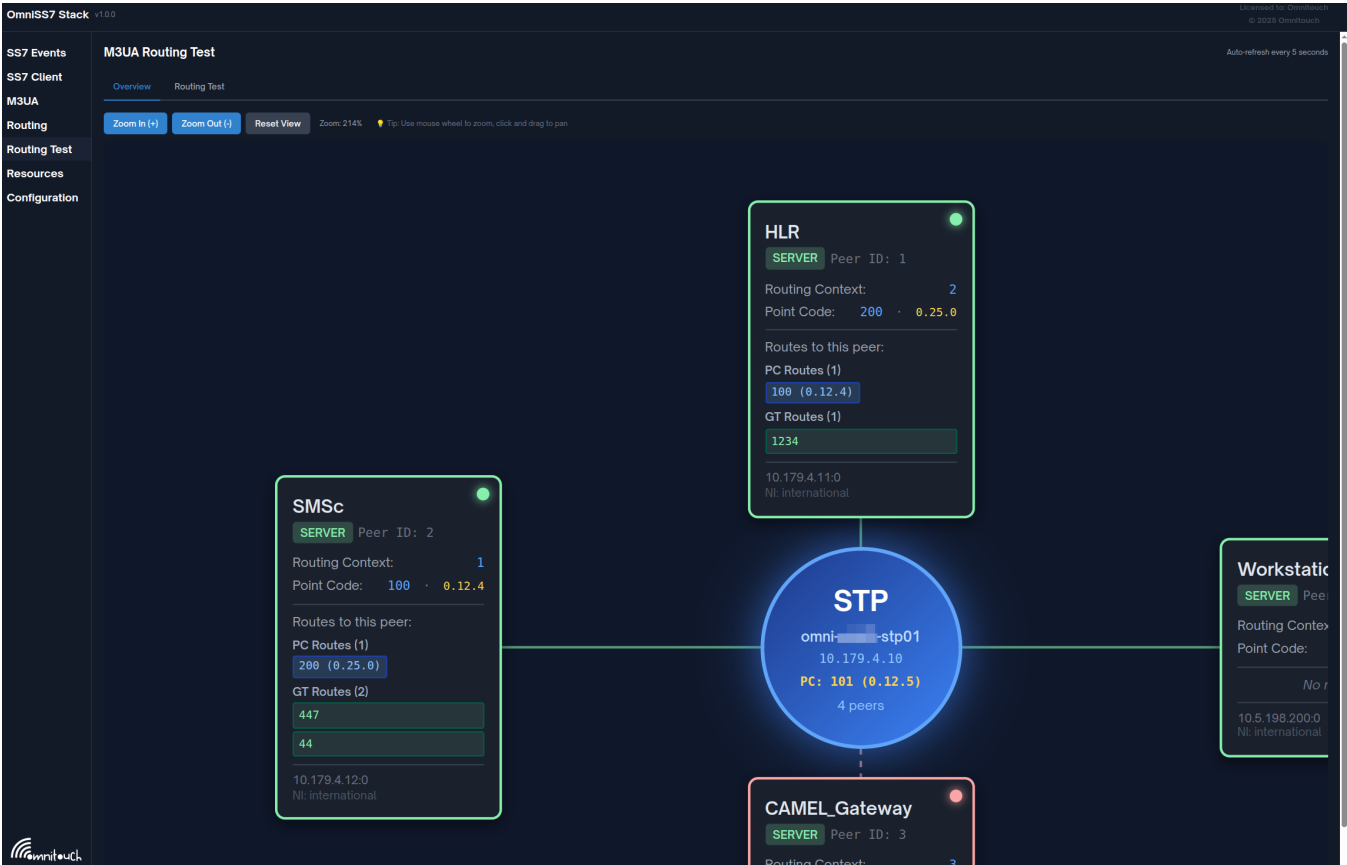




OmniSS7 -

OmniSS7 - Omnitouch SS7



OmniSS7 -

OmniSS7 -

OmniSS7 -

- STP -
 - SS7
 - SS7
 - SS7
 - SS7
- MAP - MAP
 - M3UA
 - HLR
 - MAP
 - MAP
- - (SSMc)
 -
 -
 -
 -
- HLR -
 -
 -
 -
 - HLR/HSS
- CAMEL - CAMEL
 - (CAP/CAMEL)
 - DCS
 - IN

OmniSS7 -

- -
 - Web UI
 - API
 - (Prometheus)
 -

OmniSS7 -

- -
 - SS7
 - MAP
 - TCAP
 -

OmniSS7 -

OmniSS7 -

OmniSS7 -

OmniSS7 - config/runtime.exe

OmniSS7 -

1. config/runtime.exe
2. HLRSSMc CAMEL GW
3. TCAP
4. IP API URL
5. TCAP

- ◆◆◆◆◆ (CAMEL ◆◆)

-  / 
-
-   CDR  
-    
- → CAMEL

- STP -
- MAP -
- -
- HLR -
- CAMEL -

- CAMEL - Web UI
- Web UI - Web UI
- Web UI - Web UI

◇◇◇ OmniSS7
 ◇◇◇◇ Omnitouch ◇◇◇◇
 ◇◇◇◇◇ 2.0
 ◇◇◇◇◇ 2025

OmniTouch

◆◆◆◆◆ OmniSS7 ◆◆◆◆◆



REST API

 OmniSS7 **REST API**  **Swagger UI** 



1. 
2. [HTTP](#) 
3. [Swagger UI](#)
4. [API](#) 
5. 
6. 
7. 
8.  (Prometheus)
9. 



OmniSS7  REST API  MAP  API 


-  MAP  SRI  SRI-for-SM  UpdateLocation 
-  MAP 
-  Prometheus 

API 

HTTP



  
 HTTP 
IP  0.0.0.0 
 8080 
 Plug.Cowboy 

□□□□

□□	□□	□□	□□	□□
/api/sri	POST	□□□□□□		10s
/api/sri-for-sm	POST	□□ SM	□□□□□□	10s
/api/send-auth-info	POST	□□□□□□		10s
/api/MT-forwardSM	POST	□□□□□□	SM	10s
/api/forwardSM	POST	□□ SM		10s
/api/updateLocation	POST	□□□□		10s
/api/prn	POST	□□□□□□		10s
/metrics	GET	Prometheus	□□	N/A
/swagger	GET	Swagger UI		N/A
/swagger.json	GET	OpenAPI	□□	N/A

□□: □□ MAP □□□□□□ □□□□ **10** □□□□

SendRoutingInfo (SRI)

□□□□□□□□□□□□□□□□□□□□

□□: POST /api/sri

□□□:

```
{
  "msisdn": "1234567890",
  "gmsc": "5551234567"
}
```

□□:

□□	□□	□□	□□
msisdn	□□□□	□□□	MSISDN
gmsc	□□□□	□□	MSC □□□□

□□ (200 OK):

```
{
  "result": {
    "imsi": "001001234567890",
    "msrn": "5551234999",
    "vlr_number": "5551234800",
    ...
  }
}
```

❖❖ (504 ❖❖❖❖):

```
{
  "error": "timeout"
}
```

cURL ❖❖:

```
curl -X POST http://localhost:8080/api/sri \
-H "Content-Type: application/json" \
-d '{
  "msisdn": "1234567890",
  "gmsc": "5551234567"
}'
```

SendRoutingInfoForSM (SRI-for-SM)

❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖ SMS ❖❖❖❖❖❖❖❖

❖❖: POST /api/sri-for-sm

❖❖❖:

```
{
  "msisdn": "1234567890",
  "service_center": "5551234567"
}
```

❖❖:

❖❖	❖❖	❖❖	❖❖
msisdn	❖❖❖❖	❖❖❖	MSISDN
service_center	❖❖❖❖	❖❖❖❖❖❖❖❖❖❖	

❖❖ (200 OK):

```
{
  "result": {
    "imsi": "001001234567890",
    "msc_number": "5551234800",
    "location_info": {...},
    ...
  }
}
```

cURL ❖❖:

```
curl -X POST http://localhost:8080/api/sri-for-sm \
-H "Content-Type: application/json" \
-d '{
  "msisdn": "1234567890",
  "service_center": "5551234567"
}'
```

SendAuthenticationInfo

⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢

⬢⬢: POST /api/send-auth-info

⬢⬢⬢:

```
{
  "imsi": "001001234567890",
  "vectors": 3
}
```

⬢⬢:

```
    ⬢⬢    ⬢⬢ ⬢⬢⬢    ⬢⬢
imsi    ⬢⬢⬢⬢⬢    ⬢⬢ IMSI
vectors ⬢⬢    ⬢    ⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢⬢
```

⬢⬢⬢ (200 OK):

```
{
  "result": {
    "authentication_sets": [
      {
        "rand": "0123456789ABCDEF...",
        "xres": "...",
        "ck": "...",
        "ik": "...",
        "autn": "..."
      }
    ],
    ...
  }
}
```

cURL ⬢⬢:

```
curl -X POST http://localhost:8080/api/send-auth-info \
-H "Content-Type: application/json" \
```



```
"smsPDU": "0001000A8121436587F900001C48656C6C6F20576F726C64"
}'
```

ForwardSM

◇◇ SMS ◇◇◇◇◇◇◇◇ MO-SMS◇◇

◇◇: POST /api/forwardSM

◇◇◇: ◇ MT-ForwardSM ◇◇

cURL ◇◇:

```
curl -X POST http://localhost:8080/api/forwardSM \
-H "Content-Type: application/json" \
-d '{
  "imsi": "001001234567890",
  "destination_service_centre": "5551234567",
  "originating_service_center": "5551234568",
  "smsPDU": "0001000A8121436587F900001C48656C6C6F20576F726C64"
}'
```

UpdateLocation

◇◇ HLR ◇◇◇◇◇◇◇◇ VLR ◇◇◇◇

◇◇: POST /api/updateLocation

◇◇◇:

```
{
  "imsi": "001001234567890",
  "vlr": "5551234800"
}
```

◇◇:

```
◇◇  ◇◇  ◇◇      ◇◇
imsi◇◇◇◇  ◇◇ IMSI
vlr  ◇◇◇◇  VLR ◇◇◇◇◇◇
```

◇◇ (200 OK):

```
{
  "result": {
    "hlr_number": "5551234567",
```


cURL ❖❖:

```
curl -X POST http://localhost:8080/api/prn \  
-H "Content-Type: application/json" \  
-d '{  
  "msisdn": "1234567890",  
  "gmsc": "5551234567",  
  "msc_number": "5551234800",  
  "imsi": "001001234567890"  
}'
```

❖❖❖❖

❖❖❖❖: ❖ API ❖❖❖❖❖❖❖❖

❖❖❖❖:

- API ❖❖❖❖❖❖❖❖/❖❖❖❖
 - ❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖
 - ❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖❖
-

❖❖❖❖

❖❖❖❖❖❖❖❖ **JSON** ❖❖❖

❖❖❖❖

HTTP ❖❖: 200 OK

❖❖:

```
{  
  "result": {  
    // ❖❖❖❖❖❖❖❖❖❖  
  }  
}
```

❖❖❖❖

HTTP ❖❖:

- 400 ❖❖❖❖ - ❖❖❖❖❖❖❖
- 504 ❖❖❖❖ - MAP ❖❖❖❖❖❖❖❖❖❖❖❖
- 404 ❖❖❖❖ - ❖❖❖❖❖❖❖


```
static_configs:
  - targets: ['server-ip:8080']
metrics_path: '/metrics'
scrape_interval: 15s
```



Python ◆◆

```
import requests
import json

# SRI-for-SM ◆◆
url = "http://localhost:8080/api/sri-for-sm"
payload = {
    "msisdn": "1234567890",
    "service_center": "5551234567"
}

response = requests.post(url, json=payload, timeout=15)

if response.status_code == 200:
    result = response.json()
    print(f"◆◆: {result}")
elif response.status_code == 504:
    print("◆◆ - ◆◆◆◆◆◆")
else:
    print(f"◆◆: {response.status_code} - {response.text}")
```

JavaScript ◆◆

```
const axios = require('axios');

async function sendSRI() {
  try {
    const response = await axios.post('http://localhost:8080/api/sri', {
      msisdn: '1234567890',
      gmsc: '5551234567'
    }, {
      timeout: 15000
    });

    console.log('◆◆:', response.data);
  } catch (error) {
    if (error.code === 'ECONNABORTED') {
```


◇ **HTTP** ◇◇◇ - ◇ 8080 ◇◇◇◇◇◇◇◇◇◇ start_http_server ◇◇◇

◇◇ Web UI ◇◇◇◇◇◇◇◇ [Web UI](#) ◇◇◇

◇◇◇◇◇◇◇◇◇◇◇◇◇◇ [◇◇◇◇◇◇](#) ◇



◆◆◆◆◆◆◆◆

[←◆◆◆◆◆](#)

SS7◆◆◆OmniSS7◆◆◆◆◆◆◆◆◆◆

SS7◆◆◆

MAP◆◆◆

◆◆	◆◆◆	◆◆
updateLocation	2	◆◆◆◆◆◆
cancelLocation	3	◆VLR◆◆
provideRoamingNumber	4	◆◆MSRN
sendRoutingInfo	22	◆◆◆◆◆◆
mt-forwardSM	44	◆SMS◆◆◆◆◆
sendRoutingInfoForSM	45	◆◆SMS◆◆
mo-forwardSM	46	◆◆◆◆◆SMS
sendAuthenticationInfo	56	◆◆◆◆◆◆

TCAP◆◆◆◆

- **BEGIN** - ◆◆◆◆
- **CONTINUE** - ◆◆◆
- **END** - ◆◆◆◆
- **ABORT** - ◆◆◆◆◆

SCCP◆◆

◆◆◆◆◆◆

- **E.164** - ◆◆◆◆◆◆◆◆◆◆447712345678◆
- **E.212** - IMSI◆◆◆◆◆◆234509876543210◆
- **E.214** - ◆◆◆◆

◆◆◆◆◆◆SSN◆

- **SSN 6**: HLR

- **SSN 7:** VLR
- **SSN 8:** MSC/SMSC
- **SSN 9:** GMLC
- **SSN 10:** SGSN

SMS TPDU

◆◆◆◆

- **SMS-DELIVER (MT)** - ◆◆◆◆◆
- **SMS-SUBMIT (MO)** - ◆◆◆◆◆
- **SMS-STATUS-REPORT** - ◆◆◆◆◆
- **SMS-COMMAND** - ◆◆◆◆

◆◆◆◆

- **GSM7** - 7◆GSM◆◆◆◆◆SMS 160◆◆◆◆
- **UCS2** - 16◆Unicode◆◆◆SMS 70◆◆◆◆
- **8-bit** - ◆◆◆◆◆◆◆SMS 140◆◆◆

M3UA◆◆

- **DOWN** - ◆SCTP◆◆
- **CONNECTING** - SCTP◆◆◆
- **ASPUP_SENT** - ◆◆ASPUP◆◆
- **INACTIVE** - ASP◆◆◆◆◆◆◆
- **ASPAC_SENT** - ◆◆ASPAC◆◆
- **ACTIVE** - ◆◆◆◆◆◆◆

◆◆SS7◆◆

◆◆◆◆◆14◆◆ITU◆◆24◆◆ANSI◆◆◆

◆◆◆◆◆ITU◆◆

- ◆◆◆3◆
 - ◆◆◆8◆
 - ◆◆◆3◆
-

SCCP❖❖❖❖

- 0 - ❖❖❖❖❖❖
- 1 - ❖❖❖❖❖❖❖❖
- 2 - ❖❖❖❖❖
- 3 - ❖❖❖❖❖
- 4 - ❖❖❖❖❖
- 5 - MTP❖❖
- 6 - ❖❖❖❖
- 7 - ❖❖❖
- 8 - ❖❖❖❖❖❖

MAP❖❖❖❖

❖❖	❖❖	❖❖
1	unknownSubscriber	❖❖❖❖HLR❖
27	absentSubscriber	❖❖❖❖❖❖
34	systemFailure	❖❖❖❖
35	dataMissing	❖❖❖❖❖❖❖
36	unexpectedDataValue	❖❖❖❖❖❖❖

❖❖❖❖

- [←❖❖❖❖❖](#)
- [STP❖❖](#)
- [MAP❖❖❖❖❖](#)
- [❖❖❖❖❖❖](#)
- [HLR❖❖](#)
- [❖❖❖❖](#)

OmniSS7 ❖Omnitouch❖❖❖❖❖❖



CAMEL Gateway



CAMEL Gateway (CAMEL GW) OmniSS7 (IN) CAMEL (CAP)

OmniSS7 Stack CAMEL GW

SS7 Events

SS7 Client

M3UA

CAP Sessions

CAP Requests

Resources

Configuration

CAMEL Sessions

Active: 0

Auto-refresh every 2 seconds

Call ID	State	IMSI	Calling Number	Called Number	Service Key	Duration	Start Time	OTID
No Active CAMEL Sessions Sessions will appear here when calls are initiated								
Total Sessions								
0								
Initiated								
0								
Answered								
0								
About CAMEL Sessions This page displays active CAMEL (Customized Applications for Mobile network Enhanced Logic) sessions managed by the gsmSCF (Service Control Function). initiated - Call setup in progress answered - Call is active terminated - Call ended (cleanup pending)								

CAMEL

CAMEL GSM UMTS

- -
- -
- -
- -
- -

CAP

OmniSS7 CAMEL GW CAP

CAP v1 CAMEL
CAP v2 CAMEL SMS
CAP v3 CAMEL GPRS
CAP v4 CAMEL

CAP v2



- OmniSS7
- MSC/GMSC (gsmSSF) M3UA
- (OCS) API

CAMEL Gateway

config/runtime.exs CAMEL Gateway

```
config :omni7,  
  # CAP/CAMEL  
  cap_client_enabled: true,  
  camelgw_mode_enabled: true,  
  
  # map_client_enabled: false,  
  hlr_mode_enabled: false,  
  smsc_mode_enabled: false,  
  
  # CAP/CAMEL  
  # CAP v1, v2, v3, v4  
  cap_version: :v2,  
  
  # OCS  
  ocs_enabled: true,  
  ocs_url: "http://your-ocs-server/api/charging",  
  ocs_timeout: 5000, #  
  ocs_auth_token: "your-api-token" # OCS  
  
  # CAMEL M3UA  
  # ASP  
  cap_client_m3ua: %{  
    mode: "ASP",  
    callback: {CapClient, :handle_payload, []},  
    process_name: :camelgw_client_asp,  
  
  # CAMEL  
  local_ip: {10, 179, 4, 13},  
  local_port: 2905,  
  
  # MSC/GMSC - gsmSSF
```

```
remote_ip: {10, 179, 4, 10},
remote_port: 2985,

# M3UA
routing_context: 1,
network_appearance: 0,
asp_identifier: 13
}
```

Web UI

Web UI

```
config :control_panel,
  use_additional_pages: [
    {557.Web.EventsLive, "/events", "557"},
    {557.Web.TestClientLive, "/client", "557"},
    {557.Web.M3UAStatusLive, "/m3ua", "M3UA"},
    {557.Web.CAMELSessionsLive, "/camel_sessions", "CAP"},
    {557.Web.CAMELRequestLive, "/camel_request", "CAP"}
  ],
  page_order: ["/events", "/client", "/m3ua", "/camel_sessions",
               "/camel_request", "/application", "/configuration"]
```

CAP

gsmSSF → gsmSCF

InitialDP	0	-	handle_initial_dp/1
EventReportBCSM	6		handle_event_report_bcsn/1
ApplyChargingReport	71	gsmSSF	handle_apply_charging_report/1
AssistRequestInstructions	16	gsmSRF	handle_assist_request_instructions/1

gsmSCF → gsmSSF

Connect	20	CapRequestGenerator.connect_request/2
Continue	31	CapRequestGenerator.continue_request/1
ReleaseCall	22	CapRequestGenerator.release_call_request/2
RequestReportBCSMEvent	23	CapRequestGenerator.request_report_bcsn_event_request/2
ApplyCharging	35	CapRequestGenerator.apply_charging_request/3

Web UI

CAMEL

URL: http://localhost/camel_sessions

CAMEL

- 2
- OTID ID
- CAP InitialDP CAP v1/v2/v3/v4
- IMSI/A
-

- ID IMSI OTID

- InitialDP
-
- CDR

CAP InitialDP CAP MSC CAP

CAMEL

URL: http://localhost/camel_request

CAP

- InitialDP Connect ReleaseCall
-
- SCCP/M3UA
- 20
- OTID
-

- InitialDP
 -
 - A
 - B
- Connect
- ReleaseCall
- RequestReportBCSMEvent
 - Answer Disconnect Answer Disconnect
- Continue
- ApplyCharging
 - 1-864000
 -
 - CAMEL

SCCP

-
-
- SSN 146 = gsmSSF
- SSN 146

M3UA

- OPC 5013
- DPC 5011

OCS

1. (InitialDP)

MSC InitialDP CAMEL GW

- CAP
- CAP
- OCS - InitiateSession API
- MaxUsage 30
- SessionStore ETS CAP
- MSC - RequestReportBCSMEvent + Continue CAP

```
# InitialDP
%{
  imsi: "310150123456789",
  calling_party_number: "14155551234",
  called_party_number: "14155556789",
  service_key: 1,
  msc_address: "19216800123",
  cap_version: v2 #
}
```

```
# OCS
{:ok, %{max_usage: 30}} # 30
```

SessionStore

```
%{
  call_id: "CAMEL-48880173",
  initial_dp_data: %{...},
  cap_version: v2, # #####
  start_time: 1738246480,
  state: initiated
}
```

2. ##### (EventReportBCSM - oAnswer)

#####

1. ## oAnswer ## - ## MSC
2. ## OCS - UpdateSession##=0
3. ##### - OCS #####
4. ##### - answered SessionStore
5. ##### - MSC ## Continue

3.

#####

```
# 30
OCS.Client.update_session(call_id, {}, current_usage)
```

MaxUsage ## 0##### → ## ReleaseCall

4. ##### (EventReportBCSM - oDisconnect)

#####

1. ## oDisconnect ## - ## MSC
2. ##### - #####
3. ## OCS ## - TerminateSession API
4. CDR ## - OCS #####
5. ## - SessionStore ##
6. ## ReleaseCall - ##### MSC

CDR

CDR ## OCS #####

CAMEL CDR

- Account - IMSI #####
- Destination - #####
- OriginID - ##### (CAMEL-OTID)
- Usage - #####
- Cost - #####
- IMSI - ## IMSI
- CallingPartyNumber - A
- CalledPartyNumber - B
- MSCAddress - ## MSC ##
- ServiceKey - CAMEL #####

##

#####

1. #####

http://localhost/camel_request
2. ## InitialDP ##
 - ##### "InitialDP"
 - #####100
 - #####14155551234
 - #####14155556789
 - ## "## InitialDP ##"
 - ##### OTID
3. #####
 - #####http://localhost/camel_sessions
 - ##### "##" #####
4. #####
 - #####
 - ## "EventReportBCSM"
 - ## ## oAnswer
 - ## "## EventReportBCSM ##"
 - ##### "##"
5. #####
 - ## "ReleaseCall"
 - #####16#####
 - ## "## ReleaseCall ##"
 - ##### "##"

MSC

MSC CAMEL

MSC/VLR ## CAMEL

```
# ##### MSC ##
ADD CAMELSERVICE:
  SERVICEID=1,
  SERVICEKEY=100,
  GSMSCFADDR="55512341234", # CAMELGW #####
  DEFAULTCALLHANDLING=CONTINUE;

ADD CAMELSUBSCRIBER:
  IMSI="310150123456789",
  SERVICEID=1,
  TRIGGERTYPE=TERMCALL;
```

####

CAMELGW ##### CAP

```
# #####
tail -f /var/log/omniss7/omniss7.log

# ## CAP ##
grep "CAP:" /var/log/omniss7/omniss7.log

# #####JSON ##
curl http://localhost/api/events | jq '.[] | select(.map_event | startswith("CAP:"))'
```

####

#####

```
# 100 InitialDP ##
for i in {1..100}; do
  curl -X POST http://localhost/api/camel/initial_dp \
    -H "Content-Type: application/json" \
    -d '{
      "service_key": 100,
      "calling_number": "141555551",
      "called_number": "14155556789"
    }';
  sleep 0.1
done
```

#####

Prometheus

CAMELGW http://localhost:8080/metrics #####

CAP

- cap_requests_total(operation) - #####initialDPorequestReportBCSMEvent##### CAP ##

MAP/API

- map_requests_total(operation) - ##### MAP ##
- map_request_duration_milliseconds(operation) - #####
- map_pending_requests - ##### MAP #####

M3UA STP ##### STP

- m3ua_stp_messages_received_total(peer_name,point_code) - #####
- m3ua_stp_messages_sent_total(peer_name,point_code) - #####
- m3ua_stp_routing_failures_total(reason) - #####

CAMEL -

LiveView CAMEL/CAP InitialDP CAMEL

OmniSS7 Stack CAMEL GW v0.2

Download to GitHub
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SS7 Events

SS7 Client

M3UA

CAP Sessions

CAP Requests

Resources

Configuration

CAMEL Request Builder

Build and send CAP/CAMEL requests for testing

ApplyCharging request sent successfully! OTID: DC6EBC13 (CAP v2)

Request Parameters

Request Type

InitialDP (Initial Detection Point)

CAP/CAMEL Version (Current: V2)

CAP v2 (OID: 0.4.0.0.1.0.50.1) - Default

Determines the application context OID in TCAP dialogue for outgoing requests. This selection persists across form changes.

Call Duration (seconds)

60

Maximum call duration (1-864000 seconds, max 10 days)

☒ Release call when duration expires

If unchecked, call continues but ApplyChargingReport is sent.

Show Advanced SCCP/M3UA Options

Send ApplyCharging Request

Current Session

OTID: DC6EBC13

Last Request Size: 38 bytes

Request History (Last 20)

Timestamp	Request Type	CAP Ver	OTID	Status	Size
23:56:25	ApplyCharging	v2	DC6EBC13...	sent	38 bytes
23:56:21	InitialDP	v2	DC6EBC13...	sent	74 bytes

CAMEL Request Types

InitialDP - Initial Detection Point: Notifies gsmSCF about call setup

Connect - Connect call to specified destination

ReleaseCall - Release/terminate an ongoing call

RequestReportBCSMEvent - Request notifications for call state events

ApplyCharging - Set maximum call duration and charging parameters

Continue - Continue call processing

1. CAMEL LiveView

CAMEL

InitialDP -

Connect -

ReleaseCall -

RequestReportBCSMEvent -

Continue -

ApplyCharging -

SCCP/M3UA

SSN

OPC/DPC

20

OTID

/camel_request

2. EventLog CAMEL

paklog_camel/2 - CAMEL/CAP

lookup_cap_opcode_name/1 - CAP

find_cap_opcode/1 - JSON CAP

extract_cap_tids/1 - CAP OTID/DTID

format_cap_to_json/1 - CAP PDU JSON

CAP

0 => "initialDP"

5 => "connect"

6 => "releaseCall"

7 => "requestReportBCSMEvent"

8 => "eventReportBCSM"

10 => "continue"

13 => "furnishChargingInformation"

35 => "applyCharging"

... (47)

CAMEL JSON

TCAP

SCCP

"CAP:"

3. CapClient

paklog_camel/2

lookup_cap_opcode_name/1 MAP (paklog) CAP (paklog_camel)

scdp_m3ua_maker/2

handle_payload/1

LiveView

```
# config/runtime.exs

config :control_panel,
  use_additional_pages: [
    {557.Web.EventsLive, "/events", "557"},
    {557.Web.TestClientLive, "/client", "557"},
    {557.Web.M3UAStatusLive, "/m3ua", "M3UA"},
    {557.Web.HlrLinksLive, "/hlr_links", "HLR"},
    {557.Web.CAMELSessionsLive, "/camel_sessions", "CAMEL"},
    {557.Web.CAMELRequestLive, "/camel_request", "CAMEL"}
  ],
  page_order: ["/events", "/client", "/m3ua", "/hlr_links",
    "/camel_sessions", "/camel_request",
    "/application", "/configuration"]
```

1. https://your-server:8087/camel_request
- 2.
- 3.
4. "SCCP/M3UA" "RequestType"
5. "RequestType"

InitialDP

1. 100
2. A-Party
3. B-Party
4. OTID
5. OTID

Connect, ReleaseCall

1. InitialDP OTID
2. OTID
3. OTID

InitialDP

-
- ISDN
- ISDN

Connect

-

ReleaseCall

- 16 = 17 = 31 =

RequestReportBCSMEvent

- BCSM Answer, oDisconnect

Continue

- OTID

ApplyCharging

- 1-864000 -
- -

SCCP

- GT
- GT
- SSN 146 = gsmSSF
- SSN 146

M3UA

- OPC 5013
- DPC 5011

JSON

CAMEL JSON

-
- TCAP
- CAP "CAP:initialDP", "CAP:connect"
- SCIP
- TID
- JSON CAP PDU

```
{
  "map_event": "CAP:initialDP",
  "direction": "outgoing",
  "tcap_action": "Begin",
  "otid": "A1B2C3D4",
  "sccp_called": {
    "SSN": 146,
    "GlobalTitle": {
      "Digits": "55512341234",
      "NumberingPlan": "isdn_tele",
      "NatureOfAddress_Indicator": "International"
    }
  },
  "event_message": "{ ... full CAP PDU ... }"
}
```

20

-
-
- OTID
-
-

- OTID
-
-

1. InitialDP - OTID
2. RequestReportBCSMEvent -
ApplyCharging - 290
Connect -
ReleaseCall -
3. GlobalTitle
CAMEL
CAP:

ApplyCharging -

ApplyCharging

-
-

- **OCs**

(maxCallPeriodDuration)

- 1-864000
- 60 = 1
- 290 = 4 50
- 3600 = 1
- 86400 = 24

(releaseIfDurationExceeded)

- true/false
- true
- true
- false

ApplyCharging TCAP Continue

- TCAP
- 35
- ApplyChargingArg
 - aChBillingChargingCharacteristics
 - TimeDurationCharging
 - partyToCharge

5

1. InitialDP

300
447709000123
447709000456
OTID: A182C304

2. ApplyCharging 5

300
true
OTID: A182C304

3. Connect

447709000456
OTID: A182C304

4. 5

- gsmSCF

1. Connect ApplyCharging

-
-

2. RequestReportBCSMEEvent

- oAnswer oDisconnect
-
-

3.

-
-
- 60-300

4.

- release=false
-

- OTID InitialDP
- 1-864000
- SSF ApplyCharging
- 1

ApplyCharging

- ApplyCharging
- "CAP:applyCharging"
- CAMEL
- TCAP

- LiveView
- OTID
- 20
-

- CapRequestGenerator
- TCAPMessages
- CapClient.sccp_m3ua_maker/2 SCCP

- M3UA :camelgw_client_asp
- 1
- SCCP/M3UA

-
- OTID
- UI
-

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
7. PCAP
8. CAP

- MAP paklog
- MAP
- SCCP/M3UA
- CAMELSessionsLive
- M3UA

- config/runtime.exs

- CapRequestGenerator
- M3UA CapClient
- M3UA.Server

- ♦♦♦♦♦♦♦♦♦♦ EventLog
- Phoenix LiveView ♦♦
- ♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦

Web UI Web

Omp/SS7 Stack CAMEL GW x100



```
1. 0000 Web 0000
2. 000000000000000000000000http://localhost0
3. 000000000000
```

◆◆◆ API ◆◆◆

<http://your-server/swagger>

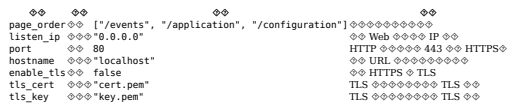
◆ config/runtime.exs ◆◆◆◆

```

conf: control_panel,
# ~~~~~~
page_order: ["events", "/application", "/configuration"],

# Web ~~~~~~
web: {
  listen_ip: "0.0.0.0", # ~ IP 0.0.0.0 ~~~~~~
  port: 80, # HTTP ~ 443 ~ HTTPS
  hostname: "localhost", # ~ URL ~~~~~~
  enable_tls: false, # ~ true ~ HTTPS
  tls_cert: "cert.pem", # TLS ~~~~~~
  tls_key: "key.pem" # TLS ~~~~~~
}

```



M3UA STP

```
config :omniss7,
  m3ua_stp: %{
    enabled: false,
    local_ip: {127, 0, 0, 1},
    local_port: 2905
  },
  enable_gt_routing: true,
  m3ua_peers: [...],
  m3ua_routes: [...],
  m3ua_gt_routes: [...]
```

m3ua_stp.enabled	false	STP
m3ua_stp.local_ip	{127, 0, 0, 1}	M3UA
m3ua_stp.local_port	2905	M3UA SCTP
enable_gt_routing	false	

M3UA

peer_id		
name		
role		:client :server
local_ip		:client IP
local_port		:client IP
remote_ip		IP
remote_port		:client
routing_context		M3UA
point_code		SS7
network_indicator		:international :national

M3UA

dest_pc		
peer_id		
priority		
network_indicator		:international :national

M3UA GT

gt_prefix		
peer_id		
priority		
description		
source_ssn		SSN
dest_ssn		SSN

MAP

```
config :omniss7,
  map_client_enabled: false,
  map_client_m3ua: %{
    mode: "ASP",
    callback: (MapClient, :handle_payload, []),
    process_name: :map_client_asp,
    local_ip: {10, 0, 0, 180},
    local_port: 2905,
    remote_ip: {10, 0, 0, 1},
    remote_port: 2905,
    routing_context: 1
  }
}
```

map_client_enabled	false	MAP
map_client_m3ua.mode	"ASP"	M3UA "ASP" "SGP"
map_client_m3ua.callback	(MapClient, :handle_payload, [])	
map_client_m3ua.process_name	:map_client_asp	
map_client_m3ua.local_ip		IP
map_client_m3ua.local_port	2905	SCTP
map_client_m3ua.remote_ip		STP/SGP IP
map_client_m3ua.remote_port	2905	SCTP
map_client_m3ua.routing_context		M3UA

```
config :omniss7,
  auto_flush_enabled: false,
  auto_flush_interval: 10_000,
  auto_flush_dest_smsc: nil,
  auto_flush_tps: 10

  auto_flush_enabled false false SMS
  auto_flush_interval 10 10000
  auto_flush_dest_smsc nil nil SMSC nil =
  auto_flush_tps 10
```

HTTP API

HTTP API

```
config :omniss7,
  smsc_api_base_url: "https://10.5.198.200:8443",
  frontend_name: "omni-smsc01" # hostname_SMSC
```

API

smsc_api_base_url	"https://10.5.198.200:8443"	API URL
frontend_name	"(hostname)_SMSC"	

API

- POST /api/frontends - SMS
- POST /api/messages_raw - SMS
- GET /api/messages - smsc
- PATCH /api/messages/{id} -
- PUT /api/messages/{id} -
- POST /api/events -
- GET /api/status -

API 5

- SMSC
-
-
- JSON

- SSL
- HTTP 5
- ISO 8601
- API JSON

- STP
- MAP
-
- HLR

OmniSS7 Omnitech



← [○○○○](#)

○○○○○○○○ OmniSS7 ○○○○○○○○○○



1. [○○](#)
2. [○○○○○○](#)
3. [HLR ○○○○](#)
4. [SMSc ○○○○](#)
5. [STP ○○○○](#)
6. [○○○○ NAT ○○](#)
7. [M3UA ○○○○](#)
8. [HTTP ○○○○○○](#)
9. [○○○○○○](#)
10. [○○○○](#)



OmniSS7 ○○○○ config/runtime.exs ○○○○○○○○○○○○○○

- **STP** ○○ - ○○○○○○○○○○
- **HLR** ○○ - ○○○○○○○○○○○○○○
- **SMSc** ○○ - ○○○○○○○○○○

○○○○: config/runtime.exs



○○○○○○○○○○

○○	○○ ○○○	○○	○○
map_client_enabled	○○○ false	MAP	○○○○ M3UA ○○○
hlr_mode_enabled	○○○ false	HLR	○○○○ HLR
smsc_mode_enabled	○○○ false	SMSc	○○○○ SMSc

○○:

```
config :omniss7,
  map_client_enabled: true,
  hlr_mode_enabled: true,
  smsc_mode_enabled: false
```

HLR ○○○○

HLR ○○○○○○○○○○○○○○

HLR API ○○

○○	○○ ○○○○○	○○
hlr_api_base_url	○○○ -	○○ HLR API ○○ URL ○ SSL ○○○○○○○○○
hlr_service_center_gt_address	○○○ -	○○ UpdateLocation ○○○○○ HLR ○○○○○○
smsc_service_center_gt_address	○○○ -	○○ SRI-for-SM ○○○○○ SMSC GT ○○

○○:

```
config :omniss7,
  hlr_api_base_url: "https://10.180.2.140:8443",
  hlr_service_center_gt_address: "55512341111",
  smsc_service_center_gt_address: "55512341112"
```

MSISDN ↔ IMSI

MSISDN ↔ IMSI [HLR ↔ MSISDN ↔ IMSI](#)

```
hlr_imsi_plmn_prefix  "50557"  IMSI PLMN MCC+MNC
hlr_msisdn_country_code  "61"  IMSI→MSISDN
hlr_msisdn_nsn_offset    0      MSISDN NSN
hlr_msisdn_nsn_length    9      MSISDN
```

2:

```
config :omniss7,
  hlr_imsi_plmn_prefix: "50557",      # MCC 505 + MNC 57
  hlr_msisdn_country_code: "99",      # 2
  hlr_msisdn_nsn_offset: 2,           # 2
  hlr_msisdn_nsn_length: 9           # 9 NSN
```

3:

```
config :omniss7,
  hlr_imsi_plmn_prefix: "50557",      # MCC 505 + MNC 57
  hlr_msisdn_country_code: "999",     # 3
  hlr_msisdn_nsn_offset: 3,           # 3
  hlr_msisdn_nsn_length: 8           # 8 NSN
```

: nsn_offset NSN

- "9"1 → nsn_offset: 1
- "99"2 → nsn_offset: 2
- "999"3 → nsn_offset: 3

InsertSubscriberData (ISD)

UpdateLocation VLR ISD [HLR InsertSubscriberData](#)

```
isd_network_access_mode :packetAndCircuit :packetOnly :circuitOnly
isd_send_ss_data         true              ISD #2
isd_send_call_barring    true              ISD #3
```

:

```
config :omniss7,
  isd_network_access_mode: :packetAndCircuit,
  isd_send_ss_data: true,
  isd_send_call_barring: true
```

CAMEL

CAMEL CAMEL [HLR CAMEL](#)

```
camel_service_key      11_110      SRI CAMEL
camel_trigger_detection_point :termAttemptAuthorized CAMEL
                           :termAttemptAuthorized:tBusy:tNoAnswer:tAnswer
camel_gsmSCF_gt_address (GT)      CAMEL gsmSCF GT NAT
```

:

```
config :omniss7,
  camel_service_key: 11_110,
  camel_trigger_detection_point: :termAttemptAuthorized
```

VLR

/ PRN [HLR](#)

home_vlr_prefixes ["5551231"] VLR GT

:

```
config :omniss7,
  home_vlr_prefixes: ["5551231", "5551234"]
```

SMSc

SMSc API

smsc_api_base_url - SMS API URL SSL
smsc_name "{hostname}_SMS" SMS
smsc_service_center_gt_address -

:

```
config :omniss7,
  smsc_api_base_url: "https://10.179.3.219:8443",
  smsc_name: "ipsmgw",
  smsc_service_center_gt_address: "55512341112"
```

: 5 SMS.FrontendRegistry

auto_flush_enabled true SMS
auto_flush_interval 10_000
auto_flush_dest_smsc - SMSC
auto_flush_tps 10

:

```
config :omniss7,
  auto_flush_enabled: true,
  auto_flush_interval: 10_000,
  auto_flush_dest_smsc: "ipsmgw",
  auto_flush_tps: 10
```

STP

M3UA STP

STP

m3ua_stp.enabled false M3UA STP
m3ua_stp.local_ip {127, 0, 0, 1} IP
m3ua_stp.local_port 2905
m3ua_stp.point_code - STP SS7

:

```
config :omniss7,
  m3ua_stp: %{
    enabled: true,
    local_ip: {10, 179, 4, 10},
    local_port: 2905,
    point_code: 100
  }
```


HTTP

REST API HTTP

```
start_http_server true  HTTP 8080
```

:

- IP: 0.0.0.0
- : 8080
- : Plug.Cowboy

:

```
config :omniss7,  
  start_http_server: true # false
```

API:

- REST API: http://[server-ip]:8080/api/*
- Swagger UI: http://[server-ip]:8080/swagger
- Prometheus : http://[server-ip]:8080/metrics

API

Mnesia

```
mnesia_storage_type :disc_copies Mnesia :disc_copies :ram_copies
```

:

```
config :omniss7,  
  mnesia_storage_type: :disc_copies #  
  # mnesia_storage_type: :ram_copies #
```

:

- :disc_copies - -
- :ram_copies - -

Mnesia:

- m3ua_peer - M3UA
- m3ua_route -
- m3ua_gt_route -

: Mnesia.{node_name}/


```
MAP : 10 MAP 10  
ISD : 10 ISD 10
```

HTTP

```
HTTP IP: 0.0.0.0  
HTTP : 8080 REST API 8080
```

SSL

HLR API SSL: SSL
SMS Sc API SSL: SSL

: 5 SMS Sc 5

Web UI

5
5
2

HLR

```
config :omniss7,
  map_client_enabled: true,
  hlr_mode_enabled: true,
  smsc_mode_enabled: false,

  hlr_api_base_url: "https://10.180.2.140:8443",
  hlr_service_center_gt_address: "55512341111",
  smsc_service_center_gt_address: "55512341112",

  map_client_m3ua: %{
    mode: "ASP",
    callback: {MapClient, :handle_payload, []},
    process_name: :hlr_client_asp,
    local_ip: {10, 179, 4, 11},
    local_port: 2905,
    remote_ip: {10, 179, 4, 10},
    remote_port: 2905,
    routing_context: 1
  }
```

SMS Sc

```
config :omniss7,
  map_client_enabled: true,
  hlr_mode_enabled: false,
  smsc_mode_enabled: true,

  smsc_api_base_url: "https://10.179.3.219:8443",
  smsc_name: "ipsmgw",
  smsc_service_center_gt_address: "55512341112",

  auto_flush_enabled: true,
  auto_flush_interval: 10_000,
  auto_flush_dest_smsc: "ipsmgw",
  auto_flush_tps: 10,

  map_client_m3ua: %{
    mode: "ASP",
    callback: {MapClient, :handle_payload, []},
    process_name: :stp_client_asp,
    local_ip: {10, 179, 4, 12},
    local_port: 2905,
    remote_ip: {10, 179, 4, 10},
    remote_port: 2905,
    routing_context: 1
  }
```

STP

```
config :omniss7,
```

```

map_client_enabled: true,
hlr_mode_enabled: false,
smsc_mode_enabled: false,

enable_gt_routing: true,
mnesia_storage_type: :disc_copies,

m3ua_stp: %{
  enabled: true,
  local_ip: {10, 179, 4, 10},
  local_port: 2905,
  point_code: 100
},

map_client_m3ua: %{
  mode: "ASP",
  callback: {MapClient, :handle_payload, []},
  process_name: :stp_client_asp,
  local_ip: {10, 179, 4, 10},
  local_port: 2906,
  remote_ip: {10, 179, 4, 11},
  remote_port: 2905,
  routing_context: 1
}

```



◆◆◆◆◆: 32

◆◆◆:

- ◆◆◆◆: 3 ◆◆◆
- HLR ◆◆: 13 ◆◆◆
- SMSc ◆◆: 7 ◆◆◆
- STP ◆◆: 5 ◆◆◆
- M3UA ◆◆: 8 ◆◆◆
- HTTP ◆◆◆: 1 ◆◆◆
- ◆◆◆: 1 ◆◆◆

◆◆◆◆◆◆◆◆◆◆:

- hlr_api_base_url◆HLR ◆◆◆
- hlr_service_center_gt_address◆HLR ◆◆◆
- smsc_api_base_url◆SMSc ◆◆◆
- smsc_service_center_gt_address◆SMSc/HLR ◆◆◆
- ◆◆ map_client_m3ua.* ◆◆
- m3ua_stp.point_code◆◆◆◆◆ STP◆



- [HLR ◆◆](#) - HLR ◆◆◆◆
- [SMSc ◆◆](#) - SMSc ◆◆◆◆
- [STP ◆◆](#) - STP ◆◆◆◆
- [API ◆◆](#) - REST API ◆◆
- [Web UI ◆◆](#) - Web ◆◆◆◆



?? ? NAT ??

??

????? (GT NAT) ???? OmniSS7 ???? GT ????
GT ???? GT ????
????/???? GT?

??? (??? GT NAT)

GT NAT ?????

???

1. ????? called_prefix ???? calling_prefix
??
2. ?????
3. ????? weight ???? = ?????
4. ?????
 - ?????
 - ?????
 - ?????
 - ????/????

?????

?????

- weight???? = ?????
- response_gt???? GT

?????

- calling_prefix???? GT ??
- called_prefix???? GT ??

???

```
gt_nat_rules: [  
  # ???? - ????  
  %{calling_prefix: "8772", called_prefix: "555", weight: 1,  
  response_gt: "111111"},
```

```
# 8772 - 222222
%{calling_prefix: "8772", weight: 10, response_gt: "222222"},
%{called_prefix: "555", weight: 10, response_gt: "333333"},

# 999999 - 999999
%{weight: 100, response_gt: "999999"}
]
```

8772

222222

87723456789012345678901234567890 GT 222222

- 8772 **A** 222222 GT 111111 222222 111111 222222
- 8772 **B** 222222 GT 222222 222222 222222 222222

8772 GT NAT 22222222222222222222222222222222 GT NAT 2222 OmniSS7 22222222222222222222222222222222

2222

222 HLR 2 SMS 2222222222222222

- 222222 222222 GT 555000
- 2222222222 **1** 222 GT 555001
- 2222222222 **2** 222 GT 555002

GT NAT 22222222222222222222222222222222 GT 222222

222222

22222222222222222222222222222222

- 2222222222 GT 222222 GT
- 2222222222222222 GT
- 2222222222222222 GT 222222

2222

22222222222222222222222222222222

1. 2222222222 OmniSS7 2222222222 SCCP 22222222222222222222222222222222

- 222 GT 5551234111222222 GT 222
- 222 GT 877234567222222 GT 222

2. **GT NAT** 877234567 55512341112
3. 8772 877234567
4. **GT** response_gt55512341112
5. SCCP
 - GT877234567 - GT
 - GT55512341112NAT'd GT

877234567

GT NAT SS7 877234567

SCCP 877234567

- 877234567 SCCP/8772 GT
- ISDInsertSubscriberData
- UpdateLocation
- 877234567

MAP 877234567

- **SRI-for-SM** 877234567networkNode-NumberSMS Sc GT
- **UpdateLocation** 877234567 hlr-Number
- **InsertSubscriberData** ISD 877234567 HLR GT

8772

877234567

8772 config/runtime.exs

```
config :omniss7,
  # 8772 GT NAT
  gt_nat_enabled: true,

  # 8772 GT NAT
  gt_nat_rules: [
    # 1 8772 8772 "8772" 55512341112
    %{calling_prefix: "8772", response_gt: "55512341112"},

    # 2 8772 8772 "8773" 55512341111
    %{calling_prefix: "8773", response_gt: "55512341111"},

    # 877234567 877234567 877234567
```



```
# 0000 VLR000 5553
%{calling_prefix: "5553", weight: 10, response_gt: "555300"},

# 0000000000000000
%{weight: 100, response_gt: "555000"}
]
```

300000

0000000 GT 0000 GT

```
config :omniss7,
  gt_nat_enabled: true,
  hlr_service_center_gt_address: "123456789", # 0 GT0000

  gt_nat_rules: [
    # 0000000000000000
    %{calling_prefix: "555", weight: 10, response_gt: "987654321"},
# 0 GT
    %{calling_prefix: "666", weight: 10, response_gt: "987654321"},
# 0 GT

    # 00000000000000 GT00000
    %{weight: 100, response_gt: "123456789"} # 0 GT
  ]
```

4000000000000000

0000000 GT 0000000000000000000000000000 GT 000000 GT

```
config :omniss7,
  gt_nat_enabled: true,

  gt_nat_rules: [
    # 00000000 SMS GT05551xxx000000 GT
    %{called_prefix: "5551", weight: 10, response_gt: "555100"},

    # 000000000000 GT05552xxx000000 GT
    %{called_prefix: "5552", weight: 10, response_gt: "555200"},

    # 000000000000 GT05553xxx000000 GT
    %{called_prefix: "5553", weight: 10, response_gt: "555300"},

    # 0000
    %{weight: 100, response_gt: "555000"}
  ]
```

000000

```
##### GT: 555100##### SMS GT#  
## GT: 441234567#####
```

```
GT NAT ###  
## GT "555100" ##### "5551"  
### response_gt: "555100"
```

```
##### GT: 555100#####
```

```
## 5##### + #####
```

```
##### GT#####
```

```
config :omniss7,  
  gt_nat_enabled: true,  
  
  gt_nat_rules: [  
    # ##### A ##### SMS GT - ##### 1#  
    %{calling_prefix: "4412", called_prefix: "5551", weight: 1,  
response_gt: "555101"},  
  
    # ##### B ##### SMS GT - ##### 1#  
    %{calling_prefix: "4413", called_prefix: "5551", weight: 1,  
response_gt: "555102"},  
  
    # ##### SMS GT - ##### 10#  
    %{called_prefix: "5551", weight: 10, response_gt: "555100"},  
  
    # ##### A ##### GT - ##### 10#  
    %{calling_prefix: "4412", weight: 10, response_gt: "555200"},  
  
    # ##### - ##### 100#  
    %{weight: 100, response_gt: "555000"}  
  ]
```

```
#####
```

```
# ##### A ## SMS GT  
##: "441234567", ##: "555100"  
→ ##### 1 ##### → "555101"
```

```
# ##### A ##### GT  
##: "441234567", ##: "555200"  
→ ##### 10 ##### → "555200"
```

```
# ##### SMS GT  
##: "999999999", ##: "555100"  
→ ##### 10 ##### → "555100"
```

```
# 123456789 GT
12: "999999999", 12: "555200"
→ 1234 100 123 → "555000"
```

1234

GT NAT 123 OmniSS7 123456789

HLR 12

GT NAT 123

- UpdateLocation 1234567 HLR GT
- InsertSubscriberData 123456789 HLR GT
- SendAuthenticationInfo 12
- 1234567

12 HLR 12345678912345 [HLR 123456](#)

123

```
config :omniss7,
  hlr_mode_enabled: true,
  hlr_service_center_gt_address: "5551234567", # 12 HLR GT

  gt_nat_enabled: true,
  gt_nat_rules: [
    %{calling_prefix: "331", weight: 10, response_gt: "5551234568"},
# 12
    %{calling_prefix: "44", weight: 10, response_gt: "5551234569"},
# 12
    %{weight: 100, response_gt: "5551234567"} # 12345
  ]
```

SMSc 12

GT NAT 123

- SRI-for-SM 1234networkNode-Number 123 - 12 [SRI-for-SM 12345](#)
- MT-ForwardSM 12

12 SMSc 12345678912345 [SMSc 123456](#)

123

```
config :omniss7,
  smsc_mode_enabled: true,
```

```
smsc_service_center_gt_address: "5559999", # SSMSc GT

gt_nat_enabled: true,
gt_nat_rules: [
    %{calling_prefix: "1", weight: 10, response_gt: "5559991"}, #
    %{calling_prefix: "44", weight: 10, response_gt: "5559992"}, #
    %{calling_prefix: "86", weight: 10, response_gt: "5559993"}, #
    %{weight: 100, response_gt: "5559999"} #
]
```

? ? ? ? ? ? ? ? ?

```
[info] GT NAT [SRI-for-SM 00]: 00 GT 877234567 -> 00 GT
55512341112
[info] GT NAT [UpdateLocation ISD]: 00 GT 331234567 -> 00 GT
55512341111
[info] GT NAT [MAP BEGIN 00]: 00 GT 441234567 -> 00 GT 55512311555
```

```
0000000000 NAT 0000
```

- "SRI-for-SM 00" - 0 SRI-for-SM 000000
- "UpdateLocation ISD" - 0 InsertSubscriberData 000
- "UpdateLocation END" - 0 UpdateLocation END 000
- "MAP BEGIN 00" - 00 MAP BEGIN 00
- "ISD ACK" - ISD 00
- "HLR 00000" - HLR 0000000000
- "CAMEL 00" - CAMEL/CAP 000000gsmSCF0

```
00
```

```
0000000000 GT NAT 000
```

```
# 00 GT NAT 00
iex> GtNat.validate_config()
{:ok, [
  %{calling_prefix: "8772", weight: 10, response_gt: "55512341112"},
  %{calling_prefix: "8773", weight: 10, response_gt: "55512341111"}
]}
```

```
# 00000000
iex> GtNat.enabled?()
true
```

```
# 00000000
iex> GtNat.get_rules()
[
  %{calling_prefix: "8772", weight: 10, response_gt: "55512341112"},
  %{calling_prefix: "8773", weight: 10, response_gt: "55512341111"}
]
```

00 GT NAT

```
0000000000 GT NAT 000
```

```
# 00000000 GT 000000called_gt 0 nil0
iex> GtNat.translate_response_gt("877234567", nil, "default_gt")
"55512341112"
```

```
# 0000000000 GT 00000
iex> GtNat.translate_response_gt("877234567", "555123", "default_gt")
```

```
"55512341112"
```

```
# nil GT
```

```
iex> GtNat.translate_response_gt_with_logging("877234567", nil,  
"default_gt", "test")
```

```
# GT NAT [test]: GT 877234567 -> GT 55512341112  
"55512341112"
```

```
# GT
```

```
iex> GtNat.translate_response_gt_with_logging("877234567", "555123",  
"default_gt", "test")
```

```
# GT NAT [test]: GT 877234567, GT 555123 -> GT  
55512341112  
"55512341112"
```

```
#
```

```
iex> GtNat.translate_response_gt("999999999", "888888", "default_gt")  
"default_gt"
```

```
GT NAT
```

```
1
```

```
iex> Application.get_env(:omniss7, :gt_nat_enabled)  
true # true
```

```
2
```

```
iex> Application.get_env(:omniss7, :gt_nat_rules)  
[%{calling_prefix: "8772", response_gt: "55512341112"}, ...] #  

```

```
3 "GT NAT"
```

```
GT
```

```
GT
```

```
#
```

```
gt_nat_rules: [  
  %
```

```
{weight: 1, response_gt: "111111"}, #
```

```
{calling_prefix: "8772", weight: 10, response_gt: "222222"} #
```

??

]

??????????????????????

gt_nat_rules: [

 %{calling_prefix: "8772", weight: 10, response_gt: "222222"}, # ?

 ?????

 %{weight: 100, response_gt: "111111"} # ??????????????

]

???**GT NAT** ??????????

????? NAT'd GT?????

?????

- ? SCCP ?? GT?????
- ? SRI-for-SM ???networkNode-Number?
- ? UpdateLocation ISD ???HLR GT?
- ? UpdateLocation END ??
- ? ISD ??
- ? MAP BEGIN ??

????? GT NAT????????????????????

????

????

GT NAT ?????? O(n)??? n ??????

?????

- ?????? 100 ??????
- ??????
- ??????

?????

- 10 ????? < 1μs
- 50 ????? < 5μs
- 100 ????? < 10μs

????

???? ~100 ?????

- 10 ??? ≈ 1 KB

- 100 000 ≈ 10 KB

0000

1. 0000000000000000

```
gt_nat_rules: [
  %{calling_prefix: "8772", weight: 10, response_gt: "111111"},
  %{calling_prefix: "8773", weight: 10, response_gt: "222222"},
  %{weight: 100, response_gt: "default_gt"} # 0000000000000000
]
```

2. 0000000000000000

```
# 0000000000000000
%{calling_prefix: "331", weight: 10, response_gt: "..."} # 00
%{calling_prefix: "44", weight: 10, response_gt: "..."} # 00

# 0000000000000000
%{calling_prefix: "3", weight: 5, response_gt: "..."} # 0000
%{calling_prefix: "331", weight: 100, response_gt: "..."} # 000000
000000
```

3. 000000

```
gt_nat_rules: [
  # 0000 XYZ - 00000GT 0004412xxxxxxx0
  # 00 1000000000000000
  %{calling_prefix: "4412", weight: 10, response_gt: "5551001"},

  # 0000 ABC - 00000GT 00033123xxxxxxx0
  # 00 1000000000000000
  %{calling_prefix: "33123", weight: 10, response_gt: "5551002"}
]
```

4. 0000000

```
# 000000 iex 000
iex> GtNat.translate_response_gt("44121234567", nil, "default")
"5551001" # 0000

# 0000 GT 00
iex> GtNat.translate_response_gt("44121234567", "555123", "default")
"5551001" # 0000
```



```
gt_nat_enabled: false, # 11111
gt_nat_rules: [
  # 1111111111111111
  %{calling_prefix: "877", weight: 10, response_gt: "111111"},
  %{weight: 100, response_gt: "999999"} # 11111
]
```

2. 1111

```
# 1111111111111111
mix compile

# 1 iex 1111
iex -S mix
iex> GtNat.validate_config()
```

3. 11111111

```
gt_nat_enabled: true # 111 true
```

4. 1111

```
tail -f log/omniss7.log | grep "GT NAT"
```

5. 111111

- 1111111111111111
- 111111 24 11
- 1111111111111111 gt_nat_enabled: false 111111

11

1111111111

- 11111111 "GT NAT" 11
- 11 GtNat.validate_config() 1111
- 1111111111111111
- 11 OmniSS7 111111111111

11

- [HLR 11](#) - HLR 1111
- [SMSC 11](#) - SMSc 1111
- [STP 11](#) - STP 1111
- [111111](#) - 1111111111

OmniHSS 

- **OmniSS7 (HLR)**

[illegible][illegible]

-

[illegible]

```

MSISDN: +1-555-123-4567
├─ IMSI 1: 310260123456789 (Milenage)
├─ IMSI 2: 208011234567890 (Milenage)
└─ IMSI 3: 440201234567891 (COMP128)

```

OmniSS7 Stack v1.0.0

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SS7 Events

SS7 Client

M3UA

HLR Links

Active Subscribers

Resources

Configuration

Active Subscribers

Total: 0 Auto-refresh every 2 seconds

Active Subscribers: Subscribers who have sent an UpdateLocation request and have not yet sent a CancelLocation.
This table shows the IMSI, current VLR, MSC, registration time, and duration for each active subscriber.

Clear All Subscribers

IMSI	VLR Number	MSC Number	Updated At	Duration
 No Active Subscribers Subscribers will appear here when they send UpdateLocation requests.				

1. OmniHSS  
2.  IMSI  
3.    HLR   
4.   HLR  
5.         
6.         
7.    
8. CAMEL  
9.         
10. HLR  

- ④④④④④④
 - SendRoutingInfo (SRI)
 - UpdateLocation / ISD
 - SendRoutingInfoForSM
- ④④④④④

•

[illegible][illegible]

- ◆◆◆◆

◆◆◆◆◆◆

◆◆◆◆ updateLocation MAP ◆◆◆◆OmniSS7 ◆ OmniHSS ◆◆◆◆◆ VLR ◆◆◆◆◆

- ### ◆◆hlr_service_center_gt_address ◆◆◆◆◆◆ UpdateLocation ◆◆◆◆◆◆ HLR ◆◆◆◆◆◆ VLR/MSC ◆◆◆◆◆◆ HLR◆

◆◆◆◆◆◆◆◆

UpdateLocation HLR alertServiceCenter MAP 64 SSMc SSMc SSMc

◆◆◆◆◆ SMSc ◆◆◆◆◆

```
# SMSc alertServiceCenter 48
hlr_alert_location_expiry_seconds: 172800
```

◆◆◆◆◆ UpdateLocation ◆◆

- SMSc
-

- **MSISDN** **TON/NPI** "19123123213" → "123123213"
- **POST** /api/location
- **API** **user_agent** **HLR GT** **HLR**
- **hlr_alert_location_expiry_seconds**
- **SMSc**

Web UI alertServiceCenter

- ```

1. 00000000000000000000000000000000
2. 00000000000000000000000000000000
3. 00 MSISDN00SMSc GT 0 HLR GT00000000000000000000
 0 SMSc GT00000 hlr_smsc_alert_gts 00000000
 0 HLR GT00000 hlr_service_center_gt_address
4. 00000000 alertServiceCenter"

```

SMSc UpdateLocation phx-blur

## UpdateLocation HLR InsertSubscriberData (ISD) VLR ISD

[illegible]

## HLR \*\*\*\*\* 3 \*\*\*\*\* ISD \*\*\*\*\*

- ```
1. ISD #1 -
  o IMSI
  o MSISDN
  o 
  o serviceGranted
  o 
  o 
  o 
  o 
  o
```

2. **ISD #2** - (SS)
- -
 -
 -
 -

3. ISD #3 -
- BAOC
 - BOIC
 -

◆◆◆◆

```
# InsertSubscriberData ◇◇
# ◇◇◇◇◇◇:packetAndCircuit, :packetOnly, ◇ :circuitOnly
isd network access mode: :packetAndCircuit,
```

```
# ISD #2
isd_send_ss_data: true,

# ISD #3
isd_send_call_barring: true,
```

◆◆◆◆◆

```
isd_network_access_mode
```

```

:packetAndCircuit  GPRS/LTE - 
:packetOnly        /LTE
:circuitOnly        SMS

```

ISD

```
ISD100 - 00000000
isd_send_ss_data: true,
isd_send_call_barring: true,
```

[illegible]

```
isd_send_ss_data: false,
isd_send_call_barring: false,
```

[illegible]

```
isd_send_ss_data: true,  
isd_send_call_barring: false,
```

◆◆◆◆ UpdateLocation ◆◆

```
VLR → HLR: UpdateLocation (◇◇)
HLR → VLR: InsertSubscriberData #1 (◇◇) - ◇◇◇◇
VLR → HLR: ISD #1 ◇◇ (◇◇)
HLR → VLR: InsertSubscriberData #2 (◇◇) - SS ◇◇ [◇◇◇◇]
```

```
VLR -> HLR: ISD #2 ( )
HLR -> VLR: InsertSubscriberData #3 ( ) - ( ) [ ]
VLR -> HLR: ISD #3 ( )
HLR -> VLR: UpdateLocation ( )

isd_send_ss_data isd_send_call_barring false ISD UpdateLocation

* :packetAndCircuit ISD
* /M2M :packetOnly SS /
* VLR -> VLR -> isd_send_ss_data
* ISD
```

CAMEL

CAMEL SendRoutingInfo

GMSC MSC SendRoutingInfo (SRI) HLR GMSC CAMEL

CAMEL

CAMEL

CAMEL GSM/UMTS

-
-
- (VPN)
-
-
-


```
# CAMEL SendRoutingInfo
# CAMEL
camel_service_key: 11_110,

# CAMEL
# :termAttemptAuthorized, :tBusy, :tNoAnswer, :tAnswer
camel_trigger_detection_point: :termAttemptAuthorized,
```


camel_service_key gsmSCF CAMEL

```
11_110
180
280
380 (VPN)

```



```
#
camel_service_key: 11_110,
```

```
# VPN
camel_service_key: 380,
```


camel_trigger_detection_point CAMEL

```

:termAttemptAuthorized
:tBusy
:tNoAnswer
:tAnswer
```



```
camel_trigger_detection_point: :termAttemptAuthorized,
```

camel_trigger_detection_point: :tBusy,

camel_trigger_detection_point: :tAnswer,

CAMEL SRI

SendRoutingInfo CAMEL

```
GMSC -> HLR: SendRoutingInfo ( )
HLR -> GMSC: SRI ( )
- IMSI
- VLR
- CAMEL
* 11_110
* gsmSCF
* :termAttemptAuthorized
* continueCall

GMSC gsmSCF CAMEL
```


- gsmSCF
- :termAttemptAuthorized
- 11_110
- defaultCallHandling: :continueCall gsmSCF

VLR VLR

HLR SendRoutingInfo (SRI) VLR VLR

VLR VLR

- VLR SRI CAMEL
- VLR PRN MSRN SRI


```
# VLR
# " VLR
# VLR "551234567" SRI
# "55123" PRN MSRN
home_vlr_prefixes: ["555123"],
```



```
#
home_vlr_prefixes: ["555123"],

#
home_vlr_prefixes: ["555123", "555124", "555125"],
```


1.

VLR

```
GMSC -> HLR: SendRoutingInfo (MSISDN: "1234567890")
HLR -> API
HLR -> VLR "551234567"
HLR -> VLR "555123" -
HLR -> GMSC: SRI CAMEL
- IMSI
- VLR "551234567"
- gsmSCF (MSC) "551234501"
- CAMEL 11_110
- :termAttemptAuthorized
```

2. PRN

VLR


```

    IMSI      OmniHSS API  OmniHSS  "999999876543218"
VLR  OmniHSS API  VLR (circuit_session.assigned_vlr) "5551234567"
    notProvidedFromVLR
extendedRoutingInfo-
gsmSCF  OmniHSS API  MSC (circuit_session.assigned_msc) "5551234501"
    runtime.exs CAMEL (camel_service.key) 11,110
    runtime.exs CAMEL (camel_trigger_detection_point) :termAttemptAuthorized
CAMEL  CAMEL  3
    gsmSCF  :continueCall

```

MSRN

VLR home_vlr_prefixes

```

    IMSI      OmniHSS API  OmniHSS  "999999876543218"
VLR  OmniHSS API  VLR (circuit_session.assigned_vlr) "49170123456"
    notProvidedFromVLR
extendedRoutingInfo-
    PRN  routingInfo
    (MSRN)  MSRN  "49170999888777"

```

```

1. OmniSS7  SendRoutingInfo
2. OmniSS7  OmniHSS API
3. OmniSS7  VLR  home_vlr_prefixes

```

```

    VLR
    - CAMEL
    VLR
    - HSC
    - PRN  MSRN
    - MSRN

```

```

    OmniSS7  OmniHSS
    OmniHSS  IMSI  VLR/MSC
    OmniSS7  MAP

```

```

# runtime.exs
home_vlr_prefixes: ["555123"], # VLR

```

```

    serving_vlr  serving_msc  null  27
    PRN  1
    PRN  27
    PRN  27

```

UpdateLocation InsertSubscriberData

VLR

UpdateLocation

```

    HLR  runtime.exs  HLR (hlr_service_center_gt_address) "5551234568"
TCAP  ISD  END

```

InsertSubscriberData #1

```

    IMSI      UpdateLocation  "999999876543210"
MSISDN  OmniHSS API  OmniHSS  "555123456"
    "n" (0x0A)
    :serviceGranted
    [<31>]
    [<17>,"!", "\""]
runtime.exs  (isd_network_access_mode):packetAndCircuit

```

InsertSubscriberData #2

```

    SS  isd_send_ss_data: true
    isd_send_ss_data: true
    isd_send_ss_data: true

```

ISD #2

```

    SS  21
    SS  41
    SS  42
    SS  62
    SS  13
    SS  51
    CLIP/CLIR

```

InsertSubscriberData #3

```

    isd_send_call_barring: true
BAOC  146
BOIC  147

```

ISD

```

    ISD #1
    ISD #2 runtime.exs  isd_send_ss_data: true
    ISD #3 runtime.exs  isd_send_call_barring: true

```

SendRoutingInfoForSM (SRI-for-SM)

SMS MSC/SMSC SMSc SMS HLR SRI-for-SM

```

    IMSI      MSISDN  IMSI  PLMN_PREFIX + zero_padded_MSISDN "001001555123456"
runtime.exs SMSC GT  SMS  smsc_service_center_gt_address "5551234567"

```

runtime.exs

```

# GT  SRI-for-SM
# SMSC  MT-ForwardSM
smc_service_center_gt_address: "5551234567", #
# MSISDN  IMSI
# PLMN  MCC (001 = ) + MNC (01 = )
hlr_imsi_plmn_prefix: "001001", #

```

MSISDN -> IMSI

OmniSS7 SRI-for-SM IMSI

```

    hlr_imsi_plmn_prefix  IMSI  MCC+MNC "50557"  MCC=505+MNC=57
    hlr_msisdn_country_code  IMSI-MSISDN "61" "1"
    hlr_msisdn_nsn_offset  (NSN)  MSISDN
    hlr_msisdn_nsn_length  MSISDN  NSN

```

MSISDN - IMSI

MSISDN IMSI

MAP SendRoutingInfoForSM (SRI-for-SM) HLR IMSI SMSc MSISDN

```

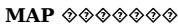
    SMSc  SRI-for-SM  MSISDN "5551234567"
    HLR
    HLR  SRI-for-SM  IMSI
    SMSc  MT-ForwardSM  MSC/VLR  IMSI

```

OmniSS7 - IMSI

OmniSS7 MSISDN IMSI IMSI MSISDN

- ◆ runtime.exs ◆◆◆◆



◆◆◆◆◆ OmniSS7 ◆◆ MAP ◆◆◆ ◆◆ MAP ◆◆◆◆◆

◆◆

- ◆◆◆ **MAP** ◆◆◆

[illegible]

◆◆ MAP ◆◆◆◆◆

◆◆◆◆

◆◆◆◆◆◆

```
config :control_panel,  
  web: %{  
    listen_ip: "0.0.0.0",  
    port: 443,  
    hostname: "ss7-gateway.example.com",  
    enable_tls: true,  
    tls_cert: "/etc/ssl/certs/gateway.crt",  
    tls_key: "/etc/ssl/private/gateway.key"  
  }  
}
```

MAP

MAP Tester API

POST	/api/mt-forwardSM	MT-forwardSM MAP Request (For sending SMS for delivery by remote MSC/SMSC)
POST	/api/deliverPDU	Utility: Build SMS-DELIVER TPDU from originating address + GSM7
POST	/api/forwardSM	forwardSM MAP Request
POST	/api/prn	ProvideRoamingNumber (PRN) MAP Request
POST	/api/send-auth-info	SendAuthenticationInfo MAP Request
POST	/api/sendSM	Utility: Perform SRI-for-SM + MT-forwardSM from MSISDN and GSM7
POST	/api/sri	SendRoutingInfo MAP Request
POST	/api/sri-for-sm	SendRoutingInfoForSM MAP Request
POST	/api/updateLocation	UpdateLocation MAP Request
GET	/metrics	Prometheus metrics
GET	/swagger.json	OpenAPI spec

Schemas	
AuthInfoRequest	>
ErrorResponse	>
ForwardSMRequest	>
PRNRequest	>
SMSDeliverPDURequest	>
SMSDeliverPDUResponse	>
SRIForSMRequest	>
SRIRequest	>
SRIResponse	>
SendSMRequest	>
UpdateLocationRequest	>

1. SM (SRI-for-SM)

HLR SMS MSC HLR SRI-for-SM [HLR SRI-for-SM](#)

API POST /api/sri-for-sm

```
{
  "msisdn": "447712345678",
  "serviceCenter": "447999123456"
}
```

```
{
  "result": {
    "imsi": "234509876543210",
    "locationInfoWithLMSI": {
      "networkNode-Number": "447999551111"
    }
  }
}
```

cURL

```
curl -X POST http://localhost/api/sri-for-sm \
-H 'Content-Type: application/json' \
-d '{
  "msisdn": "447712345678",
  "serviceCenter": "447999123456"
}'
```

2. (SRI)

HLR

API POST /api/sri

```
{
  "msisdn": "447712345678",
  "gsmc": "447999123456"
}
```

```
{
  "result": {
    "imsi": "234509876543210",
    "extendedRoutingInfo": {
      "routingInfo": {
        "roamingNumber": "447999552222"
      }
    }
  }
}
```

3. (PRN)

MSC MSC(RN)

API POST /api/prn

```
{
  "msisdn": "447712345678",
  "gmsc": "447999123456",
  "msc_number": "44799955111",
  "imsi": "234509876543210"
}
```

4.

HLR

API POST /api/send-auth-info

```
{
  "imsi": "234509876543210",
  "vectors": 5
}
```

```
{
  "result": {
    "authenticationSetList": [
      {
        "rand": "0123456789ABCDEF0123456789ABCDEF",
        "xres": "ABCDEF0123456789",
        "ck": "0123456789ABCDEF0123456789ABCDEF",
        "ik": "FEDCBA9876543210FEDCBA9876543210",
        "autn": "0123456789ABCDEF0123456789ABCDEF"
      }
    ]
  }
}
```

5.

HLR UpdateLocation InsertSubscriberData HLR

API POST /api/updateLocation

```
{
  "imsi": "234509876543210",
  "vlr": "44799955111"
}
```

MAP

API

Swagger UI

Swagger UI SS7

Swagger UI

- http://your-server/swagger
- API
-

-
- /api/sri-for-sm
 -
 -
 -
 -

API

- 200 -
- 400 -
- 504 - SS7 10

MAP

- map_requests_total - MAP
 - operation sri_for_sm prn authentication_info
- map_request_errors_total - MAP
 - operation
- map_request_duration_milliseconds - MAP
 - operation
- map_pending_requests - MAP

Prometheus

```
#  SRI-for-SM
increase(map_requests_total{operation="sri_for_sm"}[1h])

# SRI
rate(map_request_duration_milliseconds_sum{operation="sri"}[5m]) /
rate(map_request_duration_milliseconds_count{operation="sri"}[5m])

#  MAP
sum(rate(map_request_errors_total[5m])) by (operation)

#
map_pending_requests
```

MAP

- API 504
- HLR/MSC

- M3UA
 - IEx
 - sys.get_state(:map_client_esp)
- STP
- SCCP
- SCCP

SCCP

- API SCCP
- "SCCP unitdata service"

SCCP

- STP
- (HLR SSN 6)
-

- STP
-
-

◆◆◆

- [— ◆◆◆◆◆](#)
- [◆◆◆◆◆](#) - Web UI◆API◆◆
- [STP ◆◆](#) - ◆◆◆
- [◆◆◆◆◆◆◆](#) - ◆◆◆◆
- [◆◆◆◆◆](#) - ◆◆◆◆

OmniSS7 ◆ Omnitouch ◆◆◆◆◆

- 10.179.3.219:8443
- 10.179.3.219:2905

10.179.3.219

◆◆ SMSc ◆◆

OmniSS7 10.179.3.219:2905 SMSc 10.179.3.219:2905 SMSc 10.179

◆◆◆ SMSc ◆◆

OmniSS7 10 config/runtime.exs 10.179.3.219:2905 SMSc 10.179

1. 10.179 config/runtime.exs
2. 10.179 10.179.3.219:2905 53-204 10.179
 - 10.179 10.179 STP 10.179.3.219:2905 53-95 10.179
 - 10.179 20.179 HLR 10.179.3.219:2905 97-142 10.179
 - 10.179 30.179 SMSc 10.179.3.219:2905 144-204 10.179
3. 10.179 10.179.3.219:2905 10.179.3.219:2905 #10.179
4. 10.179.3.219 SMSc 10.179.3.219:2905 144-204 10.179 #10.179
5. 10.179.3.219:2905 10.179.3.219
6. 10.179 10.179.3.219:2905 iex -S mix

SMSc 10.179.3.219

10.179 SMSc 10.179.3.219:2905

```
config :omniss7,
  # 10.179.3.219 - 10.179 STP + SMSc 10.179
  # 10.179.3.219 map_client_enabled 10.179 true 10.179 SMSc 10.179.3.219:2905
  map_client_enabled: true,
  hlr_mode_enabled: false,
  smsc_mode_enabled: true,

  # OmniMessage 10.179 API 10.179
  smsc_api_base_url: "https://10.179.3.219:8443",
  # SMSc 10.179.3.219
  smsc_name: "ipsmgw",
  # 10.179.3.219:2905 GT 10.179
  smsc_service_center_gt_address: "5551234567",

  # 10.179.3.219:2905 SMS 10.179.3.219:2905
  auto_flush_enabled: true,
  auto_flush_interval: 10_000,
  auto_flush_dest_smsc: "ipsmgw",
  auto_flush_tps: 10,

  # M3UA 10.179.3.219
  # 10.179 ASP 10.179.3.219/10.179 MAP 10.179.3.219
  map_client_m3ua: %{
    mode: "ASP",
    callback: {MapClient, :handle_payload, []},
    process_name: :stp_client_asp,
    # 10.179.3.219 SMSc 10.179.3.219
    local_ip: {10, 179, 4, 12},
    local_port: 2905,
    # 10.179 STP 10.179
    remote_ip: {10, 179, 4, 10},
    remote_port: 2905,
    routing_context: 1
  }
```


HLR

- SMSc map_client_enabled: true
- **OmniMessage** OmniMessage API smsc_api_base_url
- 5 SMS.FrontendRegistry OmniMessage
- **API** OmniMessage API 5
- **MAP** MAP SRI-for-SM MT-ForwardSM 10
- SMS
- STP M3UA / MAP
- Web UI Web Web UI
- **API** REST API Swagger UI API

HTTP API

OmniMessage

OmniSS7 HTTPS REST API OmniMessage

```
config :omniss7,
  # OmniMessage API URL
  smsc_api_base_url: "https://10.5.198.200:8443",
  # SMSc hostname_SMSc
  smsc_name: "omni-smsc01",
  # GT
  smsc_service_center_gt_address: "5551234567"
```

smsc_api_base_url	"https://localhost:8443" OmniMessage API URL		
smsc_name	"{hostname}_SMSc"	SMSC	
smsc_service_center_gt_address	"5551234567"	SRI-for-SM GT MT-ForwardSM SRI-for-SM	

OmniMessage 5 SMS.FrontendRegistry OmniMessage

-
-
-
- SMS

- 5
- smsc_mode_enabled: true

```
{
  "frontend_name": "omni-smsc01",
  "configuration": "{...}",
  "frontend_type": "SS7",
  "hostname": "smsc-server01",
  "uptime_seconds": 12345
}
```

smmc_name "{hostname}_SMSc"

OmniMessage API

OmniSS7 SS7 MAP OmniMessage

-
- (MO)
- (MT)
-
-

/api/			
frontends	POST	{ "frontend_name": "...", "frontend_type": "SMSc", "hostname": "...", "uptime_seconds": ... }	
/api/			
messages_raw	POST	SMS { "source_msisdn": "...", "source_smc": "...", "message_body": "..." }	
/api/messages	GET	: smc: <smc_name>	
/api/			
messages/{id}	PATCH	{ "deliver_time": "...", "dest_smc": "..." }	
/api/			
messages/{id}	PUT	{ "dest_smc": null }	
/api/			
locations	POST	/ { "msisdn": "...", "imsi": "...", "location": "...", "ims_capable": true, "csfb": false, "expires": "...", "user_agent": "...", "ran_location": "...", "imei": "...", "registered": "..." }	
/api/events	POST	{ "message_id": ..., "name": "...", "description": "..." }	
/api/status	GET	-	

API

API JSON

- HTTP 200-201 JSON
- HTTP 4xx/5xx
- ISO 8601 "2025-10-21T12:34:56Z"
- ID

API

1. SMSc.APIClient

API OmniMessage HTTP API

- frontend_register/4 - OmniMessage
- insert_message/3 - SMS Python 3

- insert_location/9 - 00/0000000000
- get_message_queue/2 - 000000000000
- mark_dest_smsc/3 - 000000000000
- add_event/3 - 0000000000
- flush_queue/2 - 00000000SRI-for-SM + MT-forwardSM
- auto_flush/2 - 00000000

2. SMS.FrontendRegistry

000000000000

- 00000000
- 5 0000000
- 000000 smsc_name00000000
- 000000000000000000

3. SMS.Utils

00 SMS 00000000

- generate_tp_scts/0 - 00 TPDU 000 SMS 000

000000

00 SMS 00000000

00 SMS 00000000

00000000

- **SRI-for-SM** 000SMSc 0 HLR 0000 MSISDN00000 SMS 00000000HLR 000
 - 0000 IMSI0000 MSISDN 000000000 - 00 [MSISDN ↔ IMSI](#) 00
 - SMSC GT 000000000000MT-ForwardSM 00000000
 - 000000000000000000 [HLR 0000 SRI-for-SM](#)
- **MT-forwardSM** 00000000000000SMSc 000 SMS 00000000000000 MSC/VLR

SMS TPDU 00

0000000000

SMSc 0000000 HLR 0 **alertServiceCenter** 000000000000000000

00 HLR 0000 alertServiceCenter 0000000000 [HLR 000000000000000000](#)

000 **alertServiceCenter**

00000 HLR 00 UpdateLocation000000000 VLR/MSC000HLR 0000000
alertServiceCenterMAP 000 64000000 SMSc 0000000000000000

00

00000000 HLR 0000

```
config :omniss7,
  # SMSc 000 alertServiceCenter 0000000000000048 000
  hlr_alert_location_expiry_seconds: 172800
```


SS7 GT

SMSc SS7 (MO) source_smsc "SS7_GT_15551234567"

1. SS7 → source_smsc "SS7"
2. →
3. SS7 →

SMSc

SMSc source_smsc

- source_smsc "SS7"
 -
 - "SS7" "SS7"
 - PUT
 -
- -
 - SRI-for-SM MT-ForwardSM

SMSC

source_smsc

SS7 (MO-FSM)	"SS7_GT_15551234567"	-
API/SMPP	"ipsmgw" "api_gateway"	
SMSc	"smsc-node-01"	

```
{
  "message_id": 12345,
  "name": "SS7",
  "description": "SS7 - source_smsc 'SS7_GT_15551234567' 'SS7'"
}
```

- Web UI SS7 (/events)
- API events
-

SS7 SMS

1. 0000 → MSC/VLR → SMSc000 MO-ForwardSM0
2. SMSc 0 GT 15551234567 00 MO-FSM
3. SMSc 00000source_smsc = "SS7_GT_15551234567"
4. 00000000000000
5. SMSc 000 source_smsc 00 "SS7" → 00
6. 00000"000000"
7. 00000000
8. 000 SRI-for-SM 0 MT-ForwardSM000000

000000000000 8 00000000 SS7 0000000000000000

SMSc 00000

SMSc 0000 0000000 GenServer0000000 alertServiceCenter 00000000000000000000

00

0000000

- 00000000000000000000
- **HLR** 00000000000000 alertServiceCenter 0 HLR
- 00000000000000/00000000
- 00000000000000000000000000000000
- **Web UI** 0000000000000000000000000000

00000

000000000000000000

msisdn	00	0000000000000000	00	"15551234567"
imsi		0000 IMSI		"001010123456789"
hlr_gt		00 alertServiceCenter 0	HLR GT	"15551111111"
messages_sent	000	MT-FSM 0000		5
messages_received	000	MO-FSM 0000		2
status		:active 0 :failed		:active
updated_at	00000	Unix 000		1730246400

0000

00

0000 alertServiceCenter 00

- 00000000000000
- 00 status = :active
- 00 HLR GT
- 00000000000000

0 SRI-for-SM 0000

- 00 messages_sent 00
- 00 updated_at 000

0 SRI-for-SM 0000

- 00 status = :failed
- 0000000000000000

#####

- ETS
- Web UI

Web UI - SMSc

/smsc_subscribers 2

SMSc config/runtime.exs SMSc

SMSc

1.

- MSISDNIMSIHLR GT
- /
- /
-
-

2.

-
-
-
- HLR

3.

-
-

SMSc: 3				
MSISDN	IMSI	HLR GT	Msgs S/R	
15551234567	001010123456789	15551111111	5/2	●
15559876543	001010987654321	15551111111	0/0	●
15551112222	001010111222233	15552222222	3/1	○

: 3 | : 2 | : 1 | HLR: 2

API

```
# alertServiceCenter
SMSc.SubscriberTracker.alert_received(msisdn, imsi, hlr_gt)
```

```
#
SMSc.SubscriberTracker.message_sent(msisdn)
SMSc.SubscriberTracker.message_received(msisdn)
```

```
# SRI-for-SM
SMSc.SubscriberTracker.mark_failed(msisdn)

#
SMSc.SubscriberTracker.remove_subscriber(msisdn)

#
SMSc.SubscriberTracker.get_active_subscribers()
SMSc.SubscriberTracker.get_subscriber(msisdn)
SMSc.SubscriberTracker.count_subscribers()
SMSc.SubscriberTracker.clear_all()
```

- **alertServiceCenter** alert_received/3
- **SRI-for-SM** messages_sent
- mark_failed/1
- SRI-for-SM mark_failed/1

SMS

SMS

```
config :omniss7,
  auto_flush_enabled: true,      # /
  auto_flush_interval: 10_000,   # 
  auto_flush_dest_smsc: nil,     # nil = 
  auto_flush_tps: 10            # 
```

1. auto_flush_interval API
2. auto_flush_dest_smsc
3. auto_flush_tps
4.
 - **SRI-for-SM** HLR
 - HLR IMSI MSISDN
 - HLR SMSC GT MT-ForwardSM
 - SRI-for-SM HLR SRI-for-SM
 - **MT-forwardSM** MSC/VLR
 - API /
 - API

SRI-for-SM MSISDN IMSI GT
IMSI HLR SRI-for-SM

SMSc

- smsc_queue_depth - 100000000
- smsc_messages_delivered_total - 1000000000
- smsc_messages_failed_total - 1000000000
- smsc_delivery_duration_milliseconds - 100000000

100000

```
# 1000000
smc_queue_depth

# 1000000000 5 1000
rate(smc_messages_delivered_total[5m]) /
(rate(smc_messages_delivered_total[5m]) + rate(smc_messages_failed_total[5m]))

# 10000000
rate(smc_delivery_duration_milliseconds_sum[5m]) /
rate(smc_delivery_duration_milliseconds_count[5m])
```

100000 SMS

1000000000000000

1000

1. 1000000000000000
2. 1000000000000000
3. 1000000000000000
4. 10 M3UA 1000000000000000
5. 10 TPS 10

1000000000000000

1000000

- TPS 10000
- HLR 10000
- 10000000
- 1000000000

1000000

- 10 auto_flush_tps
- 10 HLR 1000
- 1000000000000000

MT-forwardSM API

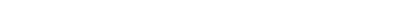
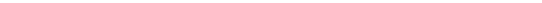
10 API 10 SMS

API 10000POST /api/MT-forwardSM

1000

```
{
  "imsi": "234509876543210",
  "destination_serviceCentre": "447999555111",
  "originating_serviceCenter": "447999123456",
  "smsPDU": "040B917477218345F600001570301857140C0BD4F29C0E9281C4E1F11A"
}
```

```
{
  "result": "success",
  "message_id": "12345"
}
```

OmniMessage  **OmniMessage** 
 OmniMessage 

OmniSS7 **OmniTouch**

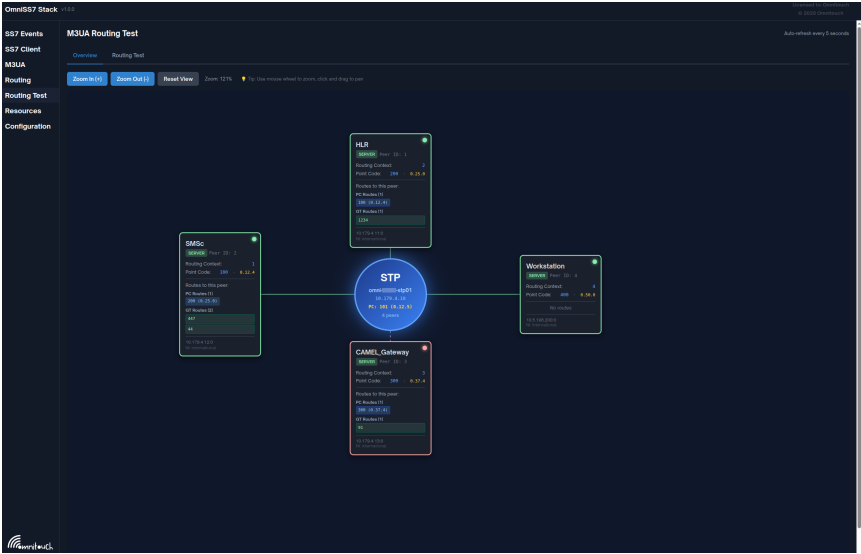
M3UA STP

OmniS57 -> S57 -> IP -> M3UA -> STP

1. S57 STP
2. S57 STP
3. S57 STP
4. S57 STP
5. S57 STP
6. S57 STP
7. S57 STP
8. S57 STP
9. S57 STP
10. S57 STP
11. S57 STP
12. S57 STP

(STP)?

OmniS57 Stack -> S57 -> IP -> M3UA -> STP



STP -> S57 -> S57 Client -> M3UA -> STP

STP

STP

ASP -> S57 -> S57 Client -> M3UA -> STP

SGP

ASP -> S57 -> S57 Client -> M3UA -> STP

AS

ASP -> S57 -> S57 Client -> M3UA -> STP

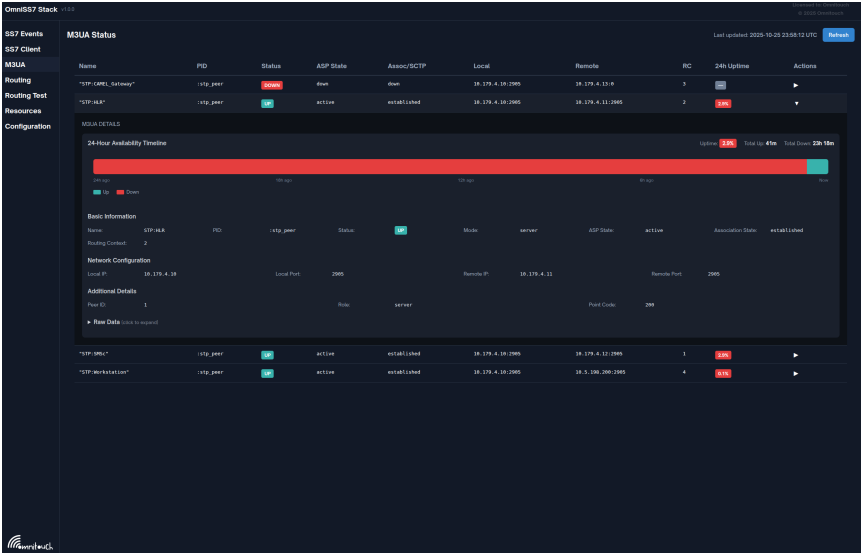
M3UA STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

1. S57 STP
2. S57 STP
3. S57 STP
4. S57 STP
5. S57 STP
6. S57 STP



STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

OmniS57 -> S57 -> S57 Client -> M3UA -> STP

```

◆◆ STP ◆◆
◆◆ map_client enabled: true ◆◆ STP ◆◆ M3UA STP ◆◆

```

```
config:ommiss7,
m3ua_stp: %{
    enabled: true,
    local_ip: {127, 0, 0, 1},      # IP
    local_port: 2905,             # PORT
    point_code: 100               # STP
```

```
STP ☐☐☐☐
enabled ☐☐ ☐☐ ☐☐ ☐☐ STP ☐☐☐☐ true
local_ip ☐☐ {127, 0, 0, 1} ☐☐☐☐☐☐ IP ☐☐ {0, 0, 0, 0}
local_port ☐☐☐☐ 2905 ☐☐☐☐ 2905
point_code ☐☐☐☐ ☐☐ STP ☐☐ SS7 ☐☐ 100
```

```

***** STP
  * ***** M3UA ***** MAP *****
  * **** STP*****
  * ***** STP ***** HLR/MSC ***** SMSC
***** STP ***** map_client_m3ua * m3ua_stp

```

[illegible]

```

1. Runtime.exe @@@@@@@@@@@@@@ config/runtime.exe @@@@@@@@@@@@@@ n3ua_peers@n3ua_routes @ n3ua_gt_routes @
2. Web UI @@@@@@ Web UI @@@@@@ @@@@@@@@@@ Mnexia @
3. @@@@@@@@@@@@@@ runtime.exe @@@@@@ Mnexia @@@@@@@@@@@@@@@@@@
4. @@@@@@@@@@ Web UI @@@@@@@@@@ @@@@@@@@@@@@@@@@@@

```

```
Mnesia 

config:omiss7,
  mnesia storage type: :disc copies #  :ram copies 
```

```

      ****          **          ***          **
:disc_copies ****
:ram_copies  ****          ***          ****

```

```
Mnesia <+++++ Mnesia <++++
  • <Mnesia.(node_name)/++++Mnesia.nonode@nhost/<
  • <mnesia peer<mnesia route<mnesia qt route
```

```

#####
#####
1. Runtime.exe - #####
2. Web UI - ##### Web UI #####
3. REST API - ##### API #####
##### runtime.exe ##### Web UI #####

```

```
◆◆ M3UA ◆◆◆◆
◆◆◆◆ M3UA ◆◆◆◆◆◆ STP◆HLR◆MSC◆SMSC◆◆◆◆◆◆◆◆◆◆ config/runtime.exe◆
```

OneWS7 Slack
< >

SD7 Events

SD7 Client

M3UA

Routing

Routing Test

Resources

Configuration

M3UA Routing Management

[Peers \(6\)](#) [Point Code Routes \(2\)](#) [Gateway Title Routes \(4\)](#)

Add New Peer

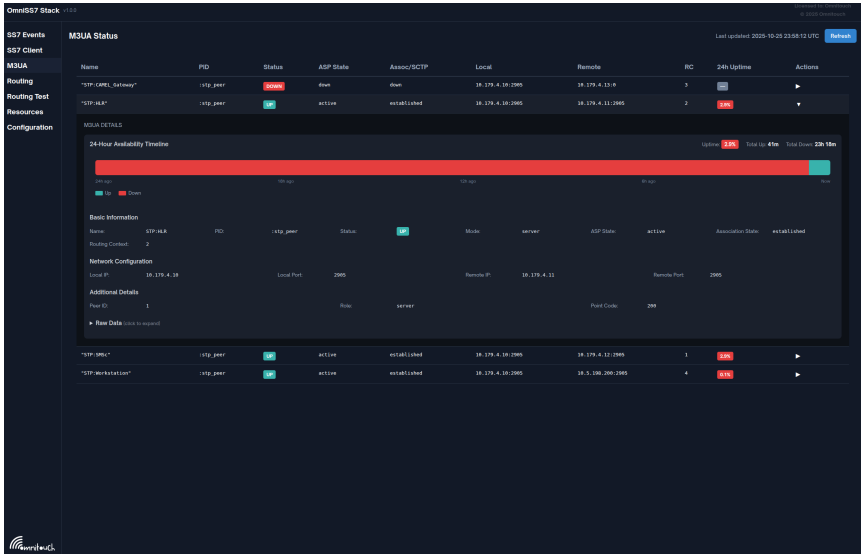
Peer ID *	Peer Name *
Auto generate if empty	e.g., DTG_West
Role	Point Code *
Client (SCP)	e.g., 100
Local IP	Local Port
127.0.0.1	0
Remote IP *	Remote Port *
127.0.0.1	2906
Routing Context	Network Indicator
1	International

Add Peer

ID	Name	Role	Point Code	Remote	Status	Actions
1	HLR	server	200	10.179.4.11-9	active	Edit Delete
4	Workstation	server	400	10.3.190.380-9	active	Edit Delete
3	CAMEL_Gateway	server	300	10.179.4.13-9	down	Edit Delete
2	SMSc	server	100	10.179.4.12-9	active	Edit Delete

[illegible]

```
point_code: 300,
network_indicator: international
},
# ~~~~~~
peer_id: 4,
name: "Dynamic_Client",
role: "server",
remote_ip: [10, 0, 0, 40], # 000 IP
remote_port: 0, # 0 ~ ~~~~~~
routing_contact: 4,
point_code: 400,
network_indicator: international
}
}
```



```
~~~~~
peer_id: 1,
name: "Static_Peer",
role: "server",
remote_ip: [10, 0, 0, 40],
remote_port: 2905,
# ~~~~~~
peer_id: 2,
name: "Flexible_Peer",
role: "server",
remote_ip: [10, 0, 0, 40],
remote_port: 0, # ~~~~~~
# ~~~~~~
}
```

```
~~~~~
# ~~~~~~
peer_id: 1,
name: "Static_Peer",
role: "server",
remote_ip: [10, 0, 0, 40],
remote_port: 2905,
# ~~~~~~
peer_id: 2,
name: "Flexible_Peer",
role: "server",
remote_ip: [10, 0, 0, 40],
remote_port: 0, # ~~~~~~
# ~~~~~~
}
```

~~~~~

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6. 

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◆◆◆◆

GT ♦♦♦♦

```

+ source_ssn nil
+ source_ssn nil

```









# Web UI

[← !\[\]\(61b1a6cbf6f31c7f9b0c23de709c30ca\_img.jpg\)!\[\]\(48418bfc6c4f9bb00fbcee8d3a3fec83\_img.jpg\)!\[\]\(0e2460a1f75d647896a3268051719448\_img.jpg\)!\[\]\(219fa6e1098636053eff32f10a3ff5dc\_img.jpg\)!\[\]\(80001faf27163633673596b854c650c6\_img.jpg\)](#)

 OmniSS7 **Web UI**  Phoenix LiveView 



1. [!\[\]\(600bfc0f5357ab008edb1e61ff03f0f7\_img.jpg\)!\[\]\(a54c534d851f8931f05ab225a657c338\_img.jpg\)](#)
2. [!\[\]\(71d0771be7cb614a498cf0c7f0b4caee\_img.jpg\)!\[\]\(0d65b75604e3e5c8ae07aaf988074b18\_img.jpg\) Web UI](#)
3. [!\[\]\(5411e9d06b1a0c1feb88e5af55decb67\_img.jpg\)!\[\]\(8a4416961b301b756b64ed3625442ac8\_img.jpg\)!\[\]\(7c4410d96ae2b440775ab72f73475541\_img.jpg\)!\[\]\(d1ab4db4351a02495fa75588b1118dc7\_img.jpg\)!\[\]\(7b5ff12f7b9660d3f56520c2e63cfba5\_img.jpg\)](#)
4. [!\[\]\(17743da271bbf108c958bab34c684bf3\_img.jpg\)!\[\]\(5218ac6ac2b35f3643e4aa880574f163\_img.jpg\)!\[\]\(bf67e2ee87536f1069cc76eb2a77bdea\_img.jpg\)!\[\]\(796bc80579ab2fe84fe91a40abb130af\_img.jpg\)!\[\]\(d084e854fa797144e7f65bab3fc70797\_img.jpg\)!\[\]\(ee9942de744681b9bc8ed9413b7ebe1b\_img.jpg\)!\[\]\(6f1e6966e7f95099b29f003e34f68091\_img.jpg\)](#)
5. [!\[\]\(691d32a3f7c7318ef1836f0b288bef49\_img.jpg\)!\[\]\(24370bd887728b61a366d69dde892fd1\_img.jpg\)!\[\]\(7415b78556c6ee543787a4ad0ff6b179\_img.jpg\)!\[\]\(69698f609c0a28c82a539a0e3c3a9b89\_img.jpg\)](#)
6. [!\[\]\(0d20cc4cc088842bb47055c615710218\_img.jpg\)!\[\]\(45f7af1c334ae38060537df22b9a75af\_img.jpg\)!\[\]\(f239209d7ac0757d7a3cccc459ce7998\_img.jpg\)!\[\]\(daf8f1fc20307b24164321f3c6ec30d2\_img.jpg\)!\[\]\(3d85684cac6b5f237dfda46b5cdd7967\_img.jpg\)](#)



OmniSS7 Web UI  **Phoenix LiveView**   
 STP  HLR  SMSc 

## Web UI



- : HTTPS
- : 443  config/runtime.exs 
-  **IP**: 0.0.0.0 
- :  priv/cert/

 **URL**: https://[server-ip]:443

## Web UI



1. **SSL** :  priv/cert/  SSL 
- omnitouch.crt - 
- omnitouch.pem - 

2. 192.168.1.1:22 iex -S mix 192.168.1.1

3. 192.168.1.1:443 HTTPS 192.168.1.1

192.168.1.1

|      | STP | HLR | SMSc |          |
|------|-----|-----|------|----------|
| SS7  |     |     |      | SCCP     |
| SS7  |     |     |      | MAP      |
| M3UA |     |     |      | M3UA     |
|      |     |     |      | M3UA     |
|      |     |     |      |          |
| HLR  |     |     |      | HLR API  |
|      |     |     |      | HLR      |
| SMSc |     |     |      | SMSc API |
| SMSc |     |     |      | SMSc     |
|      |     |     |      |          |
|      |     |     |      |          |

192.168.1.1

192.168.1.1: /routing  
192.168.1.1: STP, SMSc  
192.168.1.1: 5

192.168.1.1 M3UA 192.168.1.1

192.168.1.1

Peers 192.168.1.1

192.168.1.1 M3UA 192.168.1.1 STP HLR MSC SMSC 192.168.1.1

192.168.1.1

```
1 192.168.1.1 192.168.1.1
ID 192.168.1.1 1
192.168.1.1 "STP_West"
192.168.1.1 client, server, stp
192.168.1.1 SS7 192.168.1.1 100
192.168.1.1 IP: 192.168.1.1 10.0.0.10:2905
192.168.1.1 active, aspup, down
192.168.1.1 / 192.168.1.1 -
```







SSN        0000  
142 RANAP  
145 gsmSCF 00000000  
146 SGSN

SSN 00

- 0 SSN: 000000000000 SSN
- 00 SSN: 0000000000000000 SSN
  - 0 = 0000 SSN
  - 0 = 00 SSN 00

00: 0 SSN=60HLR0000000000000000 SSN=70VLR00

---

0000000

00000000 Mnesia 0000000000000000

0000000

1. **Web UI** 00: 0000/00/000000000000 Mnesia
2. 0000000: 00000 Mnesia 0000
3. **Runtime.exs** 00: 00 config/runtime.exs 0000000 Mnesia 000000  
000000

000000

0000000000000000

1. 0000000: 0000000000000000
  2. 000000: 00000000000000001 = 0000000
  3. 00000: 00000 active 000000
- 

000000

00: /subscribers  
00: 0 HLR  
00000: 0 2 0

00000 UpdateLocation 0000000000000000



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|          |                                |                           |
|----------|--------------------------------|---------------------------|
| ◆        | ◆◆                             | ◆◆                        |
| MSISDN   | ◆◆◆◆◆◆◆◆                       | "15551234567"             |
| IMSI     | ◆◆◆ IMSI                       | "001010123456789"         |
| HLR GT   | ◆◆ alertServiceCenter ◆ HLR GT | "15551111111"             |
| ◆◆◆◆◆    | ◆◆◆ MT-FSM ◆◆◆◆                | 5                         |
| ◆◆◆◆◆    | ◆◆◆◆ MO-FSM ◆◆◆◆◆◆             | 2                         |
| ◆◆       | Active ◆ Failed◆◆◆◆◆◆◆◆        | ● Active                  |
| ◆◆◆◆◆◆◆◆ | ◆◆◆◆◆◆◆◆◆                      | "2025-10-30 14:23:45 UTC" |
| ◆◆◆◆     | ◆◆◆◆◆◆◆◆◆◆◆◆                   | "15m 34s"                 |

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- **Active**◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ alertServiceCenter
- **Failed**◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆ SRI-for-SM ◆◆◆◆◆◆◆◆◆◆

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- ◆◆◆◆: ◆◆◆◆◆◆◆◆◆
- ◆◆◆: ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆
- ◆◆◆: ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆
- ◆◆ **HLRs:** ◆◆◆◆◆◆◆◆ HLR ◆◆

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◆◆◆◆◆: ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆

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- ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆
- ◆◆◆◆◆◆◆◆◆◆◆◆◆◆◆
- ◆◆◆◆◆ HLR ◆◆◆◆◆◆◆◆◆◆

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- $\diamond\diamond\diamond\diamond\diamond$ :  $\diamond$  SRI-for-SM  $\diamond\diamond\diamond\diamond\diamond$  MT-FSM  $\diamond\diamond\diamond$
- $\diamond\diamond\diamond\diamond\diamond$ :  $\diamond\diamond\diamond\diamond\diamond\diamond\diamond\diamond\diamond\diamond$  MO-FSM  $\diamond\diamond\diamond$

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Web UI

1.  Ctrl+F / Cmd+F 
2.  GT 

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1.  **1:**  [REST API](#) 
2.  **2:**  `config/runtime.exs` 
3.  **3:**  `Web UI` 

◆◆/◆◆

[illegible]

- `???` Mnesia `??????`
- `? config/runtime.exs` `???`








1. **Mnesia:** `?? Mnesia.{node_name}/ ??`
2. `???:? config/runtime.exs ????`

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**WebSocket** : Phoenix LiveView WebSocket

: WebSocket

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1. **HTTPS** : priv/cert/omnitouch.crt .pem
2. **443**: HTTPS
3. : iex -S mix
4. : SSL

1. **Mnesia** : mnesia\_storage\_type: :disc\_copies
2. **Mnesia** : Mnesia
3. : Mnesia

1. **WebSocket** : WebSocket
  2. :
  3. : F5
- 

- [STP](#) -
  - [HLR](#) -
  - [API](#) - REST API
  - -
- 

OmniSS7 Web UI

-  
- Mnesia  
UI - STP/HLR/SMSc  
-  
-

[API](#)