
        home_roaming_nw_type: 1,   # []
        entitlement_status: 1,      # []
        network_voice_irat_capability: "EPS-Fallback"
      }
    ]
  },

  # SMSoIP (ap2005) []
  smsoip: %{
    entitlement_status: 1          # []
  },

  # [] (ap2010) []
  data_plan: %{
    entitlement_status: 1
  },

  # [] (ap2012) []
  dcb: %{
    entitlement_status: 0,         # []
    tc_status: 2                  # []
  }

```

```
},
```

```
# 0000 (ap2016) 000
```

```
satmode: %{
```

```
  entitlement_status: 0
```

```
  # 0000
```

```
}
```

VoWiFi (ap2004)

項目	型番	説明	備考
entitlement_status	0 1	0=許可, 1=未許可, 2=許可中, 3=未許可	許可状態
addr_status	0 1	0=許可, 1=未許可, 2=許可中, 3=未許可	許可状態
tc_status	0 1	0=許可, 1=未許可, 2=許可中, 3=未許可	許可状態
prov_status	0 1	0=許可, 1=未許可, 2=許可中, 3=未許可	許可状態
service_flow_url	0 1 2	URL	許可 URL
service_flow_user_data	0 1 2	-	許可状態
message_for_incompatible	0 1 2	-	entitlement_status=2 許可状態

VoLTE (ap2003)

VoLTE 許可状態

属性名	属性種別	値	説明
access_type	整数	1=4G/LTE, 2=5G/NR	接続種別
home_roaming_nw_type	整数	1=自宅ネットワーク, 2=他国, 3=他国 他国	他国ネットワーク種別
entitlement_status	整数	0=有効, 1=無効	権限ステータス
network_voice_irat_capability	文字列 配列	"EPS-Fallback", "VoNR"	5G 互換性 機能

権限

権限ID	権限名	権限説明
0	読み取り	システム情報の読み取り
1	書き込み	システム情報の書き込み
2	実行	システム情報の実行
3	管理	システム情報の管理

設定

システム設定

```
config :omni_sep, :token,
      validity_seconds: 86400,
      signing_secret: "change_me_in_production"
```

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<code>validity_seconds</code>	□□	□	86400	□□□□□□□□□□□□ 24 □□□
<code>signing_secret</code>	□□ □	□	-	□□□□□□□□□□□□□□□□□□□□ □□□□ 32 □ □□□□□□□□□□□□

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- □□□□□□□□□□ `signing_secret`
- □□□□□□
- □□□□□□□□□□□□□□□□

```
# config/prod.exs
config :omni_sep, :token,
  signing_secret: System.get_env("OMNI_SEP_TOKEN_SECRET")
```

EAP-AKA □□

□□□□□□□□□□ EAP-AKA □□□□□□□□

```
config :omni_sep, :eap_aka,
  enabled: true,
  session_timeout_ms: 30_000
```



```
config :diameter_ex, :diameter,
  service_name: :omni_sep_aaa,
  listen_ip: {127, 0, 0, 1},
  listen_port: 3868,
  host: "omnisep.example.com",
  realm: "example.com",
  product_name: "OmniSep",
  vendor_id: 10415,
  auth_application_ids: [16777265],
  acct_application_ids: [],
  supported_vendor_ids: [10415],
  request_timeout: 5000,
  allow_undefined_peers_to_connect: true,
  peer_selection_algorithm: :round_robin,
  control_module: OmniSep.Diameter.Control,
  processor_module: OmniSep.Diameter.Processor,
  applications: [
    %{
      alias: :swm,
      dictionary: :diameter_gen_base_rfc6733,
      module: OmniSep.Diameter.Swm
    }
  ],
  peers: [
    %{
      host: "aaa01.example.com",
      ip: "192.168.1.10",
      port: 3868,
      transport: :tcp
    }
  ]
]
```

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□□	□ □	□ □	□□	□□
service_name	□ □	□	-	□□□□□□□□
host	□ □ □	□	-	Diameter Origin-Host□□□□□□□□ FQDN□□□ RFC 6733□
realm	□ □ □	□	-	Diameter Origin-Realm□□□□□□□□ RFC 6733□
vendor_id	□ □	□	10415	3GPP □□□ ID□□□□ 3GPP TS 29.230□
auth_application_ids	□ □	□	-	□□□□□□□□□□ ID □ □□SWm □ 16777265□
request_timeout	□ □	□	5000	□□□□□□□□□□
peer_selection_algorithm	□ □	□	:round_robin	□□□□ □□:round_robin □ :failover

listen

Option	Type	Value	Description
<code>listen_ip</code>	string	{127, 0, 0, 1}	Diameter IP
<code>listen_port</code>	uint16_t	3868	Diameter RFC 6733

peers

`peers` list of peers

Option	Type	Value	Description
<code>host</code>	string	-	Diameter Origin-Host
<code>ip</code>	string	-	TCP/SCTP IP
<code>port</code>	uint16_t	3868	Diameter
<code>transport</code>	string	:tcp	:tcp or :sctp

SWm

SWm ID 16777265 EAP-AKA 3GPP TS 29.273

Code	Length	Description
DER	268	Diameter-EAP-Request - EAP AAA
DEA	268	Diameter-EAP-Answer - AAA EAP

配置

Diameter OmniSEP 配置

- EAP-AKA 配置
- IMSI 与 EAP_ID 配置
- 配置
- 配置

配置

配置

```
config :omni_sep, :activity,  
  max_records_per_subscriber: 1000,  
  retention_seconds: 2_592_000
```

表

配置	配置	配置	配置
max_records_per_subscriber	配置	1000	配置
retention_seconds	配置	2592000	配置 30 配置

配置

配置

欄名	説明
imsi	IMSI
terminal_id	IMEI/ID
timestamp	時刻
client_ip	クライアント IP
user_agent	HTTP User-Agent
app_ids	アプリケーション ID
auth_method	EAP-AKA, TOKEN
response_code	HTTP レスポンスコード

設定

例

```
# config/dev.exs
import Config

config :omni_sep,
  http_port: 9014

config :omni_sep, :eap_aka,
  enabled: true # EAP-AKA - AAA 対応

config :logger, :console,
  level: :debug
```



```
# config/prod.exs
import Config

config :omni_sep,
  http_port: 9014,
  http_ip: {0, 0, 0, 0},
  server_fqdn: System.get_env("OMNI_SEP_FQDN")

config :omni_sep, :token,
  validity_seconds: 86400,
  signing_secret: System.get_env("OMNI_SEP_TOKEN_SECRET")

config :diameter_ex, :diameter,
  host: System.get_env("DIAMETER_HOST"),
  realm: System.get_env("DIAMETER_REALM"),
  peers: [
    %{
      host: System.get_env("AAA_PEER_HOST"),
      ip: System.get_env("AAA_PEER_IP"),
      port: 3868,
      transport: :tcp
    }
  ]

config :logger, :console,
  level: :info
```

環境変数

変数名	説明
OMNI_SEP_FQDN	TS.43 環境変数 FQDN
OMNI_SEP_TOKEN_SECRET	トークン秘密鍵
DIAMETER_HOST	Diameter Origin-Host
DIAMETER_REALM	Diameter Origin-Realm
AAA_PEER_HOST	AAA 環境変数
AAA_PEER_IP	AAA 環境変数 IP 環境変数

ログ設定

```
config :logger, :console,
  format: "$time $metadata[$level] $message\n",
  metadata: [:request_id, :imsi, :terminal_id]
```

変数名	説明
request_id	環境変数UUID
imsi	環境変数 IMSI環境変数
terminal_id	環境変数 ID

OmniSEP □□□□□□

OmniSEP □□□□□□□□□□□□□□□□

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- □□□□
- TS.43 □□□□
- XCAP Sirmservs □□
- □□□□
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□□□□□□□□ OmniSEP □□□□□□□□□□□□ TS.43 □□□□□□ XCAP □□□□

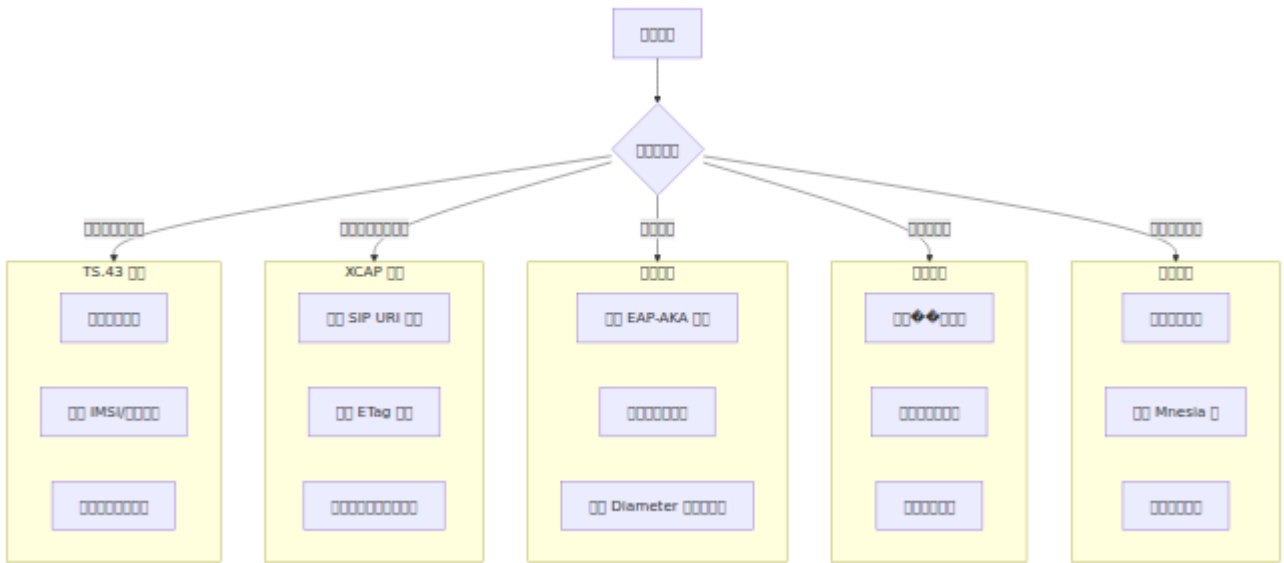
□□□

- □□□□□□□□□□ XCAP □□□□□□□□ EAP □□□□

- IMSI/MSISDN/ID / IP
- HTTP GET/PUT/POST/DELETE
-

- IP
- HTTP XCAP
- IMSI/MSISDN
- ID User-Agent
- XCAP
- User-Agent
- Content-Type/If-Match/3GPP
- XCAP XML
- HTTP

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TS.43 □□□□

□□□□“□□□□□□”

□□□□□□ VoWiFi/VoLTE □□□□□□□□□□

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- □□□□□□□ entitlement_status: 0
- □□□□□□□□□□□□□□□□□□
- □□□□□□□□ IMSI □□□□□□

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1. □□□□□□□□□□□□□□□□

```
GET /api/activity?imsi=<subscriber_imsi>
```

2. □□□□□□□□□□□□□□
3. □□□□□□□□□□


```
GET /api/entitlements/<imsi>
```

4. 删除 entitlements

```
DELETE /api/entitlements/<imsi>/<app_id>
```

返回结果

返回 HTTP 400 错误信息“invalid”

原因

- 不支持 TS.43 格式
- 不支持
- URL 错误

返回

键	值
terminal_id	IMEI 15 位
terminal_vendor	4 位
terminal_model	10 位
terminal_sw_version	
entitlement_version	“2.0”
app	ID

返回

1. 不支持 TS.43 格式
2. 不支持

3. Android User-Agent

```
PRD-TS43 term-<vendor>/<model> client-IMS-Entitlement/1.0 OS-Android/<version>
```

HTTP 406

HTTP 406

- entitlement_version
-

1.

```
config :omni_sep,  
  entitlement_version: "2.0"
```

2. Android "2.0"

3.

XCAP Simservs

HTTP 404

XCAP GET 404

-
- SIP URI
- MSISDN

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1. □□□□□ SIP URI □□□

```
/simservs.ngn.etsi.org/users/sip:+  
<msisdn>@<domain>/simservs.xml
```

2. □□□□ API □□□□□□□□□□

```
GET /api/xcap/<msisdn>
```

3. □□□□□□□□□□

```
POST /api/xcap/<msisdn>  
Content-Type: application/json  
  
{  
  "oip": {"active": true},  
  "oir": {"active": true, "default_behaviour": "presentation-  
not-restricted"},  
  "no_reply_timer": 20,  
  "call_forwarding": {},  
  "call_barring_incoming": {},  
  "call_barring_outgoing": {}  
}
```

ETag □□□□ HTTP 412 □

□□□PUT □ DELETE □□□□ HTTP 412 □□□□□□

□□□□□

- □□□□□□□□□□ ETag
- □□□□□□□□□□
- □□□□□□□□ ETag

□□□□□

1. ETag

```
GET /simservs.ngn.etsi.org/users/<sip_uri>/simservs.xml
```

2. If-Match ETag

```
PUT /simservs.ngn.etsi.org/users/<sip_uri>/simservs.xml
If-Match: "<etag_value>"
Content-Type: application/xcap-el+xml

<simservs>...</simservs>
```

3. If-Match

XML HTTP 400

PUT HTTP 400

- XML
-
-

()	<code>http://uri.etsi.org/ngn/params/xml/simservs/xcap</code>
cp	<code>urn:ietf:params:xml:ns:common-policy</code>

1. XML

2.

```
<simservs
xmlns="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
xmlns:cp="urn:ietf:params:xml:ns:common-policy">
```

3. ETSI TS 183 023

-
-
-

1. communication-diversion

```
<communication-diversion active="true">
```

2.

```
<cp:rule id="cfb">
  <cp:conditions>
    <busy/>
  </cp:conditions>
  <cp:actions>
    <forward-to>
      <target>tel:+15557654321</target>
    </forward-to>
  </cp:actions>
</cp:rule>
```

3. ID

Call ID	Call State	Call Duration
cfu	()	000
cfb	busy	00
cfna	no-answer	0000
cfnrc	not-reachable	000
cfnl	not-logged-in	000

4. Call ID tel: URI Call ID E.164 Call

0000

EAP-AKA Call ID

Call ID EAP_ID Call ID

Call ID

- Call ID EAP-AKA
- EAP_ID Call ID
- Diameter Call ID

Call ID

1. Call EAP-AKA Call ID

```
config :omni_sep, :eap_aka,
  enabled: true
```

2. Call EAP_ID Call ID NAI

```
0<IMSI>@nai.epc.mnc<MNC>.mcc<MCC>.3gppnetwork.org
```

```
0310410123456789@nai.epc.mnc410.mcc310.3gppnetwork.org
```

3. Diameter

4.

HTTP 511

HTTP 511

-
-
-

1.

```
config :omni_sep, :token,  
  validity_seconds: 86400 # 24
```

2.

3. EAP-AKA

4. signing_secret

-

- 配置 signing_secret
- 配置 token

配置

1. 配置 signing_secret

```
config :omni_sep, :token,  
      signing_secret: System.get_env("OMNI_SEP_TOKEN_SECRET")
```

2. 配置 token

3. 配置 signing_secret

配置

配置

配置

配置

- 配置 token
- 配置 signing_secret
- 配置 signing_secret

配置

1. 配置 token

```
curl http://<host>:9014/health
```

2. 配置 signing_secret




















```
config :omni_sep,  
  http_port: 9014,  
  http_ip: {0, 0, 0, 0}
```

3.            

4.     

```
netstat -tlnp | grep 9014
```

                                      <

配置

配置

配置

- Diameter 配置
- 配置
- 配置

配置

1. 配置 Diameter 配置

```
config :diameter_ex, :diameter,  
  request_timeout: 5000 # 5 秒
```

2. 配置

3. 配置 ETS 配置

4. 配置

配置

配置

配置

配置

- Mnesia 配置
- 配置 Mnesia 配置
- 配置

配置

1. 列出目录内容

```
ls -la priv/data/mnesia/
```

2. 列出 Mnesia 目录下的 .DCL 文件 - 列出文件内容

```
ls -la priv/data/mnesia/*.DCL
```

3. 删除 Mnesia 目录

```
# 强制 kill -9 信号 SIGTERM  
kill -TERM <pid>
```

4. 检查磁盘空间

```
df -h priv/data/
```

Mnesia 清理

清理 Mnesia 数据库

步骤

- 列出目录内容
- 列出文件内容
- Erlang 清理

清理

1. 列出 Mnesia 目录

2. 删除 Mnesia 目录

```
rm -rf priv/data/mnesia/*  
# 强制 kill -9 信号
```

3. Mnesia 启动

```
:mnesia.stop()
:mnesia.start()
:mnesia.wait_for_tables([:activity, :activity_by_imsi,
:activity_by_terminal], 30000)
```

启动 Mnesia

启动 Mnesia

启动 Mnesia

- 启动 Mnesia
- 启动 Mnesia
- 启动 Mnesia

启动 Mnesia

1. 启动 Mnesia

```
config :omni_sep, :activity,
      max_records_per_subscriber: 1000, # 启动 Mnesia
      retention_seconds: 2_592_000      # 30 启动 Mnesia
```

2. 启动 Mnesia

```
ls -lh priv/data/mnesia/activity.*
```

3. 启动 Mnesia

□□□□

□□□□

```
curl -s http://localhost:9014/health | jq
```

□□□□

```
{
  "status": "ok",
  "service": "omni-sep",
  "version": "0.1.0",
  "services": ["entitlements", "xcap"]
}
```

□□□□□□

```
# □□□□□□□□
curl "http://localhost:9014/api/activity?imsi=<imsi>&limit=10"

# □□□□□
curl "http://localhost:9014/api/activity?terminal_id=
<imei>&limit=10"

# □□□□□□□□
curl "http://localhost:9014/api/activity?from=<unix_ts>&to=
<unix_ts>"
```

□□□□

```
# □□□□□□  
curl http://localhost:9014/api/entitlements/<imsi>  
  
# □□□□□□  
curl -X POST http://localhost:9014/api/entitlements/<imsi> \  
-H "Content-Type: application/json" \  
-d '{"app_id": "ap2004", "entitlement": {"entitlement_status":  
1}}'
```

XCAP □□□□□□

```
# □□□□□□  
curl http://localhost:9014/api/xcap/<msisdn>  
  
# □□□□□□ simservs □□  
curl "http://localhost:9014/simservs.ngn.etsi.org/users/sip:+  
<msisdn>@domain/simservs.xml"
```

□□□□

□□□□□□

□□	□□
[info] GET / ...	□□□□□□
[info] POST / ...	□□□ POST □□□EAP □□□□
[warning] Missing parameters	□□□□□□
[error] EAP session timeout	EAP-AKA □□□□□□
[debug] Token validated	□□□□□□

□□□□□□

```
# config/dev.exs □ runtime
config :logger, :console,
  level: :debug,
  metadata: [:request_id, :imsi, :terminal_id]
```

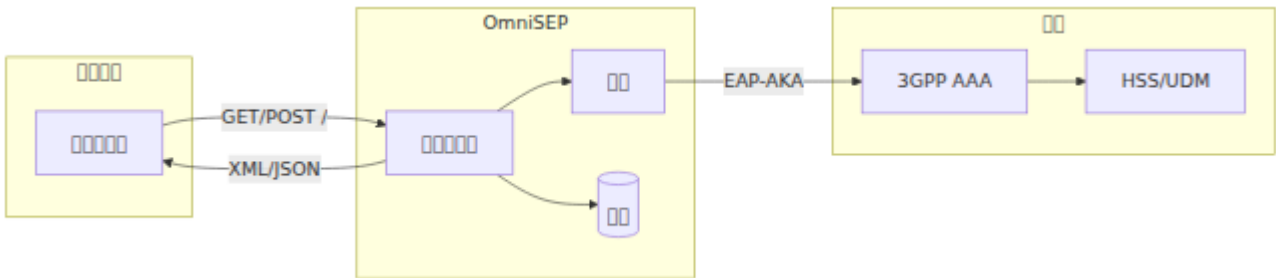
□□□□

□□□□□□□□□□□□□□□□

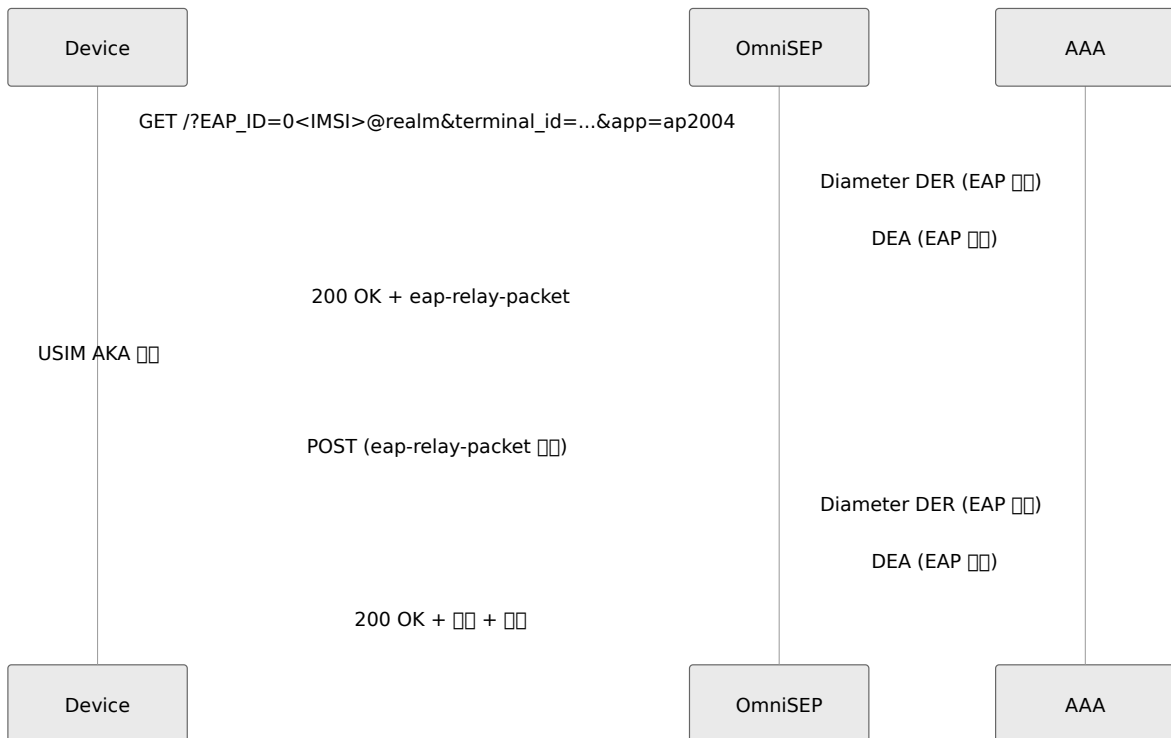
□□	□□
TS.43	GSMA TS.43
XCAP	RFC 4825
Simservs	ETSI TS 183 023
EAP-AKA	RFC 4187
Diameter	RFC 6733

TS.43

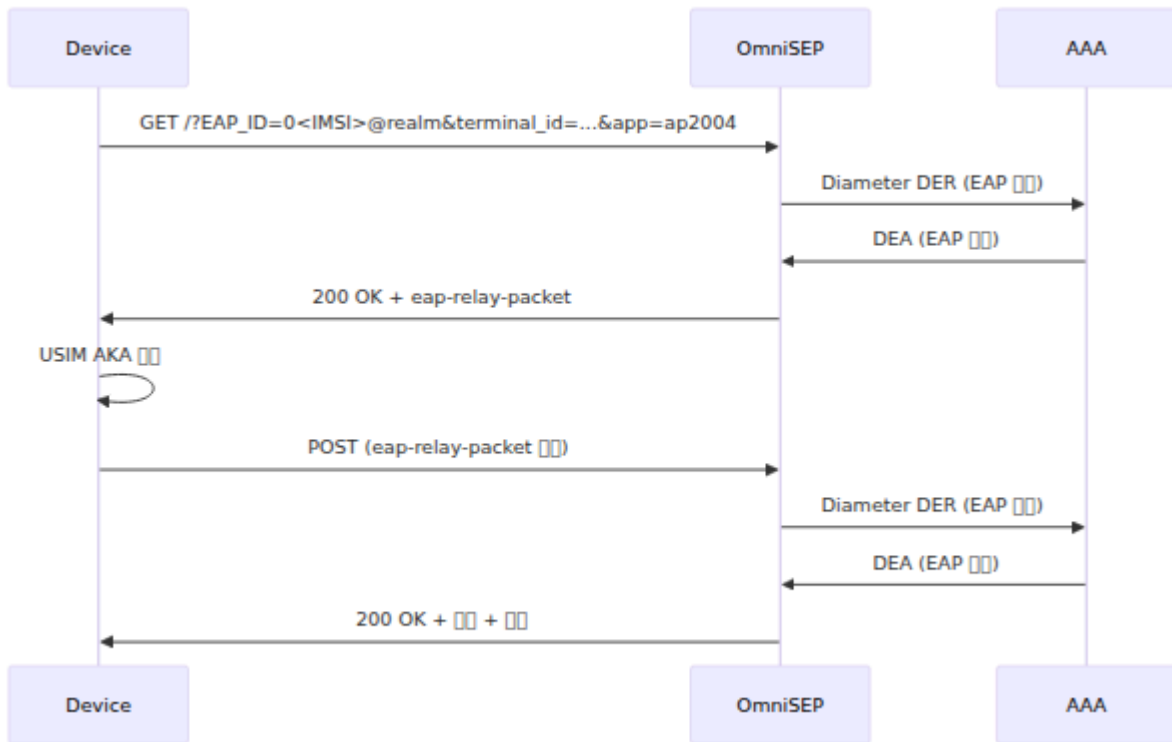
OmniSEP GSMA TS.43 VoWiFi VoLTE SMS



(EAP-AKA)



Sequence Diagram (EAP)



HTTP

Table

Method	Path	Content-Type
GET	/	application/json
POST	/	application/json

终端信息

名称	数据类型	描述
terminal_id	字符串	IMEI 15 位数字
terminal_vendor	字符串	RCC.14 4 位数字
terminal_model	字符串	RCC.14 10 位数字
terminal_sw_version	字符串	RCC.14 20 位数字
entitlement_version	字符串	"2.0"
app	字符串/列表	ID(s)

网络信息

网络配置信息

名称	描述
EAP_ID	EAP-AKA NAI: 0<IMSI>@nai.epc.mnc<MNC>.mcc<MCC>.3gppnet
token	字符串
temporary_token	字符串
operator_token	字符串

요청

필드	길이	설명
IMSI	15	token (15자리 문자열)
app_name	10	응용 프로그램 이름
app_version	10	응용 프로그램 버전
notif_action	1	0=SMS, 1=GCM, 2=FCM
notif_token	10	알림 토큰
vers	1	API 버전

응답

응답은 GET 요청

```
GET /?  
terminal_id=123456789012345&terminal_vendor=Goog&terminal_model=Pixel
```

응답은 EAP-AKA POST 요청

```
{  
  "terminal_id": "123456789012345",  
  "terminal_vendor": "Goog",  
  "terminal_model": "Pixel8",  
  "terminal_sw_version": "14.0",  
  "entitlement_version": "2.0",  
  "app": "[ap2003,ap2004]",  
  "EAP_ID":  
  "0310410123456789@nai.epc.mnc410.mcc310.3gppnetwork.org"  
}
```

□□□□

Accept □

Accept □	□□□□
text/vnd.wap.connectivity-xml	XML□□□□
application/json	JSON
application/vnd.gsma.eap-relay.v1.0+json	EAP relay JSON

XML □□

```
<?xml version="1.0"?>
<wap-provisioningdoc version="1.1">
  <characteristic type="VERS">
    <parm name="version" value="2"/>
    <parm name="validity" value="86400"/>
  </characteristic>
  <characteristic type="TOKEN">
    <parm name="token" value="eyJ0eXAi..."/>
    <parm name="validity" value="86400"/>
  </characteristic>
  <characteristic type="APPLICATION">
    <parm name="AppID" value="ap2004"/>
    <characteristic type="ap2004">
      <parm name="EntitlementStatus" value="1"/>
      <parm name="AddrStatus" value="2"/>
      <parm name="TC_Status" value="2"/>
      <parm name="ProvStatus" value="1"/>
    </characteristic>
  </characteristic>
</wap-provisioningdoc>
```

JSON ☐☐

```
{
  "Vers": {
    "version": "2",
    "validity": "86400"
  },
  "Token": {
    "token": "eyJ0eXAi...",
    "validity": "86400"
  },
  "ap2004": {
    "EntitlementStatus": "1",
    "AddrStatus": "2",
    "TC_Status": "2",
    "ProvStatus": "1"
  }
}
```

EAP ☐☐☐☐

☐ EAP-AKA ☐☐☐☐☐☐☐☐☐☐

```
{
  "eap-relay-packet": "AQEALBcBAAAn..."
}
```

□□ ID

□□□□□

□□ ID	□□	□□
ap2003	□□□□□□□□VoLTE/VoNR□	TS.43 □ 4 □
ap2004	□□□□ WiFi□VoWiFi□	TS.43 □ 3 □
ap2005	□□□□ IP	TS.43 □ 5 □
ap2006	ODSA □□	TS.43 □ 6 □
ap2009	ODSA □□	TS.43 □ 6 □
ap2010	□□□□□□	TS.43 □ 7 □
ap2011	□□□□□□□□	TS.43 □ 8 □
ap2012	□□□□□□□□	TS.43 □ 9 □
ap2013	□□□□□□	TS.43 □ 10 □
ap2014	□□□□□□	TS.43 □ 11 □
ap2016	□□□□	TS.43 □ 12 □

VoWiFi (ap2004) 表

項目	型	範囲	説明
EntitlementStatus	型	0-3	権限ステータス
AddrStatus	型	0-3	E911 緊急サービスステータス
TC_Status	型	0-3	TC ステータス
ProvStatus	型	0-3	プロバイダステータス
ServiceFlow_URL	URL	URL	サービスフロー URL
ServiceFlow_UserData	型	-	サービスフローユーザデータ

表

値	EntitlementStatus	AddrStatus/TC_Status/ProvStatus
0	型	型
1	型	型
2	型	型
3	型	型

VoLTE (ap2003) 表

VoLTE 表

項目	状態	値	説明
AccessType	00	1=LTE, 2=NR	000000
HomeRoamingNWType	00	1-3	0000
EntitlementStatus	00	0-1	00000
NetworkVoiceIRATCapability	000	-	00000000 5G

HomeRoamingNWType 00

値	説明
1	00000
2	000
3	000

00000

HTTP 状態	状態	説明
400	0000	0000000
403	00	0000
406	0000	000000000
511	000000	00000000 EAP-AKA

□□□□□□

```
HTTP/1.1 400 Bad Request
Content-Type: text/plain
```

```
Bad Request: Missing parameters ["terminal_id"]
```

□□□□□□

□□□□□□□□

□□□□ API □◆◆□□□□□□□□□□

```
POST /api/entitlements/{imsi}
Content-Type: application/json
```

```
{
  "app_id": "ap2004",
  "entitlement": {
    "entitlement_status": 0,
    "addr_status": 1,
    "tc_status": 1,
    "prov_status": 0,
    "service_flow_url": "https://activate.example.com/vowifi",
    "message_for_incompatible": "VoWiFi □□□□□□"
  }
}
```

□□□□

```
GET /api/entitlements/{imsi}
```

□□□□□□□□□□□□□□

```

{
  "imsi": "310410123456789",
  "entitlements": {
    "ap2004": {
      "entitlement_status": 1,
      "addr_status": 2,
      "tc_status": 2,
      "prov_status": 1
    }
  }
}

```

□□□□

□□□□□□□□□□□□□□□□

□□□□

```

GET /api/activity?
imsi=310410123456789&from=1704067200&to=1704153600&limit=100

```

□□	□□	□□
imsi	□□□	□□□ IMSI □□
terminal_id	□□□	□□□□□ ID □□
from	□□	□□□□□□ Unix □□□
to	□□	□□□□□□ Unix □□□
limit	□□	□□□□□□□□
offset	□□	□□□□□

□□□□

```
{
  "id": "550e8400-e29b-41d4-a716-446655440000",
  "timestamp": "2024-01-15T10:30:00Z",
  "imsi": "310410123456789",
  "terminal_id": "123456789012345",
  "terminal_vendor": "Google",
  "terminal_model": "Pixel8",
  "app_ids": ["ap2003", "ap2004"],
  "client_ip": "192.168.1.100",
  "user_agent": "PRD-TS43 Goog/Pixel8 client-IMS-Entitlement/1.0
OS-Android/14.0",
  "auth_method": "TOKEN",
  "response_code": 200
}
```

Android □□□□□□

OmniSEP □□□ Android AOSP `service_entitlement` □□□□□□□

□□□□□□

Android □□□□□□□□□□□□

```
PRD-TS43 term-<vendor>/<model> <client_ts43>/<app_version> OS-
Android/<sw_version>
```

□□□

```
PRD-TS43 term-Google/Pixel8 client-IMS-Entitlement/1.0 OS-
Android/14.0
```

□□□□ ID

Android □ POST □□□□□□□□□□□□□□□□ ID□

```
{  
  "app": "[ap2003,ap2004]"  
}
```

OmniSEP 配置

- "ap2003,ap2004" - 設定
- "[ap2003,ap2004]" - 設定Android 設定
- ["ap2003", "ap2004"] - JSON 設定

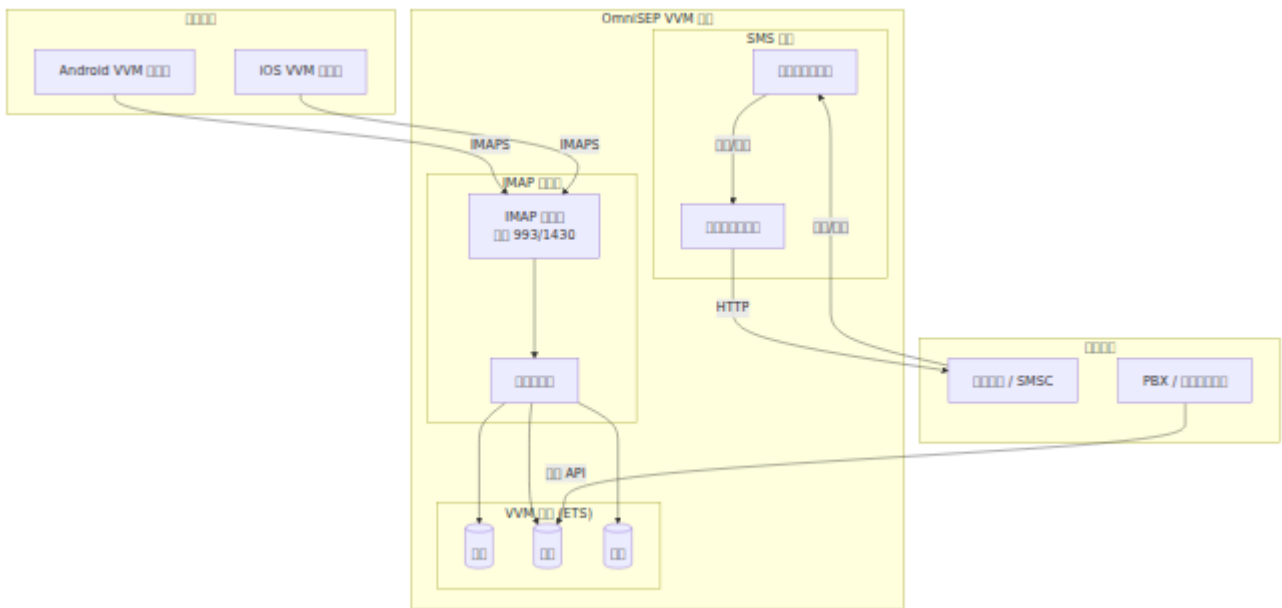
設定

項目	設定
GSMA TS.43	設定
GSMA RCC.14	IMS 設定
3GPP TS 33.220	設定 (GBA)
3GPP TS 29.273	EPS AAA 設定 (SWm)

OmniSEP VVM (VVM)

OmniSEP 993/1430 IMAP 993/1430 OMTP VVM v1.3 GSMA TS.46 VVM IMAP SMS

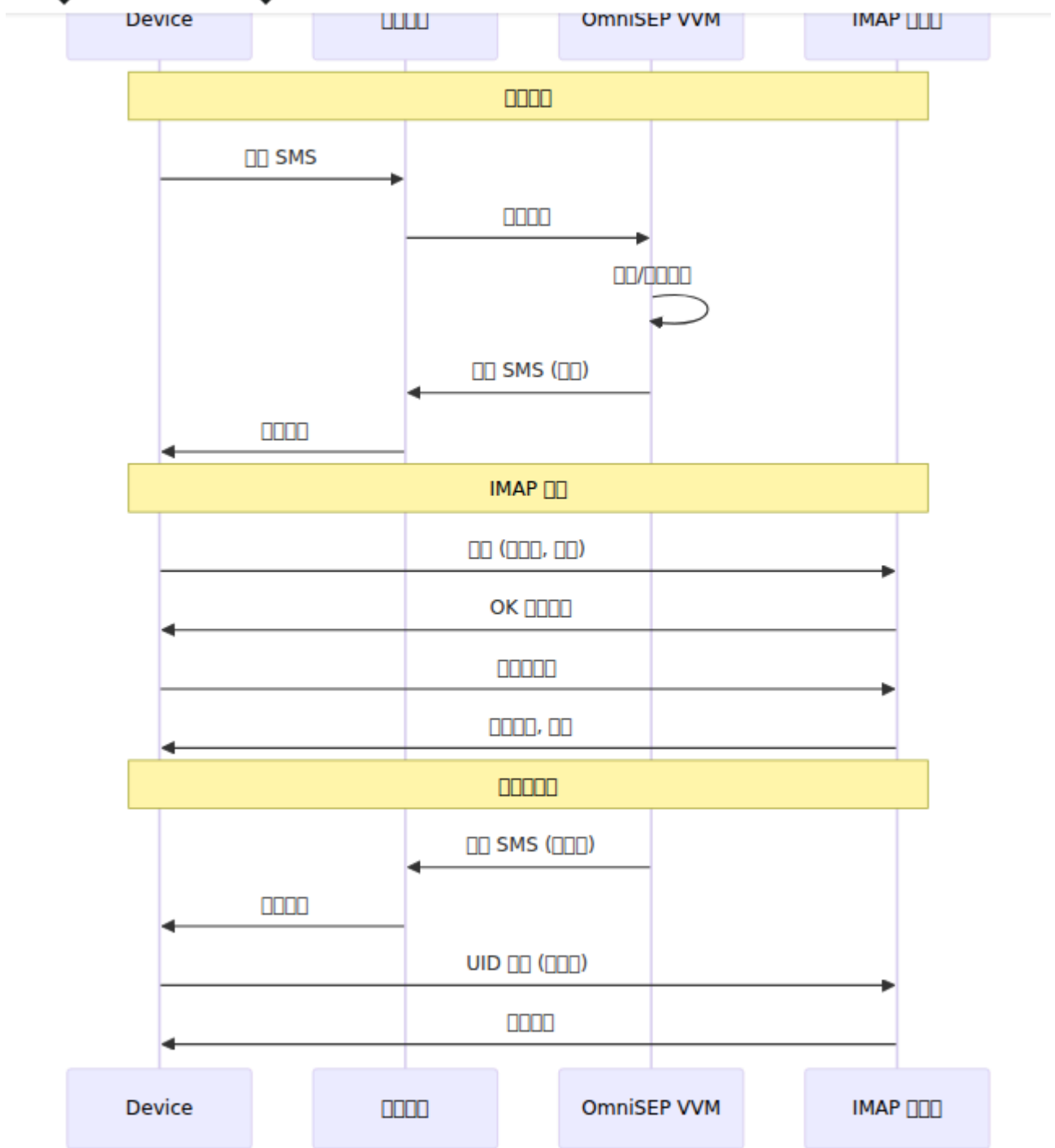
概要



接続

VVM 993/1430 IMAP 993/1430 OMTP VVM v1.3 GSMA TS.46 VVM IMAP SMS

□□	□□	□□
□□	U	□□□□□□□□□□
□	N	□□□□□□□□□□□□□□□□
□□	R	□□□□□□□□
□□□	P	□□□□□□□□□□□□□□
□□□	B	□□□□□□□□



□□□□

□□□□ (□□□□□□□□)

□□□□□□□□ IMAP □□□

```
//VVM:STATUS:st=R;rc=0;srv=vvm.example.com;ipt=993;spt=587;u=5050100015;pm=N;gm=N;vtc=A
```

項目	説明
st	ステータス (R=成功, B=失敗, N=未定, P=待機, U=更新)
rc	レスポンスコード (0=成功)
srv	IMAP サーバ名
ipt	IMAP ポート番号
spt	SMTP ポート番号 (指定)
u	ユーザーID (IMSI)
pw	パスワード
tui	TUI 有効/無効
dn	ドメイン名 (指定)
lang	言語
g_len	グループ名長
vs_len	バージョン名長
pw_len	PIN 長さ
pm	パスワード PIN (Y/N)
gm	グループ名 (G=成功, V=失敗, B=未定, N=未定)
vtc	バージョンコード (A=成功, D=失敗, B=未定, N=未定)

URI (URI)

URI

```
//VVM:SYNC:ev=NM;id=123;c=5;t=v;s=+61400123456;dt=15/01/2024 10:30+0000;l=30
```

URI	URI
ev	URI (NM=URI, MBU=URI, GU=URI)
id	URI ID
c	URI
t	URI (v=URI, o=URI, f=URI, i=URI, e=ECC)
s	URI
dt	URI
l	URI

URI (URI)

URI VVM

```
Activate:pv=11;ct=samsung.SM-A536E.13
```

URI	URI
pv	URI
ct	URI (vendor.model.os_version)

□□□□ (□□□□□□□□)

□□□□□□ VVM□

Deactivate:pv=11

IMAP □□□

VVM IMAP □□□□□□□□□□□□□□ IMAP4rev1 (RFC 3501) □□□□

□□□□□

□□	□□
CAPABILITY	□□□□□□□
LOGIN	□□□□□/□□□□□□□□
LOGOUT	□□□□
SELECT	□□□◆◆ (□□□, □□□, □□□)
EXAMINE	□□□□□□□□□
LIST	□□□□□□
STATUS	□□□□□□ (□□□□)
FETCH	□□□□□□
UID FETCH	□ UID □□
STORE	□□□□□□
UID STORE	□ UID □□□□
SEARCH	□□□□
UID SEARCH	□ UID □□
COPY	□□□□□□□□□
EXPUNGE	□□□□□□□□□
CLOSE	□□□□□□□
GETQUOTAROOT	□□□□□□

NOOP	

NOOP

IMAP4rev1 AUTH=PLAIN AUTH=LOGIN UIDPLUS MOVE QUOTA

NOOP

NOOP	

NOOP

NOOP RFC 5322 MIME



☐☐ **VVM**

```
# config/config.exs
config :omni_sep, :vvm,
  enabled: true,

  # IMAP ☐☐☐☐
  imap_port: 993,
  imap_ssl: true,
  imap_server: "vvm.example.com",
  imap_cert: "priv/cert/server.crt",
  imap_key: "priv/cert/server.key",

  # TUI (☐☐☐☐☐☐) ☐☐
  tui_number: "*86",

  # ☐☐☐☐
  sms_source_number: "+614000000000",
  sms_gateway: "https://sms-gateway.example.com/api/send",

  # PIN ☐☐
  min_pin_length: 4,
  max_pin_length: 15,

  # ☐☐☐☐☐☐
  default_max_messages: 100,
  default_storage_limit_kb: 50_000,
  default_max_greeting_seconds: 60
```

□□□□

□□	□ □	□ □	□□□	□□
<code>enabled</code>	□ □	□	false	□□ VVM □ □
<code>imap_port</code>	□ □	□	993	IMAP □□□ □□
<code>imap_ssl</code>	□ □	□	true	□□ IMAP □□□ TLS
<code>imap_server</code>	□ □ □	□	-	IMAP □□□ □□□ (□□□ SMS □□□)
<code>imap_cert</code>	□ □ □	□	priv/cert/server.crt	TLS □□□□
<code>imap_key</code>	□ □ □	□	priv/cert/server.key	TLS □□□□
<code>smtp_port</code>	□ □	□	587	SMTP □□ (□□□□)
<code>tui_number</code>	□ □ □	□	*86	□□□□□□□□ TUI □□□□
<code>sms_source_number</code>	□ □ □	□	-	VVM □□□ □□□□□

項目	型	デフォルト	説明	備考
<code>sms_gateway</code>	文字列	nil	SMS送信のゲートウェイ	HTTP経由で指定可能
<code>min_pin_length</code>	整数	4	最小PIN桁数	
<code>max_pin_length</code>	整数	15	最大PIN桁数	
<code>default_max_messages</code>	整数	100	デフォルトの最大メッセージ数	
<code>default_storage_limit_kb</code>	整数	50000	デフォルトのストレージ制限 (KB)	
<code>default_max_greeting_seconds</code>	整数	60	デフォルトの挨拶最大秒数	

設定例

IMAP/TLS設定例

```
# config/dev.exs
config :omni_sep, :vmm,
  enabled: true,
  imap_port: 1430,
  imap_ssl: false,
  imap_server: "localhost",
  tui_number: "*86",
  sms_source_number: "+61400000000"
```

□□□□

```
# config/prod.exs
config :omni_sep, :vvm,
  enabled: true,
  imap_port: 993,
  imap_ssl: true,
  imap_server: "vvm.carrier.example.com",
  imap_cert: "/etc/omnisep/certs/vvm.crt",
  imap_key: "/etc/omnisep/certs/vvm.key",
  tui_number: "*86",
  sms_source_number: "+61400000001",
  sms_gateway: "https://smsc.carrier.example.com/api/v1/send"
```

□□

IMAP □□□□

□□: vvm_imap_sessions_total

□□: □□□

□□: VVM IMAP □□□□

□□:

- result - □□□□: success, auth_failed, timeout

□□: vvm_imap_active_sessions

□□: □□□

□□: □□□□□ IMAP □□□□

□□: vvm_imap_commands_total

□□: □□□

□□: □□□ IMAP □□□□

□□:

- command - IMAP □□: LOGIN, SELECT, FETCH, □□
- result - □□□□: ok, no, bad

消息

接口: `vvm_messages_total`

接口: 消息

接口: VVM 消息

接口:

- `operation` - 操作: `deposit`, `read`, `delete`, `move`

接口: `vvm_messages_stored`

接口: 消息

接口: 消息存储

接口: `vvm_message_duration_seconds`

接口: 消息

接口: 消息持续时间

接口: 5, 10, 15, 30, 60, 120, 180, 300

短信

接口: `vvm_sms_total`

接口: 短信

接口: VVM 短信

接口:

- `type` - 类型: `status`, `sync`, `activate`, `deactivate`
- `result` - 结果: `success`, `failed`, `no_gateway`

账户

接口: `vvm_accounts_total`

接口: 账户

接口: VVM 账户

接口:

- `operation` - 操作: `create`, `activate`, `deactivate`, `update`
- `result` - 结果: `success`, `error`

API IMAP

VVM

“”

:

-
- SMSC
- VVM

:

1. sms_gateway
- 2.
3. VVM enabled: true
4. vvm_sms_total{type="status"}

IMAP

SMS

:

- /
- TLS
- IMAP

:

1. SMS
2. TLS
3. IMAP

4. `telnet/openssl` `openssl s_client -connect vvm.example.com:993`

□□□□□

□□: □□□□□□□□□□□□□□

□□□□:

- □□□□ SMS
- IMAP □□□□
- □□□□□□

□□□□:

1. `vvm_sms_total{type="sync"}` □◆◆◆◆
2. □□□□□□□□□□
3. `vvm_messages_total{operation="deposit"}` □□□□□□□□
4. □□ IMAP □□□□□□□□□□□□

□□□□□□

□□: □□□□□□□□□□

□□□□:

1. □□□□□□: `default_storage_limit_kb`, `default_max_messages`
2. `vvm_messages_stored` □□□
3. □□□□□□□□□□□□
4. □□□□□□: `get_greetings/1` □□□□□□

□□□□□

- **OMTP VVM** □□ v1.3 - □□□□□□□□□□□□
- **GSMA TS.46** - □□□□□□□□□□□□
- **RFC 3501** - IMAP4rev1 □□
- **RFC 5322** - □□□□□□□□

XCAP 介面 (Simservs)

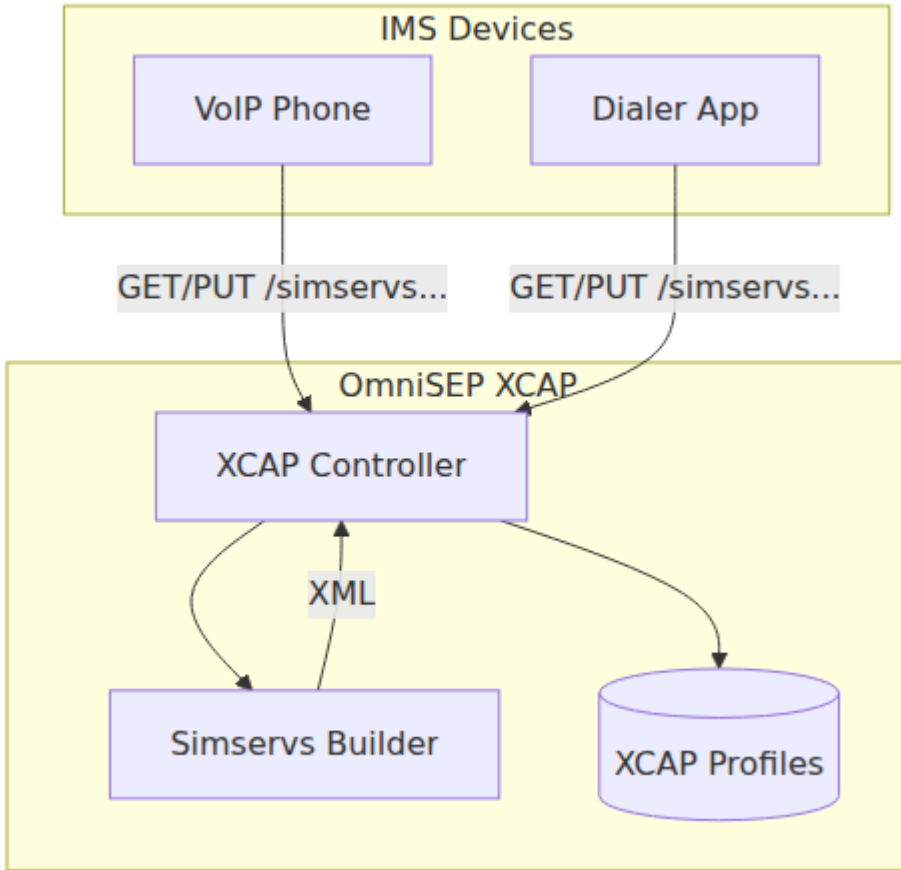
OmniSEP 符合 ETSI TS 183 023 XCAP (XML 介面) 與 IMS 介面

UI

XCAP Simservs Web 介面

功能

- MSISDN 查詢
- Diameter Sh 與 HSS 查詢
- 2 種查詢
 - OIP/OIR 查詢 (查詢)
 - 查詢
- HSS 查詢
- 查詢



Simservs

simservs ETSI TS 183 023



HTTP

XCAP URL

```
/simservs.ngn.etsi.org/users/{sip_uri}/simservs.xml[/~/~/{xpath}]
```

Placeholder	Description	Example
{sip_uri}	MSISDN or SIP URI	sip:+15551234567@ims.example.com
{xpath}	XPath expression (optional)	simservs/communication-diversion

□□

□□	□□
GET	<code>/simservs.ngn.etsi.org/users/{sip}/simservs.xml</code>
PUT	<code>/simservs.ngn.etsi.org/users/{sip}/simservs.xml</code>
GET	<code>/simservs.ngn.etsi.org/users/{sip}/simservs.xml/~/simservs.</code>
PUT	<code>/simservs.ngn.etsi.org/users/{sip}/simservs.xml/~/simservs.</code>
DELETE	<code>/simservs.ngn.etsi.org/users/{sip}/simservs.xml/~/simservs.</code>

□□□□

Content-Type	□□
application/xcap-el+xml	XCAP □□□□
application/xml	□□ XML

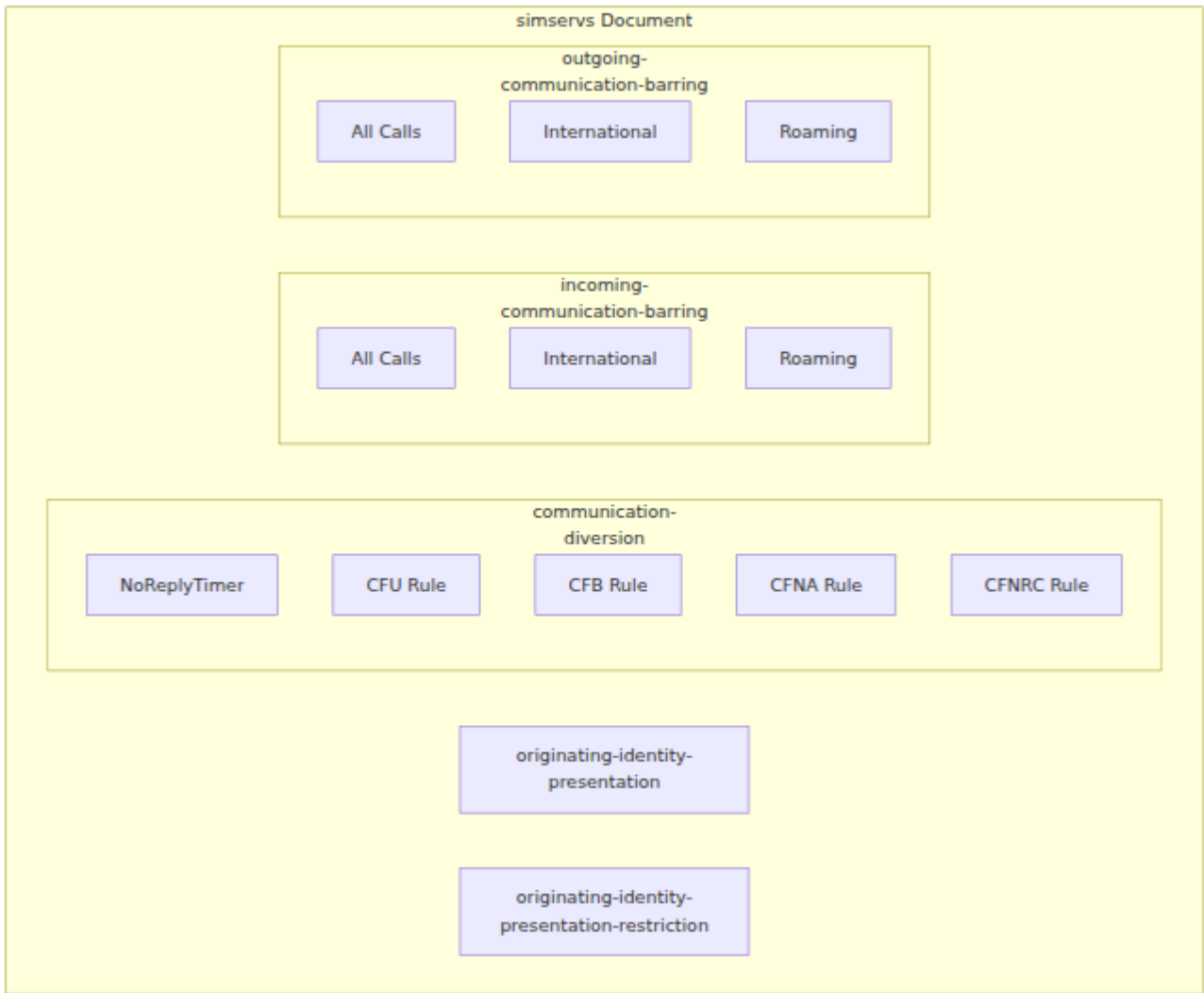
ETag □□

OmniSEP □□□ [RFC 4825](#) □□ ETag □□□□□□

□□	□□
ETag	□□□□□□□□□□
If-Match	□□□□ (PUT/DELETE)
If-None-Match	□□ GET (304 Not Modified)

□□□□

OmniSEP □□□□□□□□□□□□□□□□ ETS □□□□□ HSS □□□



□□□

□	□	□	□□
xcap_profiles	IMSI	{profile_map, etag}	□□□□□□□□
xcap_by_msisdn	MSISDN	IMSI	XCAP □□□□□□□□

□□□□

□□□□ (GET)

1. □□□□□□ ETS □□
2. □□□□□□□□□□ Diameter Sh □ HSS □□

3. HSS
4. HSS

PUT

1. ETag
- 2.
3. ETag
4. HSS

ETag

ETags MD5

```
ETag = MD5(erlang:term_to_binary(profile))[0:16]
```

"a1b2c3d4e5f6g7h8"

16

ETS read_concurrency	
GenServer	
ETag	

3GPP TS 24.623

-
- OIR presentation-not-restricted

- NoReplyTimer 20
- /

HSS

	Diameter	
	Sh UDR (User-Data-Request)	
	Sh PUR (Profile-Update-Request)	PUT

HSS

Simservs XML ☐☐

☐☐☐☐☐☐

```
<?xml version="1.0" encoding="UTF-8"?>
<simservs xmlns="http://uri.etsi.org/ngn/params/xml/simservs/xcap"
  xmlns:cp="urn:ietf:params:xml:ns:common-policy">

  <originating-identity-presentation active="true"/>

  <originating-identity-presentation-restriction active="true">
    <default-behaviour>presentation-not-restricted</default-
behaviour>
  </originating-identity-presentation-restriction>

  <communication-diversion active="true">
    <NoReplyTimer>20</NoReplyTimer>
    <cp:ruleset>
      <cp:rule id="cfb">
        <cp:conditions>
          <busy/>
        </cp:conditions>
        <cp:actions>
          <forward-to>
            <target>tel:+15557654321</target>
            <notify-caller>>false</notify-caller>
          </forward-to>
        </cp:actions>
      </cp:rule>
    </cp:ruleset>
  </communication-diversion>

  <incoming-communication-barring active="false">
    <cp:ruleset/>
  </incoming-communication-barring>

  <outgoing-communication-barring active="false">
    <cp:ruleset/>
  </outgoing-communication-barring>

</simservs>
```

□□□□

□□	□□□□	□□
(default)	<code>http://uri.etsi.org/ngn/params/xml/simservs/xcap</code>	ETSI Simservs
cp	<code>urn:ietf:params:xml:ns:common-policy</code>	RFC 4745 □□ □□

□□

□□□□ (OIP)

□□□□□□□□□□□□□□

```
<originating-identity-presentation active="true"/>
```

□□	□□	□□
<code>active</code>	□□□	□□□□/□□

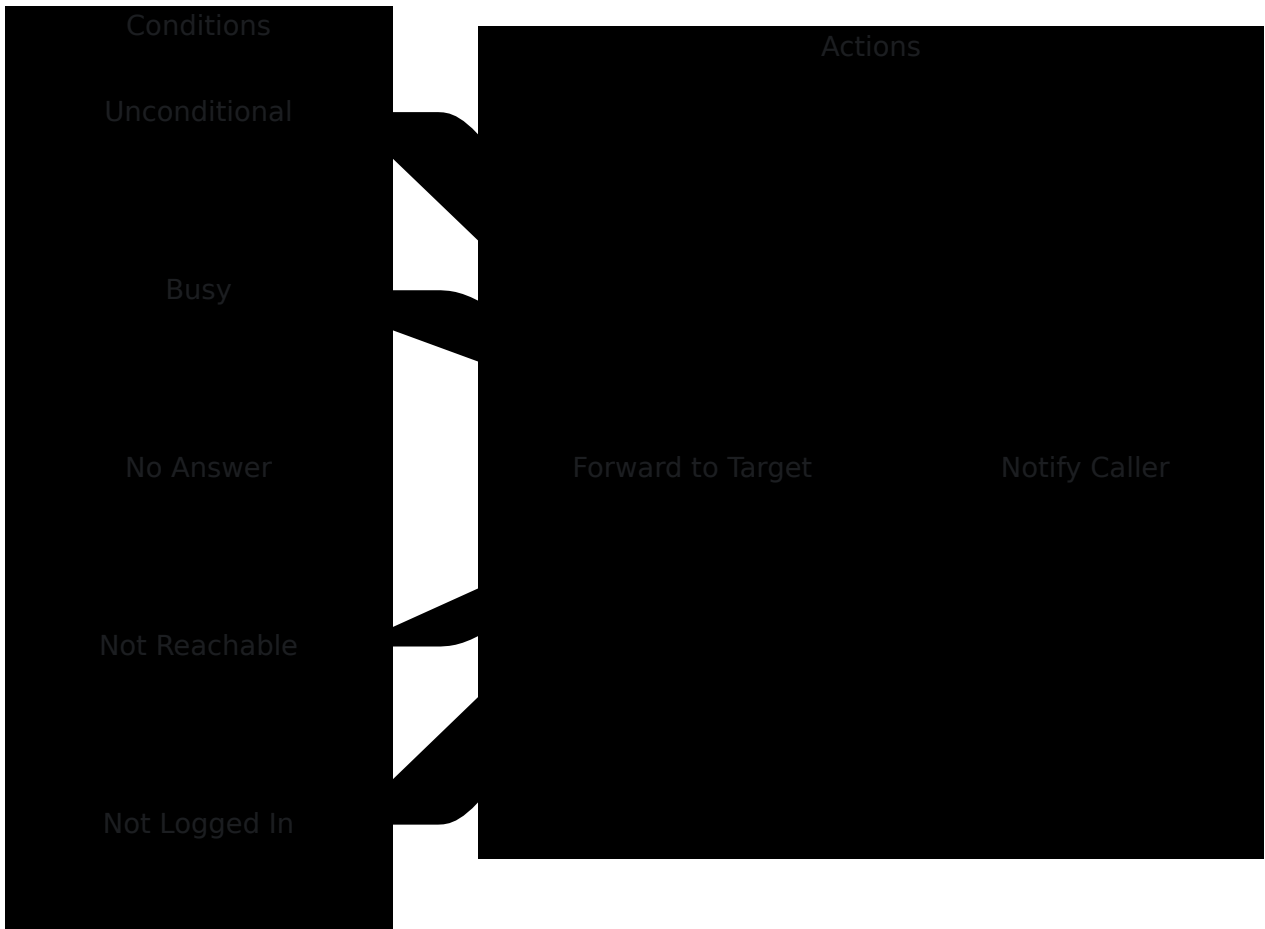
□□□□□□ (OIR)

□□□□□□□□□□

```
<originating-identity-presentation-restriction active="true">  
  <default-behaviour>presentation-not-restricted</default-behaviour>  
</originating-identity-presentation-restriction>
```

☐☐	☐	☐☐
default-behaviour	presentation-restricted, presentation-not-restricted	☐☐☐☐ ☐☐☐

☐☐☐☐ (☐☐☐☐)



☐☐☐☐

ID	状態	説明
cfu	()	通話中 - 通話中
cfb	busy	通話中
cfna	no-answer	通話中 (NoReplyTimer)
cfnc	not-reachable	通話中
cfnl	not-logged-in	通話中

通話中

```
<communication-diversion active="true">
  <NoReplyTimer>20</NoReplyTimer>
  <cp:ruleset>
    <cp:rule id="cfna">
      <cp:conditions>
        <no-answer/>
      </cp:conditions>
      <cp:actions>
        <forward-to>
          <target>tel:+15557654321</target>
          <notify-caller>>false</notify-caller>
        </forward-to>
      </cp:actions>
    </cp:rule>
  </cp:ruleset>
</communication-diversion>
```

URI	URI	URI
NoReplyTimer	URI	CFNA (1-300)
cp:rule/@id	URI	URI (cfu, cfb, cfna, cfnc, cfnl)
target	tel: URI	URI
notify-caller	URI	URI

URI

URI tel: URI RFC 3966

```
tel:+15557654321;phone-context=ims.mnc001.mcc310.3gppnetwork.org
```

URI	URI
tel:	URI
+15557654321	URI E.164
phone-context	IMS (URI)

URI

URI

```
<incoming-communication-barring active="true">
  <cp:ruleset>
    <cp:rule id="international">
      <cp:conditions>
        <international/>
      </cp:conditions>
      <cp:actions>
        <allow>>false</allow>
      </cp:actions>
    </cp:rule>
  </cp:ruleset>
</incoming-communication-barring>
```

□□□□

```
<outgoing-communication-barring active="true">
  <cp:ruleset>
    <cp:rule id="international">
      <cp:conditions>
        <international/>
      </cp:conditions>
      <cp:actions>
        <allow>>false</allow>
      </cp:actions>
    </cp:rule>
  </cp:ruleset>
</outgoing-communication-barring>
```

□□□□□□

API ID	API	API
all	()	
international	international	
international-exHC	international-exHC	
roaming	roaming	

API

Simservs

```
GET
/simservs.ngn.etsi.org/users/sip:+15551234567@ims.example.com/simservs
Accept: application/xcap-el+xml
```

Response

```
HTTP/1.1 200 OK
Content-Type: application/xcap-el+xml
ETag: "a1b2c3d4e5f6g7h8"

<?xml version="1.0" encoding="UTF-8"?>
<simservs
xmlns="http://uri.etsi.org/ngn/params/xml/simservs/xcap"...>
  ...
</simservs>
```

□□□□□□□□

GET

/simservs.ngn.etsi.org/users/sip:+15551234567@ims.example.com/simserv
diversion

□□□□□□□□

PUT

/simservs.ngn.etsi.org/users/sip:+15551234567@ims.example.com/simserv
diversion/cp:ruleset/cfb

Content-Type: application/xcap-el+xml

If-Match: "a1b2c3d4e5f6g7h8"

```
<cp:rule id="cfb">
  <cp:conditions>
    <busy/>
  </cp:conditions>
  <cp:actions>
    <forward-to>
      <target>tel:+15557654321</target>
      <notify-caller>>false</notify-caller>
    </forward-to>
  </cp:actions>
</cp:rule>
```

□□□□□□□□

DELETE

/simservs.ngn.etsi.org/users/sip:+15551234567@ims.example.com/simserv
diversion/cp:ruleset/cfb

If-Match: "a1b2c3d4e5f6g7h8"

PUT NoReplyTimer

```
PUT
/simservs.ngn.etsi.org/users/sip:+15551234567@ims.example.com/simserv
diversion/NoReplyTimer
Content-Type: application/xcap-el+xml

25
```

GET API

JSON API

GET

```
GET /api/xcap/15551234567
```

JSON

```
{
  "oip": { "active": true },
  "oir": {
    "active": true,
    "default_behaviour": "presentation-not-restricted"
  },
  "no_reply_timer": 20,
  "call_forwarding": {
    "cfb": {
      "enabled": true,
      "target": "tel:+15557654321",
      "condition": "busy"
    }
  },
  "call_barring_incoming": {},
  "call_barring_outgoing": {}
}
```

Request

POST /api/xcap/15551234567
Content-Type: application/json

```
{  
  "no_reply_timer": 25,  
  "call_forwarding": {  
    "cfna": {  
      "enabled": true,  
      "target": "tel:+15559876543",  
      "condition": "no-answer"  
    }  
  }  
}
```

Response

Response Headers

Header	Value
OIP	0
OIR	presentation-not-restricted
NoReplyTimer	20
Cache-Control	no-cache
Content-Type	application/json
ETag	W/"15551234567"

□□□□

HTTP □□	□□
200	□□
304	□□□ (If-None-Match □□)
400	□□□□ - □□□ XML □□□
404	□□□ - □□□□□□□□
405	□□□□□
409	□□ - □□□□
412	□□□□□□ - ETag □□□

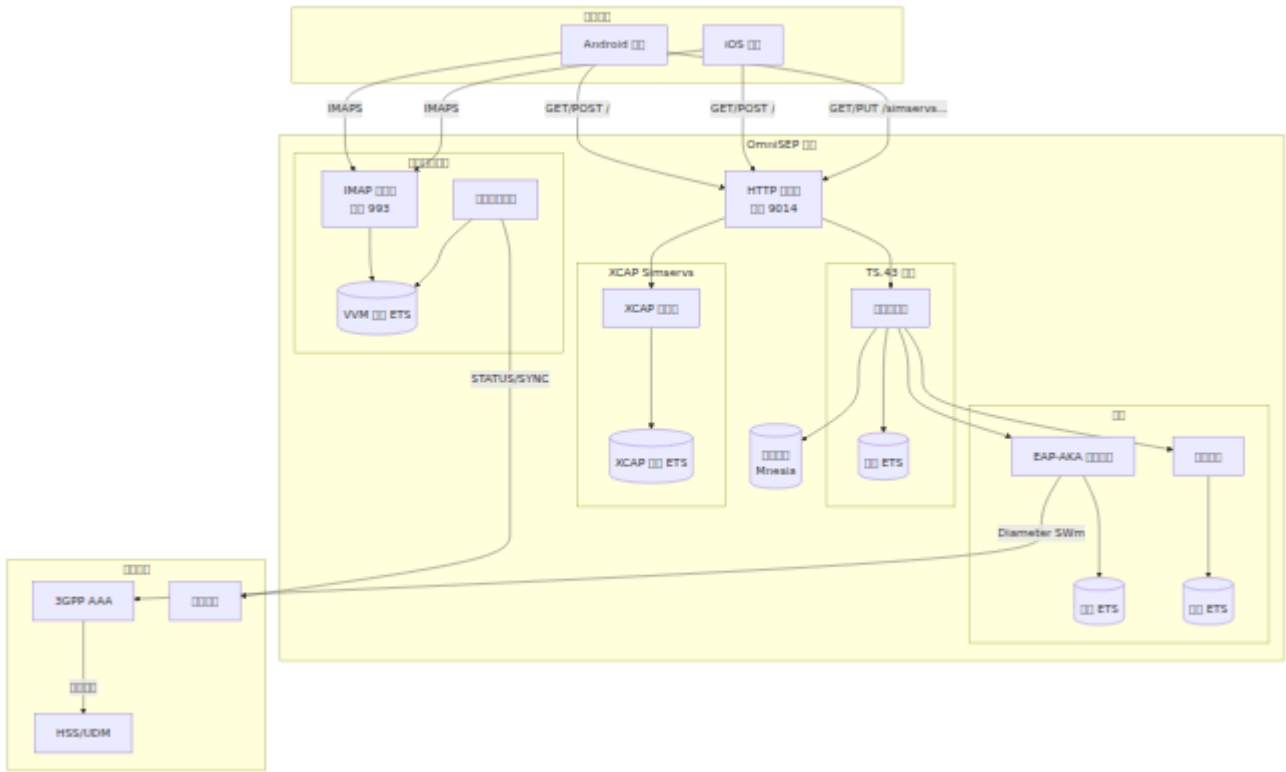
□□□□□□

```
<?xml version="1.0" encoding="UTF-8"?>
<xcap-error xmlns="urn:ietf:params:xml:ns:xcap-error">
  <error-element>Element not found: simservs/unknown</error-
element>
</xcap-error>
```

□□□□

□□	□□
ETSI TS 183 023	NGN Siversvs □ XCAP □□
ETSI TS 183 004	□□□□ (CDIV)
RFC 4825	XCAP □□
RFC 4745	□□□□
RFC 3966	tel: URI
3GPP TS 24.623	XCAP □□ Ut □□

□□□□



□□□□ ? ? ?

TS.43 □□□□

□□ GSMA TS.43 □□□□□□□□

AP ID	Feature	Requirement
ap2003	VoLTE	VoLTE/VoNR
ap2004	VoWiFi	WiFi
ap2005	SMSoIP	IP SMS
ap2006	ODSA	
ap2009	ODSA	
ap2010		
ap2012		DCB
ap2016		

XCAP

ETSI TS 183 023 IMS

Feature	Requirement	Reference
CFU,CFB,CFNA,CFNRC		ETSI TS 183 004
		ETSI TS 183 023
		ETSI TS 183 023
OIP/OIR		ETSI TS 183 023

OMTP VVM v1.3 GSMA TS.46

プロトコル	機能	規格
IMAP	メール	RFC 3501
SMTP	SYNC/STATUS	OMTP VVM v1.3
HTTP	API	GSMA TS.46
HTTP	API	OMTP VVM v1.3

API

GET /health

API

GET /api/activity GET /api/entitlements/{imsi} GET /api/xcap/{msisdtn}

XCAP Simserve

GET /simserve.ngn.etsi.org/users/{sip}/simserve.xml PUT /simserve.ngn.etsi.org/users/{sip}/simserve.xml DELETE /simserve.ngn.etsi.org/users/{sip}/simserve.xml/{path}

TS-43

GET / POST /

URI	Method
/	GET/POST
/simservs.ngn.etsi.org/users/{sip}/simservs.xml	GET/PUT
/simservs.ngn.etsi.org/users/{sip}/simservs.xml/~/~/{xpath}	GET/PUT
/api/activity	GET
/api/entitlements/{imsi}	GET/POST
/api/xcap/{msisdn}	GET/POST
/health	GET

Web UI

OmniSEP Web Phoenix LiveView UI

<http://<host>:9014/>

XCAP Simservs

API

API	URI	Description
Root	/	Root endpoint
Entitlements	/entitlements	IMSI-based TS.43 entitlements
Sessions	/sessions	EAP-AKA sessions
Activity	/activity	TS.43 activity
XCAP	/xcap	XCAP Simservs HSS
Diameter	/diameter	Diameter
Logs	/logs	Logs

API

API

- HTTP EAP-AKA VVM
- XCAP
- ETS
-

5

XCAP

XCAP

- MSISDN
- OIP/OIR
- Diameter Sh HSS
- HSS
- IP

XCAP

- XCAP EAP
- IMSI MSISDN ID IP
- /
- HTTP

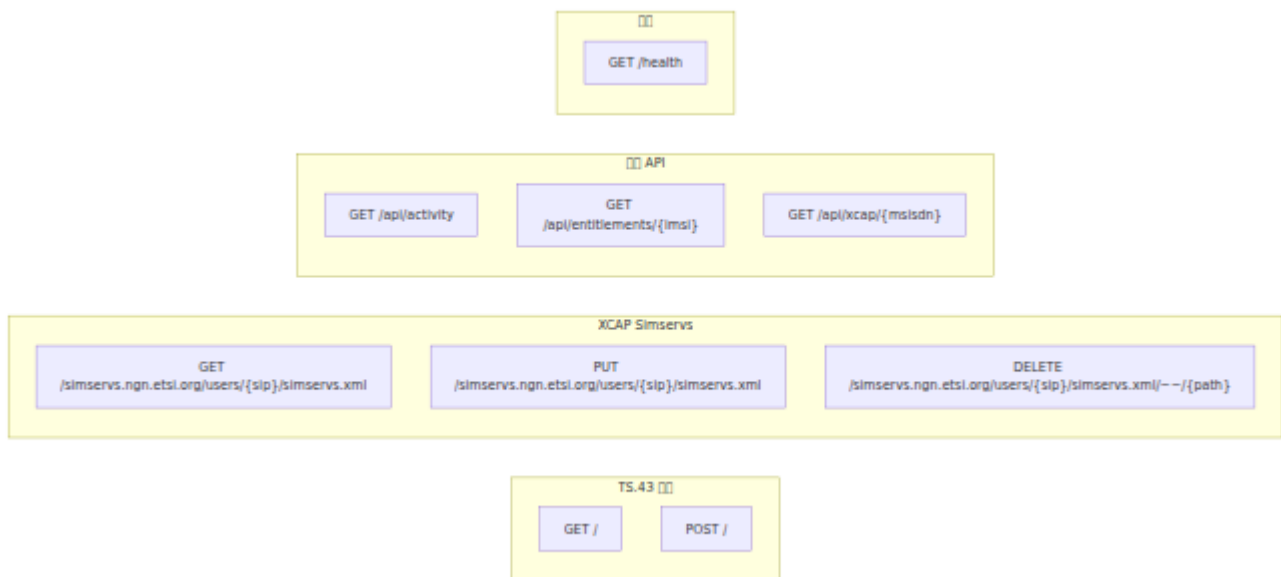
□□□□

□□□□□□

- EAP-AKA
-

□□□□□□□□/□□□□

□□□□



□□□□□□

□□□□

```
# config/config.exs
import Config

config :omni_sep,
  http_port: 9014,
  http_ip: {0, 0, 0, 0},
  server_fqdn: "sep.mnc001.mcc001.pub.3gppnetwork.org",
  entitlement_version: "2.0"

# □□□□□□□□
config :omni_sep, :default_entitlements,
  vowifi: %{
    entitlement_status: 1,
    addr_status: 2,
    tc_status: 2,
    prov_status: 1
  },
  volte: %{
    entries: [
      %{access_type: 1, home_roaming_nw_type: 1,
entitlement_status: 1}
    ]
  }

# □□□□
config :omni_sep, :token,
  validity_seconds: 86400,
  signing_secret: "your-production-secret-here"

# EAP-AKA □□
config :omni_sep, :eap_aka,
  enabled: true,
  session_timeout_ms: 30_000
```

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□□□□□

1. □□□□□
2. □□ □□□□ □□□□□□
3. □□ □□□□ □□□□□□

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1. TS.43 □□ □□ VoWiFi/VoLTE □□
2. XCAP Simservs □□□□□□/□□

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1. □□□□□□ □□□□□□
2. □□ □□□□ □□□□□

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GSMA TS.43□

- TS.43 □□ - □□□□□□□□□□
- □□□□ GSMA TS.43

ETSI XCAP□

- XCAP Simservs - □□□□□□
- □□□
 - ETSI TS 183 023 - XCAP □□
 - ETSI TS 183 004 - □□□□
 - RFC 4825 - XCAP □□